Students' perceptions of a multimedia computer-aided instruction resource in histology

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Objective. To develop an interactive multimedia-based computer-aided instruction (CAI) programme, to determine its educational worth and efficacy in a multicultural academic environment and to evaluate its usage by students with differing levels of computer literacy.

Design. A prospective descriptive study evaluating pre- and post-module testing, student usage tracking and a questionnaire survey.

Setting. University of Natal Medical School.

Participants. Thirty-four volunteers from the class of 125 second-year M.B. Ch.B. students who participated in the CAI study; 13 of these were not computer-literate.

Intervention. The study group used the CAI module for 2 weeks as part of the course.

Main outcome measures. Post-test scoring and evaluation of questionnaire responses.

Results. Results of pre- and post-tests show that CAI users' scores were slightly lower on pre-testing (22.1% v. 23.2%), while their post-test scores were higher (65.6% v. 60.7%). Lack of computer literacy did not restrict or hinder students in their use of the programme. Responses to a questionnaire completed by all CAI users indicate consensus that the programme helped the students to learn (94%), that it provided important basic knowledge (88%) and that it was a helpful learning experience (88%). All but 1 student wished to have more programmes like this available in histology.

Conclusions. The CAI programme reduced the time spent by students in the histology microscopy laboratory and did not negatively affect their marks in post-course evaluation. The concept of multimedia-based CAI in medical education was positively received by the students who participated.

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Recognising the worldwide reappraisal of medical teaching and curricula, the University of Natal Medical School is investigating an integrated, problem-based (or problem-solving) curriculum. Fundamental to these methods is the

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concept of small-group discussions as opposed to didactic class lectures. With the aid of facilitators, and with the provision of suitable resource material, students will be expected to drive their own learning experience. They will be expected to discover information and acquire knowledge themselves. It is envisaged that the changes will take place in the 3 preclinical years of study.

The second year currently consists of courses in anatomy and physiology, the latter including biochemistry and histology. Both courses entail a large laboratory component. Given the possibility that students will progress at different rates and in different directions, logistical problems are expected in terms of provision of staffing and laboratory resources for these small groups. Computer-aided instruction (CAI) is seen as a possible solution. Through networked software, CAI resources can be made available to students, laboratory experiences can be simulated and students can gauge their progress through self-assessment and drill-type exercises. In addition, student/staff contact time can be directed to activities more productive than laboratory supervision.

While it is often argued that CAI is potentially useful as an educational tool, tertiary education in South Africa has not integrated such technology widely into curricula. Reluctance to do so may in part be due to the lack of vividness or realism of presentations, but may also be ascribed to economic, practical and administrative constraints. With rapid advances in sound, video and image management on personal computers, interactive multimedia is now available at relatively low cost, and may act as a catalyst to realise the full potential of CAI. Mayers' suggested that if multimedia components were included in CAI, the learner would be enticed into and experience an enriched learning environment.

While multimedia-based CAI appears an attractive solution, several questions must be asked before widespread implementation is attempted. Has it been shown to be any better than existing forms of CAI? Does it work in our multicultural educational environment? Is it a resource that will help close the gap for educationally disadvantaged students, or will it disadvantage them further? As few students at our medical school have had exposure to computers and computing, what is the effect of a lack of computing skills and computer literacy on successful use of interactive CAI?

While much research is under way to evaluate multimedia-based CAI, the response to all four questions is the same — the technology is too new to provide a valid answer.

As a pilot study, one section of the second-year course in histology, viz. the eye, was chosen in which to introduce the use of CAI as an additional resource, and to evaluate its worth, before a decision about more widespread implementation was made. The present histology course consists of one didactic lecture per week, and 3 - 4 hours per week of supervised laboratory microscopy. The laboratory is open at all times for self-study. The course handbook provides objectives, key references and slide information. The students take regular self-assessment tests and, at the end of each of the 6 units, take a mark-earning competency test. This test consists of tissue and cell identification from histological slides and photographs and true/false questions, and requires brief written answers.

The aims of this pilot study were to write an interactive multimedia CAI programme on the histology of the eye, to evaluate the software and its effect on student performance, to evaluate the students' response to both the software and the concept of CAI, and to assess the effect of lack of computer literacy and experience on the use of multimedia-based CAI.

Method

Programme content and development

Programme content was structured around the course objectives. A list was compiled of questions frequently asked by students when looking at microscopy sections of the eye, and of questions asked by teaching staff of the students. A preliminary questionnaire on problem areas in histology had shown that 65% of the students had difficulty in identifying specific structures and cells in histological preparations. These questions, their answers and the identified areas of difficulty, including adequate labelling of cells and/or structures, were subsequently addressed within the programme. A script was written for each screen of the programme, detailing the image to be displayed, the accompanying text, the effect of interactions accessed by the clicking on of words or images on the screen, and the text of the voice/sound file to be played with the screen or its interactions.

Software was then written by the authors within Windows™, using a commercial software authoring programme, Authorware Professional™. Images were digitised from 35 mm photographic colour slides of histological sections of the eye with a video camera, a video 'grabber' card and software. Care was taken to ensure that the colour reproduction of the computer images was faithful to the normal colours seen with light microscopy. Images were filtered and enhanced with commercial software when necessary, and resized to occupy a quarter of the screen when presented from within the programme. Several diagrams were drawn on a digitised pad for use in the programme.

Liberal use was made of voice/sound files to introduce new concepts, to give advice on the use of the interactions in the programme, to ask questions and to supply answers to incorrectly answered questions. The voice used was that of the staff member responsible for teaching the section on the eye. An attempt was made to use a conversational style in the sound recordings, so as to give the student the impression of having an individual tutorial with their lecturer. Sound files were recorded with a microphone linked to the sound card in the computer.

Several standard interactions were used. Within the text window, interactivity was indicated by a word or phrase in red. Clicking of the mouse cursor on a red word resulted in various actions, such as the highlighting of an area of the histological image, labelling or animation of the image, presentation of additional text or sound information, or a self-assessment question relating to the topic. Other interactions related to alternative methods of asking and answering questions.

A modular approach was adopted. The introductory module contained instructions on the use of a mouse, use of

the programme, features of the programme such as an orientation option and interactive words, instruction on how to exit the programme, and the course objectives with regard to the histology of the eye. A dictionary of new words encountered in the course, including their derivations, and the key references in the prescribed textbooks were also provided.

The menu offered access to any of the 5 remaining modules — the corneoscleral layer, the middle vascular layer, the retina, the accessory structures and a slide test. Three of the 4 modules on the components of the eye included self-assessment questions, which were asked in the course of the module. Questions were either multiple-choice, true/false, text response-based or they required a 'drag and drop' labelling, a method in which a label is dragged by the mouse cursor to the appropriate site on the image. The text responses were programmed to allow for common spelling errors. In the event of a spelling error, the 'voice' informed the student that although they had answered correctly, they should check the correct spelling that appeared on the screen. Incorrect answers produced a verbal explanation as to why the answer was wrong.

The fifth module, the 'slide quiz', consisted only of questions or structures to be identified. A total of 93 questions were included in the programme, 50 in modules 1, 2 and 4, and 43 questions in the slide quiz. On exiting any module, the student was informed of the number of questions attempted and the percentage of correct answers, based on the number of questions answered correctly at the first attempt.

Programme delivery

The completed software comprised the 6 modules, each compiled as a separate programme. These were loaded on the faculty local area network (LAN) and accessed via the 13 computers in the student computing facility in the faculty library. The computers were 486SX IBM™ clones, with 4 megabytes of RAM, a 512k VGA card, a 0.28 colour monitor, a Soundblaster™ card with attached headphones, connected via ethernet cards to the LAN file-server running Novell Netware 3.1. When switched on, the computers were set to run to Windows™. The icon to initiate the eye programme was the only icon shown on the start-up screen, and the only instruction given the students was to press the enter key to start the programme. Further instruction on the use of the programme and the mouse was given from within the programme. The programme was available to the students for 2 weeks. It was later made available on the LAN for a week for revision purposes.

Student tracking

Once within the introductory/menu module, students were obliged to log on and enter a password in order to proceed. This information was used to generate unique files of each student's progress through the programme, with the files being updated and saved on the LAN file-server on exit from a module. New data were appended to each file every time a module was accessed. Information stored included the student's name, password, log-on time, the module chosen, time spent on the module, the number of questions attempted and the number of questions answered correctly at the first attempt. These files were reviewed at the end of the course.

Programme evaluation

Given that there were only 13 computers, we initially planned to call for 20 volunteers from the second-year class of 125 students. Thirty-four students volunteered and all were included in the study. The students were asked to use the programme as an alternative method of completing the section on the eye. They did, however, also have access to the microscopy lab if they desired.

All 125 students in the class completed a 20-question pre-test on the eye before teaching commenced. At the end of the semester, after the final tests had been written, the same test was re-administered. At the post-test, the study group completed a 38-point questionnaire covering the student's computing experience, programme evaluation and CAI evaluation, and five questions requiring a written response.

Results

The 6 modules comprising the whole programme totalled 18.5 megabytes, and required approximately 70 hours of programming, and approximately 50 hours of script writing, image acquisition and audio recording. No difficulties were encountered with either multi-user access, or graphic and sound transmission on the LAN.

A total of 374 modules were accessed by the 34 students during the 2 weeks that the programme was available on the LAN, an average of 11 ± 6.9 modules per student (range 4 - 30). Five students did not complete all the modules. The slide quiz, module 5, was the most frequently accessed module (Fig. 1). Students averaged 2 ± 1.2 sessions at the computer (range 1 - 5). Total time spent on the computer, excluding the introductory module, averaged 90 ± 71 minutes (range 31 - 328 minutes). Students in the study group spent significantly less time (an average of 92 minutes) in the microscopy laboratory than the remainder of the class (170 minutes) ($P < 0.0001$, t-test). Seven students used only the programme and did not use the microscopy laboratory.

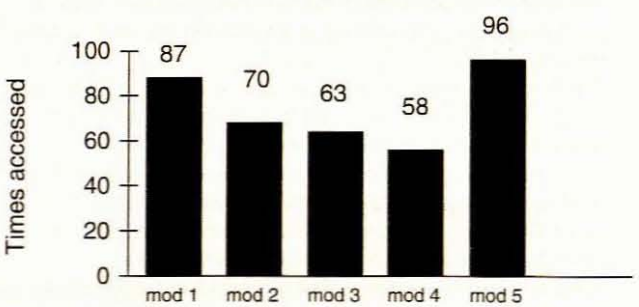


Fig. 1. The number of times each module was accessed by the 34 students during the 2-week study period.

All students improved their self-assessment scores with repeated use of a module (Fig. 2). Approximately half the students attempted a module only once, and their self-assessment scores were on average 7 - 9% higher than the first-try scores of those who repeated modules.

MVSA MASA

MANAGED CARE & QUALITY REVIEW

September 1996

Facts, trends and knowledge for doctors in today's changing health care environment

SHC negotiations successfully concluded!

The revised Individual Provider Agreement of Southern HealthCare JV meets with the essential principles required by MASA.

'We are there!,' was the general comment from a satisfied MASA negotiation team after concluding the final discussions on the Southern HealthCare JV (SHC) contract on 28 August.

The revised SHC provider contract, or 'Individual Provider Agreement', as it is called, was initiated by MASA four months ago, as certain aspects of the contract caused some concern.

The revised SHC document incorporates the essential principles of the *pro forma* contract that was drawn up by MASA's legal department in conjunction with a legal expert on managed care in the USA, Noah Rosenberg. The *pro forma* contract has been accepted by the relevant specialist and special interest groups as a basis for future negotiations with health care funders.

The negotiation team consisting of Dr Richard Tuft, chairman of the Private Practice Committee, and Drs Paul Cooke, Alistair Lamont, Jos van Niekerk and Christo Botha, confirmed in a statement that

- **The revised Individual Provider Agreement of Southern HealthCare JV incorporates the essential principles of MASA's *pro forma* contract, which has been accepted by the relevant MASA groups as a basis for future negotiations with health care funders.**
- **MASA does not comment on the tariff offered by SHC JV. Acceptance of the tariff is a business decision of the individual doctor, following advice from MASA's specialist and special interest groups and/or specific IPAs.**

The most important revisions concern the following:

- SHC accepting financial responsibility for incorrectly confirming a member's eligibility for benefits;
- confidentiality of medical records meets acceptable norms set by MASA;
- prior authorisation for treatment and hospital admissions;
- SHC will make use of MASA's clinical guidelines;
- regular review of the fee schedules;
- payment for after-hours services.

To facilitate communication between the profession and SHC, MASA has been invited to nominate representatives on the SHC Management Advisory Committee. This committee will consider issues such as guideline development, admission requirements, fee schedule development, confidentiality and contract amendments.

MASA will also have the right to nominate a 'participating provider' on SHC's Quality Assurance and Credentialling Committees. Doctors will receive the revised agreements shortly.

In this issue

News on Sanlam Health

The prediction that Sanlam Health's final provider contract will be released to the profession in August onwards, as reported *MC&QR* of August 1996, has not been realised, but a few draft versions of the contract have since seen the light.

MASA has requested a meeting with Sanlam Health to discuss the final contract before its release to the profession. This meeting is scheduled to take place on August 30.

The Private Practice Committee asked members **not to sign** Sanlam Health's contract until so advised by their group representatives, as certain clauses in the contract were regarded as unacceptable.

This publication has been made possible by Sanlam in the interest of quality managed health care for South Africa.

Sanlam

Top pharmaceutical and medical companies

There are six pharmaceutical and medical companies listed among the JSE's top 300 industrial companies, measured by total assets. They are:

- SA Druggists (ranked 52) with total assets worth R1 584 million, a net profit of R 124 million and a turnover of R 468 million (August '94 to '95).
- Clinics (ranked 68) with total market assets worth R 1 079,5 million, a net profit of R 42,1 million and a turnover of R 840,8 million (September '94 to '95).
- Adcock Ingram (ranked 93) with total assets worth R 713,7 million, a net profit of R 131,1 million and a turnover of R 1 165,8 million (September '94 to '95).
- Presmed (ranked 173) with total assets of R 162,1 million, a net profit of R 14,0 million and a turnover of R 171,5 million (February '94 to '95).
- Medex (ranked 175) with total assets of R 157,7 million, a net profit of R 10,6 million, and a turnover of R 51,1 million (April '94 to '95).
- Aukland (ranked 259) with total assets of R 28,5 million, a net profit of R 2,6 million and a turnover of R 41,5 million (June '94 to '95).

Source: *Financial Mail Special Survey of Top Companies in South Africa*, 28 June 1996.

New clinic group compete on the PHC market

Pharma Clinic, a new division of the medical supply company Medhold Ltd, announced its entrance into the managed care market on the primary care level with a plan to convert more than 400 retail pharmacies into private care centres over the next three years.

Each of these pharmacies will offer a low-cost private health care package to employed people without medical cover, according to general manager, Mark Hyman.

He said at a media launch at Summer Place in Johannesburg, property of the Krok family, that health care principles will be applied in these centres. Clinics would be staffed by a primary health care nurse, supported by a general practitioner.

Fee-for-service patients would pay R30 for a PHC nurse consultation, diagnosis and treatment, dispensed by the pharmacist. Further treatment would be for their own account.

Capitation patients would be recruited through employer groups and pay monthly fees of between R104 and R120 per member per month for nurse and GP consultations and treatment, as well as access to further treatment on referral.

Don't buy new software packages or make drastic changes to your hardware at this stage in order to accommodate the new CTP-4 (Current Procedural Terminology) coding system, warns Dr George Veliotes, Head, Private Practice of MASA and member of PHISC, the task group exploring the most cost-effective way to implement CPT.

Ranking of medical schemes administrators

Medscheme (Pty) was ranked first among medical schemes administrators in the latest *Financial Mail Special Survey of Top Companies in South Africa*, (28 June 1996) in the category for average members, contributions received and administration fees and AMA second. D&E was ranked first in the categories for administrations fees as a percentage of contributions, as well as for administration costs per month.

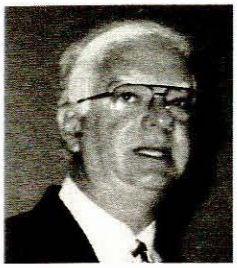
MEDICAL SCHEMES ADMINISTRATORS 1994

Name	Average members 1994	Contributions received (Rm)	Rank	Admin fees (Rm)
Medscheme (Pty)	543 922	3 155,0	1	195.8
AMA	193 270	1 172,7	2	67.4
D&E	117 631	653,5	3	32.3
Sanmed	93 559	605,9	4	34.8
Northern	77 094	492,0	5	37.2
Old Mutual	66 865	350,2	6	27.1

Name	Admin fees as % of contributions	Rank	Admin costs per month	Rank
Medscheme (Pty)	6.21	4	30,00	3
AMA	5.75	3	29,08	2
D&E	4.94	1	22,87	1
Sanmed	5.74	2	30,97	4
Northern	7.56	5	40,20	6
Old Mutual	7.74	6	33,79	5

Source: GED Thierry

The 1996 Directory of South African Clinical guidelines that appears yearly (61 pages PLUS three one-page updates per year), is now available at R190 for members and R290 for non-members. It can be ordered from Roger Macdonald, MASA Publications, Cape Town, tel (021) 531-3081, or fax (021) 531-4126.



'Believe me, it will not go away' (part 3)

In this third article in a series based on workshops held in South Africa, Dr Richard F. Corlin, a gastroenterologist in private practice in Santa Monica, California, and speaker of the American Medical Association (AMA) House of Delegates, expands further on the topic of risk-sharing.

At some point you will need to negotiate a capitation rate with the funder. You cannot do that without data or information.

THE payment strategies of managed care organisations often go through different phases. Initially it will be some version of whatever they pay you now. Then the managed care organisations will try to introduce a reduced fee for service rate in return for more patients as everybody won't be on the contract, and in return for earlier payment.

The next step will be a capitated system – to which I am not fundamentally opposed – but you will have to know how to work with it.

One of the minimal advantages under a capitated system is that billing costs are remarkably reduced because you only have to keep track of how many people are enrolled in the plan. You also get a fixed amount of money per member per month.

You also need to know that at some point you will be asked to negotiate a capitation rate with the funder. You cannot negotiate that rate blindly and without data or information.

So what data or information do you need? Firstly a computer system and a soft-ware package that allow you to obtain certain information from your system.

The information you need includes all the things you do in significant quantities, and how many you do for each funder.

You will need information on all the things you do in significant quantities, and on how many you do for each funder. For example how many consultations, office visits, gastroscopes, endoscopes. And you'd better be able to get the information off you computer, because if you have to ask the funder for the information he will think that you are an idiot.

Without that information you cannot negotiate a capitated rate. Now why would they want to negotiate a capitated rate? Because they want to transfer the risk of access utilisation of patients from them to you. If you are on a capitated rate, the MHC company can predict its costs accurately, and you take the risk.

Before you can negotiate, you need to know how many people they have covered under a certain plan. And you need to ask them how many people they had covered during each of those months.

With that information you will be able to tell if the capitated rate they offer, is fair. For example, if I did an average of 12 colonoscopies per month for people in a plan for the last two years, and they paid me $ 400 per colonoscopy, I would get $ 4 800 per colonoscopy per month. If there were 1 000 people in the plan, I would do 12 colonoscopies for a 1 000 patients per month, and if 10 000, 1.2 colonoscopies per 1 000 patients per month for the same amount. In gastroenterology the typical capitated rate offered by MHC companies starts at 50c per member per month. The question is: what does that 50c mean? Is it enough? Is it more than enough, or is it less?

How do I work that out? If there are 10 000 people in the plan at 50c per member per month, it will mean $ 5 000 a month for a colonoscopy. I were previously paid $ 4 800. Under the capitated system it would mean that I will receive more or less the same amount. I can live with that.

If, however, they only have 1 000 members in their plan and they offer me 50c per member per month, I will only get $ 500 per member per month where I used to get $ 4 800, and I cannot begin to live with that. And if they have 20 000 members in their plan I would receive $10 000 a month instead of $ 4 800, which is a huge bonus.

The point is that if you don't have the data, you won't know if a negotiated rate of 50c per member per month is a reasonable, or a great rate, or whether it will it drive you into bankruptcy.

Let's recap some of what was said in the first two articles: What will be the outcome of a properly run managed care system?

- A significant drop in hospital patient days of at least 50%.
- More work will be done in your rooms and you will notice that for every $1000 dollars you generate in your office, it costs you a lot more to generate the same amount in hospitals.
- Because more work will be done at your practice instead of at the hospital, your overheads will tend to rise. You will have to cut on overheads as far as possible.

Risk-sharing: Capitation fees

Things to do and records to keep:

Patient files

Capitation service contract file

Register of patient consultations

Patient education programmes

Records or outcome and treatment

CAPITATION is when a fixed amount is paid to a provider by a health plan to cover the cost of health care delivered for a person. The term usually refers to a negotiated rate per member per month paid to the health care provider, regardless of the use of services. The provider is responsible for delivering or arranging for the delivery of all health services required by the covered person under the conditions of the provider contract.

This differs from fee-for-service contracts in that the funder carries the volume risk and the medical practitioner submits a fee account for every patient who attends. Under capitation the funder has capped their liability by the amount of the capitation fee and the medical practitioner carries the risk relative to the number of patients who attend.

Practice management must change so that the medical practitioner is fully aware of the implications of capitation contracts.

The first implication for your practice will be in the area of record-keeping. The practitioner needs to maintain the following records and statistics:

■ **Patient file:** This would continue as in the past to contain clinical history of the patient in the prescribed manner.

■ **Capitation Service contract file:** This file will include the details of the defined services which are to be provided in terms of the contract. The file will need to be updated with further definition of services that result from enquiry and funder updates. It is important to understand when the patient may or may not be referred to a specialist and the terms of referral as prescribed by the funder. If a patient is incorrectly referred, the funder may refuse payment and seek payment from the practitioner or the patient. Similarly, the rules for admitting a patient to a day clinic or hospital need to be understood and followed to protect both practitioner and patient from embarrassment. Conversely, the practitioner will not want to carry out a procedure which can be referred to a specialist against payment by the fund.

■ **Register of patients:** This is an extremely important function. The patient may only receive attention under the contract if they are still paid up members of the fund. The monthly returns from the funder will advise of changes in membership and if the practitioner is not kept advised of a change the patient could receive attention when no longer a member of the fund. This will lead to drawn-out fee collection procedures or even bad debts. The practitioner will introduce a process whereby the fund's membership list is checked against the register of members before the start of each month. When a patient presents for a consultation the practitioner will check the eligibility of the patient against the register beforehand.

■ Register of patient consultations: Fee accounts are no longer prepared by the practitioner. The introduction of a register which records each patient visit and the procedures carried out for each visit has become important for two reasons:

1. the funder may require statistics. The funder used to collate statistics from fee-for-service accounts and now seeks another method of information collection;

2. the practitioner will need to have basic procedure volumes to manage the practice and as a base for future fee negotiations.

■ **Patient education programme:** The objective is to improve the health status of the patient without adding to the average number of visits per patient per annum. To achieve this end the funder and the practitioner must work together to educate the patient on matters such as preventive medicine, early consultation, self-diagnosis, self-medication and healthy living habits. The practitioner will develop and introduce an ongoing patient education programme using material supplied by the Funder and other organizations.

■ **Outcome and cost of treatment awareness:** Practitioners have in the past enjoyed practice habits which carried little or no risk to their income and lifestyle. The introduction of capitation means that the risk has been transferred. It will now be necessary to maintain records of the outcomes of particular treatment regimes so that the most cost effective protocol can be adopted for treating patients in the future.

Malcolm Brown CA (SA), Health Care Consultant, tel and fax (012) 47-6468.

An average of 45% of all primary care medical services in the USA covered by HMOs are capitated, according to a recent survey by InterStudy Publication, a research organisation. HMOs paid 27.3% of primary health care services under fee-for-service arrangements, 7.2% through relative value scale systems, and 8.5% to salaried health care workers. (*American Healthline*, 9 July 1996).

Speak your mind! Letters and questions

The principles of set-off

D.L. Pearmain, Legal Advisor, AMA (Pty) LTD, writes: The subject of set-off is poorly understood within the health care industry. In an article on the Southern HealthCare JV (SHC) provider contract (*MC&QR*, May 1996) the writer observes that SHC has agreed to review a clause which gives SHC the right to reverse payment for the treatment of a patient not eligible for benefits.

This is called set-off, but set-off within a health care context is **not usually** illegal. The clause proposed by SHC is legal. Indeed, set-off will automatically apply where there is a contract. Set-off applies to all commercial affairs, including transactions within the health care industry.

Set-off is a method by which debts may be cancelled. Debts arise from contracts but they can also arise where no contract exists, e.g. where one person has been unjustifiably enriched at another's expense.

Set-off occurs when parties are reciprocally indebted to each other. Set-off can occur between the scheme and its members where there is no contract to the contrary between the scheme and the provider. Where overpayment is made to a provider in respect of a patient A and patient A subsequently incurs further medical expenses with the same provider and then claims these from the scheme, the later claim may be offset against the earlier overpayment.

Set-off can also occur where there is a contract between the provider and the scheme, regardless of whether the claims concerned are for different patients. Contracts do not have to be written to be valid.

The SHC contract, in requiring the provider not to bill the patient, substitutes the scheme as the debtor. This is not illegal. The law requires that a statement be sent to the patient. The provider is not required to demand payment from the patient.

Set-off operates by operation of law. Set-off is not implemented by anyone. Unless it is specifically excluded, set-off will occur as soon as the parties incur reciprocal debts. **For set-off to occur, the claim must be liquidated.** It must be evident that the debt is due and the amount thereof.

Many providers have tacit agreements with medical schemes. The standard terms are as follows:

- The provider agrees that if the scheme consistently pays directly all accounts submitted in respect of members of the scheme, he/she will consistently charge the RAMS recommended tariff (RRT).
- Direct payments will be made only to the limit of the RRT. Charges in excess of this will be reduced to the amount of the tariff. If the provider persists in charging in excess of the tariff, direct payment status will be withdrawn.
- The scheme is obliged to give reasonable notice of termination of this arrangement.
- The arrangement may be terminated if the provider acts fraudulently or abuses the agreement.

The reason for the existence of such contracts is the mutual benefit of providers and schemes alike.

Esmé Prins, Manager: Legal Affairs of MASA, answers: The reversal of payment practised by medical schemes to recover incorrect payment from doctors should only be allowed in exceptional circumstances. In the past year we obtained legal advice from council on two occasions to determine whether schemes had the right to recover their losses in this manner.

MASA was advised that medical schemes could indeed reverse payment under certain conditions, but that each case should be dealt with individually. It would appear that the system used by the schemes to determine whether a patient qualifies for benefits or not, is inefficient, and that incorrect information is sometimes provided. At its recent meeting the Private Practice Negotiating Committee recommended that schemes should be encouraged to improve patient information systems to prevent under- and over payment for services. This aspect would be negotiated with managed health care organisations in future to eliminate this practice.

If you have any questions, comments, or special issues you would like to see addressed in MQ&QR, we undertake to get experts to answer it! Please address your letters to: Ina van der Linde, PO Box 27232, Lynnwood 0005. or fax: (012) 47-6101, e-mail: masivdl@aztec.co.za

Strategic Health Care Systems (Stratmed), in which Thebe Health Care holds a controlling interest, secured a tender of R100 million to renovate the Northern Province's health services. It will include the training of hospital personnel in the handling, distribution and storing of medical supplies, the handling of medication and establishing of a medical database (*Beeld*, 5 July, 1996).

Doctors give birth to own Bank

A major step forward in the establishment of the Southern African Medical and Dental Bank, **MED-DIRECT Bank,** *was taken at a meeting in Randburg on 6 August when a steering committee was appointed to oversee the raising of the capital and the formation of a holding company* **MED-DIRECT Holdings.** *Dr Chris Archer, the chairman of the steering committee, explains why.*

A single company is to be formed for all accredited providers in Kwazulu-Natal. This follows a meeting between representatives of the Greater Durban Association of IPAs, the Family Practitioners Association, and the Zululand IPA. The company will be an integral part of the South African Managed Care Coalition (SAMCC).

The idea of the medical community creating and owning its own bank was first raised at a meeting of the Private Practice Committee (PPC) of MASA in February 1994.

Since then a number of discussions and meetings have taken place with members of the medical community and with bankers culminating in the decision to establish a company to hold shares on behalf of Doctors in MED-DIRECT Bank.

The formation of an independent bank owned and used by the medical profession and allied professions empowered to address this community's needs would enable the medical community to share in the revenue emanating from the provision of banking services, meaningfully participate in the growth and development of health care services, and to participate in the recurring revenue streams associated with transaction and information processing.

The medical case

Bernard Mandell made a statement recently and in the process laid down a challenge to all who are concerned about the future of the profession when he said: "The medical community has the prerogative to manage health care. If we do it right there should be no need for third parties to do it for us". I might add: "to the possible detriment of our patients and ourselves".

NMA Medical Fund Managers have embarked on an exercise to identify medical practitioners whose claims are excessive, said Review and Audit Manager, Mark Slabbert. Direct payments to practices whose claims exceed the norm by more than 200% were suspended from May 1996. The 200 doctors (about 3% of GP practices) who were affected, received 12.5% of the total amount paid out to all GPs in 1995. (*Sunday Times*, 1996)

Why our own bank?

The medical profession has a right to own the medical profession. For many reasons the control of funds generated by the profession has been the domain of others and not the profession. The establishment of MED-DIRECT Bank will bring back the financial control where it rightly belongs, with the medical profession itself.

Benefits to the medical community

- A bank whose raison d'etre is the provision of cost effective and efficient services to the profession.
- Funds generated by the profession will remain within the profession. (A means of diverting profits away from third parties and back to the medical community)
- The capability of acquiring all financial transactions generated by the industry.
- Maximise the use of the money market.
- Participation in the emerging managed care environment.

Med-direct Holdings Ltd

To satisfy the Reserve Bank's requirement that the medical profession is the dominant partner, MED-DIRECT Holdings Ltd will act as the entity through which professionals invest in MED-DIRECT Bank.

MED-DIRECT Holdings Ltd will thus be the major shareholder in the Bank.

MED-DIRECT Bank

Unlike a conventional bricks and mortar bank MED-DIRECT Bank will be an electronic bank similar to Midland Bank PLC "First-Direct" in the UK. Unlike a conventional bank with its high overheads, it will operate at an expense to income ratio of less than 35%, according to Alastair Graham, banking consultant to the group stated, "making MED-DIRECT Bank extremely competitive".

Branch and ATM services will be provided by the banking partner. All the banking and allied services required by practitioners will be provided more efficiently and at a lower cost than at present.

NBS Bank participation

Following extensive negotiations NBS Bank have agreed to provide the needed banking services support and will take a minority equity position subject to certain benchmark parameters being achieved. You can make the difference. Support this initiative now.

The steering committee are:

Drs Chris Archer (O&G), Alan Adno (O&G), Sylvia Breno (Anaes), Ray Dawson (Surg), Brian Ginsberg (MCC), Dougie Gurnell (GP), Herman Hamersma (ENT), Arnie Jaffe (Path), Chris Joseph (ENT), Alistair Lamont (Plastics), Ed Levin (Radiol), Tony Saner (GP), Jos van Niekerk (Ortho), and Jan Talma (opth).

Dr Chris Archer, fax (011) 425 5617, or voice mail 082 302 8378.

Benign prostatic hyperplasia (BPH)

BPH is a consequence of aging affecting more than 70% of older men. It is associated with recurrent urinary infections, bleeding and bladder stones. Men with similar symptoms vary considerably in the degree to which their condition bothers them.

Treatment

Many patients are willing to tolerate symptoms when fully informed about the variable natural history of the condition, the risks and benefits of possible treatments and the large placebo effect.

■ Watchful waiting seems to be the safest and most cost-effective option for men with mild and moderate symptoms. Clinically diagnosed, untreated BPH shows a variable pattern of exacerbation and remission. In a 7-year study 10% developed acute retention and 48% had no symptoms at final follow-up. Acute retention at the beginning was not associated with worse symptoms later. Prostate size did not correlate with symptom severity, degee of obstruction or treatment outcome.

■ Alpha-blockers relax muscles in the bladder neck and prostate. All seem to produce small improvements in a short time. Adverse effects are usually minor though dizziness and tiredness may be severe.

■ Finasteride which reduces the level of dihydrotestosterone causes the prostate to shrink. Reduction in symptoms takes months. In 123 patients sexual dysfunction affected 19%.

■ Audits showed 1/4 failed to improve symptomatically after transurethral resection [TURP]. Men with severe symptoms were most likely to benefit; those with mild or moderate symptoms ended up worse. Impotence, incontinence and strictures were long-term adverse effects. More than 70% experienced dry or retrograde ejaculation.

■ Open prostatectomy leads to slightly higher rates of improvement. Re-operation rates are lower. Complications are more common.

■ Incision of the prostate [TUIP] is only suitable for glands ≥ 30g. In these men it is as effective as TURP. It is quicker, uses fewer resources and causes less tissue damage than other forms of surgery.

■ Laser prostatectomy seems slightly less effective than TURP but is safer and causes less complications. Disadvantages include lengthy catheterisation, persistent irritation, dysuria and a delay in benefits.

■ The effectiveness of thermotherapy, transurethral needle ablation [TUNA], high intensity ultrasound and balloon dilatation is doubtful or unknown.

Adapted with permission for *Effectiveness Matters* Vol. 2(2) 1995. Univ. of York, NHS Centre for Reviews & Dissemination, Heslington, York, YO1 5DD.

Prescription-of-the-month

This prescription was sent to us by a group performing drug utilisation review. The main comment related to the abuse of the medical aid system by doctors. The prescription is undeniably unaffordable. But we sense that there is an underlying problem relating to the comprehensive management of a person living with chronic pain. Our version follows. We have not considered drug interactions — that is another story.

A patient with arachnoiditis is treated with the medication marked[1]. Zofran® is prescribed for the nausea caused by fentanyl.[2] Other medications are given as indicated: Barlow's syndrome[3]; idiopathic oedema[4] ; hypermotility syndrome[5]; Zyrtec® for pruritus due to fentanyl.

Dilemmas

The management of chronic pain can be extremely difficult and often needs teamwork by several clinical disciplines to assess all the physical and psychological aspects of the condition and of the management.

Medication	Dosage	Cost R/month
Durogesic TTS® (fentanyl) 100mcg/h[1]	72 hours	2 089,12
Durogesic TTS® (fentanyl) 50mcg/h[1]	72 hours	1 120,64
Emdalen® (lofepramine) 70mg[1]	at night	155,03
Zofran® ondansetron) 8mg[1,2]	12 hourly	4 850,24
Motilium® (domperidone) 10mg[1]	8 hourly	187,38
ScopodermTTS® (scopolamine) 1,5mg[1]	72 hourly	238,12
Purbloka® (propranolol) 40mg[3]	12 hourly	36,44
Burinex-K® (bumetanide + KCl)[4]	2 daily	85,24
Aldazide® (spironolactone + HCTZ)[4]	2 daily	146,89
Zyrtec® (cetirizine Hcl) 400mg[1,4]	daily	111,26
Brufen® (ibuprofen) 600mg[5]	8 hourly	122,70
Covamet® (cyclizine HCl)	4 x day	127,20
Duphalac Dry® (lactulose)	prn	161,80
Senokot® (sennosides)	prn	32,69
TOTAL		**R9 464,75**

The prescription also presents a compelling argument against the use of opioid analgesics (like fentanyl) in the management of chronic non-cancer pain. In this patient the opioid side effect could even explain the manifestations ascribed to the other diagnosed conditions.

Apart from the prohibitive cost of this prescription, the overwhelming impression is of a very desperate prescriber who has been forced to add on drugs to counteract the fetanyl's side effects e.g. ondansetron, domperidone, scopolamine, cyclizine, lactulose, senna, cetrizine and even propanol, the diuretics and the lofepramine.

The patient should be admitted for a complete physical and psychological assessment and weaning off the present medication. The management plan may include medication like non-narcotic analgesics, anticonvulsants and antidepressants. Psychotherapy and possibly hormonal treatment may be considered.

Bernard van de Wal, fax: (021) 932-2189, and Victoria Pinkney-Atkinson , fax: (012) 481-2100.

ACUTE LOW BACK PAIN ALGORITHM: TREATMENT

Adult with low back pain of <3 months duration and with no assessed serious spinal conditions.

Provide assurance – educate about back problems

Does the patient need help to relieve symptoms?

YES

NO

Recommend activity alterations to avoid back irritation.

Review activity limitations (if any) due to back problem: encourage to continue or return to normal activities (including work, with or without restrictions) as soon as possible.

Encourage low stress aerobic exercise.

Symptoms improving?

NO

Follow-up and evaluation of the slow to recover patient.
See October issue of *Managed Care and Quality Review*

YES

Return to normal activity

Recommend/prescribe comfort options based on risk/benefits and patient preference from the list below.

RECOMMENDED

Nonprescription analgesics

- Acetaminophen (safest)
- NSAIDS (aspirin[1], ibuprofen[1]).

Prescribed pharmaceutical methods	*Prescribed physical methods*	
Nonspecific low back symptoms and/or sciatica	Nonspecific low back symptoms	Sciatica
Other NSAIDs[1]	Manipulation (in place of medication or a shorter trial if combined with NSAIDs)	

OPTIONS

Nonspecific low back symptoms and/or sciatica	Nonspecific low back symptoms	Sciatica
• Muscle relaxants[2,3,4] • Opiods [2,3,4]	• Physical agents & modalities[2] (only heat or cold for home programmes) • Shoe insoles[2]	• Manipulation (in place of medication or shorter trial if combined with NSAIDs) • Physical agents modalities • Few days' rest • Shoe insoles[2]

NOTES

1. Aspirin and other NSAIDs are not recommended or use in combination with one another due to the risk of GI complications.
2. Equivocal efficacy
3. Significant potential for producing drowsiness and debilitation: potential for dependency.
4. Short courses of a few days only for severe symptoms.

Algorithm adapted by Victoria Pinkney-Atkinson, MASA Quality Care. From the US Agency for Health Care Policy and Research Clinical Practice Guideline 1994 *Acute Low Back Problems in Adults*.

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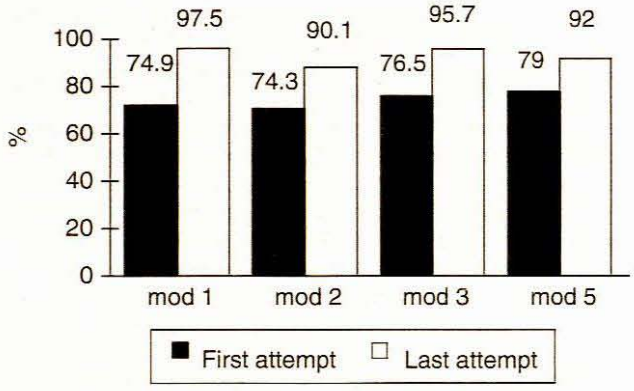

Fig. 2. The scores achieved on first and last attempt at each of the modules. The increases are significant for each module ($P < 0.002$, paired t-test).

Thirteen of the 34 students (38%) indicated that they had had no computer experience prior to taking part in this study. These students spent less time in the laboratory and more time using the computer (119 minutes) than the experienced users (73 minutes). In addition they accessed, on average, 2 modules more per person than the experienced computer users. There was no significant difference between experienced users and new users in their pattern of use of the programme, in the marks obtained in self-assessment scores within the modules, in their pre- and post-test scores (Table I) or in their end of block test marks.

Table I. Mean scores obtained in the pre-test and post-test. The improvement in scores between groups was not statistically significant

	Study group	Non-users	*P*-value
Pre-test	22.1%	23.2%	0
Post-test	65.6%	60.7%	0
Improvement	43.5%	37.5%	0.12

Questionnaire

In addition to the 13 students who had had no previous computer experience, 1 other had not used a mouse before. Of these 14, only 1 student claimed to have had difficulty in using the mouse. No students found that their lack of computer experience hindered their use of the programme. All felt that the instructions within the programme were adequate and found it easy to work through the modules. All but one found it interesting to use the programme. Four students had difficulty in starting up the programme and 6 did not know how to exit the programme, despite a 'quit' button's being permanently displayed on the screen.

The questions and responses of the students to the worth of the programme and its content are summarised in Table II. All but 1 student favour another programme like this in histology. Sixty-seven per cent were in favour of CAIs being introduced into physiology and biochemistry, while only 1 (3%) was against this. All but 1 student felt that CAI has a future in the teaching of medicine. (The dissenter was the same student in each case.)

Table II. Questionnaire — sample of questions and responses

	Positive	Neutral	Negative
The questions and answers provided in the programme helped me learn.	94%	0%	6%
The programme provided me with important basic knowledge.	88%	3%	9%
Using the programme was a helpful learning experience.	88%	6%	6%
This programme disrupted my studies.	0%	6%	94%
I would like the programme to tell me facts rather than ask me questions.	15%	15%	70%
I would like the programme to tell me how often my first answers were correct.	73%	15%	12%
The interactive labelling made more sense than being presented with an already labelled image on the screen.	82%	3%	15%
The information in the programme was presented in a logical, ordered fashion.	85%	12%	3%
I would have liked there to be more questions in the programme.	70%	21%	9%

Forty per cent of the students had had no previous experience with a mouse, but this did not appear to be a problem, as all the students found the instructions adequate and over 90% found it easy to use and work through the programme. There was consensus that the programme helped students to learn (94%), provided important basic knowledge (88%) and was a helpful learning experience (88%).

In response to what students liked best about the programme, 'the graphics' and 'the interactive labelling' were the most common replies, with 'easy to learn from' being the next most common. Other responses included 'ease of use', 'not having to use a microscope', 'the self-assessment questions', 'the sound' and the 'orientation feature'.

Aspects of the programme they liked the least were the poor sound quality, the lack of a 'zoom' facility to change magnification at will and the inability to return to completed screens. Several wanted more information given by voice. In response to what they would like to change within the modules, the response 'nothing' was the most frequent after 'improve the sound'. Asked what they would like to see added to future programmes in histology, 'more questions', 'a zoom facility', and 'a return option' were most commonly requested. Several students wanted more slides, and 1 asked for a slide gallery from which he could choose the slide that he wished to view.

During the week that the programme was available for revision, an additional 30 students who were not in the study group accessed 122 modules of the programme. The slide quiz was the one most frequently used.

Discussion

While the generally positive response of the students to this pilot study suggests that there may be a place for more widespread implementation of multimedia-based CAI within a subject such as histology, the various questions asked of multimedia-based CAI and issues raised in the objectives of the pilot study need to be examined more closely.

The first objective was to produce an interactive programme on the eye. Why write 'in-house' software? It is a common phenomenon in educational software development that educationists prefer to use a home-grown product.[2] This preference is understandable in clinical medicine, where investigation and treatment algorithms may vary in different countries and from centre to centre. Within the basic sciences, the need is less apparent, save to present information in a specific form and at a specific level. Another advantage is that it is easier and cheaper to update and modify the software as and when required. Multimedia-based CAI is still so novel that little commercial software is available, thereby necessitating self-development at present.

Much of the time spent on this project — 120 staff hours — was taken up with finding solutions to programming problems and improving the end product. Once over the learning curve, the final module of 3.7 megabytes was produced in under 3 hours. The software was written without the services of a computer programmer, which confirms that it is possible for the 'average' computer-literate academic to produce multimedia CAI. While a programmer would reduce development time, academic staff input is still required to write the script and to edit the software.

Software evaluation can take place at different levels, ranging from student participation in software design and development, to academic peer review and end-user review.[3] This programme has undergone peer and end-user-review. The students formed two groups, the computer-literate, familiar with the standards of commercial software and games, and those with no standards against which to judge the end product. The instructions within the programme were found to be adequate. Both groups expressed satisfaction with the content, the quality of the graphics and the interactions, including the labelling. This approval probably reflects the time taken to identify student problem areas before writing the script. The quality and quantity of the self-assessment questions, while generally acceptable, did not meet the expectations of all the students, some of whom found them too easy while others considered them too difficult. Academic peer review within the faculty was favourable.

The use of sound was considered a positive feature. The poor quality of the sound was, however, the major problem identified in the programme. This was partly a consequence of the quality of equipment used for making the recordings, the low recording sampling rate used to minimise file size, the standard of the sound card through which it was played and the quality of the headphones used by the students. These are all issues that warrant attention if voice files are to be used by students who have become used to the high quality of digital sound.

The lack of computer literacy and experience in the use of a mouse was identified as a possible problem that might restrict the use and efficacy of multimedia CAI. The group of students lacking computer literacy were nonetheless able to use the programme and accessed, on average, 2 modules more than their more experienced peers. While this was encouraging, the problem has not been fully resolved, as only 13 of the 75 (17%) students with no computer experience volunteered for the study. It is of interest that 4 of these 13 students used only the computer programme and did not make use of the microscopy laboratory.

The improvement in the post-test scores of the CAI users is in keeping with other studies, which show that students exposed to CAI score better in unannounced testing.[4] Of greater importance is the finding that, despite a significant reduction in time spent in the microscopy laboratory, the CAI users fared no worse than the rest of the class. Notwithstanding the bias of the sample in favour of computer-literate students, only 1 student, an experienced computer user, was not in favour of general implementation of multimedia CAI in histology.

While the students' response to multimedia CAI appears favourable, it is the response of administrators faced with financing the implementation of CAI that will dictate the future of the medium in many institutions. The provision of initial infrastructure is costly. A student computing facility is required. This should preferably be a LAN linked to a faculty or university network. An adequate number of computers is needed to meet the demand of the student population. There is the additional cost of ownership of computer hardware, which conservatively requires replacement and/or upgrading every 5 years. The students should have access to the computers after-hours, so that they may work at their own pace and in their own time. Depending on the siting of the student LAN, this may have security and staffing implications. There is, in addition, the cost of software and software development in terms of both finance and staff time. Against this burden must be weighed the annual costs of laboratory equipment purchase and maintenance, laboratory technical staff salaries, the provision of expendables, and academic staff time given to laboratory supervision.

This pilot study was undertaken to assess the potential use of multimedia-based CAI as a resource in problem-based teaching in a group of students with disparate computing skills, and as a means of reducing the need to staff laboratories for small groups of students proceeding at different speeds through their course. Use of CAI reduced student laboratory time and did not affect their marks. Lack of computing skills was not disadvantageous to students using CAI. The lack of computing skills on the part of second-year students has been identified, and computer literacy is to be introduced into the first-year curriculum. Given the favourable response of the students, further CAI resource programmes will be designed.

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