
Reviews

edited by Philip Barker

Technology-based Learning Environments: Psychological and Educational Foundations edited by S. Vosniadou, E. De Corte and H. Mandl, volume 137 in NATO ASI Series F (Computer and Systems Sciences), Berlin, Springer-Verlag, ISBN: 0-387-58253-3, 1994.

This publication is one of a collection of texts that has been produced within the NATO ASI F series – books published as a result of the activities of the special programme on advanced educational technology. Currently, the list of books in this series totals over 35. The present volume contains 37 papers that were contributed to the Advanced Study Institute (ASI) on Educational Technology held in Crete in the summer of 1992. The purpose of the Institute was to bring together lecturers and graduate students in order to investigate and discuss the psychological and educational foundations of technology-based learning environments, and to debate the implications of recent research findings in the area of cognitive science for the development of educational technology.

The papers that make up these proceedings are organized into four basic sections, each devoted to a particular theme.

Part 1 contains 10 contributions dealing with design principles for learning environments. A range of relevant issues is discussed, some of the more important of which are: theoretically-based visions of educational environments; active and constructive learning; exploratory learning environments; simulations; socio-cultural issues; the use of intelligent co-operative systems; role play; experimentation; and assessing the effects of a learning environment.

The ten papers that make up the second part of the book deal with the use of educational technology to promote conceptual change in the physical sciences. Some of the interesting topics discussed in this section include multimedia environments for enhancing science instruction; generative problem-solving in school science; use of hypermedia; model-based reasoning; promoting the study of conceptual change; diagnosis and remediation; software tools integration, environmental education; and the development of subject-oriented learning environments for teaching basic electricity, the human nervous system and physics.

The third part contains eight papers. These explore, describe and discuss various aspects of technology-based learning environments devoted to knowledge acquisition in mathematics and natural language. The first five papers deal with topics related to the study of mathematics, namely the use of multimedia environments for enhancing student learning in mathematics; task analysis and didactic tools to support mathematics tutoring; 'unintelligent' tutoring in algebra based on psychological theories and experimentation; the use of intermediate models for solving word problems involving the development of arithmetic skills; and the use of computer programming as a mechanism to support the development of open-ended project work. The remaining three papers deal with specific issues in language learning, covering the use of computer-based methods to develop reading and writing skills; computer facilitation of skilled narrative writing processes; and the development of a 'flow-driven' English (as a foreign language) course.

The final part of the book – containing the remaining nine papers – is devoted to the theme: 'Taking into consideration the needs of the learner'. The important issues covered here include the use of knowledge profiles in a flexible learning environment; the use of student models; semantic networks; representational systems in mathematics and science; the use of graphics in the computer-aided learning of chemistry; an investigation into motivation and co-operation in computer-assisted learning; and various issues relating to the use of hypertext. The three papers on hypertext discuss the effects of visible-link types on learning, knowledge construction and acquisition in customized hypermedia environments, and the relationship between hypertext learning environments and epistemic beliefs.

I found the contents of this book extremely interesting from both the point of view of topics and that of treatment. Obviously, the wide range of writing styles encountered in a multi-author book of this type means that continuity and content often fluctuate from one chapter to another. However, the editors have done a masterly job in selecting and grouping papers, and in ensuring that a reasonably consistent style has been maintained.

The book is expensive (£47.00 Sterling), so I have to recommend it for a departmental library rather than for individual purchase, but I do so recommend it.

Philip Barker, University of Teesside

Aspects of Educational and Training Technology, volume XXVIII: Computer-assisted and Open Access Education edited by F. Percival, R. Land and D. Edgar-Nevill, London, Kogan Page, ISBN: 0-7494-1414-6, 1995.

This is a selection of the proceedings of the 1994 International Conference of the Association for Educational and Training Technology (on computer-assisted and open-access education) hosted by Napier University in Edinburgh. Around 85 papers were presented at the conference; 44 have been reproduced in full in this volume, with the inclusion of abstracts from the rest. Reflecting the organization of the conference, the papers have been divided into four sections: Perspectives on Teaching and Learning; Computer-Assisted Learning (CAL) and Computer-based Training (CBT); Multimedia and Hypermedia; and Open and Distance Learning. Discussions of political

issues, underlying concepts, and project reports appear in each section.

Clearly, then, the conference attempted to cover a lot of ground, and quite successfully on the evidence of these proceedings. As a result, the book works effectively on two levels: as a useful update for experts, and as an informative introduction for newcomers to any of the subject areas described above. However, as the editors readily acknowledge, there is considerable overlap between these areas, leading to the somewhat arbitrary placement of some papers.

The use of computer-based technology in the classroom still continues to excite healthy debate, as evidenced by some of the arguments advanced in the first section. There are some who predict a radical shift towards technology-based solutions in the near future; others take a more cautious approach. Separating those contributors actually using the technology in teaching/learning situations from the politicians might assist the reader in evaluating the arguments. It was also heartening to see the work of Price, Hobbs and Cheah in which the use of standard software-development control and quality assurance procedures are applied to courseware development. All too often where courseware development is concerned, software design is confused with interface design, often leading to predictably unfortunate consequences.

Sections 2 and 3 will be particularly useful to those involved directly in the production of CAL/CBT packages. Many of the papers here describe applications of some of the better-known authoring tools, such as ToolBook and Guide, and the inclusion of a large number of screenshots gives the reader a real feel for what is taking place. Jacquetta Megarry's paper on design challenges is particularly refreshing, questioning the indiscriminate use of resource-hungry video in desktop packages. Section 4 is again largely project-based. The final section, containing the abstracts, may certainly prove useful, as readers may obtain full papers from the authors, though (given this) the inclusion of full addresses here would obviously have been helpful. The selection criteria used to determine whether a paper was included in full or in abstract form are not included.

The volume has been produced to a very high standard. The hardback format combined with good quality print and paper give substance to a

book which would be a very useful purchase on the basis of content alone.

Lorraine Warren, University of Humberside

Groupwork in Education and Training: Ideas in Practice by Michael Reynolds, London, Kogan Page, ISBN: 0-7494-1027-2, 1994.

The intended audience for this book is broad. It is aimed at practitioners involved in education and training who use, or want to use, group-work methods, and anyone interested in the social, psychological or educational processes associated with group work. The author states the overall purpose of the book as being 'to make sense of the complex array of ideas, methods and issues' associated with designing and using group activities, and 'making sense of the consequences of using them'.

My overall verdict is positive. I enjoyed reading the book, and on several occasions it challenged my assumptions about the way I work with groups. The one downside lies in the fact that the subject area is vast, and to do justice to all aspects of it would need substantially more than the 138 pages of this book. To be fair to the author, however, he acknowledges that he has gone for breadth rather than depth, and he gives excellent references for following up particular points of interest. As an overview of the subject, then, it offers a well constructed, easy-to-read account of many of the key issues.

Chapter 1 addresses the question of why someone might want to use group methods in the educational process. It offers a description of the different types of group methodologies (for example, simulations, discussions, and action learning) and how they differ. The author concludes that the key reason why group work is so valuable is that it enables learning to be 'grounded in the personal and social experience' of the learner, and that it places the responsibility and (to different degrees) control of the learning in his or her hands.

Chapter 2 focuses on the design of group work and looks at what factors actually contribute to the learning outcomes of a group session. The author's key point is that while the design is important, the outcomes can be influenced by a great many things, such as participant expectations, the group's history or the social context – good comfort for those of us who agonize over 'failed' designs!

Chapter 3 gives an excellent overview of some of the theories that underpin group work. The author emphasizes how important it is for trainers and teachers to be aware of the assumptions, values and beliefs that inform their approach (theories are seldom value-free), and adds that no single school of thought is the 'unarguable truth'. He summarizes a few of the models in current use which can act as a good starting point for observing the behaviour of groups, and sets out some complex ideas simply, though I found that his description of how to apply these models in practice was less clear.

Chapters 4, 5 and 6 offer examples from practice which are intended to illustrate some of the issues associated with learning groups which tend to be neglected. These chapters make a number of key points which made me think. The first is that whatever the intended focus of an activity, the actual experience of it will be broader, as participants relate it to their own individual experience/circumstance. The second point is that it is easy to assume that there are neat boundaries that can be drawn around particular group activities. However, that so many such activities have unintended consequences points to the fact that they are often not as 'bounded' as one might imagine. The final point, is that the design of a group session inevitably transmits to participants certain social values (for example, about who is in control, what is/is not open to influence). I found these chapters very thought-provoking.

Chapter 7 looks at some of the newest approaches to group work, and takes the form of a series of 'interviews' between the author and practitioners who are using these methods. I found the descriptions a little too cursory to be very useful, but they act well as an introduction to the subject areas.

This very well-written book is, therefore, a good introduction to the area of group work, and although a little superficial in places, it raises some important issues.

*Marion Gillie Partner, Sheppard Moscow Ltd
Management Consultants (Tel: 0181 468 7975)*

Teaching and Learning with Audio in Open and Distance Learning by Derek Rowntree, London, Kogan Page (Open and Distance Learning Series), ISBN: 0-7494-1154-6, 1994.

This publication is an audio-print package intended for teachers and trainers. It consists of

a book of 124 pages together with an audio cassette, presented together in a durable book-size container. The audio cassette contains examples of audio teaching which are referred to in the book. Side A contains fifteen short clips as illustrative material; Side B contains two more extensive examples.

As might be expected from an author with Derek Rowntree's background and experience, both the book and the audio tape are introduced in a way which gives excellent, friendly study guidance to users of the package. The tape begins with a personal introduction and advice from the author on how best to study the material, and the book opens, as all good training packages should, with a statement of aims and objectives. This is followed immediately by a concise summary of the overall organization of the package and a restatement of the study advice given on the audio tape.

The package is divided into five parts: (1) the case for using audio; (2) examples of the diversity of audio teaching; (3) examples of extended audio teaching and their analysis; (4) making your own audio package; and (5) evaluating audio packages. The book also includes a list of 17 specialist references which are relevant to the use of audio packages in teaching and training. In each case, the author has indicated how that reference might be useful.

At an early stage, Rowntree emphasizes that good audio tuition will probably make use of both the sense of hearing and sight, and this is reflected in the exemplary material he has chosen. In Part 1, he reviews the potential objectives of using audio in teaching, either as an aural source or combined with visual materials and activities. This section is typical of the book as a whole, in that the layout is pleasing and well-organized, with excellent use of different fonts, borders and headings to distinguish author contributions from examples, and something like 20 per cent of the pages in the book feature diagrams and drawings referred to in the taped examples. I stress the appearance of the book because it is presented and structured as a self-study package rather than as a textbook with accompanying audio tape. Excellent use is made of boxed instructions and reminders within the formal textual materials so that the behaviour and thoughts of users can be appropriately organized. This means that the package is free standing and ready for

immediate use by interested tutors or by students following courses in educational technology or flexible and open learning, and I shall have no hesitation in offering this package to my own students.

The taped extracts in Part 2 illustrate the use of audio for listening, for listening and looking, and for listening and doing. In each case, the text poses questions for readers to consider as the tape is listened to, and then comments on the extract afterwards. One very useful feature is that the text then invites readers to consider how they might use the strategy they have just listened to in their own teaching.

It is worth emphasizing that the illustrative examples are all examples of good practice – there is no attempt to create a somewhat artificial exercise of comparing good and bad practice. However, Part 3 of the package does compare and contrast two extended examples of good practice using different techniques. Both illustrate techniques unique to audio, and could not easily be provided by alternative means.

The final two sections give clear advice on how to prepare and evaluate audio packages, represent an excellent compilation of good practice in the audio field, and are sufficiently detailed to allow an instructor to use audio for the first time.

It will by now be clear that I was very impressed with the overall quality of this package: its excellent study guidance (both in the text and on the audio tape), and the integration between the text and the audio tape. My single quibble is with the price (£19.95 Sterling) which is presumably related to a potentially limited sales volume. Equivalent text plus audio packages in modern languages are much more modestly priced.

Dennis Moss, University of Wales, Cardiff

Using Communications Media in Open and Flexible Learning by Robin Mason, London, Kogan Page (Open and Distance Learning Series), ISBN: 0-7494-1149-X, 1994.

As the range of available educational technologies and their respective proponents multiply, so does the need for some rational and enlightened view on what these technologies offer those who are engaged in the process of education. Mason's book, as part of the Open and Distance Learning Series, provides this

evaluation for the subset of educational technologies she calls communication media.

The book is intended as an introduction to the subject. It has approximately 120 pages of content, and is quick and easy to read. It contains eight chapters, an annotated bibliography and an index. The structure is both logical and straightforward. The first chapter discusses the uses of telecommunications media in education, and introduces the three main approaches to using them (computer conferencing, audiographics and video-conferencing). The following two chapters are devoted to the important issues of interactivity and the implications of using these technologies. Mason then considers each of the technologies in subsequent chapters using similar section headings for consistency. The penultimate chapter describes nine live projects that are currently using these techniques. The concluding chapter explains why the different technologies do not compete with each other, and gives some advice on best practice.

In chapter 2, Mason gives her personal view on what attributes of interactivity are desirable in an educational context, and evaluates these for computer conferencing, audiographics and videoconferencing. The view taken is the constructivist one – that interactivity can enhance learning. The author proceeds to explain how these technologies can facilitate collaborative working and help cultivate a social presence. Chapter 4 examines the implications for those using and developing communications-media applications in education, and the overriding message is that using these technologies can be very rewarding for students and staff alike, but that it requires commitment and hard work. The message to organizations is that these technologies do not necessarily mean cost savings, and that they must provide appropriate support and investment in infrastructure.

Chapter 5 explores computer conferencing by outlining the current state of the technology, its educational uses and its advantages and disadvantages. The impression given is that computer conferencing is the most accessible of the three technologies and is also the most educationally effective. Chapter 6 examines audiographics following the themes of the analysis introduced in the previous chapter. Audio and graphics seem to work well together, the graphics being the focal point for audio interaction – analogous to the OHP in a

conventional lecture. Currently, the main use for audiographics seems to be for connecting smaller groups to larger centres for tutorial purposes, but trends suggest that this fascinating technology has quite a promising future, especially when combined with multimedia functionality. Chapter 7 discusses the educational uses of video-conferencing; unfortunately, this is limited (perhaps reflecting the cost of the technology?). The section on advantages concludes that one-way video conferencing facilitates didactic lecture-delivery over a wide area with the potential of reaching a large audience, while two-way video-conferencing is best reserved for small tutorial groups. Mason suggests that visual communication courses are probably best suited for exploiting videoconferencing techniques.

A chapter concerned with live project case studies is very useful and puts the material covered in previous chapters into context. The case studies come from all over the world and, taken together, are inspiring. Each project includes an evaluation of its educational effectiveness with pointers for success, though it would have been interesting to have had more information on the curriculum design aspects of the projects.

In the concluding chapter, Mason is emphatic about the fact that the three technologies discussed in her book do not compete with each other. Each technology supports different learning styles, and the context in which they are used is different. Good pragmatic and pedagogic reasons are given for adopting these technologies. Communication media are important elements in the emergence of a new type of learning environment ('close distance education') that will capture the best of our conventional learning environments and our newer open and distance learning systems. The book finishes with some best-practice advice.

Mason's clear intention with this book is to provide an easily accessible introduction to communications media for education, and this she does very successfully. Specialists and non-specialists alike will find the book easy to understand, and it may even inspire them to try out the technologies for themselves. Indeed, it will most likely leave many readers with the question: 'How do I redesign my course to include one of these technologies?'

Geoff Elliott, Cardiff Institute of Higher Education

Computer-based Learning in Science - Proceedings of the International Conference CBLIS '95 edited by Graham M. Chapman, Open Education and Sciences, Opava, Czech Republic, ISBN: 80-901974-0-X, 1995.

CBLIS '95 was held in Opava (Czech Republic) in July 1995, and provided a forum for researchers and practitioners interested in technology-based science education. The proceedings consist of 60 contributions selected from a total of 110 papers originally submitted for review.

The papers are grouped into 11 sections which vary greatly in size - from a single paper (forming the section on Intelligent Software) to 12 papers (in the section on Teaching Packages). This reflects quite well the focus of research in computer-based education generally, where solutions are required relatively quickly to address current teaching problems. Systems utilizing aspects of artificial intelligence, on the other hand, can have significant time, cost and complexity overheads due to the additional dimension of embedded 'intelligence'. As a result, far fewer projects aim at using potentially useful techniques drawn from the field of artificial intelligence.

The first section (Invited Lectures) consists of four invited contributions which provide a broad overview of some important issues arising from the development of computer-based education in science. In this review, I shall present a short summary of each of the invited papers before providing a brief guide to the remaining sections of the book.

In the opening paper by Philip Barker, the main issues covered concern cognitive engineering and interface design. Some of the key cognitive engineering concepts introduced here are mental models, learning styles and the use of metaphors. Interface design issues explored by Barker include interactivity, graphical user-interfaces, hypermedia, and intelligent interfaces. Each of these issues is discussed in the context of designing human-computer interfaces to support effective learning.

The second of the invited papers, by Graham Chapman, provides a brief review of some recent trends in computer-based learning and hardware development. Chapman places considerable emphasis on a few key issues and identifies the use of expert computer programmers as perhaps his most important message.

Chapman argues that expert programmers must be used, and that the production of quality courseware necessarily involves a close co-operation between academics who are subject experts and computer programmers who provide production expertise.

Milos Lansky takes a somewhat philosophical view of computers in education in the third of the invited contributions. Lansky makes parallels between the work of Comenius (a sixteenth-century Czech scholar) and computer-based learning. This analysis results in nine statements (or guidelines) which indicate that historically important pedagogical concerns remain relevant in computer-based learning.

The final invited paper, by Peter Wright, addresses the problems surrounding educating the educators. Here the main concern is the preparation of technologically literate teachers who can act as both advocates and role models for the use of computers in education. Both in-service and pre-service teacher training are considered as means by which teachers in general can become catalysts in the widening educational use of the new technologies.

It is impractical to present a detailed discussion of the wide range of topics addressed in the remaining sections of the proceedings. Since some effort has been made to organize the proceedings into sections, however, a list of the areas covered can provide an indication of content. Topics addressed are: (a) Review Lectures (b) Teaching and Learning: Educational Strategy (c) Teaching and Learning: CBL Structures (d) Monitoring of Performance (e) Software and Hardware Developments (f) Intelligent Software (g) Teaching Packages (h) Teaching with Simulation (i) Interactive Programmes (j) Networking and Distance Learning. The book also has a preface, contents list and author index. The preface is light, to say the least, and gives little more than the location of the conference and the names of the organizers, papers committee and sponsors. The inclusion of an author index will be of use, though (in line with many proceedings) the absence of a traditional index prevents the work being used efficiently as a reference source (perhaps the main use to which academic books of this kind are put).

Even better than the inclusion of an index, however, would be availability on CD-ROM along with an appropriate search engine. This

would allow the primary target audience of the book, academics, to use the information effectively in their work. The falling costs of CD-ROM publication could make this a viable option for many conference proceedings and would greatly increase their utility.

Copies of these proceedings can be obtained from: Open Education & Sciences, PO Box 84, 746 20 Opava, Czech Republic.

Stephen Richards, University of Teesside

ISDN Applications in Education and Training edited by Robin Mason and Paul Bacsich, London, The Institution of Electrical Engineers, ISBN: 0-85296-860-4, 1994.

This is an edited collection of papers describing the exploitation of ISDN for distance education. It is unfortunate that the publisher chose to print the acronym ISDN in huge letters on both the spine and the front of the book since it misleads the bookshop browser. It is not a book primarily about ISDN, though it does describe the benefits and limitations resulting from its exploitation in education and training.

A summary on the back of the book explains ISDN:

Integrated Services Digital Network (ISDN) is the provision of a digital-based coupling between two sites, using the ordinary telephone network and the existing twisted-pair cables into customers' premises, for the purpose of conveying data at a relatively high speed as a cost-effective alternative to high-speed leased communication lines. As a result it provides a motion-video communication link operating at several frames a second (using special compression/decompression hardware) to organisations that would otherwise be unable to justify a leased line.

While the importance of this infrastructure provision must not be understated, the excessive enthusiasm over ISDN in this book is unwarranted, and the subject is often needlessly incorporated. However, this comment should not put off the potential buyer looking for a source of information that explains the ramifications of exploiting ISDN as a transmission medium for both passive and interactive distance learning.

The book consists of 13 chapters divided into three sections, plus a concluding chapter, an index and an extensive glossary.

The first section introduces the nomenclature of digital communication standards. It identifies the requirements for fast transmission of text, images and speech, together with the possibility of exploiting data compression techniques. The problem of re-synchronizing speech (which is difficult to compress) with its corresponding moving image (which is not so difficult to compress) is briefly mentioned. Since basic-rate ISDN is not capable of transmitting television-quality video in real time, various compromises are described (e.g. using monochrome only, or accepting a jerkily changing image) with particular reference to their use in education and training. This first section also describes what is meant by audiographics, videoconferencing and computer conferencing, and relates them to their exploitation in education and training. Some interesting views on the future methods of teaching are expressed, including the fundamental need for interaction in order for learning and monitoring to take place. The section ends with a world view as to which countries have adopted ISDN, its continued and future use as a means of communicating information not specifically targeted at education and training, and ISDN's strategic relationship with leased lines, local-area networks, and so on. The issue as to whether basic-rate ISDN is fast enough is revived at the very end of the section with views as to how speed improvements will become available at a cost that is affordable for educational establishments and for students located at home.

Videoconferencing provides for two-way audio and video communication, and Section 2 consists of six chapters, each with a different perspective on this facility. The first describes a university's provision for staff members at two major companies to participate in the university's courses. The organizational issues, the perceived benefits, and three common lecturing approaches are discussed. There are problems (e.g. reliance on last-minute preparation, and ignoring off-campus students), but we are told that these are largely overcome by coaching the lecturers into handling this new environment. The next three chapters describe the exploitation of videoconferencing in the British Isles, Australia and Norway, the main rationale for this exploitation being to provide important courses 'to a dispersed student population with a thinly distributed demand'. The descriptions are mainly about the equipment and technical formats involved, but

there is also some focus on the way in which this method of teaching changes work patterns. For example, it 'encouraged students to become more responsible for their own learning patterns' and 'promoted group cohesiveness and group independence from the tutor'. There is also some emphasis on the lecturers' concerns about videoconferencing and their perceived benefits of the medium, and comments about the technology degrading the prepared visual material so that special care has to be taken over its preparation. For most of these systems, the lecturer was physically present in a lecture theatre teaching a group of students, with the other students located at centres with two-way audio-visual links, but a French system had the lecturer shut in a booth remote from any student. The natural consequence of this isolation was that the apprehension of being in front of a live audience was diluted. It is a very 'presidential' style, but does 'allow you to concentrate on (giving) the lecture', though students did demand a greater degree of interaction with the lecturer.

Section 2 also contains a cost-benefit analysis of videoconferencing for both companies and universities. It is based on a range of equipment and a range of features available. The analysis includes illustrations of various jobs from factory-floor training through engineering to sales and management, and should offer helpful arguments for adopting videoconferencing in both industry and academe.

This second section covers distributed lecturing with the opportunity for students at remote sites to ask questions. Section 3, in contrast, describes systems in which students are more participative. These systems involve the technology of computer-supported co-operative work based on personal computers. Teacher and students share the same information displayed on their own computers, and of course there is an audio link. One of the systems described enables a shared window to display the output of a program so that, for example, a number of people can experience the hands-on learning of a drawing program; the locus of control passes from teacher to student and back again as the learning progresses. Various scenarios are described to illustrate the usefulness of such a

system. Unfortunately, it seems, each window took many seconds to update, and the teacher had to fill in while each person's computer synchronized, making the whole session much longer than if it had been face to face. A view of participants' faces was not felt to be too important although the absence of some turn-taking cues caused minor problems.

Section 3 generally reviews teleconferencing, audiographics and computer conferencing, and concludes that 'conversation represents the strongest underlying paradigm for any computer-mediated form of collaborative learning'. Nevertheless, the lack of visual cues means that tutors will adopt a more interrogative style in order to monitor the 'presence' of students than they would need to do in face-to-face tutorials. Two systems designed to support collaborative learning are described. One was an attempt to integrate, in one system, audio teleconferencing, audiographics and computer conferencing, where each student sees on his or her personal computer a resource centre consisting of lectures whose material (slides and drawings) has been previously down-line loaded and the live lecture then given via a two-way audio link, a 'meeting room' within which participants can orally discuss and present documents, a 'study room' in which the tutor can observe the state of each learner's computer screen, a conventional computer-conferencing tool, and a multimedia resource library. The view is expressed that social interaction is an essential component of the learning process and that informal peer learning is as important as formal teaching.

Is the book worth buying? It certainly should be bought by libraries and retained on their shelves for decades to come, since it will become an important source of historical information recording the pioneering days of distance education using digital communication links. For current educators, it does provide an introduction to the transmissive technology at present available, identifies whether it is useful to them, and describes how it has been exploited.

Ian Benest, University of York