

Microbes and the media: A telecourse for nurses

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Introduction

Twelve months ago the School of Nursing requested that Microbiology 263 be externalised so that all units offered in the nursing degree programme could, to a large extent, be completed by students off campus. We have students scattered throughout the state in remote areas. We therefore needed to find a way of taking a highly visual and practical microbiology unit into the bush.

Microbiology 263 is a key component of the nursing degree programme and as of this year it is the first accredited tertiary level telecourse in Australia at degree level. It will be broadcast via satellite on GWN's educational network Ed TV in July, August and September 1990.

The telecourse was developed by the Schools of Medical Technology and Nursing, in conjunction with the Educational Media Centre and the Centre for External Studies at Curtin University. Microbiology 263 is a compulsory unit in the nursing degree programme; failing the unit twice results in termination from the programme. The telecourse unit will be offered externally to registered nurses with Nursing Diplomas who wish to upgrade their qualifications to degree status.

The unit is now made up of 18 video lectures and 12 laboratory demonstrations together with a Unit Guide, a Study Manual, a Practical Workbook and a Booklet of Answers. It is intended that these materials be used in conjunction with a published text. As part of the unit, external students will be expected to attend a two day workshop at their closest hospital laboratory.

The problems with Microbiology 263

Although Microbiology 263 has been taught on campus for the past 5 years, it has never been offered externally because of the highly visual nature of the unit as a whole and problems associated with running the practical sessions for students scattered all over WA. Hands on experience is most important in microbiology. It is possible to tell students how small bacteria are and explain the problems of working with them, but until they have laboratory experience with microorganisms they cannot appreciate the problems associated with diagnosing and preventing disease. As many of the organisms they will use in practical sessions are capable of causing disease, it would be extremely negligent to allow external students to handle them without proper instruction and supervision.

The other major difficulty was the cost of transporting and maintaining the microscopes needed by the students to view their practical material. The cheapest microscope costs about \$2000 and would be difficult to maintain in working order on the road.

A five day workshop in Perth was proposed as a solution to the problem. It was estimated that five days would be needed for the lecturer to do the practical demonstrations and for the students to follow up with supervised hands on experience. However, the cost of bringing students to Perth for this period was prohibitive.

Aside from the difficulties involved in externalising Microbiology 263, the lecturers for the nursing microbiology units on campus were facing the monumental problem of assessing 700 students per year. Students were required to submit ten brief practical assessments, two tests and an examination during the course of the unit. This in turn provided a daunting, not to mention tedious, task of assessment for the lecturers involved.

The solution: Microbiology 263, a telecourse

Given the need to produce an external unit with a highly visual component, together with the necessity of providing demonstrations for the practical sessions, a video course seemed to be the ideal solution. The link with GWN's Educational Television network also guaranteed that we could reach all our external students free of charge. We still needed to provide a hands on practical experience for the external students. However, with the demonstrations on video, the practical sessions could now be reduced to a two day workshop which will take place in hospital laboratories all over WA. The workshop will not only provide hands on experience for our nurses, but also will lend further emphasis to the fact that they are an integral part of a paramedical team whose intention is the diagnosis, treatment and prevention of disease in their patients.

The question of assessment has also been solved with the externalisation of the unit. Instead of submitting the required assessments to be marked by lecturers on campus, students will complete self assessment tasks at the end of each module in the unit. Answer Booklets will be provided. The motivation to complete these tasks is that by so doing students know that they are preparing for their final examination. Lecturers are now left with the less onerous task of marking only the end of unit exam paper.

Description of the telecourse

As mentioned in the Introduction to this paper, Microbiology 263 now consists of

- 18 video lectures;

- 12 laboratory demonstration videos;
- a Unit Guide;
- a Study Manual;
- a Practical Workbook;
- an Answer Booklet;
- TV Broadcast dates and times
- a published textbook.

The *Unit Guide* outlines how the unit is to be conducted. It includes assessment information, a video programme and information about how to make the best use of the study material. The *Study Manual* contains the objectives for each lecture session. It also includes a copy of all the overheads used, in the lectures, with space for the students' own notes, so in fact this will become their theory note book. The *Study Manual* also contains references for information and revision questions to be found in the published text.

The *Practical Workbook* outlines the objectives for each practical demonstration and guides students through the various demonstrated exercises on the video. It also includes self assessment questions to be answered by the students. An *Answer Booklet* will supply, in full, the answers to tasks and questions in the *Practical Workbook*.

The text is *Microbiology: An introduction* (Tortora, Funke and Case, 1989). The publisher has allowed us to use material from the text in the videos. This provides the course with a continuity which ties the whole unit together.

Our external students will be required to attend the 2 day workshop at their closest hospital laboratory before taking their final examination. Relevant guidelines will be sent to the technologist in charge of each hospital laboratory. Following the workshop the technologist will complete a standardised report sheet on the students' performance. This report will have some bearing on the final grading at the end of the semester.

Advantages of the telecourse

We now have the ability to show large numbers of moving visuals which are usually impossible to present in a traditional lecture theatre. We can, for example, magnify many times the view through a microscope, and we are able to slow down or speed up the movement of the microorganisms being observed.

We can clearly show, in closeup, processes which, in the past, could be demonstrated only through "live" practical sessions. We can clearly demonstrate the use of sophisticated medical technology, which would not ordinarily be accessible to students in remote areas. We can show live and preserved specimens of organisms which may not be available to external students in remote areas. We can make the presentation more interesting and effective by using special effects such as having two or more images on the screen at one time.

Students can video record the entire programme of lectures and practical sessions. This allows them greater flexibility and more control over their own learning.

They can

- learn at their own pace;
- view and review the videos as often as necessary to ensure complete understanding;
- use the videos as revision tools before the workshop and final examination;
- view the videos at home, in a library, at college or university;
- work individually or with peers.

The Study Manual, the Practical Workbook and the Answer Booklet can be used by on campus as well as external students. The videos will also be available to on campus students through Curtin University library facilities.

The self assessment component of the unit allows students to make mistakes in private.

The production process

The technology used and the production techniques employed were kept as simple as possible to keep costs to a minimum, while still attaining a high quality standard of production, and to be as unobtrusive as possible in the studio lecture and laboratory situations. Our presenters are experienced microbiologists and lecturers relaxed when interacting with 300 or more students, but less so when confronted by video cameras. We thus used only two cameras. One camera focused on the presenter and the other was fixed overhead to record the print materials, illustrations, photographs and equipment variously being demonstrated.

We used a video camera attachment to record greatly magnified shots of the view through a microscope. These shots, together with shots of additional illustrations and textual material were edited in later.

To further reduce costs there was no formalised scripting for the production, and our schedule and respective workloads allowed little time for rehearsals. This required the presenters to be well prepared, highly organised and concise. The strategy for the recording of each lecture or demonstration was a preliminary meeting to discuss

- the content of the lecture or demonstration

- the order of presentation
- the visuals, specimens or equipment to be used and how they were to be exploited
- the close ups required
- additional visuals etc to be inserted at the editing stage
- the way in which the lecture had to be adapted to accommodate the video medium.

Then the cameras rolled. The ten month production schedule took the following sequence.

- October 1989 - December 1989;
 - Students needs analysis;
 - Current materials assessment;
 - Media production, assessment given time and human resource constraints;
 - Decision to use video as a key medium for instruction.
- December 1989 - April 1990
 - Development, revision, updating and publishing the Unit textual materials: Unit Guide, Study Manual, Practical Workbook, etc.;
 - Graphics production;
 - Video recording.
- April 1990 - July 1990
 - Editing;
 - Insertion of visual and text material in video sequences;
 - Dubbing sub masters for Educational Television.

The telecourse production was undertaken during a normal year long teaching programme with no reduction in workload. It was an exhausting, but exhilarating experience. We feel a great sense of achievement and have proven that a telecourse can be developed under such circumstances and with a low budget, with little sacrifice to the quality of the production.

Future directions

Questionnaires will be distributed to students to ascertain their perceptions of the strengths and weaknesses of the unit. We will use this feedback to refine or restructure the course to more closely reflect the needs of the users.

It is hoped that the course will be used in part, or in total, with on campus as well as external students. The market potential for the course in the Eastern States and in other areas, such as South East Asia, will be investigated.

Eventually it is intended that a computer managed assessment programme will be developed for the unit. This would provide students with direct feedback and guidance on their progress through the modules of Microbiology 263. In the longer term, a text will also be developed specifically for the unit.

Reference

Tortora, G. J., Funke, B. R. & Case, C. L. (1989). *Microbiology: An introduction* California: Benjamin/Cummings.

GWN Ed TV broadcast schedule for *Microbiology: A telecourse for nurses*

			Day	Date	Time
1	Module 1.	Introduction to microbiology (27 min).	Mon	30/7	9.30
2	Module 2.	Intro to the microbial kingdom (38 min).	Mon	30/7	10.00
			Repeat: Sat	4/8	7.00
3	Practical 1	The microscope and microbial environ (45 min)	Tues	31/7	9.30
4	Module 3	Bacterial chemistry and cultivation (34 min)	Mon	6/8	9.30
5	Module 4	Laboratory procedures (34 min)	Mon	6/8	10.07
			Repeat: Sat	11/8	7.00
6	Practical 2	Microbes of the environment (47 min)	Tue	7/8	9.30
7	Practical 3	The control of microbial culture and growth (48 min)	Tue	7/8	10.20
8	Module 5	Host-parasite relations and infection (58 min)	Mon	3/8	9.30
9	Module 6	Introduction to immunology (38 min)	Tues	14/8	9.30
			Repeat: Sat	18/8	7.00
10	Module 7	Principles of serology (33 min)	Tue	14/8	10.11
11	Module 8	Introduction to mycology (36 min)	Mon	20/8	9.30
12	Practical 4	Bacterial and fungal cell structures (23 min)	Mon	20/8	10.09
13	Module 9	Sterilisation (38 min)	Sat	25/8	6.31

14	Module 10	Disinfection (49 min)	Sat	25/8	7.11
15	Practical 5	The transfer and control of organisms (41 min)	Mon	27/8	9.30
16	Practical 6	Sterilisation controls compared (21 min)	Mon	27/8	10.14
17	Module 11	Intro to antibiotics and chemotherapy 1 (50 min)	Tue	28/8	9.30
			Repeat: Sat	1/9	7.01
18	Module 12	Intro to antibiotics and chemotherapy 2 (47 min)	Tue	28/8	10.23
19	Module 13	Nosocomial infections (38 min)	Mon	3/9	9.30
			Repeat: Sat	8/9	7.01
20	Module 14	Urinary tract infections (45 min)	Mon	3/9	10.11
21	Practical 7	Urinary tract infections (46 min)	Tue	4/9	9.30
22	Module 15	Respiratory tract infections (47 min)	Mon	10/9	9.30
23	Practical 8	Respiratory tract infections Part 1 (36 min)	Tue	11/9	9.30
24		Respiratory tract infections Part 2 (26 min)	Tue	11/9	10.09
			Repeat: Sat	15/9	7.01
25	Module 16	Infections of the intestinal tract (41 min)	Mon	17/9	9.30
26	Module 17	Blood and cerebrospinal fluid infections (51 min)	Mon	17/9	10.14
27	Practical 9	Blood cultures and enteropathogens 1 (35 min)	Tues	18/9	9.30
28		Blood cultures and enteropathogens 2 (31 min)	Tue	18/9	10.08
29	Module 18	Sexually transmitted diseases (45 min)	Mon	24/9	9.30
30	Practical 10	Anaerobic infections (34 min).	Mon	24/9	10.17

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