E1. VIRTUAL LEARNING WORKSHOP
Organised by Sarah Blackford, Yolande Knight and Heather Sears for the SEB Education &
Public Affairs Committee and LTSN Centre for Bioscience

**E1.1 - Understanding student learning and how to influence it: are the traditional and
virtual environments really different?**
J. Markwell, University of Nebraska, USA

This presentation will strip the technology and structures away from science education and
attempt to examine the underlying dynamics that affect learning in both traditional and distance
education. Components to be examined will include some that can be controlled or manipulated
to improve student learning, and others that are beyond your control. The mechanisms of
interaction between student and teacher (Socratic, transmission, constructivist and apprentice)
should fit your personality and be appropriate to the level of student and educational objectives
of the course. What students bring to the interaction (deficit needs, growth needs and level of
cognitive development) may limit their ability to learn. Attitudes teachers bring to the interaction
(McGregor's Theory X and Theory Y) may profoundly impact student motivation. Dynamics that
govern student learning (cognitive ability, metacognition, prior knowledge, motivation, and
tactics) permit the teacher to manipulate and optimize the learning process. Finally, strategic
teaching will be discussed in terms of cycles of assessment, reflection, planning and
implementation. The goal of this presentation is to make instructors more aware of dynamics and
tactics most likely to result in improved student learning. Improved understanding of these
dynamics should improve educational outcomes for students in both traditional and virtual
courses.

E1.2 Using learning technologies to promote active learning in Biology
V.K. Sieber, Centre for Academic and Professional Development, University of North London

Case studies demonstrate how learning technologies (LT), used as tools, become part of a rich
learning experience for undergraduate biologists.
Using the Internet to teach evaluation skills
First year students frequently have limited evaluation skills which will must be developed to
further their studies. Structured Internet assignments, where students find and evaluate a small
number of sites on a topic of general interest e.g. genetic modification/ genetically determined
diseases, provide the opportunity to teach Internet searching, summarising and evaluative skills
in a context that students generally find familiar and friendly.
Producing multimedia teaching materials
As an alternative to traditional final year laboratory projects, students produce multimedia
teaching materials. These projects have a clear structure involving a range of skills. Once the
topic is agreed, the student evaluates available multimedia resources, authoring tools and chooses
a tool (Dreamweaver, Flash). Library and Internet research provide the subject content of the
project. Navigation, appearance and screen content are specified and the programme constructed
and, possibly, peer-evaluated. Assessment includes a summary of these processes and the final
programme.
Students enjoy these projects and gain evaluative, communication, and programming skills along
with a product they can show potential employers. As students are using LT as tools and
interacting closely with the subject content they develop the higher order cognitive skills

expected of a final year project. Advantages to the department are that these projects are cheap and the programmes may be for future

E1.3 The use of webCT in distance learning delivery of postgraduate biomedicine
P. Hollands, Anglia University

We are currently using webCT to deliver our highly successful MSc in biomedical science by distance learning. The students in all three years have their own web page where they can communicate with staff privately or in a forum. There are also student chat rooms which are used for general chat as well as formal student meetings, e.g. student representative meetings. We are currently looking at the possibility of developing on line asessment. The presentation will cover these items and describe our experience with webCT.

E1.4 Online learning needs online assessment, but is it good for students?
C. Ricketts, University of Plymouth

In a world where online learning is increasing, it is important to match the mode of assessment with the mode of learning. Also, one of the benefits claimed for computer-based assessment is that it can improve student performance in summative assessments if used previously in an appropriate formative way. During the introduction of computer-based assessment in a first-year module on numeracy and statistics in Biology, on-line assessment was used to replace OMR-marked multiple-choice tests.
Analysis of student results after the first year (Ricketts & Wilks, 2001) showed that students using on-line assessment did not perform as well as those using OMR-marked multiple-choice questions. The difference in performance could not be attributed to a weaker student cohort. Nevertheless, on-line assessment was reasonably popular with the students. More detailed analysis of the students feedback suggested that the interface was not as user-friendly as it could be, which might have affected the students' performance.
In the second year we adjusted the interface to present one question at a time. Student performance improved dramatically, and the acceptability also increased. Our results suggest that a naive introduction of online assessment may disadvantage students, unless care is taken with the student-assessment interface. It is important to monitor both performance and acceptability of students under new assessment regimes.

E1.5 Computer based assessment in biological sciences - it doesn't have to be as simple as ABC
D.O'Hare and D. Mackenzie, University of Derby

Over recent years there has been a great push to increase the amount of both formative and summative assessment in HE delivered by computer (Stephens & Mascia, 1997). This can be seen to have two advantages, in that there can be potential savings of staff time in assessing large student cohorts, and in addition students find great value in the immediate feedback that can be offered by computer based assessment.
However, there has long been a concern that the simple types of questions currently on offer via computer based assessments were too limited, in the main computer based assessment meant multiple choice assessment. For many academics this was not acceptable, multiple choice whilst

being acceptable elsewhere (particularly in the US) has long been mistrusted as a measurement tool where the problems of recognition (Johnstone & Ambusaidi, 2000) and guessing have led many to question the value of multiple choice items (Cox, 1976).

The TRIADs assessment system developed at Derby (Mackenzie, 1999) is one of the few computer based assessment systems that can offer the ability to assess higher order skills. The system has a range of question styles - currently over 30 and with the possibility of linking these items together the tutor has the potential to form complex interactions which can simulate real situations and dissect the students thinking. We aim to demonstrate the rich learning environment that the range of interactions offered by the

TRIADs system can produce and in addition illustrate how the system can be utilised to test higher order skills.

Cox, K.R (1976) How did you guess? Or what do multiple choice questions measure ? Med J Aus 1 884-886

Johnstone, A & Ambusaidi, A. (2000) Fixed response: What are we testing ? Chemistry Education: Research and Practice in Europe 1 323-328

Mackenzie, D.M. (1999) Recent developments in the tripartite interactive assessment delivery system (TRIADS). Proceedings of the 3rd Annual CAA Conference
http://www.lboro.ac.uk/service/fli/flicaa/conf99/pdf/contents.pdf

Stephens D & Mascia, J (1997) Results of a survey into the use of CAA in HE in the UK January 1997

E1.6 Virtual learning and formative assessment with WebOL

R. Harper, University of Luton

A role for virtual learning and for computer-based formative assessment in support of learning is well established. There are various software packages that enable the construction of computer-based assessments and many of these enable delivery through the World Wide Web. However, many of these packages have disadvantages such as (i) being restricted to use solely through the World Wide Web, (ii) being restricted to solely producing assessments, (iii) having a restricted range of question styles, (iv) being difficult to install, particularly for inexperienced users and (v) being difficult to use. WebOL Lite attempts to provide a package that addresses these issues (http://bio.ltsn.ac.uk/tdf/webollite.htm). It is easy and quick to use through completion of fill-in forms for a wide range of question styles. In addition to questions, simple web pages can be constructed with the built-in web editor. Formatting enhancements are available and additional materials such as video, animations, etc. can be included. WebOL can produce virtual learning environments of three main types - lecture style courseware, tutorials and assessments. However, there is no restriction on mixing the types of projects. The information that is displayed to the user is easily customised when designing a project. The projects can be delivered on any PC with a modern browser and can be delivered through a variety of media such as the World Wide Web, LANs, CD-ROMs and floppy discs. The system makes it easy to reuse questions and web pages to produce interrelated virtual learning projects.

E1.7 Lifesign Project - networked moving images for the life sciences

A.J. Dalgleish, Library Services Manager, University of Glamorgan; J. M. Mahoney, Learning Development Centre, University of Portsmouth

New technological developments allow for delivery of video almost instantly via the Internet, known as video streaming. This allows the flexibility to incorporate video streams into lecture theatres, PowerPoint presentations and online learning resources such as Web-CT and Blackboard. Students can access video-streamed resources at anytime.

The Lifesign project provides a resource of on-line videos in the Life Sciences, which are aimed at undergraduates. The project promotes the use of the programmes and is working with lecturers to evaluate the learning outcomes.

Whether the changing teaching environment is brought about by the perceived needs and demands of students or is in itself an evolutionary development of the tools available to teachers and learners, big changes are taking place. It is of paramount importance that any change benefits the student.

The project partnership comprises four universities, each administering their own specialist areas. The University of Glamorgan is responsible for managing the project and also for matters concerning cataloguing and metadata. The University of Portsmouth is responsible for content acquisition, new production and computer servers. The University of Southampton and the University of Wales Institute Cardiff are responsible for dealing with the pedagogical evaluation. Talis Information Limited provide consultancy for software development to integrate resource access into other learning environments.

A number of important issues have already been highlighted by the project and evaluation of the use of video streaming by carrying out case studies is continuing.

E1.8 WWW.BIOLOGY4ALL.COM
P.K. Robinson, University of Central Lancashire

The recent comment from the Education Secretary Estelle Morris that university academics should participate in "*day-in day-out cooperation with the staff of schools and colleges*" presents a real challenge to the UK HE community. The Biology4all project may assist biologists in meeting this challenge through the use of email and web based communications. The project, has as its foundations two email discussion lists run by the University of Central Lancashire; one (BIOTUTOR-L) for biology schoolteachers and one (SCITECH-L) for school science technicians. Each list has approximately 400 subscribers. These email forums are both unmoderated but are private in nature enabling the discussion of some sensitive issues such as examination performances and difficulties in the delivery of syllabus material. Through the active participation of university academics in these forums much useful information can cross the school-university divide, not only helping schoolteachers, but also aiding university staff in for example designing suitable first year undergraduate courses.

The Biology4all project also features a website (http://www.biology4all.com) where teachers can deposit and share learning materials, together with information about university bioscience departments across the UK, and jobs in biology. This website is soon to house the UKLSC talks database – a searchable database of academics willing to visit their local schools to give talks on their subject specialisms within the biosciences. It is envisaged that this project will contribute to the UKLSC's activities in Science Year and fall under the umbrella of the DfEE/DTI Science Ambassadors Scheme.

E1.9 What can LTSN Bioscience do for you?
LTSN Centre for Bioscience

The Learning and Teaching Support Network (LTSN) is a programme established within the context of the increased prominence given to learning and teaching in both HE and FE institutions. The LTSN Centre for Bioscience has been up and running for just over 18 months and is involved in a number of projects which may be of interest to you, such as the Imagebank and the Compendium of Good Practice and Innovation in Bioscience Practical Classes. Members of the LTSN Centre for Bioscience will introduce the objectives of these projects, discuss how members of the audience can become involved, and underline the further services that are available to the bioscience academic community.
The LTSN Centre for Bioscience can be contacted on tel.: 0113 233 3001, fax.: 0113 233 3167, email: ltsnbioscience@bmb.leeds.ac.uk and on the web at http://bio.ltsn.ac.uk/

E1.10 e-Tutoring - setting up a course in a virtual learning environment
A.G. Booth, University of Leeds

This session, limited to 24 participants, will provide hands-on experience in setting up, managing and tutoring a class in a virtual learning environment. Using the Bodington System, developed at the University of Leeds, participants will create online courses,
assessments and feedback questionnaires. They will set up access for groups of students and explore how the learning of online, probably remote students can be supported in this environment.
Participants must be familiar with the WWW and using a browser such as
Netscape or Internet Explorer.

E1.11 e-Learning and Legislation

Lawrie Phipps, TechDis

From September 2002 all higher and further education institutions are obliged under the Disability Discrimination Act 1995 and the Special Educational Needs and Disability Act 2001 to ensure access to education regardless of a persons disability. Additionally, new European Commission mandates will also come into force over the next five years that will affect how those with disabilities access the 'e-society'. These initiatives will impact greatly on all staff involved in education.
For those staff involved in the development, deployment or use of electronic materials for learning and teaching it is essential that they understand how the legislative measures may impact on their practices. The session will cover issues of good practice in design and alert delegates to some of the issues that they may not have considered when supporting their teaching with e-learning. The session will demonstrate case studies showing how material can be made accessible and how, by following good practice guidelines, e-resources can more easily shared and deployed to a wider range of learners.Additionally, a code of practice accompanies the UK legislation giving examples for the various legislative elements. The session will explore some of the terminology used in the legislation, particularly the phrases 'less favourable treatment' and 'reasonable adjustment', and how they may apply to e-learning.

General Education and Public Affairs Posters

E1.12 Broken links: The ephemeral nature of educational WWW hyperlinks.
J. Markwell and D.W. Brooks
Department of Biochemistry, and Center for Curriculum and Instruction, University of Nebraska-Lincoln, USA

The use of distributed (Internet) resources to enhance both traditional and distance education has caused much excitement in the science education community. However, one of the difficulties with relying on such freely available distributed resources has been the lack of certainty that the resources will be available for students next month, next semester or next year. We have recently been involved in the development of three graduate-level biochemistry courses designed for high school teachers. These courses may be viewed at the following URLs
Biomolecules: http://dwb.unl.edu/Teacher/NSF/C10/C10.html
Metabolism: http://dwb.unl.edu/Teacher/NSF/C11/C11.html
Molecular Biology: http://dwb.unl.edu/Teacher/NSF/C08/C08.html
Development of these courses relied heavily upon distributed science education resources. As a consequence, they represented a set of authentic science education resources that could be monitored over time to determine their rate of extinction. In total, the three courses contained 515 non-redundant URLs. These have been monitored on a monthly basis since the completion of the courses (August 2000). During first thirteen months, 16.5% of the URLs ceased to function. The most attrition was seen in URLs with the 'edu', 'com' and 'org' domain names, in which approximately 18%, 16% and 12% had already become inaccessible.The poster presentation will analyze these data in more detail.

E1.13 Replacing Lectures By Text-Based Flexible Learning: A decade of evaluation.
J.A. Green, Napier University

The effectiveness of text-based flexible learning in replacing formal lectures has been evaluated by several means over a period of a decade, and the results are presented here.
Results Of Formal Assessments
The grades (mean marks) and failure rates in exams (closely scrutinised as part of the University's QA procedures), were not significantly different in a given module before and after the introduction of flexible learning. Currently results from modules taught by flexible learning compare favourably with other modules taught by conventional methods.
Comments From Students And Examiners
Comments from students and external examiners on the use of flexible learning have been/are overwhelmingly positive and supportive.
Feedback From Students By Questionnaire
Responses to a questionnaire, given by students after results of examinations were known, show that; a majority students were enthusiastic about this approach to learning; a majority of students considered that this approach made learning more interesting and easier; a majority of students considered that this approach led to them performing better in assessments.
Students' Choice Of Questions In Examinations

The choice of questions answered by students in examinations where the syllabus has been covered partly by flexible learning and partly by lectures, and free choice of questions to be answered has been allowed, has been scrutinised. Results demonstrate that students showed a significant preference in examinations for questions on topics taught by flexible learning.
These findings support the use of flexible learning for full time students, and advantages to the lecturer will be outlined. Disadvantages of this approach that have become apparent will also be outlined.

E1.14 Data analysis and statistics for first year biology undergraduates.
J. Cresswell, University of Exeter

The poster publicises a future initiative to find out common areas in the teaching of experimental design and statistics in university biology departments and to develop portable support materials for teachers and students.
At Exeter, training in fundamental scientific skills, such as the design, conduct and statistical analysis of experiments is delivered to first year undergraduates in BIO1304 *Biological Investigations*, which is designed to promote independent, team-based learning. The course is sponsored by the SEB and helps to raise student awareness of the scientific community. The course involves students in conducting an experiment and then producing a scientific paper with a professional standard of presentation that could be submitted to *J. Exp. Bot.* The structure of this course is described, and data over five years is used to analyse changes in the knowledge of incoming students and their subsequent attainments.

E1.15 Its hard not to re-invent the wheel: a differentiated approach to developing ICT skills at level 1
J. Wilson, E. C. Smith, R. Reed and H. T. Hooper, University of Northumbria at Newcastle.

Students currently attend scheduled ICT sessions covering skills such as the use of email, the internet and popular software packages such as MS excel, Word *etc*. ICT classes are mixed ability, ranging from students who have difficulty manipulating a mouse to advanced users of MS software. We identified key categories of competence which students should be able to demonstrate at the end of their first year at University. Partially differentiated material that spanned the range of student abilities was produced for a number of stand-alone projects, covering the key categories identified. *ie* at an introductory level these involved activities to facilitate acquisition of basic skills, through to advanced level which engaged students in more challenging use of ICT and encouraged exploration of wider ICT resources. Material was offered via the e-learning platform Blackboard, with scheduled ICT sessions to maintain tutor contact. Emphasis was placed on application of ICT to solve real, subject-based, problems and improvement of ICT skills through self-assessed activities (it was important that the assessment burden of staff involved did not increase). Formation of interactive and self-supporting "electronic peer groups", based on existing ICT ability, was encouraged. Use of material was monitored through Blackboard and both informal and formal, questionnaire based, student feedback was gathered. General feedback was positive, but use of differentiated material was not uniform. Introductory level users (self classified) accessed and used the material provided regularly, but the material failed to engage advanced level users and further development of this material needs to be undertaken.

E1.16 Progress and Pitfalls in the Skills Development
P.J. Lumsden and M.A. Shaw, University of Central Lancashire

Skills…….!! In HEIs we recognise that skills development is inherently a 'good thing' for students, but it has taken a long time for institutions to embrace the philosophy. This poster shows activities within the University of Central Lancashire, and their outcomes, viewed in three phases.
1. Prior to Dearing (1997), some lone projects were carried out by Skills 'disciples';
these generated some resources, but these remained isolated with individuals or Departments.
2. Post-Dearing. DfEE funding supported projects on *Learning from Work* and *Key Skills*. These had greater institutional involvement, involving representatives from faculties (LfW) and whole Departments (KS). There was a significant raising of awareness of the Skills agenda, and resources available across the Institution were generated (e.g. modules in Learning from Work; Planning your Career).
3. Establishment of a *Learning and Teaching strategy* (2000). This has seen the Skills agenda move centre stage; it is now driven by *strategies* rather than being simply *policy* based (e.g. recognition of staff through promotions).
Significant progress has been made, and drivers such as *Employability, QAA*, and *subject benchmarks* should encourage further progress. The main pitfalls to progress are that many academic staff do not take a wide view of their own Personal Development Planning, and are often reluctant to engage with the Skills agenda.
A lap-top display presents a case-study of how skills development has progressed in the Department of Biological Sciences.

E1.17 Virtually Biologists: Teaching Web Skills to Biology Students
R. Ladle, Napier University

With the increasing reliance of students on web resources, many of uncertain pedigree, it is vitally important that undergraduates are fully aware of the potential limitations of the information they are bombarded with. Furthermore, it is also important that students are able to communicate effectively and in context within this borderless virtual world. Here, I present two general examples of skills based indicative assessments that have been successfully integrated into several biological degree programs. The first assessment requires students to find and critically appraise the level, breadth and depth of biological information available while the second requires them to design a web site that communicates biological information within an appropriate context. The results of student feedback on these assignments are described and discussed.

E1.18 Virtual Practical in biological sciences: development and implementation
A.S. Bowman, C.J. Calder and P.G. Marston, University of Aberdeen

Though the traditional "wet" practical familiarises students with the practicalities of experimentation, the constraints of available equipment, time and increasing student numbers often results in the generation of a very limited, and often poor, data set. To mitigate this problem, we developed a self-contained Online Virtual Laboratory shell. The shell consisted of tutorial materials and interactive multimedia experiments emulating a real laboratory, including

interactive animations and video clips. Each student was able to generate a unique and rich dataset, which included replicates and multiple variables allowing a range of statistical analyses. The first sets of experiments to use the new environment, investigated the effects of sub-lethal copper toxicity on *Gammarus duebeni*, by examining: 1) respiration using an oxygen electrode; 2) pleopod beat rates; 3) swimming endurance, and 4) comparing against a sample population from a contaminated stream. While the Virtual Laboratory was timetabled for half the usual allocated laboratory time (normally a day), the students were able to complete a greater number of experiments and their write-ups showed a greater understanding of the phenomenon due to the multi-faceted experimental approach. Grades were comparable with the other "wet" practicals of the course. Overall, a VP was developed that is engaging enough to be of interest to the student, allows a series of experiments to be "performed" that time and equipment would normally prevent and provides a rich and accurate dataset for a practical write-up. The Virtual Laboratory will be demonstrated at the meeting. The OVL will be demonstrated at the meeting.

E1.19 Training Opportunities with PSI
M.A. Bacon and D. Oliver, Lancaster University

Plant Sciences of Industry (PSI) is a new initiative at Lancaster University which has developed in recognition of the need of agricultural, horticultural and environmental sectors of plant based industry for high-quality, focused research and training opportunities.
A series of intensive training modules has been launched which address the key areas of contemporary plant science: *The PSI 100 series*. These modules are designed to provide industry with an affordable and efficient way in which to access up-to-date training in research techniques via intensive short courses. As well as providing opportunities for industry, the PSI training initiative will also offer those within higher education at either masters of research degree level, the opportunity to quickly develop an understanding and ability in a wide variety of current techniques in the plant sciences.

E1.20. LTSN Bioscience ImageBank - a feasibility study
A. Levesley, LTSN Bioscience, University of Leeds

The LTSN Bioscience ImageBank feasibility study which is co-funded by LTSN (Learning and Teaching Support Network) and JISC (Joint Information Systems Committee) / DNER (Distributed National Electronic Resource), aims to identify the real needs of the bioscience educational community with respect to image use and availability. The project also aims to run a pilot ImageBank. It is expected that the information gathered in the feasibility study will lead to the development of a full ImageBank, which will consist of freely available images contributed by academics, publishers, pharmaceutical companies and research organisations, rights cleared for educational purposes, accessible through the LTSN for Biosciences web site.

E1.21 Compendium of good practice and innovation in bioscience practical classes
J.M. Wilson, LTSN Centre for Bioscience

The Learning and Teaching Support Network (LTSN) Centre for Bioscience has a new project aimed at compiling a new resource: 'A Compendium of Good Practice and Innovation for Bioscience Practical Classes'. The aims and objectives of the project will be outlined, project

progress and future plans will be presented, and details of how people may get involved will be given.

E1.22 The SEB and research animals
P. Hawkins, Research Animals Department, RSPCA

The ethical and scientific benefits associated with proactively implementing the Three Rs of replacement, reduction and refinement are increasingly recognised. Aside from improving the lives of experimental animals and reducing the conflict between animals and science, better standards of welfare have frequently been found to improve the quality of scientific results.
A survey was conducted of the policies, position statements, guidelines on animal use and welfare initiatives that have been set up by a range of UK funding bodies, medical research charities and learned societies. Data were obtained from individual organisation's websites and also by contacting each body directly. Results are presented on (i) the nature of policies and position statements on animal use; (ii) the method by which these were established; (iii) the depth and scope of refinement guidelines; (iv) the nature and outcomes of initiatives to further the Three Rs.
The discussion will assess the welfare impact in practice of different approaches to animal use and the Three Rs, with reference to their implications for the Society for Experimental Biology.

E1.23 Development of Presentations to Facilitate Visualisation of Biomolecules by Students with Limited Background in Chemistry
A.M. Caswell, Leeds Metropolitan University

Many students find biochemistry conceptually difficult, because most of the entities involved can not be "seen". This is compounded for students with a weak background in chemistry, because of unfamiliarity with standard chemical projections. The aim of this project was to produce materials to help level 1 bioscience students studying a basic biochemistry module to visualise biomolecules. Rasmol software was used to generate molecular images in an appropriate orientation and format. Images were then exported into Powerpoint files for presentation. Two versions of each presentation were developed. The first comprised solely the images and was used in class, while the second additionally contained supporting text and was disseminated via our Intranet. Presentations were piloted, and student feedback was sought through the module evaluation questionnaire.

Six presentations were produced covering small versus large molecules, amino acids, protein structure, carbohydrates and lipids, glycolysis, and the TCA cycle. Module evaluation data indicated that 63% of the students had found the presentations helpful during the lectures, and approximately 40% had accessed the Web-based versions. This latter figure was surprisingly high given that there were access problems when the module was running. The only specific comments related to problems with access and a perceived need for more explanation. Overall, the presentations have provided additional support for students studying a basic biochemistry

module, and appear to be enhancing the student learning experience. During this academic year, the presentations have been refined and further analysis of student performance indicators and student feedback is being carried out.

E1.24 *Journal of Biological Education*
Natalie Partridge, Institute of Biology

Both biology and educational research are rapidly developing fields. The *Journal of Biological Education*, the journal for applied educational research, brings you the latest developments in both these fields – accompanied by straightforward practical applications and accessible reviews. *JBE* also includes educational theory, pedagogical research, news items and reviews of educational media. The research is not diluted and articles are explained so that results can be easily understood and applied.

JBE is the major support produced by the Institute of Biology for biology educators and is particularly aimed at teachers in upper secondary and tertiary education and those in teacher education. Four issues are produced per year and each issue covers a wide range of subjects, so that there is something of interest for every reader.

If you would like more information about *JBE* and the Institute of Biology, including details for submitting your educational research for publication, please visit Natalie Partridge at our stand or go to our website at www.iob.org.