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Siting CAL in a Legal Environment: CMLCAL

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Abstract: This paper describes the ESRC funded research project on constructing a methodology for legal cal (CMLCAL). The project is mainly aimed at examining the way in which computer assisted learning (CAL) courses were developed by a selected group of academics in the United Kingdom. The medium selected for the courses was LEXICAL, an authoring system developed at Queen's University of Belfast with support from IBM UK Trust, which has been distributed to BILETA members. The project has provided a number of insights mb the problems involved in CAL development, and strategies for the future. It has also resulted in the development of a number of useful CAL tutorials which will be distributed free to the academic community.

Introduction: The problem of CAL

Computer Assisted Learning (CAL) is not a new use of computers. Since the mainframe became available in the academic environment various disciplines have attempted to use it to improve, and sometime replace, the teaching which is made available to students. Any history of CAL would show that its experimental usage was more akin to a shot-gun blast (with widespread, but difficult to locate effects) rather than the single targeted bullet of the sharpshooter (which can be easily quantified). We can still see the effects of this history - there is still no clear agreement even over whether CAL is a "good thing" or not, for there is no large body of evidence which supports CAL's success and puts it beyond doubt (CALI Report 1989, Clark 1983, Korn 1983, Burris et al 1979, Jones 1989, Paliwala 1991). This is not to say that we do not believe that CAL is a useful addition to the armoury of the educator. It is simply stating that there has been no concerted attempt to provide CAL with clear foundations and guidelines, and pointing out that there is a degree of scepticism about the vaiue of CAL.

The constraints which law schools still find in using mainframes (difficulty of access, the fact that they use "dumb" terminals etc.) were obviously a severe limiting factor upon those early pioneers in the CAL field. This period covered from the 1960s right up to the mid 1980s. However, with the rapid rise of the personal computer (PC) environment, CAL has had something of a renewal of interest: most law schools now have PCs available to their students - many staff are now computer literate, and the environment for CAL seems to us to be healthier than it has ever been before (Paliwala 1991). With a healthier computing environment, though, we are still left with "the problem" of CAL. In our terms, this problem can best be described as the difficulty of producing good, high quality teaching materials. Although there are many who might suggest that even with such materials, CAL is of little practical advantage in comparison with the good lecturer or tutor, we do not hold such a position ourselves. Indeed, it seems to us that the sceptical position might only be

relevant because we have not been able to produce the necessary quality of computer-based teaching materials which we need in order to use CAL satisfactorily.

That there is a difficulty in producing high quality materials is clear. In the USA, the CALl project has been run for some years now (and with substantial funding) and is only beginning - its co-ordinators believe - to have brought the bulk of its teaching materials up to an approved standard (and kept it there). In the early days of this project, some materials were used and disseminated about US law schools which the project would have preferred not to have so disseminated because of their relatively poor quality. Most research into the area of CAL has been interested in the reception of the materials by students and has attempted to find ways to quantify this (CALI 1989). One standard method has been with one group using the materials having their exam scores matched against those who have not. Such empiricism is no doubt useful and helpful, but it does not really tefl us much about the process and the techniques and the methods which those who produce CAL tutorials use, or should use, in order to produce good quality materials.

In order to highlight the area which we feel to be the greatest problem of CAL - that is, the production of CAL tutorials - we undertook research with a group of law lecturers. These lecturers had indicated an interest in CAL but could be described as naive CAL producers. The lecturers undertook to develop CAL courses while co-operating with us in our study. We were interested in various factors:

1. What were their initial views on the utility of CAL and how did they see CAL impinging upon their teaching?
2. How they went about choosing an area of law, and how they dealt with it (what factors about CAL or that area were limiting, for example).
3. How they responded during the research period, and how their views changed.
4. The quality of the materials produced and how these related to individual circumstances (eg Is it easier to "do CAL" in some environments than in others?)

From these interviews and analyses, our more long term aim is to try to produce some guidelines, or more formally, a methodology which we can suggest to potential CAL authors as a path to success. Hopefully, emphasis upon this part of the CAL chain would mean that the eventual use by students would be easier and more pedagogically sound. In the rest of this paper we shall give some indications of our strategy and what we have found, and our initial suggestions as to appropriate method.

One point should be made about the nature of the general task set those wishing to bring the computer into legal teaching. It is that, despite the existence of the computer in the academic environment for the past twenty or so years, the PC has only been present and widely available for some five years. This means that we are only at the beginning of any real "computer revolution" in law schools: we need to learn in a wider way how computers can be integrated into law teaching. There are a variety of projects underway which demonstrate the broad base of potential applications. The sort of CAL which our project was interested in - that is, the traditional question/answer kind - is but one of these potential application areas. There are other methods whereby the computer can be used as a teaching aid which do not follow this path: for example, simulation and negotiation projects based upon the computer can clearly be seen to be oriented to teaching and learning in the legal environment. Our interest in this paper is therefore specific, rather than global with regard to the gamut of possible application techniques.

Methodology of the Project

A self-selecting group of law lecturers was brought together at one site for a one-day overview of

what our project was and to encourage the lecturers to participate in the project. It was self-selecting insofar as there was a general invitation for anyone interested to attend, and those who took the trouble to travel to Leicester Polytechnic were more interested than those who did not. The group which we began with were therefore more positive than other groups. This is not a minor point, since we have found in the past that colleagues sometimes indicate an interest in producing CAL materials (in the comfort of a staff common room) but then never find the time nor inclination to carry this interest through.

The initial research proposal specified that the law lecturers would come from three distinct institutions. This would have allowed us to contrast the effect which a different educational environment had on the writers. In the end, though, our final co-operants came from a more diverse set of institution: from colleges of further education to university environments. Also, since there was a mix of single person and group participants within each institution, this further altered our original plans. These factors highlighted even further the differences which we were trying to ascertain, so we do not feel that we were disadvantaged in our research.

From that initial group of 11, we had agreement from 7 to participate. Most agreed to produce two CAL tutorials, for which a sum of money was to be paid. Given that it has been estimated that a high quality tutorial can take up to 300 hours of effort to produce, the sums of money made available were not large. Rights to distribute the CAL tutorials after the project ended meant that the general law school population would gain from the project, too.

The participants were not given any instruction in the writing or production of the tutorials apart from a very basic introduction to the authoring system. They were left with a manual and a copy of an authoring system and, by and large, left to get on with it. They were told, though, that they could have support from the team if they requested it-either by telephone or by arranging a one-day seminar. None of the participants took up these offers. Help was given, though, during visits by the research team to the participants.

Each participant was interviewed twice. We tried, wherever possible, to have all members of the research team visit every institution. Interviews were taped, and we intend to make use of these in further writing on the subject. At the end of the period for the production of the materials a get-together of all participants was planned.

Since one of the research team had designed a CAL authoring system (LEXICAL) which was being made available to law schools in the UK, this system was used as a test bed for the research project. An advantage from this was that information was gleaned to help produce a new and revised version of LEXICAL. We believe that our research was not marred by this tie-in. In fact, in comparison with some CAL approaches, LEXICAL is easier for the novice to use: particularly compared with approaches which require that the author produce a programmed script which is interpreted by a CAL interpreter. LEXICAL as an authoring system requires expertise which is not much more arduous than basic word processing. There is no need to define screens or to produce complex text formats. In addition, the author can try out each question as it is edited, and can easily enter corrections. Of course, any simple system will have its limitations, and as we point out below, it is important to select the system most appropriate to one's needs and ability.

In the United Kingdom recently, various attempts have been made to develop CAL using a variety of techniques. Computer literate CAL enthusiasts such as Max Young and Peter Sparks have hard programmed their courses in programming languages such as basic or pascal. This has obvious advantages in enabling the author to develop a flexible programming approach. For example, Peter Sparks has been able to introduce a limited graphic capability in his tutorials. The disadvantage is the enormous programming effort required. Some authors have also attempted to use FORMAT PC's topclass system which is a dedicated authoring system. However, TOPCLASS does require a significant amount of computer literacy and effort in designing screens, colours etc. The CALI-US

"PIL" system involves the use of a number of PASCAL routines which simplify programming procedures. But these are not for naive computer users. The system requires co-operation between the course developer and a programmer in which the course developer drafts text files and sends them to be programmed. There is a loss of immediacy and learning by trial and error as compared with the interactive use of LEXICAL. The INTERPRO system developed by USCALI has similar intentions to LEXICAL, and it is not our intention to compare the two here.

The output - in terms of CAL tutorials which run on LEXICAL - from the project was significant. Nine usable tutorials have been produced already. In addition, participants have written a number of CAL exercises which are of value to those interested in investigating computer assisted learning.

Since we felt that, at the beginning of the project, we - as reasonably computer literate people - knew very little about the actual way that the novice would approach the task of setting out to discover how to work within the limitations of CAL and use its advantages, we felt that the most appropriate analytic technique was that of observing the production of tutorials, and interviewing during the course of this production. Crude empirical approaches - questionnaires strictly set and responded to - would not have given us insights in the style of thinking of those novices. Thus we chose a relatively informal approach. We feel that this was successful and that we have not lost out on anything which a more quantitative "scientific" approach would have gleaned.

Initial Findings

As our understanding of the difficulties which novices had in developing and thinking about CAL became clearer, we started to formalise these into various classifications. Some were to do with the difficulty of using computer systems, some with the difficulty of getting access to these, and some with the difficulty of knowing just what CAL could do and what it could not do. Further more, there is an added layer of complexity which arises in legal CAL, which is not so obvious in other subject areas. This further layer is due to the philosophical difficulty of knowing what law is and what legal education is about. We discuss this in a later section of this paper.

However, the problems which our participants had can be dealt with under the following sub-headings:

Isolation of legal academics

Our original aim to have as project participants groups of academics at several different institutions was based on the belief that there would be a coming together of the participants to discuss and help each other with the task of producing tutorials. However, a tentative finding is that this is not really the case at all - most legal academics in the UK are relatively isolated from each other.

The institution which had three participants provided the clearest example to us. It became apparent that while there was some discussion on how fast or slow each of the participants was at producing the tutorials, there was not a great deal of precise aid being transferred between the group members. For example, one member of the three had managed to find a way to copy text from one part of the CAL tutorial relatively easily to another part of it. This was mentioned in the LEXICAL manual, but was not too obvious. Another member asked one of the project team whether this could actually be done or not, only to be told that his colleague had been doing this for some time.

As well as these indications, we saw that staff members in most institutions by and large had closed office doors - an indication of the difficulty of simply popping in and out of offices for a short discussion or help. Indeed, most UK law academics probably work in an environment where the office door has to be closed off from constant student noise and interruption. This differs quite

radically from those US law schools we have visited: there, office doors are more frequently open and there seems to be more professional contact between teaching staff. And, even in science faculties in the UK, there is much more contact between members as they come together to carry out joint research projects on the expensive equipment which is shared by a team, rather than used by one academic on his or her own project.

Taken together with some of the other findings below, we can begin to see that there are indications of how difficult it is to integrate new teaching methods in legal education: the law lecturer might be aware of work into CAL going on in her institution, but it is unlikely that she will see the process of tutorial construction underway. Lacking these kinds of insights suggests that the novice will be more isolated than we might ideally wish.

Access to facilities

The ease or difficulty of access to computing equipment was found to be an important, if expected, factor in CAL development. In the best serviced institutions academics had a PC on their desk and used it for word processing etc. In the worst, the law lecturer had to physically travel between teaching sites in order to access a PC. As can be imagined, we found that this was a major cause for concern to the lecturer.

Access was not only important in allowing the lecturer ease and time to produce the tutorial, but it also had a major effect upon the feedback which students could provide on first versions of tutorials. Those institutions with teaching labs which were easily accessible to the student population could provide a test-bed for the lecturer: and since most students seem to be quite positive with regard to CAL, this feedback is encouraging to the lecturer.

Computer illiteracy/literacy

We did not look for participating lecturers who were computer naive. Rather, our ideal was someone who knew how to use a computer, used it for word processing, and could understand the basics of the computer's operating system. By and large, we did get this, though there was a wider spread of competence than we might have imagined.

One lecturer who had a computer system on her office desk turned out to have more problems in understanding that the "word processor" as she saw it, was actually a computer which could do more than simply word process. Since she only used preformatted disks, she was unsure about the whole process of formatting, directories and suchlike. At the other extreme one lecturer turned out to have an aptitude for programming and was very keen to test the software to the very limits.

Between these two extremes, most of our participants were capable of using the system (that is, both computer and software) at the basic level. We found that they read the manual first, tested the system and then, when they could do the basic tasks, they tended to ignore the manual as a means of extending their limited abilities. This, together with the isolation mentioned above, suggested to us that our participants were on a slow learning curve - learning to solve problems by themselves and only by accident.

Computer literacy is not only about being able to use a computer. It can also be regarded as knowing about the general usage, power and limitations of various pieces of software. For example, lack of initial comprehension about what CAL can do led - we felt - to highly exaggerated expectations of what the lecturers might be able to achieve. We found that there was a decided downgrading of expectation over the period of the project. This is not to say that the downgrading of expectation led to a downgrading of the individual's view of the usefulness of CAL software; rather, that a more

realistic approach came as literacy increased.

How the authors went about it

There were some interesting differences between the approach of authors. Perhaps the most significant was the contrast between those who accepted the system as it was and those who tried to test and stretch the limits of the medium. This could be done, firstly, by setting the system intellectual tasks which it found difficult to deal with. This was particularly the case with an exercise in developing a legal theory tutorial. While LEXICAL can cope easily with questions where there is a limited range of legal answers which involve specific legal terms, the system cannot cope easily with questions which can be answered by a variety of complex statements except by using a multiple choice format. Another author tried to test the technical capabilities of the system, by setting it difficult tasks. While these exercises did not produce useable tutorials, we learnt much about the capabilities of the system from them. A second difference was between those authors who started off with a clear notion of the limitations of CAL and the educational objectives they wanted to achieve, and those who developed their objectives as they went along. The first group, for example, already had exercises which they used with students in printed material, which they proceeded to translate to a CAL mode. While this was relatively easy, it provided insights about change from one teaching medium to another which were useful for each of the authors in developing their second tutorial. The other group was trying to discover what CAL could be used for and what it couldn't. This more intellectually tasking problem enabled enquiry into the educational objectives of CAL. Nevertheless, it seems significant that the successful tutorials developed through either method indicate a realistic understanding of what one should and should not try to do with CAL. In particular, there is an understanding that CAL needs to be perceived of as part of and fitted into one's own overall teaching and learning objectives. For example, one has to deal with issues such as whether CAL should be used as a replacement for lectures or tutorials, as pre-lecture or tutorial preparation or as revision exercises. What subject matter in a course is most suitable for CAL and what is not?

Deciding what is gocd and what is sufficient

While it is difficult to do so, and not necessary to judge at this stage, the project has in principle retained and stimulated the interest of those involved not only in LEXICAL, but in other computer based learning systems. However, having an interest in developing CAL tutorials is not enough: in order to build a corpus of teaching materials which can be disseminated throughout the law schools in the UK, it is essential for the authors of the materials to be able to judge the level of the tutorial (in terms of student ability), length of time, and - very importantly - the views of other colleagues teaching the same subject.

This we feel to be the most difficult part of the whole CAL enterprise. Certainly, as mentioned above, it has been a major factor in the US experience.

In the CAL materials developed, there is a a wide variation in, what we saw as the, quality of the tutorial. This can be divided first into those who used the authoring system most effectively and those who did not. Second, there was a divergence in the effort which the participants put into the project and which they saw as sufficient to qualify as a completed CAL tutorial.

There are several reasons why this divergence might have come about. However, we have the feeling that the basic reason is that of remoteness from other comparable CAL materials. It would be difficult for a law lecturer to write a legal textbook of high quality if she or he had not seen one before, or had had only fleeting contact with one. Similarly, since our participants had not had too much contact with other CAL systems, it would be expected that their first attempts would be lacking in CAL sophistication. Certainly, there was a feeling amongst all the authors that they would

be able to improve their efforts as they found the problems and tested the tutorials further on their students.

The next phase of the project is to evaluate the CAL output from the authors. We shall be doing this by using students at different institutions and colleagues who have expertise in the various areas of law. Some student evaluations were carried out by several of the participants, of course, and we hope to receive fuller feedback of this in future. Our general impression from these is a positive response from students to CAL exercises. (See also Scott, 1989)

Resources and Time

One major problem with legal education is that there are inadequate resources and insufficient time. Mostly, law teachers do not have equipment on their desktop, and students do not have access to computer resources. The latter factor can make development of CAL courses a futile exercise - why produce CAL tutorials if you can't run them with the students? It is, as we mentioned above, noticeable that interest in CAL has picked up with the development of student work areas with PCs in institutions.

Time is another major problem. CAL development can take a considerable time. It used to be assessed at 300 hours per one hour tutorial. An advantage of LEXICAL is that this period has been considerably reduced. However, there is still the notion of competition between teaching and research time, which we deal with next.

We found that the time constraint was perhaps one of the major factors affecting the successful completion of the tutorials. Those who worked in the relatively conducive university environment were more likely to be able to produce than those who worked at the opposite end of the educational system. This should not be a surprise: university lecturers often have less than 12 hours contact per week with students, while those in Further Education colleges can have more than double that. We also noted that there are other pressures, such as student demands upon time.

Low profile for teaching applications

We found one problem mentioned over and over again by our participants: how was CAL to be evaluated - as research or simply as teaching? This was seen to be highly important for the individual within their law department. It is not too contentious to say that at present teaching has a very low profile in academic institutions in comparison with research. In the University sector, this is, to a significant measure, due to the current University Funding Council selectivity exercise, which privileges research. However, research has mostly been seen to be more prestigious and more worthwhile in education: CV's are supposedly stronger for research publications than for courses taught. (Whether this is actually the case, one of us is not too sure!)

The pressure upon institutions to perform well in the UFC research selectivity exercise was certainly seen to impact upon our individual participants. Some felt that their departments took the line that CAL was all very well, but that it didn't look as impressive as a printed publication.

In our view, CAL development should merit the same value as writing an article in a periodical. One conclusion which we drew from the project was that there must needs be a formal publishing outlet for CAL software so that individuals who do put time and effort into it can clearly be rewarded with a suitable publishing citation.

Lessons to be learnt

There were several major findings from our research.

First, and most positively, we conclude that lawyers can, if they have reasonable resources and incentives, produce CAL courseware without too much effort. We also saw that, as the learning curve develops, these lawyers become more confident in their abilities and more adventurous in their use of CAL authoring systems. This indicates that there is a starting point for the serious development of a corpus of CAL courseware within the UK.

However, there are a whole host of problems which mitigate against the successful completion of good quality CAL materials. These are those which we mentioned above -isolation, resources, etc. Most cannot be solved without the express support of the legal educational establishment and are really outwith the individual's control. Of those elements which are within our control we might suggest the major conclusion we found was that early support and training is essential. It is too easy to have problems with a computer system and simply switch off and go to do something else, and it is too much to expect naive CAL users to understand the potential teaching strategies and techniques which are required in order to produce high quality materials.

LEXICAL, the authoring system used by the participants, is one of the easier systems to use. Yet, easy though it was, it was still obvious to us that using it was akin to programming rather than teaching. In order to do teaching with it, one needs to know how to program. Of course, programming LEXICAL is much easier than programming with BASIC or similar languages, but it is stifl a form of programming: this requires practice, support and training.

On LEXICAL, we should point out that our participants were very insightful into amendments which would improve the system. We found that the interface was very important, as was ease of access to information retrieval. Some suggestions were made that a limited hypertext type system help facility such as available in the Latent Damage Advisor system would be valuable.

Feedback to the author of CAL materials is very important, and should be on a variety of levels. We are aware that this is often a sensitive subject in the UK where lecturers are used to having their research criticised but not their teaching. However, given that CAL materials could be disseminated throughout all the UK law schools, it is important to have some means of ensuring that authors are not embarrassed by their CAL work. BILETA and the Law Technology Centre can have an important role here in providing standards, promoting effective evaluation and distributing CAL course materials.

Conclusion: Can there be a Legal CAL methodology?

This paper can really only suggest in outline the results of our project. We intend to detail these further elsewhere. However, given the problem of legal education and its relation to law, it is important to notice that CAL is part of the wider framework of law, and is affected by and affects our view of law. We saw this very clearly in the discussions with our participants - their view of what law was, what legal education should be, affected their view of the success, goals, and failures of CAL. It is important, hence, to pay heed to these.

There is also the problem of the fact that rarely are there right answers in law - we cannot, as in chemistry, produce a chemical formula as the correct answer. In tutorials, we might expect a variety of possible answers (even possible case citations) which are valid and correct answers. This makes the production of CAL tutorials harder in law than in other areas, and our participants found this a highly limiting factor.

The text-based nature of legal education causes problems as well. It is more difficult to produce CAL exercises in law, because a lot of text is involved. For example, an issue raised by participants is

whether there might not be too much text on the screen for students to assimilate. We have tended to suggest to them to use a combination of computer and hardcopy material. In general, of course, all computer users have found the screen a bad way of presenting and assimilating more than a small amount of information.

Also, answering questions becomes difficult, because many legal questions are answerable only by inputting a fairly large amount of text. Reducing answers to single words or phrases may raise a question of crude over-simplification. The common way out is multiple choice, and our respondents innovated in the use of multiple choice both as part of the "multiple choice" formula in LEXICAL as well as adapting the "normal" question (which requires typing of words or phrases to answer) to a multiple choice formula. Whether this is the best way forward is a moot point.

Another problem is that of indeterminacy of law. This affected a fair number of our participants who raised questions about attempting to write legal theory type of tutorials. The difficulties they found tended to make them change the subject matter of CAL tutorials away from the more theory-based areas.

A most significant and yet unresearched aspect of CAL development is understanding of the impact of CAL on the way people teach. The use of CAL involves an interaction between the CAL developer, teachers and students. The teacher has to ascertain from students their views on how computer based learning can be integrated into their course. She or he also needs to understand the objective of the CAL developer. We hope to develop these issues in the following stages of the project.

There is a need to clarify the learning objectives and to fit CAL into the total learning environment. We might describe this as, generally, the horses for courses argument, eg. LEXICAL can fulfil certain objectives fairly well, but there may be need to resort to other solutions for different teaching objectives. These other solutions might well be hypertext based or simulation or communication based, depending on the skills to be appreciated.

Students, we feel, need to obtain full appreciation of the value of technology and should be taught to see CAL as part of a number of technological resources including bibliographies, communication with students and staff (for example in the Warwick Legal Practice Office System, Paliwala and Clark 1990), access to library systems, access to on-line systems, text processing, computer conferencing etc. To do this adequately, we need to think seriously of resource problems: for that, we suggest, is the real constraint upon discovering whether there is a successful future for legal CAL (Jackson 1990).

References

Burris R. et al. Teaching law with computers: A collection of Essays. 1979. Westview.

CALI Report 1989, "Evaluation of the CALI exercises by students and professors". *CALI report* Vol 6 No.3.

Clark R., Rationale for Computer-Aided Instruction**.** Journal of Legal Education 1983. Vol 33, p.461.

Jackson B. 1990. "BILETA Inquiry into Computing in Law Schools". In T. Green ed. *5th BILETA Conference Pre-proceedings* 101.

Jones R. 1988. Computers in legal education in the United Kingdom". Report to the *Committee of Experts on Legal Data Processing*. Council of Europe. Strasbourg 27 April 1988.

Jones R. 1989. "Computers assisting in legal education" 'The *Law Teacher* Vol 23 No.3.246

Korn G. 1983. "Computer assisted legal instruction: Some reservations". *Journal of Legal Education* 1983 Vol 33. 473.

Paliwala, A. 1991. "Creating an academic environment. The development of teelmology in legal education". *Yearbook of Law, Computers and Technology* Vol 5 1991 (forthcoming).

Scott D., Students give CAL marks out of 10. In *LTC & BILETA Newsletter* Vol 2 No 11989.20.