

TEACHING POSTGRADUATE OPHTHALMIC BASIC SCIENCES ON THE INTERNET

G. Sanderson, B. Vote, R. Gardiner, G. Chew

Abstract— The University of Otago is offering the first Australasian Otago Postgraduate Diploma in Ophthalmic Basic Sciences (PGDipOphthBS). This is an internet based distance learning course building on twenty years of experience in teaching ophthalmic basic sciences.

The diploma course has been designed to allow medical graduates to gain an understanding of the ophthalmic basic sciences by studying at their own pace.

The physical interface at the computer screen is provided by the Blackboard platform. This platform has been adopted by a number of tertiary teaching institutions globally and has a proven track record.

A total of 12 candidates enrolled during the first year that the diploma course has been offered- seven from Australia, four from New Zealand and one from Malaysia. A total of five graduated at the end of the second semester.

The use of reusable learning objects has provided a valuable extension of postgraduate medical education allowed by the use of computer technology.

Index Terms— Anatomy, Internet, Medical Education, Ophthalmic Basic Sciences, Ophthalmology, Optics, Physiology, Postgraduate Diploma, Reusable Learning Objects

I. INTRODUCTION

At the University of Otago we have taught Ophthalmic Basic Sciences for over twenty years to candidates from both Australia and New Zealand intending to sit the Royal Australian and New Zealand College of Ophthalmologists (RANZCO) Part 1 fellowship examination. Early in 2000 RANZCO announced that it would be no longer offering a Part 1 examination. They also announced that they expected candidates to attain a competency in the basic sciences and that these would be examined in future using a modular approach. Previously the Ophthalmic Basic Sciences had been regarded as a prerequisite for further ophthalmic training. Since the candidates would not be given an opportunity either to assess their skills or evaluate their inclinations towards ophthalmology before embarking on a formal Training Scheme

we decided to continue to teach the basic sciences under a University umbrella. This necessitated the (PGDipOphthBS). The course has been offered since the beginning of 2002 and has been running for two full semesters. The University of Otago operates on a two fourteen week semester year: Semester one running from March to June, Semester two from July to November.

OBJECTIVES

The objective of the course is to provide potential candidates for ophthalmic training positions with an opportunity to study the basic sciences prior to commencing their Hospital-based Training Programme. For those candidates already in an Ophthalmic Training Programme the objective of the course is to provide an opportunity to focus on particular subjects which have been identified as requiring additional tuition.

The objective of this paper is to describe the structure, implementation and early feedback regarding this course which has just completed its first academic year.

COURSE CONTENT

The course consists of three 20 hour a week papers. Students can complete the diploma in 12 months of full-time study or take up to five years. These papers; anatomy, physiology and optics; are taught as distance learning papers on the internet with students only permitted to take a maximum of two papers per semester. The fourth paper Practical Ophthalmic Basic Sciences is taught as a three week full time residential course in Dunedin, New Zealand. Lecturers are also asked to provide clinical correlations that are relevant to their particular aspect of basic sciences.

DESIGN OF THE COURSE

It was decided that a large proportion of the course should be taught as a Distance Learning Programme because the majority of candidates do not reside in Dunedin but are resident throughout Australia and New Zealand. Furthermore candidates are typically Resident Medical Officers (junior doctors) in busy house surgeon and registrar jobs. Each semester of 14 weeks duration enables instruction to take place during a 13 week lecture programme. Assignments interspersed at three weekly intervals are followed by a final written examination at the end of each semester. Candidates can achieve up to 10% of the final mark per assignment with the final written examination counting for 70% of the total mark.

Manuscript received

G Sanderson is with the Ophthalmology Section, Medical and Surgical Sciences, University of Otago. Phone 64 3 4747970 Fax 64 3 474 7628 email: gordon.sanderson@stonebow.otago.ac.nz

B. Vote is with the Ophthalmology Department, Bristol Royal Infirmary

R. Gardiner is with the Lions Eye Institute, Perth, WA, Australia

G.Chew is with the Ophthalmology Section, Medical and Surgical Sciences, University of Otago. Email geraldchew@yahoo.com

students by providing variety in delivery method but may also confuse other students with the lack of consistency.

METHOD OF DELIVERY

Blackboard is used as the vehicle for delivery of lectures. It has been selected by the University of Otago as a suitable platform for distance learning programmes.

In common with other similar web-based interfaces, it offers facilities for discussion groups chat rooms and bulletin boards where student's email questions can be posted for others to attempt to answer them or for the lecturers responses to appear¹. One of the advantages of this technology over conventional lectures is the immediacy of opportunity that it offers students. This immediacy was observed by Chaada who stated "being on-line it is possible to capture the moment. For example, if you have a burning question you can fire off an email straight away no matter what time of day or night it is"¹. Cahill et al states "We anticipated that the discussion board would offer a public forum where participants could see, learn from and interact with each others contributions but this might also be intimidating"². Certainly our experience so far reflects this as there have not been as many users of the interactive opportunities as we had anticipated. We actually abandoned chat rooms midway through the first semester as lecturers were waiting at their scheduled times during their "week" without in some cases, receiving a single question. Apart from the "intimidation" described above, part of the explanation may lie in the fact that students were not all keeping to the rostered program with their studies.

There are also on-line examination facilities that we have at this stage, elected not to use.

Our department was not responsible for the choice of software interface as BlackBoard is the method of delivery selected by Otago University. It however appears to be a suitable choice. It also seems to meet criteria for an internet vehicle suggested by various authors in the literature.^{3,4}

Particularly relevant in our case for the study of ophthalmic basic sciences, the web based interface has allowed presentation of high quality images and movies with narration from lecturers, interactive labels and diagrams. The advances in still and moving image compression (for example jpeg and mpeg) have allowed students visual access to rare and valuable specimens and demonstrations although many thousands of miles away physically. This combined with interactive web animation technology such as that enabled by Flash provides the basis of many Reusable Learning Objects (RLO's) integral to the value-added success of an internet-based distance learning programme.

Screen-shots of a few of our RLO's are included as Fig 1-5.

Few of the clinicians involved in the teaching of this course have had much training in teaching and often have a limited range of teaching strategies at their disposal. None had any previous experience of web based teaching. The styles of individual lecturers varied. This may be of benefit to some

RESULTS

A total of 12 candidates enrolled during the first year that the diploma course has been offered- seven from Australia, four from New Zealand and one from Malaysia. A total of five had graduated by the end of the second semester.

Feedback from all the students has been extremely positive although inevitably during the first year of operation some teething problems were encountered. A number of candidates found the workload more than they had anticipated but never the less they considered it acceptable. Cahill et al², who organized a training course to be delivered over the internet to postgraduate trainees in obstetrics and gynecology, found that while the internet is a suitable medium for a course of that nature, six out of their eighteen candidates were unfamiliar with the technology required. All the students in our group reported having the necessary computer skills to access the material effectively. Several found that large file download times often meant careful planning was required before commencing study. None experienced any insurmountable technical difficulties. This compares favourably with the four that were found in the Cahill study. In common with observations made by Jha, Duffy and McAleer⁵, a few students suggested that more interactive multi media tools should be used. However like Jha, Duffy and McAleer we feel that: "all clinical problems do not necessarily lend themselves to use of multimedia and often the quality of videos and images are too poor to be used". Additionally the file sizes and bandwidth required make on-line use of this medium less practical despite the use of compression technology. The use of CD ROMs has overcome this problem in certain instances. When the protection of intellectual property is an issue, CD ROMs can be protected in such a way that they require on-line access and course participation privileges to enable them to be opened. Although we have not yet resorted to this, we are contemplating using such a system in the future.

Limited access to equipment was reported by Cahill to be an impediment for a number of trainees. Some in their study had limited internet access at work or at home, restricting the hours when they could study. We found that all our students could access equipment where they chose but most elected to do so at home. Only the speed of connections proved to be an impediment, particularly in the rural areas. It was found that the majority of our students use dial-up 56k modems for the internet with broadband connections being the exception rather than the rule.

DISCUSSION

Medical teaching on the internet is becoming used more extensively^{2 6-8}. Postgraduate medical education towards a recognised university qualification is still relatively uncommon and although a number of courses seem to exist in other disciplines^{2 4 7}, and a number of diplomas in Ophthalmology exist in Europe, to the best of our knowledge there is no equivalent postgraduate diploma in Ophthalmic Basic Sciences. Wiecha and Barrie note that: "Continuing Medical Education (CME) has not taken advantage of the ability to communicate and collaborate on-line".⁴

Our experience agrees with Alur et al when they state that: "medical teaching websites, in general, are not reflecting the principles of the learning paradigm". They also suggested "an ideal stand alone medical teaching website should not only meet the general requisites of an informal website but also incorporate the principles of the new educational philosophy through appropriate use of the multimedia".⁸

Alur further suggested that "E-technologies do not change how human beings learn". We employed a total of seventeen lecturers mostly from New Zealand four from Australia and one from the UK. All these lecturers were advised that what they should provide students on line should be an improvement the standard textbooks. They were told that if what they are providing is not better than a book then references or a book should be provided instead.

As part of this strategy we have used a great many re-usable learning objects in our course and agree with Harden and Hart that "The reusable learning object is poised to become the instructional technology of E-learning".⁷ Ours were designed for the anatomy and optics papers in particular. RLO's make very good use of difficult to obtain resources such as dissections, prosections and unusual specimens. The specific reasons are separate but related. In the case of anatomy, students simply have not got access to anatomy dissection rooms, prosections etc and by using RLO's students can in their own time study for instance, three dimensional anatomical dissections, or study osteology using rotatable disarticulated bones. These can be either accompanied by a dialogue provided by the lecturer or they can use existing textbooks in conjunction with the RLO's to enhance their learning. In the case of optics RLO's are particularly valuable for explaining concepts some of which may require multiple diagrams in texts or are poorly explained in the literature. One of the major advantages of RLO's is that they are interactive. In optics in particular, the opportunity to change parameters, observe the effects of different elements or movement of images can be enormously helpful in understanding difficult concepts. Although a number of RLO's were designed for teaching the physiology paper the vast majority were applied to anatomy or optics. All RLO's remain available throughout the duration of the course but only those that are specific to individual papers. Lecturers are encouraged to make reference to them in addition to supplying references to other URLs as appropriate. The use of a bank of RLOs was encouraged by Harden and Hart when they stated: "Two important components of IVIMEDS (An Interactive Virtual Medical School) will be a curriculum map and a bank of reusable learning objects. A curriculum is a sophisticated blend of

educational strategies, course content, learning outcomes, educational experiences, assessment, the educational environment and the individual's learning style". Some of the RLO's that we developed for this course have since found their way into the undergraduate medical curriculum of Otago Medical School albeit in simplified form. Other examples of RLO's already used in the undergraduate curriculum have been made available to these postgraduate students as well. RLO's on the internet are easily accessible and found and can be easily updated.

Advantages of an internet-based distance learning course include:

1. Students can study in their home or home town at different geographic locations.
2. Students can study at their own pace.
3. Lecturers can be appointed from all over the world. In our case all of course lecturers come from Australia or New Zealand. They are chosen for their particular skills in this field.
4. Lecturers can travel and still participate. In our case one lecturer has moved from Australia to the United Kingdom for a year and he still continues to teach from the United Kingdom.
5. On-line library facilities are available through the University library.
6. Assignments can be posted electronically and critiqued electronically.
7. Students can use RLO's when required.
8. Once lectures have been prepared they can remain available for the next semester or can be refined by the lecturer.
9. Encourages self-directed learning. Important in the learning versus teaching paradigm.

These advantages mirror those stated by Harden and Hart:⁷

- "A high quality unique education programme with access to learning experts locally, or internationally - the best in the world;
- A global perspective with students being part of our international community;
- A flexible and adaptive curriculum catering for the needs of individual students. This will include fast track and part-time options and the choice from a wide range of learning opportunities and approaches;
- The choice of a home base with a possibility of saving money;
- Experience gained with the new technologies and approaches to information technology;
- Preparation for life-long learning."

Disadvantages of an internet-based distance learning course include:

1. High cost of setting up.
2. Not all students are IT literate.
3. Time required to download large files.
4. Lack of classroom atmosphere.

5. Lack of immediate peer support.

SUMMARY

Postgraduate medical education has long needed a good distance learning model as most candidates are from diverse geographical areas and have busy daily schedules.

Our proposed internet-based distance learning model not only provides course content in the home environment but preserves the liveliness of human interactions that usually characterize on site learning opportunities. It furthermore enriches the learning experience with the unique opportunities provided by the different web base communication modalities and tools. In particular we feel that the use of good RLO's provides an advantage to this course and we suggest that this can be integrated into many different teaching programmes in the future.

8. Alur P, Fatima K, Joseph R. Medical teaching websites: do they reflect the learning paradigm? *Med Teach* 2002;24(4):422-4.

1. Chadda D. Online learning. Cyberschool days. *Health Serv J* 2000;110(5693):suppl 3-6.
2. Cahill D, Cook J, Sithers A, Edwards J, Kenkins J. Evaluation of an online postgraduate education programme. *Med Teach* 2002;24(4):425-28.
3. Toohey S, Watson E. Twelve tips on choosing web teaching software. *Med Teach* 2001;23(6):552-555.
4. Wiecha J, Barrie N. Collaborative online learning: a new approach to distance CME. *Acad Med* 2002;77(9):928-9.
5. Jha V, Duffy S, McAleer S. Evaluation of distance interactive learning in obstetrics and gynaecology (DIALOG). *Bjog* 2002;109(4):456-61.
6. Giani U, Martone P. Distance learning, problem based learning and dynamic knowledge networks. *Int J Med Inf* 1998;50(1-3):273-8.
7. Harden RM, Hart IR. An international virtual medical school (IVIMEDS): the future for medical education? *Med Teach* 2002;24(3):261-7.