



1994-95 REPORT

LTDI is funded by the Scottish Higher
Education Funding Council

1994 - 95 Report of the Learning Technology Dissemination Initiative

August 1995

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Report of the SHEFC Learning Technology Dissemination Initiative

EXECUTIVE SUMMARY

This report summarises the activities of the LTDI during the first year of its operation. The overall aim of the LTDI is to help Scottish Higher Education Institutions make teaching and learning more effective by harnessing modern technology.

- LTDI workshops were well attended. Demand was such that 14 workshops, rather than the 12 originally proposed, were held. In addition a seminar, jointly organised with COSHEP was staged for senior management representatives.
- The LTDI Handbook and World Wide Web pages provide wide information in a concise and concentrated form. These information services have received very favourable comment and are much in demand.
- LTDI staff have been involved in 92 implementation projects, supporting the use of learning technology in 20 institutions. This is in excess of the 30 implementation projects envisaged at the outset. Implementation includes detailed discussion with staff of the issues involved in using computer-based learning in specific courses, intended to lead on to the use of materials in the classroom with students. The process of discussion followed by implementation and reflection on the teaching and learning process demonstrates that the LTDI acts as a catalyst for the kind of change which enhances the quality of the learning experience provided for students.
- LTDI implementation support activities have revealed that the integration of learning technology into specific courses raises significant institutional issues. It requires that teaching and learning strategies be made clear and explicit at institutional level. Support needs to be given to academic staff, both through staff development and in terms of recognition given to those who are involved in implementing learning technology. There are also financial implications, to ensure that appropriate hardware is acquired.

The LTDI has met real needs in disseminating and implementing good practice and good learning technology materials in the Scottish higher education community. The demand for its services has been in excess of the resources available to it. Through the LTDI the benefits of learning technology have been disseminated to a wide range of SHEFC institutions, with institutions formerly funded by SOED well represented.

Subject to funding, the project anticipates providing support throughout Scottish Higher Education until a point is reached where effective use of learning technology is widespread and institutions have infrastructures through which they can provide their own support.

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Report of the SHEFC Learning Technology Dissemination Initiative

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1. Introduction

This report summarises LTDI activities during the first year of the project, from 1st. August 1994 to 31st. July 1995, regarding progress made, value added to previous projects and initiatives and points worthy of note.

2. Overall Aim

To help Scottish Higher Education Institutions make teaching and learning more effective by harnessing modern technology.

3. Specific Aims

- 3.1 To raise awareness among academic staff of the potential of learning technology.
- 3.2 To enable academic staff to identify where computer-based learning methods are appropriate.
- 3.3 To make academic staff aware of the materials which are available.
- 3.4 To work with academic staff in implementing learning technology by integrating its use into courses and developing the necessary skills.
- 3.5 To assist academic staff to manage computer-based learning methods effectively.
- 3.6 To make the full benefits of learning technology available to all SHEFC-funded institutions, including those formerly funded by SOED.

4. Objectives and Outcomes

- 4.1 To stage twelve workshops, presenting case study examples reflecting good practice and demonstrating a variety of relevant software.
- 4.2 To provide information in a concise form, including a handbook listing information on relevant sources of learning technology and expertise.
- 4.3 To establish a collection of resources of learning materials and technology representing good practice.
- 4.4 To provide expert advice and establish up to thirty implementation projects in Higher Education institutions within Scotland across a range of subject areas.
- 4.5 To make the benefits of learning technology available to all SHEFC-funded institutions, including those formerly funded by SOED.

5. Outline of Project

5.1 *Workshops*

Fourteen workshops were staged instead of the twelve originally envisaged. This was due to the nature and extent of the demand which was identified. As well as the subject-specific workshops, it was found appropriate to provide two further workshops focusing on generic issues, one on assessment and the other on study skills. Details are given in Appendix 1 (A1.1 - A1.14).

The total number of participants attending the fourteen workshops has been 589. The number of SHEFC funded institutions represented by workshop participants is 18. An attendance summary can be found in Appendix A1.15. At the workshops a total of 46 invited case study/keynote talks have been given and there have been 97 different software demonstrations. These have included projects from TLTP and ITTI, as well as examples produced by individual lecturers and departments.

It has been a feature of workshop feedback forms that delegates have particularly appreciated the opportunities afforded to try out software and to discuss its relevance with those demonstrating. The case study presentations at workshops have addressed aspects of practical classroom implementation. These have been followed up by LTDI staff in site visits, which have involved the discussion of how to adapt specific courses to include appropriate learning technology materials. Some quantitative information from workshop feedback forms is given in Appendix A1.16.

Quotes from workshop feedback forms:-

- "Good workshop, well balanced"
- "Excellent location"
- "It gave me a lot of ideas about how to improve my teaching by using CAL"

- "I enjoyed the talks and have widened my knowledge of what is available"
- "Very well organised day - good speakers"
- "There are several major barriers to introducing such innovations ... staff time to customise materials ... attitudes at upper levels."
- "Very good day - interesting exchanges with delegates"
- "An extremely worthwhile session."
- "Will look forward to Business Studies as a featured area."

5.2 *Seminars*

5.2.1 *Russian Seminar*

A seminar was staged at the University of St. Andrews on 10 May 1995, bringing together lecturers in Russian, to explore the use of technology in teaching and learning. This was attended by 12 delegates from a variety of institutions.

5.2.2 *COSHEP Seminar*

A seminar was staged at Heriot-Watt University on 12 May 1995 jointly with COSHEP involving senior staff from institutions. The aims of this were:

- to provide senior staff with information on recent developments in the application of Learning Technology;
- to discuss implications for institutions of the implementation of technology to support teaching, learning and assessment.

The joint LTDI/COSHEP Seminar was attended by senior management representatives of 16 Higher Education Institutions. The proceedings consisted of keynote talks, discussion sessions and software demonstrations.

5.2.3 *Staff of University Mathematics & Statistics Departments Meeting*

The LTDI contributed to this meeting, which was held at the University of Glasgow on 27 June 1995. This was attended by 20 delegates representing 12 departments. An outline was given of Mathematics software, with a discussion of its implementation with students.

5.2.4 *International Seminar on Staff and Educational Development (ISSED 95)*

At this international seminar held outside Moscow, Russia, 23 - 26 June 1995, which was attended by delegates from 10 countries, the LTDI presented an overview of what it is doing in Scotland to promote the effective use of modern technology in teaching to enhance the students' learning experience. A display consisting of materials generated by LTDI and TLTP (in particular central TLTP and TILT publications) was also mounted as part of a poster session.

5.3 *Database, Publicity and Newsletter*

A database has been designed, to facilitate the publicising and organisation of events and the provision of services. The database currently contains in excess of 3000 names and addresses, including those of lecturers, heads of departments, staff development officers and other staff within higher education in Scotland. The maintenance and development of this database is an ongoing task within the project.

Publicity and information have been distributed both by direct mailing of staff and via the services of the LTDI institutional contacts. An LTDI poster has been produced to publicise events and services.

In March 1995 a newsletter was produced, entitled "LTDI Update". This comprises four pages containing articles on a number of different themes, such as software examples and delegates' views on LTDI workshops. The presentation and style of the newsletter are lively and informal. Articles are short and conversational in style. A total of 2000 copies were produced and distributed to a wide readership, including all LTDI workshop delegates.

5.4 *Handbook and World Wide Web Pages*

An LTDI handbook has been produced, synthesising information on learning technology from a variety of sources, such as TLTP, CTI and ITTI. The handbook also includes a general introduction to learning technology and guidelines for evaluation and implementation of computer-assisted learning materials. The handbook has been updated through the year, including some revisions made in response to feedback from workshop participants, CTI centres, TLTP projects and others.

A list of experts in each subject and domain has been included in the latest version of the handbook. This consists of academic staff within SHEFC institutions who have different degrees of expertise in the implementation of learning technology. In every case permission has been obtained from these experts to include their name. It is anticipated that this list will be a useful resource to those academic staff who are new to learning technology and who wish to seek advice on how to start.

The handbook has been distributed to all delegates at workshops, as well as to academic staff who have requested an LTDI information pack by post. In addition, as a result of discussions at the UK TLTP Dissemination Working Group, a copy of the handbook has been sent to each higher education institution in the UK, via their recently nominated institutional TLTP contacts. To facilitate this, 500 copies of the LTDI handbook were delivered to the TLTP Co-ordinator for distribution in England, Wales and Northern Ireland.

Demand for the LTDI Handbook has been at such a high level that it has not proved possible to satisfy it within the budget allocated. In cases where institutions have requested extra Handbooks, a master copy has been sent, together with permission to photocopy as required.

The LTDI has created and is maintaining an extensive set of pages on the World Wide Web (<http://www.icbl.hw.ac.uk/ltidi/>). These pages present information in a concise form and are linked with the TLTP Home Page (<http://www.icbl.hw.ac.uk/tltp/>). They

include the main written output of the LTDI, namely the handbook, the newsletter, a workshop booking form and an implementation support request form. The pages also point to other relevant sources of information and software. Links exist within the LTDI Web pages to many TLTP projects, CTI centres and ITTI information. A number of workshop bookings have been received via the Web and it is intended to incorporate a recorder to count the number of accesses.

The LTDI handbook and World Wide Web pages are disseminating relevant information on learning technology to a large audience, both in Scotland and beyond it. The LTDI is unique in providing such wide ranging information in such a concise and concentrated form.

5.5 *Resource Collection*

A resource collection has been established, including a wide range of software in different subject areas, from the TLTP, the ITTI, public domain and commercial sources. This software acquired has been used by the Implementation Support Consultants for demonstration purposes during site visits to lecturers and departments. In some cases demonstration disks, or beta evaluation copies, in cases of software shortly to be completed, have been obtained. Summarised details of relevant software are recorded in a database.

5.6 *Implementation*

An Implementation Support Pack was produced. This pack gives an overview of the possible levels of Implementation Support available from the LTDI and outlines what may be involved at each level. Site visits, which can be institutional, departmental or to individual staff, provide a variety of services, such as demonstrating software or discussing issues related to integrating software into courses. A number of visits have been made in response to requests for Implementation Support, although in many cases the first contact is made by a member of the LTDI staff.

In December 1994 a letter was sent from SHEFC to all institutions inviting applications by January 1995 for support under the LTDI implementation support scheme. In response to this and to invitations issued at workshops a considerable number of requests for support were received. In addition to this LTDI staff have also been proactive in offering implementation support to staff, departments and institutions.

A total of 92 implementations have commenced in 20 institutions. See Appendix 2 for details. It has been found that the demand for implementation support is at such a level that the number of implementations benefiting from support is greater than that originally anticipated.

An important function of implementation support is to help staff develop skills in the integration of computer-based materials into their courses in order to improve learning opportunities for their students. The LTDI has been extensively involved providing assistance of this kind. Of the implementation projects commenced, 8 are presented in the form of case studies in Appendix 2. 26 of the implementation projects have progressed to the stage where detailed consideration of integration issues is under way and materials are being prepared for delivery in the 1995-96 session. 29

implementations have the possibility of implementation, but without a firm commitment yet. With the remaining 29 implementation projects, visits and contacts were made, but without resulting in definite implementation. For a fuller discussion of issues regarding implementation, see Appendix 2.

5.7 *Institutional Contacts*

Each of the 21 SHEFC-funded institutions has nominated a member of staff to act in the role of LTDI contact. This has facilitated communication with institutions and provided an effective route for the distribution of information about the LTDI to relevant academic staff.

5.8 *Problems Encountered and Steps Taken*

5.8.1 *Faculty/ Subject Strategy*

The original strategy of targeting specific subjects within named faculty areas raised a number of difficulties, as follows.

Many of the 21 SHEFC-funded institutions have faculty structures which differ considerably from the model originally envisaged. Some subjects (such as Geography or Psychology) lie across faculty areas and are placed differently within different institutions.

The overlap between subjects within a faculty grouping is often very limited. Hence it did not prove possible in practice to reach, for example, the whole of the Arts and Humanities area through the medium of Modern Languages. Particular efforts have been needed to accommodate the needs of Arts and Humanities staff other than linguists. An example of this was the staging of sessions in History and Geography in parallel with Modern Languages case study talks at an Arts and Humanities workshop.

The pairing of Mathematics with Statistics, although intuitively attractive, highlighted the differences in the nature of the subjects, the favoured teaching strategies and the target audiences. Statistics and data handling are taught at a basic level much more widely than just within Science and Engineering, and share much with areas of Business and Social Studies. This problem was addressed by the addition of workshops specifically aimed at the service teaching of Statistics.

The initial focus on Economics was widened in the workshops to include in addition Business and other Social Sciences. This increased the target population and available materials, and more fully utilised the expertise of LTDI staff.

5.8.2 *Generic Issues*

The importance of, and widespread interest in, generic issues was not sufficiently addressed solely within subject-based workshops. It was therefore decided to stage two additional workshops dedicated to generic issues, to give these matters an appropriate level of attention. The foci of these additional workshops were study and information skills, and assessment.

5.8.3 Administration

The significance of the task of creating and maintaining a database of names and addresses of academic staff, for mailings to publicise LTDI events, was not fully realised at the inception of the project. The volume of correspondence associated with workshop registrations, joining instructions and other details proved considerable, as did the tasks involved in the provision of workshop packs and other items. A part time secretary was recruited in February and this assisted the LTDI staff in making appropriate and effective use of the time available to them.

5.8.4 Scheduling and Planning of Workshops

The process of booking venues for workshops was begun in August 1994. Some difficulties were experienced in this, as institutions tend to be planning their timetables during this period, so that room allocation can be problematic. With the benefit of hindsight there were periods in which too many workshops were planned in too short a timespan. It will be better in future years to establish the workshop schedule during the summer.

Initial planning and contacts for workshops in the session 1995-96 were begun in June 1995, with a view to scheduling one workshop per month for the second year of LTDI.

6. Developments and Findings of Interest

6.1 *The Nature of Implementation Support*

The need to clarify the meaning of Implementation Support was evident from an early stage of the project, given that different institutions and departments are likely to require different levels of support. To this end an Implementation Support pack was produced which suggests different levels and categories of possible support, to assist a given department or member of staff in requesting support of an appropriate nature.

Enabling academic staff to manage computer-based learning methods effectively is a long-term process. The skills demanded of academic staff in this respect are in many ways a departure from those traditionally required of the lecturer. Academic staff require adequate time to review available materials and to assess their applicability to particular courses. Use of computer-based learning methods usually implies a change in teaching style and demands resource management skills. These issues have been addressed within implementation support projects.

The long-term nature of implementation means that many implementations will continue into future academic sessions. For this reason there is a need to ensure continuity between the present year's LTDI and next year. In the session 1995-96, as well as extending into new subject areas, implementation support will continue to be offered to some extent in Generic Issues, Mathematics & Statistics, Modern Languages and Economics.

Although the form of support depends considerably on the institution and staff involved, implementation support consultants have developed an outline plan of support. This usually starts with an initial visit, often to talk to a range of staff within a broad subject area. This is followed by more detailed individual consultations with staff who are particularly interested, before agreeing a detailed agenda for support and course modification with a specific lecturer or course manager. In this way LTDI implementation support achieves the twin objectives of expanding awareness within an institution and offering detailed assistance in the use of learning technology.

A clear departmental or institutional commitment to the implementation is expected, so as to ensure that the issues of equipment and necessary institutional infrastructure are adequately addressed.

6.2 *Institutional Contacts*

During the spring of 1995 a series of meetings with all LTDI institutional contacts was held. This has been effective in establishing useful working relationships with the contacts, clarifying mailing arrangements and identifying potential areas of LTDI collaboration with institutions. In some cases generic implementation projects have resulted from meetings with institutional contacts.

It is perhaps inappropriate to specify the role of the LTDI institutional contact too prescriptively, or to attempt to structure procedures too rigidly, as different institutions have nominated different kinds of officer to act in this role. At the very least the institution's LTDI contact is expected to make arrangements to ensure that LTDI

mailings are distributed to all appropriate staff within the institution. In many cases however the LTDI contacts have been pro-active on behalf of the LTDI and their efforts have led to fruitful contacts with faculties, departments, teaching & learning committees and staff development officers.

6.3 *Senior Staff*

The joint LTDI/COSHEP Seminar (referred to in Section 5.2 above) was attended by senior management representatives from 16 Higher Education Institutions. The proceedings consisted of keynote talks, discussion sessions and software demonstrations.

Mr. Jim Donaldson, Director of Teaching and Learning, described the SHEFC perspective on Learning Technology. LTDI staff outlined issues and materials in teaching and learning, from both subject and institutional perspectives. A lively and frank discussion followed, welcoming the opportunity for discussion and expressing support for the activities of LTDI to date. A number of concerns were also addressed:

There are fears among lecturers that an imposition of set materials could lead to standardisation and "fossilisation" of courses. Teachers must be in control of what enters the curriculum. There are also suspicions that Learning Technology could be used as an expedient to justify "efficiency gains". Lecturers and institutions require assurance that the materials being promoted have been effectively evaluated and will be relevant to their students' needs.

Learning Technology generally needs to be applied with care and attention. It was generally agreed that support for staff in this area was most welcome, while recognising that much work remains to integrate materials fully into courses and to carry out the adaptation and tailoring which are needed.

After this discussion the day concluded with informal software sampling. The seminar achieved its aims of providing senior staff with information on Learning Technology and discussing implications for institutions.

6.4 *Range of Interest in LTDI*

There has been a high level of interest in the LTDI throughout the higher education sector, including those institutions which were previously funded by SOED. This is of particular relevance because of the wealth of initiatives (ITTI, CTI, TLTP) funded by the former UFC, and the need to ensure dissemination of information from these initiatives to staff of the new universities and HE colleges. Of the 14 workshops, 6 were staged at former SOED institutions. Of the 92 implementation projects, 43 are at former SOED institutions. Approximately one half (47%) of workshop delegates were from institutions formerly funded by SOED.

6.5 *Main Subject Areas*

The three main subject areas of Mathematics & Statistics, Modern Languages and Economics have not been uniform in the issues encountered in implementation and in the kinds of workshop which have proved appropriate. Rather, distinct issues have tended to arise in each subject.

Mathematics has a generic role, in that it is used to service many different subjects. Thus a workshop in Mathematics will attract a wide range of scientists and engineers, as well as mathematicians, and fruitful dialogue spanning these domains can and does take place. It has been found however that academic staff in these areas very often already have a fair knowledge of computers and some experience of applying packages in their teaching. For this reason their main requirement is to be given information on what software is available and how they can obtain it. The demand for classroom assistance has been less than in other subjects.

Statistics also has a generic role. It spans not only the Sciences and Engineering, but also Health, Business and some of the Arts. There are a significant number of lecturers teaching Statistics who are not specialists in this subject and who are relatively new to the idea of using technology to teach it. It has been found that deeper levels of support involving more direct assistance are often requested by such colleagues.

Economics, although having points of contact with Business Studies and other subjects within the Social Sciences, is less generic than Mathematics or Statistics. For this reason it has been found appropriate to provide workshops in Economics, Business and Social Sciences which are more focused in the subject matter covered. Unlike the other subjects covered this session, there is a significant overlap in Economics between the use of technology in teaching and its use in research, which has been addressed in workshops.

Modern Languages are generic in the sense that, in addition to specialist courses, they are also taught as service subjects. However in all cases they are taught by linguists. There is not a great deal of overlap between Modern Languages and other Arts Faculty subjects, with the exception of text-based studies and linguistics. Accordingly workshops here have again been focused carefully on specific aspects of Language learning. There has also been limited generic coverage achieved by the themes selected in each workshop. For example the themes of "Modern Languages and Literary Studies" and "Modern Languages and Textual Studies" chosen for two of the workshops were successful in stimulating wider interest from specific sections of Arts Faculties. The different kinds of implementation support requested and supplied reflects the diversity of need in this sector.

From the experiences outlined above it may be concluded that, in seeking to raise awareness of and implement Learning Technology, there is unlikely to be one general "solution" which could be applied homogeneously across all subjects. Rather it is more apposite to apply a range of different solutions and strategies depending on the particularities of each subject area and how it is addressed at each institution.

6.6 *Other Subject Areas*

There has been interest in subject areas in which the LTDI is not currently operational. At workshops attendance has been by no means limited to participants from the three main subject areas. Rather, participants have represented a broad range of subjects within the faculty areas addressed at each workshop. A number of requests for implementation support have been received from subject areas outside the domains of subject expertise of the Implementation Support Consultants; support has been offered in the current year, subject to the availability of appropriate resources.

6.7 *Workshops*

LTDI workshops have been found to have an important role in raising awareness of the importance of technology in teaching and learning. Delegates have stated that their main reasons for attending are to obtain information on and to sample the software which is available and to discuss what are the appropriate ways to implement these with students.

The direct link between workshops and implementation projects should not be overstated. Implementation Support request forms were distributed at workshops and a number of applications were received in this way. However, the bulk of implementation projects were initiated by:- the proactive efforts of the Implementation Support Consultants, in writing, emailing, making telephone calls, establishing contacts and following these up; the letter sent to institutions by SHEFC referred to in Section 5.6 above.

The LTDI workshop format evolved through the course of the year in response to comments made by delegates on the workshop feedback form. The idea of Case Study talks met with limited success. The most successful of the Case Study talks were those which closely followed the remit of concentrating on issues related to classroom implementation with students. Discussion sessions were also variable. In the early workshops these were largely unstructured, but in the later workshops discussion groups were directed to more specific issues. In one workshop, discussion groups fed into a discussion panel concluding the day. Other activities featured in workshops were: a business simulation game, involving the group members in decision making at regular intervals throughout the workshop, in much the same way as business students might 'play' such a game within the framework of a degree course; and a discussion session based on a fictitious scenario which involved identification of appropriate software and planning the integration of those materials into a statistics course. These sessions were successful in providing a relevant and structured focus for discussion, and helped lead to clearer conclusions to the workshops.

As the year progressed a revised workshop model was adopted, consisting of keynote addresses, combined with spoken demonstrations. In spoken demonstrations, software examples were categorised into themed parallel sessions and the demonstrators had the opportunity to speak to their software for 10 minutes or so. This was successful in initiating useful discussions in the themed groups and in relating discussions to specific examples and situations.

A further feature worthy of note is that, towards the end of the year workshops included sessions covering on-line work and World Wide Web demonstrations.

7. Points of Generic Interest

Discussions at workshops and site visits highlighted the challenges faced by higher education in the following areas.

7.1 *Study Skills*

Anecdotal evidence suggests that students embarking on programmes of study at higher education institutions often lack the skills required to cope with the work they have to do in higher education. This is not only observed in entrants from non-traditional backgrounds, but also in those entering straight from school, as students are expected to rely on their own initiative and competence and have to organise work for themselves. Discussions have focused on the level of and effectiveness of study skill training currently offered at departmental and institutional levels. There has been interest in the products developed within the TLTP in these areas, with institutions going ahead and implementing packages as a direct result of LTDI visits. An LTDI workshop on Study Skills was staged on 31 May 1995.

7.2 *Library and Information Skills*

Increasing numbers of students are entering higher education institutions lacking the skills required to use a library effectively. Therefore packages offering assistance in developing these skills, such as "how to choose a book or journal" have stimulated interest. Information Skills featured in the LTDI workshop held on 31 May 1995.

7.3 *Assessment*

Increased student numbers and the corresponding increase in time spent by staff on assessment have instigated many enquiries into how technology can assist in this area. Ensuring that the assessment methods adopted reflect both the aims and objectives of the course and any technical developments which have taken place, is becoming increasingly important, especially as quality assurance procedures require departments to justify the assessment procedures adopted. The validity and reliability of assessment procedures which not only save valuable staff time, but also measure and encourage deep, as opposed to surface, learning have been discussed. Two institutions have implemented computer-based formative assessment with the support of LTDI during the current session. An LTDI workshop on Assessment was staged on 27 March 1995.

7.4 *Evaluation*

Measuring and observing the performance of courseware is very important not only in terms of summative evaluation, such as students' ratings of how happy they were with using the materials, but also in terms of formative evaluation from both staff and students which can provide invaluable feedback to course organisers and teams. This formative approach, which includes open-ended measures as well as systematic ones, will allow teachers to detect issues which may not have been anticipated but which are important in determining how useful the courseware has been at meeting the teaching aims and learning objectives and in promoting student learning.

7.5 *Accessibility*

The availability of hardware to mount courseware has been a particular issue which has stimulated discussion. It may appear obvious that, in order to implement learning technology, students require sufficient access to appropriate hardware. Yet the discussions held to date with LTDI staff have indicated that in practice inappropriate or insufficient hardware availability can be a serious constraint to effective implementation. This has been in terms of:-

- The hardware that is currently available for teaching
- Access to clusters of machines for teaching
- Student access, not only during scheduled class times, but also self-access
- Opening hours of facilities and possible knock-on effects of increasing this provision, in terms of janitorial, technical and academic support
- Cost implications in obtaining additional hardware and software
- Constraints associated with software, mainly in areas of selecting and customising learning packages
- Copyright issues

7.6 *Staff Development*

Enhancing the skills of staff in being able to use technology in an effective and efficient manner to facilitate student learning has been an issue arising in discussion. The Teaching, Learning and Research sub-committee of the COSHEP Staff Development Committee is regularly updated on the range of resources offered by LTDI and members are incorporating details of LTDI workshops in institutional brochures relating to provision of staff training.

In response to invitations, LTDI has provided some courses/workshops in a few institutions, tailored to meet the specific constituency and interests of these institutions. It is planned that more of these will be arranged in 1995/96.

8. **Collaboration with Other Initiatives**

A very positive attitude has been encountered from all the CTI Centres, TLTP and ITTI projects we have been in contact with. They have gladly provided speakers, demonstrators and help and advice on their materials at every stage. Generally TLTP project directors have welcomed the contribution of the LTDI to dissemination, as they view this as a key, and yet potentially time-consuming element of their projects.

Care has been taken to ensure that the LTDI does not duplicate the work of the CTI Centres, as each of these already has a wealth of information for their particular

subjects. LTDI has therefore supplied general information on the sources of information for each subject area. Thus the LTDI handbook supplies concise directories on TLTP projects, ITTI products and CTI Centres.

The LTDI has also played a significant role in adding value to the work of the CTI Centres, in terms of the implementation support which it provides.

9. Disseminating existing good practice

The dissemination of good practice includes both selecting appropriate software and using it appropriately with students. The LTDI team has gathered a substantial collection of software, much of which has been demonstrated at workshops, and the team has involved itself in 92 implementation projects at 20 institutions. Implementation support has helped colleagues to create learning environments in which good practice in the use of specific software packages can flourish. For details on this, see Appendix 2.

In instances where implementation projects have not yet reached the classroom, staff have given considerable thought to establishing areas in which learning technology is likely to prove helpful and to identifying and integrating suitable materials. Discussions about how learning technology can be incorporated into existing courses and the potential value to student learning demands reflection on the teaching and learning process. This re-examination of the curriculum, in terms of the teaching aims and learning objectives, course content, teaching and learning methods to be used, assessment methods and evaluation strategies, in itself has the potential to improve the quality of teaching and student learning. This process of curriculum review and development represents good practice, whether technology is involved or not.

Tackling any future extension of technology into courses in this way will not only ensure that learning technology is embedded into the curriculum, as opposed to being an incidental extra, but will also ensure that its use is based on a sound pedagogical basis and on efficient use of staff and student time to enhance learning.

Achieving good practice results from analysing the requirements of students and staff at specific institutions and selecting and adapting materials as appropriate. There is no automatic recipe for success. Rather, the LTDI tends to have the role of a catalyst of change, stimulating discussion and reflection on the learning process amongst staff.

10. Financial Statement

The administration of funds is carried out through the Heriot-Watt University Finance Office. A sum of £200,000 has been allocated by SHEFC. Details of expenditure to date from the LTDI account have been prepared by Dr. Rist and submitted to SHEFC.

11. Recommendations

The implementation of Learning Technology raises a number of issues at departmental and institutional level. General recommendations addressing these are as follows.

- Institutions require to develop teaching and learning strategies which take into account the potential of Learning Technology.
- Institutions require financial resources which are adequate for the effective implementation of such strategies. In particular the requirement for modern computing equipment and appropriate facilities is considerable.
- Successful implementation of Learning Technology depends on far more than the provision of hardware and software. It requires careful reflection on the learning process and consequent planning in courses and departments. Academic staff require time to reflect on appropriate methodologies to implement Learning Technology in their own situations. This has implications for academic staffing levels and hence for resourcing. Currently academic staff appear to lack adequate time, due to the many pressures which they experience in the course of their duties. If this issue is not significantly addressed, then the impact of technology on teaching will be seriously impeded.
- Institutions need the means to provide incentives to reward staff who develop or implement Learning Technology, with promotion and other recognition.

12. Conclusions

In the first year of its operation the LTDI has made good progress in helping Scottish Higher Education Institutions to make effective use of learning technology.

- The LTDI has raised awareness among academic staff of the potential of learning technology by providing 14 workshops featuring case studies and software demonstrations. The workshops have been well attended and participatory in nature. The talks and discussions have assisted staff in identifying where computer-based methods are appropriate.
- Through the Implementation Support programme, LTDI staff are working with academic staff in implementing learning technology effectively.
- Through the LTDI the benefits of learning technology are being disseminated to a wide range of SHEFC institutions, with institutions formerly funded by SOED well represented.
- The LTDI is providing information on learning technology in concise forms through its handbook and World Wide Web pages.
- The LTDI is establishing a collection of resources of learning materials.
- The LTDI is providing expert advice to a wide range of institutions, including 92 implementation projects in 20 institutions.
- The LTDI is meeting real needs in disseminating and implementing good practice and good learning technology materials in the Scottish higher education community. The high level of demand for its services has demonstrated the requirement for continuation of this level of support.
- The project anticipates providing continued support throughout Scottish Higher Education, encouraging the effective use of learning technology and assisting institutions in strategies to support future implementations.

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Appendix 1. Details of Workshops

A1.1 Science: focus on Mathematics & Statistics at University of Paisley.

Date: 7 November 1994
Attendance: 49
Institutional welcome: Professor Gordon Wilson, Assistant Principal and Director of Craigie Campus
Keynote talks: Dr. Roger Rist (LTDI) - Introduction to Computers in Teaching
Professor Cliff Beevers (Heriot-Watt University) - CALM and Mathwise
Ms. Moya McCloskey (Strathclyde University) - Quercus project
Ms. Su White (University of Southampton) - SCHOLAR project

Software demonstrated:

CALM, CALMAT, Mathwise, Quercus, STEPS, Computer-aided diagnostic test, Chemistry Courseware Consortium, Biodiversity, Earth Sciences Consortium, ITTI materials, IMPACT materials.

A1.2 Engineering: focus on Mathematics & Statistics at Heriot-Watt University

Date: 6 December 1994
Attendance: 46
Institutional welcome: Dr. Roger Rist, Acting Director of Institute for Computer-Based Learning
Keynote talks: Dr. Roger Rist (LTDI) - Introduction to Computers in Teaching
Dr. Jean Cook (Glasgow Caledonian University) - CALMAT
Mr. Phil Ramsden (Imperial College, London) - Transitional Mathematics Project
Ms. Wilma Strang (University of Kent at Canterbury) - Hypertext Campus Project

Software demonstrated:

CALM, CALMAT, Mathwise, STEPS, Computer-aided diagnostic test, Nottingham University Statistics software, Transitional Mathematics Project, CLASS project, Study Skills (identifying and advising students at risk from deficient study skills), Biomechanical Engineering (CTI Centre for Engineering), Computer-Based Courseware for Public Health Medicine; ITTI materials, IMPACT materials, TILT materials.

A1.3 Arts & Humanities: focus on Modern Languages at University of Glasgow.

Date: 12 December 1994
Attendance: 37
Institutional welcome: Professor James Armour, Vice Principal for Planning and External Relations
Keynote talks: Dr. Rick Trainor (University of Glasgow) - Introduction to Computers in Teaching
Dr. Paul Donnelly (University of Glasgow) - Implementing CBL in a Languages department
Professor Doug Thompson (University of Hull) - Teaching Translation Skills with Transit Tiger
Dr. Don Spaeth (University of Glasgow) - Incorporating Computers into Teaching - A Nuts and Bolts Approach
Mr. John Castleford (Leicester University) - Cultural Change in Higher Education - Recognising the Reality
Dr. Stephen Barr (Glasgow Caledonian University) - Assessment Using the Computer

Software demonstrated:

TILT Portuguese software; TELL Metatext; TELL Transit Tiger; CD-ROM "Who Built America?"; History Courseware Consortium; Geography and Generic software (Geography CTI); Identifying and Advising Students at risk from Deficient Study Skills; TILT (library skills); ITTI materials.

A1.4 Social Science & Business Studies: focus on Economics at University of Dundee

Date: 6 January 1995
Attendance: 51
Institutional welcome: Professor Alan Newell, Vice Principal
Keynote talks: Mr. Jonathan Darby (CTISS, Oxford University) - Introduction to Computers in Teaching
Ms. Lynne Baxter (Heriot-Watt University) - TQM software
Ms. Liz Cox and Dr. Simon Heath (University of Aberdeen) - CAL for Agricultural Economics
Mr. Mike Emslie (CTI Centre for Economics, University of Bristol) - Computers in Economics
Dr. Gordon Doughty (University of Glasgow) - TILT project

Software demonstrated:

WinEcon; CAL courseware for Agricultural Economics; MENTOR, Statistics software: LoCAL project; Introductory Financial and Management Accounting; EQL Accounting; Marketing and Management software from Ivy; TQM software; GraphIT and other TILT materials, ITTI materials.

A1.5 Mathematics & Statistics in Science at Napier University.

Date: 1 February 1995

Attendance: 57

Institutional welcome: Professor Geoff Fielding, Assistant Principal

Keynote talks: Dr. Neil Pitcher (LTDI) - Introduction to Computers in Teaching and LTDI

Dr. Ed Robertson, Dr. John O'Connor (University of St. Andrews) - Mactutor

Mr. John McColl (University of Glasgow) - Statistics for non-Specialists - a Problem-Based Approach

Mr. Mike Bell (University of Liverpool) - Implementing CAL in Chemistry: Practical Issues

Software demonstrated:

CALM, CALMAT, Mathwise, Quercus, STEPS, Diagnosys, Mathcad, Mactutor, CTI Chemistry, Biodiversity, Bionet, ITTI materials, IMPACT materials, TILT materials, CALSCI, Sensei Physics, SToMP, RadiCAL.

A1.6 Statistics at Queen Margaret College.

Date: 17 March 1995

Attendance: 44

Institutional welcome: Mr. Scott Allan, Vice Principal

Keynote talks: Dr. Adrian Bowman (University of Glasgow) - Computers in Statistics Teaching

Professor Sally McClean (University of Ulster) - Use of Computer-Based Tutorials in the Undergraduate Programme

Ms. Sue Tickner (University of Glasgow) - TILT/GraphIT

Software demonstrated:

Quercus, STEPS, WinEcon, Introduction to Regression, ELABORATE, QUTAL, Psyche, Archaeology Consortium, Introduction to Statistics (Nottingham University), CTI Statistics materials, ITTI materials, TILT materials, IMPACT posters.

A1.7 Modern Languages and Textual Studies at Heriot-Watt University.

Date: 24 March 1995
Attendance: 33
Institutional welcome: Dr. Roger Rist, Acting Director of Institute for Computer-Based Learning
Keynote talks: Dr. Neil Pitcher (LTDI) - Introduction to LTDI
Mrs. Sue Hewer (LTDI) - Overview of CALL
Dr. M-M Kenning (University of East Anglia) - Exploiting CD-ROM Resources for Language Learning
Ms. Jean Anderson (University of Glasgow) - The STELLA Project
Dr. J Delin (University of Stirling) - Exploiting On-Line Resources
Professor Graham Chesters (Pro-Vice Chancellor, University of Hull) - Institutional Issues in Implementing CALL

Software demonstrated:

French for Hotel Receptionists, French Pronunciation Tutor, CTI Centre for Textual Studies, CTI Centre for Modern Languages, Discatext, Le Monde sur CD-ROM, Le Robert sur CD-ROM, MicroConcorde, TILT materials, IMPACT posters.

Spoken Demonstrations:

Dr. Mike Popham (University of Oxford) - Hypertext and the Poetry Shell
Ms. Jean Anderson (University of Glasgow) - Locating On-Line Resources
Dr. C Kay (University of Glasgow) - Concordancing
Dr. J Delin (University of Stirling) - Linguists' Workbench and Other Software
Dr. J Higgins (University of Stirling) - Text Manipulation for Language Learning

A1.8 Assessment at University of Stirling.

Date: 27 March 1995
Attendance: 40
Institutional welcome: Professor Duncan Timms
Keynote talks: Mrs. Helen Watt (LTDI) - Introduction to LTDI
Mr. John Partington (ALTER Project, University of Sheffield) - Overview of the Use of Technology in Assessment
Dr. Jeff Haywood (ASSHE Project, University of Edinburgh) - Changing Assessment Practices across Scotland - the ASSHE Project

Software demonstrated:

Examine (ITTI), Diagnosys, ALTER, CALM, Mathwise, Life Sciences, Geotechnical CAL, Course Management, QuestionMark, TILT materials, IMPACT posters.

A1.9 Mathematics in Engineering at University of Aberdeen.

Date: 29 March 1995
Attendance: 26
Institutional welcome: Professor James Penman, Head of Department of Engineering
Keynote talks: Dr. Neil Pitcher (LTDI) - Introduction to Computers in Teaching and LTDI
Mr. Peter Samuels (University of Newcastle upon Tyne) - Diagnostic Testing in Basic Mathematics
Mr. David Wild (Heriot-Watt University) - CALM and Mathwise
Dr. Tony Cartwright (University of Surrey) - Quality in Engineering through Simulation Technology

Software demonstrated:

Mactutor, CALMAT, Diagnosys, CALM, Mathwise, Diagnostic Testing in Mathematics (Nottingham University), Fast Fracture and other TILT materials, Topclass ('A' level Mathematics), Computer Aid to the Teaching of Engineering Product Design, QUEST.

A1.10 Software for the non-Specialist, Ab Initio and First Year Language Learner at University of Abertay Dundee.

Date: 3 May 1995
Attendance: 29
Institutional welcome: Professor Ray Harris, Assistant Principal
Keynote talks: Ms. Miranda Stewart (University of Strathclyde) - El Cine (TELL)
Ms. Anny King (University of Cambridge) - French and German for Scientists and Engineers
Mrs. Barbara McDevitt (University of Abertay Dundee) - Supporting the Self-Access Student

Software demonstrated:

Year 1 German, Eclipse (both University of Stirling), Stancall (Spanish - University of St. Andrews), French for Scientists and Engineers (TELL), Luisa, Gramdex & Gramdef, French for Hotel Receptionists (Napier University), CALIS (Spanish), TILT materials, IMPACT posters.

A1.11 Economics and Econometrics at Glasgow Caledonian University.

Date: 11 May 1995
Attendance: 44
Institutional welcome: Professor Seamus McDaid, Dean of Faculty of Business
Keynote talks: Dr. Rupert Loader (LTDI) - Introduction to Learning Technology
Mr. Mike Emslie (CTI Centre for Economics, University of Bristol) - Information for Economics Teachers and Researchers, Using the World Wide Web
Dr. Bahram Pesaran (University of East London) - Microfit 4.0, an Introduction
Dr. Philip Crompton (University of Stirling) - Evaluating WinEcon in Class
Dr. Jurgen Doornik (University of Oxford) - Using PC-Give with Econometrics Students

Software demonstrated:

WinEcon, AgricEcon, Project LoCAL, Spreadsheet Models, Hummer (Econometrics), PC-Give (Econometrics), Mentor, Other Economics Software, Mathwise, Statistics Software, Microfit 4.0, TILT materials, IMPACT posters.

A1.12 Study Skills and Information Skills at University of Strathclyde.

Date: 31 May 1995
Attendance: 42
Institutional welcome: Mr. Nigel Kay, Director of Information Strategy
Keynote talks: Dr. Roger Rist (LTDI) - Introduction to LTDI
Mrs. Helen Watt (LTDI) - Generic Issues: What Are They and Why are They Important?
Mrs. Helen Watt (LTDI) - How to Implement
Discussion Panel: Dr. Hilary Tait (University of Edinburgh); Professor Ray McAleese (Heriot-Watt University); Mrs. Linda Creanor (University of Glasgow); Dr. Joseph Smyth (University of Dundee); Dr. Roger Rist (LTDI); Mrs. Helen Watt (LTDI, chair).

Software demonstrated:

CLASS (Introductory Skills; Report Writing; Group Working; Automonitoring and Exam techniques), PASS (Diagnostic Questionnaire; Study Advisor; Student View), TILT (Choosing Books and Journals; Library Search Skills; Computer Searches; Study Skills), Technology Based Learning in Medicine: Beyond Courseware (University of Dundee), IMPACT posters.

A1.13 Business Studies at University of Edinburgh.

Date: 22 June 1995
Attendance: 60
Institutional welcome: Mr. Nicholas Terry, Director of Part-Time MBA Programmes
Keynote talks: Dr. Rupert Loader (LTDI) - Introduction to Learning Technology
Dr. Ashley Lloyd (University of Edinburgh) - Information for Business Studies Teachers and Researchers, Using the World Wide Web
Mr. Mike Kerrison (Heriot-Watt University) - Developing and Implementing Software for Financial Analysis

Software demonstrated:

PharmaSim (Active Business Game run during the day), Business Simulations (AutoSim, Boom or Bust, Brandmaps, Enterprise, Entrepreneur), BITE, Byzantium, EQL Accountancy Software, Financial Ratios, MENTOR, Mathematics & Statistics software, Total Quality Management, Planner, The Plymouth Business School Introductory Marketing Project, Ivy, Basic Economics, TLTP Marketing Multimedia CD-ROM, TILT materials, IMPACT posters.

A1.14 Statistics at The Robert Gordon University.

Date: 30 June 1995
Attendance: 48
Institutional welcome: Ms. Shirley Earl, Staff Development Coordinator
Keynote talks: Dr. Neil Pitcher (LTDI) - Introduction to the LTDI
Dr. Roger Rist (LTDI) - General Introduction to Technology in Teaching
Mr. Patrick Daly (The Queen's University of Belfast) - Case Study: QUTAL
Dr. James Currall (University of Glasgow) - STEPS: First Tentative Steps in Use
Dr. Chris Robertson (University of Strathclyde) - QUERCUS: Statistics Tutoring for Biologists
Dr. James Currall (University of Glasgow) - Dynamic Graphics (Parallel session)
Dr. Rupert Loader (LTDI) - Making Use of the WWW to Enhance Statistics Teaching (Parallel session)

Software demonstrated:

Introduction to Statistics (University of Nottingham), STEPS, ITTI, Epidemiology, QUERCUS, CTI Centre for Statistics, GraphIT and other TILT materials, QUTAL, ELABORATE, Statutor, IMPACT posters.

A1.15 Attendance Summary

The following are percentages of delegates from each institution attending the fourteen workshops specified in A1.1 - A1.14 above.

University of Aberdeen	6.4
University of Dundee	9.0
University of Edinburgh	7.5
University of Glasgow	7.9
Heriot-Watt University	7.9
University of St. Andrews	3.6
University of Stirling	4.0
University of Strathclyde	6.4

Institutions formerly funded by SOED:-

University of Abertay Dundee	8.1
Glasgow Caledonian University	8.5
Napier University	9.8
University of Paisley	6.6
Queen Margaret College	4.5
The Robert Gordon University	7.0
Northern College of Education	1.1
Scottish College of Textiles	0.6
Edinburgh College of Art	0.4
Moray House Institute of Education	0.7

Percentage of attendance from institutions formerly funded by SOED is 47.3.

Eighteen SHEFC funded institutions have been represented at the fourteen LTDI workshops. Those not represented in the workshops were:- Glasgow School of Art, Royal Scottish Academy of Music and Drama, St. Andrew's College.

A1.16 Quantitative Information from Workshop Feedback Forms

Figures are given below on answers given through the year to questions on the Workshop Feedback forms where these can be quantified. All figures quoted below are percentages.

"Did the workshop fulfil your expectations?"

Completely	Mostly	More or less	A little	Not at all
9.5	59.9	21.1	8.8	0.7

Delegates responded in one of five categories as above.

"How did you find out about the workshop?"

LTDI	Institutional	CTI	email	Personal
Mailshot	Information	Centre		Invitation
66.7	19.7	4.5	2.3	6.8

Delegates responded in one of five categories as above.

Appendix 2. Summary of Implementation Projects

A 2.1. Introduction

Applications for Implementation Support were received via Implementation Support application forms which lecturers or departments completed and forwarded to the LTDI. Implementation is an ongoing process, beginning with an initial contact and progressing, typically through meetings with staff, to classroom use of learning technology in specific courses.

The LTDI Implementation Support Consultants were involved in several different kinds of contact with academic staff in this process. A great deal of time was spent answering queries and providing expert advice over the telephone. Although this expert advice is not summarised quantitatively in the information given below, it formed a significant part of the LTDI project, both in terms of the time devoted to it by LTDI staff, and in terms of value added to the use of learning technology.

An important part of the implementation process is the discussion which takes place with academic staff, to identify the needs which technology can meet. This process is time consuming, but vital if integration of learning technology into the curriculum is to be organic and not superficial.

Implementation support is being provided in 17 institutions, in one form or another.

The common factors are as follows:

- The focus is on the improvement of the quality of the learning environment for the student in ways which make efficient and effective use of staff time;
- The starting point is departmental need rather than availability of products;
- Integration into courses is the ultimate aim;
- The head of department or course leader supports the implementation project.

A number of projects involve one or more departments within a single institution who are seeking CBL solutions to problems which they have identified, often in connection with growing student numbers, diversity of entry qualifications and the desire by students for self-access materials which offer feedback.

In the paragraphs which follow some details are given on the implementation support projects in which LTDI is currently involved. Section A2.2 below lists some examples as Case Studies. These are cases in which classroom implementation has taken place during the session 1995-96. A complete listing of implementation projects is given in Section A2.3.

The Case Studies and implementation projects listed in A 2.2 and A2.3 below include subject specific and generic examples. Generic issues cover areas such as study and

information skills, assessment, evaluation, accessibility and training for staff. Visits covering generic issues were organised through the LTDI contact or the person responsible for staff development in the area of teaching and learning.

These initial visits usually led to further visits and discussion with an LTDI Implementation Support Consultant at the level of Vice Principals, Teaching and Learning Co-ordinators, Staff Development Officers, Institutional IT Strategy Committees, Deans of Faculty and on occasions departmental or course teams, or a combination of these. Discussions covered the issues associated with the use of computers in teaching and learning. Demonstrations were given of study and information skills material. The specific implementations are listed in Section A2.3 below.

There has been considerable interest in the various study and information skills packages to be incorporated into the range of resources available to students starting in 1995/96. However it is not yet possible to determine how many of those stating an interest will implement within this timescale.

The issues discussed at the various visits to encourage the uptake of CAL fall into the categories listed below.

- What can courseware providers do?
- What shall individual teachers do?
- What help can be given to departments and cost centres?
- What shall institutional management do?
- What influence can funding and quality assurance bodies have?

The major issues are:-

- What are the benefits for students, lecturers and institutions?
- What are the barriers?
- How can these barriers be overcome?

All the institutions visited have been very positive about the SHEFC LTDI initiative and the important role it can perform, in terms of an information resource, expert advice and general help through the maze of information, to point them to the appropriate source which can assist them with their particular needs.

A2.2 Case Studies

Summaries of Case Studies arising from LTDI implementation projects are now given. In each case information is given in summary form. Case Studies are coded as follows:

- Subject area is denoted by a capital letter:- M for Mathematics and Statistics; S for Social Sciences; L for Modern Languages; G for Generic.
- The institution is denoted by a numerical value. Names of institutions are confidential.

CASE STUDY G4a

Location	Department of Hospitality, Tourism and Leisure Management, Faculty of Business
Number and Level of Students Involved	80, second year HND or Degree students

Reason for Implementation

The course team was interested in using learning technology in future years to assist and encourage students to take more responsibility for their own learning by using computer-based open learning and revision material. Any computer-based packages to be included would relate directly to the course material by providing additional exposure and practice to compliment current contact time. However staff wished to gauge the potential student reaction to this new innovation to the course by observing and measuring the way students responded to a trial formative assessment exercise. Therefore a pilot implementation was used to investigate whether a computer-based formative assessment would assist students, undertaking the Managing Employees and Service Organisations Module, to obtain feedback on their current knowledge and understanding of the material presented on this course and encourage them in their learning without increasing time spent by staff on assessment.

Description of Implementation

Following an initial visit to explore the possible role for LTDI in this department, and a demonstration of some items of software, it was agreed that a pilot formative assessment project would be developed and implemented during this academic year using QuestionMark. A set of twenty multiple choice and multiple response questions was developed by a lecturer on the course and LTDI produced a demonstration run-time version of a program to operate in a DOS environment and loaded it onto a cluster of IBM compatible machines for evaluation purposes. The program allowed students to confirm or alter their answer after each question presented, review their responses at the end of the assessment exercise, and then work through each question observing the correct answers prior to receiving a printout of their score. Four groups of twenty students, each using a machine, used this program during scheduled class time. The students' answers to the questions were stored on an answer file on each machine. These were copied and combined to produce a single file, containing all students' answers to all the questions, which was then used to generate a series of reports for the course leader and lecturing team. These reports showed that some students had returned to reuse the program out with normal contact hours.

Evaluation and Conclusions

Feedback was obtained from the students involved on the layout, user friendliness, and appropriateness of the content of the exercise. They were also asked to comment on whether it had been a useful learning experience and on how confident they felt about using the program. The students' comments were mainly positive. The only criticisms were that the number of answers expected for any question was not clear and that they would have liked a printout containing the questions and correct answers to take away after the assessment. Both the implementation support consultant and the course lecturer had observed that the students found it difficult to differentiate between multiple choice and multiple response questions. This will be clarified for future use of this assessment. Students were deliberately not given a printout of the questions and answers because not all students did the assessment at the same time and they had been given this feedback on the screen at the end of the session. After this pilot the department is planning to purchase the software used to design and deliver assessments and produce relevant reports. Therefore in future students will have the opportunity to access the package as often as they feel appropriate and can use it for monitoring their own learning. This series of questions will be further developed and a windows version of the assessment exercise is planned for next session. In addition with assistance from LTDI further formative assessment exercises will be developed for other parts of the course using this package.

CASE STUDY G12a

Location	Department of Pharmacology
Number and Level of Students Involved	26, Third year students

Reason for Implementation

A software package on drug metabolism was being developed as part of the TLTP Phase 2 Pharma-CAL-ogy project. The content of this covered the same material as that delivered in previous years during the first 4-5 lectures of the Neuroscience and Biomedical Systems Level 3 Drug Metabolism Course. Therefore the course leader wished to evaluate the effects on the student learning experience of introducing the computer assisted learning package into the course. The lecturer concerned did not wish to decrease the number of lectures the students received on the course but wished to use the freed lecture time to introduce new material which would extend the students knowledge of the subject area.

Description of Implementation and Evaluation

The Pharma-CAL-ogy software was introduced during a lecture and used by the students during scheduled lab time. The overall contact time for lectures and laboratory work remained the same as in previous years. However the students were introduced to additional material during the lectures than had previously been possible. After discussion it was agreed that the evaluation utilise some of the evaluation instruments which were being developed by the Evaluation Group of the TLTP institutional project Teaching with Independent Learning Technologies (TILT) plus a comparison of marks awarded to students undertaking identical practicals over a three year period.

When the TILT Evaluation Group was approached by the implementation support consultant about using their instruments for this evaluation of the Pharma-CAL-ogy

courseware they very generously offered to become directly involved in the evaluation. Two of the TILT evaluators worked with LTDI and the course team to administer a Post-Course questionnaire to the current students and to the students who had undertaken the course during the previous year which contained open questions about the course in general and about the courseware. The responses suggest that several aspects of the course content and practice particularly interested the students and increased their interest in the biological sciences as a whole. A Resources questionnaire was also administered to gain some insight into how students use different resources in order to learn and whether the amount of time available to study this course was sufficient to allow their best use of the learning resources available. Looking at resources this year's students seemed to find lectures and class notes more useful than last. The response to the CAL package by this year's students was positive. The analysis of practical marks indicated that there was no evidence of a difference in the marks in these years.

Conclusions

The introduction of the courseware showed no significant difference in student performance and student feedback indicates that the quality of the student experience has been enhanced.

CASE STUDY M1

Location Department of Mathematics & Statistics
Number and Level of Students Involved 140, first year

Reasons for Implementation

To develop activities in the Mathematical Sciences Laboratory. The department has been using packages in teaching for a number of years. There is a perceived need however for more computer-based materials for purposes of revision and review, in view of increasing student numbers and the variability resulting from wider access. To address this the department runs a Mathematics Support Unit which includes both computer-based and paper materials.

Description of Implementation

One of the Mathwise modules produced by the UK Mathematics Courseware Consortium was used on an experimental basis in a laboratory class. A review lecture was given on the subject of Complex Numbers and students then explored more specific information and activities in the topic using the computer-based module. It was decided to give students minimal guidance, with a view to them exploring the material using their own initiative, based on the navigation instructions available on screen.

Evaluation and Conclusion

A group of 20 students completed feedback questionnaires and some interviews of students were held. Students felt that the presentation of the software was good and that the materials were suitable, both for delivery of information and for revision purposes. However, many also felt that there was a need for more interactivity in the way the materials were used. Also it was evident that there is a need to provide more guidance for students on how to get the most benefit out of the materials. Although help is available on screen, there is a place for paper materials providing specific guidance.

Another issue is equipment. The department in question was using stand alone computers. However, installation and management of the Mathwise software is best done using a network. Also, on the machines available the software was rather slow. There is a need to upgrade equipment if the maximum benefit is to be obtained from the materials.

Future Plans

It is anticipated that a number of Mathwise modules will be used in subsequent years, both in the Laboratory and in the Mathematics Support Unit. However, in the light of student comment, it is likely that worksheets will be prepared to direct students to relevant pages, exercises and experiments. This will assist in adapting the material to the particular needs of students on the course in question.

CASE STUDY M9

Location	Department of Mathematics
Number and Level of Students Involved	60, first year

Reasons for Implementation

A progress test has been given to all first year students taking courses in Mathematics, about six weeks into their first term at university, and used as a guide both for themselves and for staff to assist in the identification of any students with major difficulties in the transition to higher education. Until now this test has been set and marked manually, making great demands on staff time, but staff have felt that the information gained through use of the test has been a valuable diagnostic aid. The level of the test is close to that of Higher Mathematics, covering a wide range of mathematical topics.

It was hoped that a computer based diagnostic test could be used which would have the following advantages: reduction of staff marking time; allow students to take test at time most appropriate for each individual (i.e. after one week, or after eight); provide even better diagnostic information.

The department has two dedicated computer laboratories for its own use.

Description of the Implementation

The diagnostic test, developed by Stephen Hibberd as part of the University of Nottingham's institutional TLTP project, was thought to be a good model for the suggested use, and some time has been spent (with the permission and the help of the author) in moulding the shell of the test to use at another institution. The structure of the package is such that surface details can be altered while maintaining the same basic structure. Staff in the department have collected a large bank of questions, taking care to ensure comparable levels of difficulty and these have been authored for integration into the diagnostic package shell. The questions are grouped into topic areas, and a random selection of questions from each topic bank will be presented to the student giving both student and staff prompt feedback on success in a wide range of topic areas.

The computerised test is to be used first with a small group of students in a pilot study. The group of students identified for this pilot will be selected to allow a comparative study which is currently being designed.

Evaluation

Feedback will be sought from the students in a variety of ways (e.g. questionnaires, interviews, video) and this information will be used to determine, in consultation with all relevant departmental staff, how to effect a wider use of the computerised test in following years.

Future Plans

It is anticipated that the computerised test will be used with the entire first year from the academic session following the pilot.

CASE STUDY S6a

Location	Module in Irrigation
Number and Level of Students Involved	20, postgraduate

This implementation represents a slightly different form of assistance to a member of academic staff wishing to implement CBL with students.

The implementation task involved taking a piece of simulation software (called Mahakali) and improving its documentation in order that it might be used more effectively. The lecturer concerned had used the software as a small part of a course in irrigation management in previous years, but due to the lack of documentation had found it to be of limited applicability, and difficult to integrate into the course. The lecturer's objective in contacting LTDI was to obtain assistance in integrating the courseware fully into an eight-session module dealing with irrigation economics and management, taught as an option to a group of 20 postgraduates.

The Mahakali software was developed under a UNDP/World Bank project, and aims to simulate management and operational decision making for an irrigation project in Nepal.

The ISC firstly met with the lecturer to discuss the range of needs of the students involved and the potential for including the courseware in the module. Given the extensive 'tutorial' support offered in the software (a wide range of factual information is available to users prior to running the simulations), it was decided that the software could run through most of the eight weeks of the module, with the lecturer picking parts of the courseware and referring students to it (with accompanying worksheets) at the appropriate time (usually as an additional tutorial session, compensated for by less lecture hours).

The ISC then prepared extensive documentation on the software, including full descriptions of its menu structure and suggestions as to how it might be implemented. The software will definitely be used as a major part of the module in January 1996.

This exercise, although somewhat time-consuming, proved to be successful - particularly in improving the usability of a current piece of software. If the documentation is subsequently published, this will represent a useful output of LTDI's activities.

CASE STUDY S13a

Location Economics Department
Number and Level of Students Involved 22, third year

This implementation started with telephone contact by the LTDI implementation support consultant with a number of members of the Economics department. It was subsequently established that although the department taught a number of courses involving the sort of basic Economics available from a CBL tutorial, one course in particular could be selected as a pilot in the first year. This course (Microeconomics III - General Equilibrium) was selected as it was run for a relatively small number of students, and would provide a suitable test case.

The problem identified with the course was that students from different backgrounds had difficulty with the relatively advanced economics concepts presented, and were often in need of remedial help. A certain amount of IT was already incorporated into the module (particularly spreadsheet exercises) so that staff members were already familiar with the hardware required.

The penultimate beta version of WinEcon was identified as the software which would broadly suit this module. Although not complete or fully functional, this version offered much of the necessary microeconomics material that was required.

The implementation support consultant held meetings with the senior lecturer concerned to discuss the areas of the module where WinEcon might be usable. Subsequently, the ISC then prepared a detailed outline of the parts of the WinEcon software which would be suitable for specific parts of the course. Finally it was decided that four tutorial sessions would be run, to substitute for regular tutorials, and in addition to the 24 hours currently taught on the module.

The implementation proved successful with this group of 22 students. They remained well motivated throughout the hour-long sessions, even with an unfinished version of the software. There were no significant technical problems, and students (when questioned informally afterwards) were largely satisfied that the experiment had been successful. The institution concerned has a good record for teaching quality and is keen to maintain its contacts with LTDI and to continue implementing this and other software, and especially WinEcon in its final incarnation.

CASE STUDY L1

Location Faculty of Education
Number and Level of Students Involved 90+ Second year, 25+ Third year,
15 PG Cert

Reasons for Implementation

In order to prepare intending primary teachers to offer a foreign language within the context of the SOED Foreign Languages in the Primary School project, it is necessary to provide opportunities for them to revise and develop their existing linguistic skills and knowledge, as well as opportunities to develop appropriate pedagogical strategies to teach the language to children in the primary school. Practising teachers also wishing to offer a foreign language have similar needs, particularly with regard to the revival and extension of their own linguistic knowledge and skills.

Description of the planned implementation

It is planned to use commercially produced CD ROM courses in French, German and Spanish for self-access purposes to enable students to enhance their existing linguistic knowledge and skills. GramDef and GramEx from the TELL consortium will also be available to enable students to gain a firm grasp of the grammar of their chosen language. Software produced for the target age group will also be made available and students will be invited to evaluate it and to plan how they would integrate it into their teaching plans. In the third year, students will revisit the software already provided and undertake more detailed evaluations. They will also work with frequently used authoring packages and create files for specific learning situations. It is felt that the introduction of software as a teaching medium will prove useful in helping students to reflect on their practice. With regard to the PG certificate students, the course will have a strong focus on reading skills. Software which seeks to promote reading strategies will be presented to students, in addition to the package referred to above. It is hoped that the inclusion of software in all three courses will help students to extend their own IT capability as well as to make good use of IT in the classroom. The detailed planning and timetabling of the IT components of the courses is to take place during the summer break.

Evaluation and Conclusion

The inclusion of the IT components in these three courses will be evaluated in the same way as other components. However, the use of software to enable students to develop their own linguistic skills and knowledge will be the subject of a specific evaluation process which has yet to be planned in detail. It will relate to the self-set learning outcomes achieved by the students. The detailed planning of the various evaluations will take place in August 1995.

CASE STUDY L8a

Location	Departments of French, German, Italian and Russian
Number and Level of Students Involved	350+ First year

Reasons for implementation

Departmental representatives from the School of Modern Languages, with the support of the Head of School, decided to set up a feasibility study into the potential of CALL to enrich the students' learning experience and to provide alternative teaching strategies. Funds were made available by the Head of School and a committee was set up with representatives from each of the departments, including the Spanish department

which had been offering computer-based learning opportunities to students for some years. More funds will be made available by the Head of School for further implementation stages of what is perceived to be a major initiative in teaching.

Description of implementation

The planning for the implementation took the form of a series of meetings and workshops which took place throughout the 1994-95 session. The committee examined a range of software options, including the TELL software, some of which they plan to incorporate into their first year teaching. It was also decided to use two accessible yet powerful authoring packages which would require comparatively small investment of both time and money, but provide a useful starting point for staff to investigate the potential of IT as a medium for teaching and learning. The chosen software was purchased and staff identified to undertake the task of creating and inputting texts. A workshop was run specifically for these people and the materials are due for completion on 22nd September when they will be demonstrated to the committee. The materials will be used by students during supervised, timetabled slots and will also be available on a self-access basis.

Evaluation and conclusion

A meeting of the committee was dedicated to the planning of the evaluation and each department prepared an evaluation plan. The focus will be on the achievement of learning outcomes and data collection techniques will include questionnaires, unstructured discussion and observation.

The project was seen as a staff development exercise as well as a serious attempt to consider alternative approaches to teaching and learning. The processes undertaken by the committee have had very positive outcomes, both in terms of the project itself, and in terms of relationships within the School. The discussions have drawn people together and prompted cross-departmental reflection on course content and course delivery. Some staff have gone along with the project despite personal misgivings, and attitudes have been changed as the project has progressed.

A2.3. List of Implementations

Implementations are grouped according to levels of support being provided. These levels are:-

Level 1

An initial meeting has been held or arranged, but no further commitment has yet been shown by the department or individuals.

Level 2

An initial meeting has been held or arranged and there is definite potential for individuals to implement CBL. Discussions are continuing.

Level 3

Initial meetings have been held and staff are committed to implementing CBL in some form in the near future, with the assistance of LTDI.

Implementations are coded as follows:

- Subject area is denoted by a capital letter:- M for Mathematics and Statistics; S for Social Sciences; L for Modern Languages; G for Generic.
- In the case of an implementation covering more than one subject area, two capital letters are used. Thus MS indicates an implementation involving Mathematics and Statistics and Social Sciences.
- The institution is denoted by a numerical value. Names of institutions are confidential at this stage.
- In the case of two implementations in the same subject in one institution, the lower case letters a, b, etc. are used.

Note. *The term 'authoring package' is used below in some of the Modern Languages implementations to refer to packages designed for use in foreign language teaching and learning which has a limited range of functions. It is not comparable with authoring tools such as ToolBook.*

Level 3 : Firm commitment to Implementation in this or next session

- G10a** A request was made for assistance with the development of a question bank for assessment in Psychology. The lecturer wished to use questions which accompanied a text book. A selection of possible packages were demonstrated. The implementation support consultant contacted UK distributors of the text book to investigate the issue of copyright and whether it would be possible to use the bank of questions. Permission to use these would require to be obtained from the publishers in the USA although it was not foreseen that there would be any difficulty as the textbook was the recommended reading for the course. The lecturer was given the relevant contact details for permission to be sought. Meanwhile the lecturer was asked to provide a dozen questions for students to use as a self assessment tool in order that a pilot implementation could be undertaken during this academic session. Using these and LTDI's demonstration copy of the DOS version of Question Mark_ a runtime version of the questions was prepared and given to the lecturer to use with her class. She was going to liaise with support staff within her institution to mount the assessment software onto the appropriate machines. It has not proved possible to follow this up with the member of staff to obtain feedback on the pilot. A further attempt will be made in the new session.
- G12b** Following a briefing session outlining the aims and objectives of LTDI, which included an overview of learning technology, CTIs, ITTI and TLTP, plus the services LTDI could offer this Dean intended to contact TILT directly about making the information skills and study skills packages available on his

faculty cluster as they became available. He would also ensure that staff within his domain had access to the relevant CTI publications and identify individual members of staff to follow developments of appropriate TLTP projects. Information about LTDI would be disseminated and future briefing sessions would be welcome.

- G12c** This faculty had already developed a considerable amount of CAL for its discipline and had experience of implementing and evaluating it. However the Dean welcomed the opportunity to be briefed on LTDI activities and to discuss additional packages which would assist students. Information and study skills packages will be made available within this faculty.
- G12f** This faculty had just installed its first cluster and therefore the Dean wanted to know what was available in his area of responsibility. Information and study skills packages will be mounted on the cluster for student use.
- G14b** As a result of the LTDI workshop on study skills an implementation request form was received from one of the attendees. After further discussion a demonstration of all suitable software was arranged for department staff to evaluate the appropriateness of the packages for their students. The TILT information skills and study skills packages were identified as their preferred choice. All six packages were sent to the department for further consideration and possible customisation to tailor them to their own specific requirements. It is anticipated that these will be used with students in the 1995/96 session.
- G19** A visit in response to an implementation request form resulted in a display of study skills materials being given as a follow-up. The PASS package was identified as the one which most closely matched with their needs and the type of equipment which they currently had available. An implementation will result probably next year. This will be followed up early in the next session.
- M2** This department has considerable experience in the creation and use of computer based learning materials, and computerised assessment techniques. LTDI assisted with an informal evaluation of one of the Mathwise modules, and some other items of mathematical software, with two separate groups of students, who completed detailed evaluation forms as well as providing verbal feedback on their impressions of the software. Consequently it was decided to adopt the Mathwise module, to make it available to the students for unrestricted access, and to encourage students to make use of it. In coming sessions Mathwise will be included with other computerised tutorial sessions.
- M4b** LTDI was approached by the Chemistry department for help with the introduction of technology to support teaching. Discussion covered a broad range of educational issues and concentrated on the need to identify the aims of using technology and its proper integration with other course materials. One section of the course was identified as consistently causing difficulty for the students and is to be targeted for the introduction of technology, provided suitable software can be identified. Useful sources of information were discussed. Further discussions have taken place with LTDI and a number of pieces of software are being investigated by departmental staff. The intention

is to select and use one piece of software in the coming session, and LTDI will continue to be involved in discussion about successful integration strategies once the target software has been selected.

M4c Software was demonstrated to staff in department of Physiotherapy, particularly for the teaching of biomechanics and bioengineering. The Mathwise mechanics module has been ordered and an evaluation with students is planned for later in the semester with which LTDI has been asked to assist. It is hoped that the opportunity will also arise to discuss issues of integration and evaluation. A request for information about Statistics packages which could be used by students involved in their honours projects, having forgotten much of the Statistics they were taught earlier in their course, was also made, and some details have been sent on. This will be followed up in due course.

M4d This Mathematics department has a great deal of experience in the use of CBL, but it contacted LTDI enquiring about any software which might help one particular student who had persistent difficulty with algebraic manipulation. Two packages were identified, available from the World Wide Web, which although not highly interactive or presented in a polished form, did give the opportunity for extended practice of manipulative exercises. The student has used one of the packages and their informal feedback was that it had been helpful to them, and the academic staff were pleased to have been able to assist the student. The software is being considered for use with another student attending an access course, also experiencing similar difficulties.

M9a An initial visit to the co-ordinator of the first year Mathematics course was followed up over a number of weeks with varied discussions and software demonstrations. The department has decided to use some diagnostic testing software which it discovered through contact with LTDI and support is currently being provided to tailor this for integration with other aspects of the course. LTDI is training some staff in the skills required to alter and amend the content of questions, so that they will be able to make future amendments to the content unassisted. A full bank of questions of equivalent difficulty has been written, from which a number are randomly selected for each test, and these are currently being electronically authored prior to use with the first group of students in the autumn. A detailed pilot study is being undertaken to evaluate the success of the introduction of the computerised assessment.

M9c LTDI was approached by this department to demonstrate the STEPS material, and this was followed by demonstrations of other packages and discussions about the practicalities of using technology with students. It was discovered that a number of packages were already licensed for use in the department, although not available on the network. Two of these packages, plus one developed within the department have now been mounted on the network and made available for use with classes. Special worksheets have been created for use with some of the software in laboratories, and staff feel that this has been helpful in assisting students to understand the concepts involved. Students also gave positive feedback.

- M10b** An initial visit was made to the department of Physiotherapy to discuss software available for teaching research methods and for teaching biomechanics with academic staff and the course leader. Several different packages were demonstrated. Three of these have subsequently been obtained by the institution. Detailed consideration of the course documents allowed LTDI to make some specific suggestions about which materials could be successfully integrated into tutorials. A definite decision has been taken to use one of the Mathwise modules in the coming session, and LTDI is continuing to work closely with the staff team involved.
- M14a** Mathematics software was demonstrated to a member of staff in the department of Electrical Engineering along with discussion of some implementation and evaluation strategies. The faculty has now purchased a suite of computer assisted learning materials. LTDI consultants have an ongoing involvement with this department and faculty, who have an active interest in making the most of the available technological resources.
- M17a** Here a new masters course is being established, which will include compulsory modules in research methods, and quantitative and qualitative methods. Student numbers are expected to be low for the first year (starting Jan 1996), but to grow rapidly. The staff have no experience of using computers within teaching, but are keen to make the course practical and avoid getting entangled in too much theory. LTDI visited the staff team concerned and spent some time discussing the sorts of ways they might consider using computers with the available resources. Some examples of software packages have subsequently been obtained by the staff, who have been writing the detail of the course content and trying to identify where software packages could best be integrated. A number of pieces of software have been identified which could enable students to fill any gaps in their knowledge (students will enter this course from diverse backgrounds) and LTDI are assisting in discussion about software which could usefully support the main teaching of the course.
- M4a/10c/14c** All three Radiography departments were approached by LTDI and after initial visits, a subsequent meeting was arranged in Dundee with the RADICAL project staff. At this meeting the software was made available for hands-on investigation and there was a great deal of discussion about its suitability for use with students and the most appropriate methods of integration, as well as feedback for the designers on possible material for future case studies. The software is to be released in autumn 1995, and each of the departments have arranged to receive copies without delay. LTDI will continue to offer support as the materials are used with students in the coming session.
- S2a** LTDI, in conjunction with IMPACT, has helped an Econometrics lecturer, who wished to specify and develop package for teaching of introductory Econometrics. This lecturer is teaching large groups of 3rd and 4th year economists and is currently using commercial Econometrics analysis packages. This software does not quite achieve the level of basic learning required, and therefore some self-developed materials are appropriate. The assistance from

LTDI has included specifying the module and liaising with colleagues, and making contacts with colleagues in other institutions (see S13)

- S4a** Implementation of WinEcon will definitely take place in September 1995 for students in the department of Hospitality and Tourism Management. Two colleagues in this department are also interested to develop a series of worksheets or a workbook to accompany the WinEcon software - advice and contacts provided.
- S4b** Implementation of WinEcon will definitely take place in September 1995 for around 350 Year 1 Economics students taught by the department of Economics. This implementation arises from a staff seminar and demonstration, and subsequent talks with specific colleagues in the department. Awaiting the final version of the software.
- S9a** In the (amalgamating) Department of Economics, one lecturer will definitely implement WinEcon in the forthcoming semester. LTDI's role has included providing demonstration versions of the software, details on downloading software via ftp, and discussion of implementation issues with the lecturer concerned and his Head of Department. There is strong institutional support at this site.
- S10a** The Departments of Health Studies and Hospitality Management were both visited twice. Definite implementations of WinEcon will take place this semester - although possibly on a small scale only, due to the relatively advanced nature of some of the materials. Some software has been mounted on machines and demonstrated. Continuing contact is required.
- S11a** Several visits were made to this Economics department, first to present two staff seminars, and secondly to devise a programme for the implementation of WinEcon in September 1995. Details were prepared in conjunction with the Year 1 Economics lecturer, along the lines of those prepared for Case Study S13a. Definite implementation, with considerable departmental academic and technical support, will take place this September.
- L2** Following discussions with the head of department and with the member of staff responsible for the use of IT, the department decided to make use of the GramEx and GramDef TELL packages. It was also decided to consider the place of text reconstruction as a means of providing follow-up activities to listening comprehension classes for specialist language learners. A workshop was held and the department decided to go ahead and purchase the package. A training session was then held for the person who had time set aside to create and input the relevant texts. The materials will be used in timetabled slots during the 1995-96 session when the possibility of formal evaluation will be discussed. The package is also likely to be used for non-specialist language learners as self-access materials to supplement contact sessions.
- L11** This university offers language courses for non-specialist learners, for which credit can be obtained in final year examinations. Much of the teaching is done

by visiting native speaker tutors. It was decided to set up a course of training to help people to make use of the university network to set written assignments and to comment on the work of the students in such a way as to encourage revision and editing so that errors became stepping stones to success and learning opportunities, rather than indications of failure. The month long training course consisted of a contact session at the beginning and end and three on-line units which modelled good practice to be completed between the contact sessions. As a means of supporting the use of the network in the future, the department bid successfully for 12 computers, has appointed a half-time CALL officer to take things forward during the new session. A bid has also been put in for university funds to finance further CALL development under the university's teaching and learning initiative.

L13 This university offers courses in modern languages and European management or business. The languages department decided to supplement text-based, audio and video materials by software packages which related directly to the content of the courses offered. Their main reason was to make up for what they believed to be inadequate contact time with students. Support for the staff concerned consisted of four workshop sessions in which appropriate TLTP packages were identified and the potential of a previously purchased but unused authoring package explored. Staff time was set aside to develop the necessary text files and evaluation procedures are in place. Materials in French and Spanish will be available for students at the beginning of the 1995-96 session when their use will be evaluated as part of the on-going evaluation of the self-access centre. German staff are intending to make use of the software during the new session.

L16 A seminar was held for representatives from each of the Scottish universities where Russian is taught. The day consisted of four brief case study presentations, interspersed with hands-on sessions. The day proved to be a great success. Colleagues were grateful to have the opportunity to spend time looking at packages read about or seen briefly at exhibitions. They also benefitted greatly from meeting together to share experiences and to discuss future plans with colleagues that they meet rarely. A request for implementation support was received as a result of the seminar, and several people went away with plans to incorporate some of the software packages demonstrated into their existing CALL provision.

Level 2 : Some interest and possibility of implementation, but no firm commitment made

G4b A visit was made in response to an implementation support request form. The content of the course in question and the lecturer's requirements were discussed, relevant information about packages available to meet the individuals needs was identified and details of these were mailed to the member of staff. Further contact is expected with a possibility of support.

G5 After receipt of an implementation support request form a telephone conversation was held about possible learning technology materials available

in this colleague's subject area. These highlighted the lack of provision of available CAL to meet the need of this lecturer. However he seemed keen to follow this up and get involved in authoring materials, Therefore a meeting was set up with the implementation support consultant and the appropriate person within his own institution who would be able to assist him with this. It looks as if he will be developing his own courseware assisted by internal staff who have experience in authoring packages and expertise in teaching and learning. Contact will be maintained to let the implementation support consultant know how the project is progressing.

- G7** A visit was made to the LTDI contact, Enterprise in Higher Education and Teaching and Learning staff to discuss the assistance available via LTDI and what might be useful for LTDI to do in conjunction with this institution. Further contact with other LTDI implementation support consultants arose from these discussions.
- G10b** After receipt of a completed implementation request form several meetings were held with a member of staff regarding the use of e-mail, networks and electronic news groups. Further discussions / assistance may be possible.
- G10c** Via the LTDI contact within this institution a presentation to members of the institution's Strategy Committee on Issues involved in CAL was made.
- G11** Visits to various staff were made. A possible implementation involving study skills materials may result next session. This will be followed up early next academic year.
- G12d** This faculty is currently reviewing its degree programme and intends to increase significantly the amount of independent learning, including the use of technology. Therefore this Dean welcomed the opportunity to discuss what LTDI could offer. A follow-up meeting with the member of staff responsible for co-ordinating computer based developments within this faculty was arranged and future contact will continue.
- G12h** A briefing session about LTDI with the Dean of the Science Faculty resulted in a series of meetings being arranged with each of the Heads of Planning Units within Science. A subsequent lunch-time seminar on Computers in Teaching and Learning was attended by about 30 members of staff.
- G12j** A meeting with the Dean of Social Science led to a series of meetings with staff within this faculty and an invitation to LTDI to mount a display and participate in a panel discussion at a faculty meeting.
- G12l** Following a briefing session with the Head of the Department of Adult and Continuing Education outlining the aims and objectives of LTDI, which included an overview of learning technology, CTIs, ITTI and TLTP, plus the services LTDI could offer an afternoon workshop for departmental staff was arranged to discuss technology in teaching and learning and to disseminate information about LTDI. As more than 14,000 people are attracted to courses

in a wide range of subject areas run by this department staff would welcome further contact with LTDI.

- G18** A visit was made to the TLTP institutional project at this institution to discuss ways in which LTDI could collaborate with them and in particular to discuss their input into some of the planned LTDI workshops. Some internal workshops with input from LTDI will take place in the next academic year.
- G20** A briefing meeting was held with the LTDI contact, plus a discussion of possible future plans. It is envisaged that assistance with the use of the MANs may emerge during the next academic year.
- M4a** Software has been demonstrated to staff in the departments of Occupational Therapy and Radiography, both of whom have made further enquiries about different items.

Radiography have experienced difficulty for several years in the students' understanding of many mathematical topics, but especially those to do with rates of decay and the exponential function. Some software was identified and tried informally with a few students with mixed results. The most interested member of staff in Radiography retired at Christmas and although they passed on a recommendation to the staff member who took over the course, LTDI has, as yet, been unable to persuade this new member of staff to try out the software or discuss possibilities.

Occupational Therapy are in the process of planning a new course, and LTDI have been in touch with some general ideas and suggestions which might be considered at this stage. The department has recently purchased a major anatomy package which will be used in teaching in the new course, replacing anatomy lectures from the local hospital and medical schools. The initial uses of this package have proved interesting and the staff concerned are keen to exploit the full potential of the resource - they hope to work closely with the second year of LTDI.

- M5a** This Mathematics department within the teacher training college maintains an interest in software to support teaching in schools on a variety of machines, but would also find software to enhance the mathematical skills of some of their students useful, generally reinforcing topics perhaps not fully grasped when first encountered. A number of packages have been explored and demonstrated, one of which has been followed up and its potential will be explored - it is an exciting graphing program which encourages very easy exploration of functions and parameters, in a visually stimulating manner.

Another member of staff in the department, again with many years of practical experience of using technology within teaching, seeks a variety of support materials which could be made available in an open access computing facility, for all students, but particularly those entering the second year of the course directly. Experience shows that these students (6 or 8 each year) typically lack some of the skills which were covered in year 1 of the course, but very rarely do the deficiencies of the students coincide with each other, so a bridging

course is not practical, and individual programs of study are required. In addition to seeking useful tutorial software, a diagnostic package which could assist in the identification of these deficiencies would be useful and would allow interview time to be spent assessing the candidates' suitability for teaching, rather than assessing their skills to date. LTDI is assisting in the search for software, and working with staff on possible computerised diagnostic aids.

- M5b** In this technical education department problems have been experienced with direct entry students into second year. Most have gaps in their knowledge, but these are rarely in similar areas. Much time is spent with students identifying the exact nature of their past experience, and in establishing and delivering a successful program to ensure that they are as close as possible to the level of the 'standard' students. The department has experience in the use of computer based tutorial materials, and is already using Mathwise for example. LTDI has been involved in the identification of possible tutorial materials for these students, and also in some consideration of a computerised interviewing procedure which may be able to assist in the identification of important gaps in knowledge without being so demanding on staff time.
- M9b** A request was made for assistance with the development/adaptation of a question bank for student use as a self assessment tool, within the Mathematics Department. An initial response was made, including suggestions of other individuals with expertise in this area, and some further discussions have taken place. LTDI will maintain contact with these staff and will assist where practical - at present it is still in an exploratory phase.
- M13** LTDI was invited to take part in one of a series of Mathematics departmental seminars, but staff from other departments were also present. This department has been using CAL for many years and have expressed an interest in exploring some of the Mathwise modules. Different software items were briefly demonstrated at the seminar along with some discussion about the advantages and difficulties of using technology in teaching. The possible role of LTDI was explained, although no direct request for assistance has been received. This department is practised and confident in the use and integration of technology and actively maintains contact with many good sources of information.
- M14b** The Mechanical Engineering department has a long standing resource bank of tutorial software available for student use, but recently the member of staff most closely involved has had great difficulty in obtaining new materials. LTDI has given practical assistance in identifying a number of new packages which are of interest to the department, and in some cases has been active in following up requests for materials. As a result of these efforts LTDI has become involved in some discussion with the faculty strategy committee for the use of IT, which may lead on to other useful associations.
- M19** The staff at this institution were seeking introductory materials which could support exploratory data analysis. We explored a number of packages briefly

and discussed some of the relevant issues. It is expected that some materials will be obtained for more detailed consideration - particular interest was expressed in those which allow some tailoring, because the applications relevant to these students tend to be quite specialised. Continued LTDI input is expected for some time.

- S6b** Several visits were made to meet Rural Economics and Business staff, out of which two implementations have occurred (see S6c and S6a). A follow up demonstration session was arranged in conjunction with the CLUES project at Aberdeen, where Economics, Statistics and CLUES modules were demonstrated. Interest was shown by a range of individuals - mostly in the CLUES and Statistics software, with a number of follow-up visits, either through CLUES or LTDI, possible.
- S7** Meetings were held in the departments of Agriculture and Economics, discussing CLUES materials. Dr. Loader was co-opted onto an expert group for AgricEcon which is currently being implemented in the Department of Agricultural Economics (2-year on-going implementation and trial). Discussions were held with the Department of Economics regarding Hummer Econometrics software - currently implemented. Interest was identified in Valuation and Economics Software in the department of Land Management.
- S8** The Department of Economics is keen to implement introductory Economics software. A staff seminar was arranged but then postponed due to a problem with dates. LTDI staff will follow this up.
- GS9b** A visit was made to demonstrate Economics, generic and other software. Three further visits were made to the Department of Economics, to install software and discuss with colleagues the possibilities for implementations. There will be implementation on this site, but it is constrained by a long lead time for the re-design of modules and will not be before September 1996.
- S11b** A staff seminar was presented in the Department of Accountancy and Finance, demonstrating a wide range of software for Economics, Business and Accountancy. Considerable interest was shown by staff, especially in business game software. One colleague also keen to use Project LoCAL approach to update some of his spreadsheet models - details provided.
- S12** Following visits to the Department of Political Economy, there is a strong likelihood that WinEcon will be implemented this September, or at least next year. The full version of the software is still awaited.
- S13b** Significant discussions have been held with an econometrics lecturer, keen to become involved in software development. Contact has been made with colleagues in Economics at institution S2, and collaborative ventures are likely to emerge as a result, possibly based around the Project LoCAL approach. Documentation has been sent.

- S13c** There has been considerable interest around the institution - especially in Management Studies and the MBA programmes - in business games and simulations. Three colleagues were visited (in different departments) and demonstrations, with details of business game software provided. Implementation is possible next semester.
- L14** After an initial indication of interest in the use of Question Mark and a demonstration of the package for the head of department, it was decided against starting with computer-based assessment and attention turned to the use of authoring packages and grammar packages from the TELL consortium. It was decided to put on a workshop for staff to acquaint them with the facilities of the chosen authoring packages which were purchased in advance of the workshop. The staff response was good. At a follow-up meeting with the head of department it was decided to put a PC on the desk of each member of the department with money offered to the department for investment into IT. This will enable staff to create files for the authoring package and will also enable them to make use of the university's network.
- L17** This college of education has requested implementation support to provide CBL activities to help BEd students to increase their knowledge of the English grammar to equip them to deliver the 5-14 English Language curriculum, and also to give them the necessary background to be able to build up their knowledge of the grammar of the foreign language(s) which they wish to pursue as part of their degree. If the course is successful, it will also be offered to the PGCE primary and secondary courses. It is planned to use an amended version of the Poetry Shell produced as part of the ITTE project and GramDef and GramEx from the TELL consortium.

Level 1 : Contact has been made with these departments, software demonstrated, but no implementation is currently expected

- G11b** A request has been received to discuss assessment with a member of staff which may lead to an implementation. It has not proved possible to follow this up at this stage but a date will be arranged early next academic year for the implementation support consultant to visit the member of staff.
- G12e** The Dean of the Engineering Faculty, which already develops and uses a considerable amount of CAL for their discipline, was interested in LTDI activities. A follow-up meeting with the convenor of the faculty's teaching and learning committee resulted in a number of staff attending LTDI workshops and a visit from LTDI to one of the departments.
- G12g** Following a briefing session outlining the aims and objectives of LTDI and a discussion on learning technology, this Dean showed the new computer suite which had just been installed and introduced the implementation support consultant to staff involved in the TLTP CLIVE project and a new informatics

group. Information about LTDI would be disseminated and future briefing sessions would be welcome.

G12i Following a briefing session outlining the aims and objectives of LTDI and a discussion on learning technology this Dean arranged for the implementation support consultant to meet with the appropriate person who sits on the faculties teaching committee. Information about LTDI was disseminated and future contact would be welcome.

G12k A visit was made, arising from an implementation support request form. Discussion indicated that the work which this member of staff wished assistance with did not really fall within the remit of LTDI. He was guided as to who would be the appropriate people to approach for assistance with his particular request within his own institution. Also information about other issues raised at the meeting were sent to him. No further contact is expected at this time.

G14a A visit was arranged to brief Teaching and Learning staff about the work of LTDI and the range of activities undertaken by members of LTDI staff. A possible internal workshop will result during the next academic year.

G21 Discussion with member of staff may result in collaboration on assessment during 1995/96.

MS3 An initial visit was made to explore the interests of this institution and an afternoon of software demonstrations was subsequently arranged through the staff development officer, which was attended by about a dozen members of staff from different academic backgrounds. The software included a range of mathematical and business applications. It was hoped that the interest expressed in one of the statistical packages would be followed up, but (perhaps because the member of staff concerned is part time) this has not proved to be the case until now.

M4d A visit was made to one member of staff to demonstrate the MENTOR project software - other staff had been at a demonstration by the project themselves some weeks before. This member of staff has now obtained a copy of the software and is exploring its potential for inclusion in courses, although the approach used by the project does not closely match with his preferred teaching methods. This department has a great deal of experience in the use of CAL, and a request for support from LTDI is not anticipated.

M6 A visit was made to the Biology teaching group to demonstrate software to support basic mathematical skills. The staff were impressed with the appearance of Mathwise but the content of the available modules did not match with their needs. Perhaps when the basic skills module is released it will be of interest to them, and this will be explored then.

A request was also received for assistance with training materials for Statistics in Biosciences, mostly at a fairly high academic level. There is not a large amount of tutorial software at this level, and the staff are experienced in a

range of analysis packages and their potential as a teaching tool. LTDI did demonstrate a few packages and will continue to seek higher level materials.

- M7** LTDI was invited to demonstrate software to the Mathematics department and a general discussion about the use of technology in teaching also occurred. This department did not feel that any of the Mathwise modules they saw would be appropriate for use with their course, but were happy to have had the opportunity to look at them, and will monitor details of other modules as they become available.
- M10a** A visit was made to the department of Food Technology to discuss the availability of software to support the teaching of experimental design. Some suggestions were made, but the number of packages in this area is limited, and none were felt to be an improvement on those already in use. LTDI will continue to monitor any material in this subject area and will pass on details should any useful items emerge.
- M12** A visit was made to a lecturer in the Civil Engineering Department who expressed interest in the implementation of CAL. The department has significant experience in using CAL in Mathematics teaching and there is interest in extending this into other areas, such as diagnostic testing and Engineering. Materials in these areas were demonstrated. The department may follow up its interest with the relevant TLTP projects, but the LTDI is unable this session to provide particular expertise in Engineering.
- M15** An initial visit was made to explore the possible role for the LTDI in this teacher training college, and to demonstrate some items of software, one of which has been followed up, although it is not anticipated that it will be integrated into the teaching programme. This member of staff has requested more information from LTDI, has attended a workshop, and is delighted to be kept informed about interesting and innovative educational products. No implementation is expected here, although contact will be maintained with the staff.
- M17b** The Mathematics department at this teacher training college was visited and a brief presentation was made showing a variety of software and highlighting some of the issues, however the staff did not feel that the content or the style of the packages were appropriate for use in their course, or for their students to consider for use in schools.
- S1** A request was received from the department of Mathematics for case study materials relating to linear programming for Economics students. Details of such materials were sent and acknowledged, with some prospect of implementation this year.
- S2b** Contact was made with teachers of MBA and Business students. Details of business games and simulations provided.

- S3** There is a possibility of implementation of introductory Economics software, although now less so due to a recent change of the personnel teaching the course.
- S5** Visits were made to the departments of Marketing and Law. Some advice and contacts were given to a lecturer in marketing developing a demonstration of WWW resources. This will be followed up by the new LTDI staff.
- S6c** A visit was made to discuss the implementation of WinEcon with the Economics department. A possible implementation may result, although probably not in 1995.
- S4c** Considerable advice was provided on business games and simulations, with the possibility of implementation in the near future.
- S14** Some interest shown in involving LTDI in a School of Surveying distance learning course at some stage in the future - probably not immediately. Further contacts are to be made.
- S18** Visits were made to the VARSETILE project at Stirling, to appraise the evaluation of WinEcon with a group of Economics student volunteers. VARSETILE will assist with the implementation of the package in the Economics department in the forthcoming semester.
- L4** A request for implementation support has been received from staff offering non-specialist language courses in this new university, following their attendance at an LTDI workshop which dealt specifically with this group of learners. An exploratory meeting will be held early in the 1995-96 session.
- L6** Following an LTDI workshop, staff from the German department expressed an interest in implementation support. They planned to raise the matter at a departmental matter at the end of the 1994-95 session with a view to setting up a meeting early in the new session to take the matter further.
- L8b** The EFL centre at this university has requested a meeting in order to consider the possibilities of implementation support during the 1995-96 session.
- L10** This implementation is still at the planning stage. Following an initial meeting, the head of department came to two LTDI workshops and is also planning to visit the CTI Centre for Modern Languages in Hull to get first hand experience of a wide range of software packages. A further meeting is planned early in the new session to take things further, particularly with regard to issues of integration with existing courses. A second request for assistance has been received from staff teaching EFL in the same institution. This will be followed up early in the new session.
- L12** As a result of the Russian seminar at which there were representatives of every department of Russian in Scotland, this department expressed interest in an a multi-media authoring package which they saw demonstrated. The package has been purchased by LTDI and work will begin in the new session to

demonstrate the package in more detail and to consider where it would be most effectively used within the department. It is likely that it will prove to be most useful with first year students who need help with morphology.

- L15** It did not prove possible to find a date when the relevant staff at this college of education were all free for the workshop which had been requested. A further attempt will be made to find a date in the new session.

A 2.3. Quantitative Summary of Implementations.

Numbers of implementation projects:-

Level 3	34
Level 2	29
Level 1	29

Total number of implementation projects is 92. Of these, 43 are situated at institutions which were formerly funded by SOED.

In addition to the above implementations, a further 6 requests for implementation support have been received, but LTDI has been unable as yet to provide support. This has been due to the fact that these requests have been outwith the domains of subject expertise covered by the current LTDI staff.

Appendix 3. LTDI Project Staff

Dr. Roger Rist, Project Director

Dr. Neil Pitcher, Development Officer

Mrs. Sue Hewer, Implementation Support Consultant (three days per week)
(Modern Languages)

Dr. Rupert Loader, Implementation Support Consultant (Economics)

Ms. Nora Mogy, Implementation Support Consultant (Mathematics & Statistics)

Mrs. Helen Watt, Implementation Support Consultant (two days per week)
(Generic Issues)

Ms. Wilma Brown, Part Time Secretary

Appendix 4. LTDI Consultative Group

The LTDI Consultative Group advised the project staff and helped to ensure that the activities of the LTDI were meeting the needs of the Scottish Higher Education Institutions and were coordinated with the activities of other initiatives including CTI, ITTI and TLTP.

Members of Consultative Group:-

Dr. D Baty, Dr. J Cook, Mr. J Darby, Dr. S Heath, Mr. G Madill, Dr. F Percival, Dr. R Rist, Mr. B Shields, Dr. R Trainor, Ms. S Turpin, Professor G Wilson.

Meetings held:-

18 August 1994, 22 November 1994, 16 February 1995, 17 May 1995.

Brief summary of discussions:-

At the August meeting guidance and advice were provided for a number of areas, including:- collaboration with CTI, ITTI and TLTP; aims of workshops, selection of materials for demonstration and case studies; the place of generic and institutional issues; format of handbook and other information services; strategies for feedback and evaluation.

At the November meeting suggestions were made regarding arrangements for mailings and the format and appearance of publicity leaflets. There was also reference to the format of workshops, including the suggestion of a more definite start. There was discussion of the nature of Implementation Support and advice was given on the kinds of issues and needs which were likely to arise.

At the February meeting the Development Officer presented a progress report on the conduct of the Initiative to date. The Group also considered the first draft version of the

LTDI Interim Report and made suggestions regarding appropriate revisions. These suggestions were incorporated into the Interim Report, which was circulated in February. Some queries were raised regarding the production costs for the LTDI handbook. Consequently care was taken in the subsequent print run to ensure that the costs incurred were reasonable. Some initial discussions took place on arrangements for year 2 of LTDI, subject to funding.

At the May meeting the Development Officer presented a further progress report, outlining workshops, implementations, the handbook and the COSHEP Seminar. A discussion followed on further useful services which the LTDI could provide. Ideas included training for Quality Assessors in the area of Learning Technology and contributions to Staff Development programmes. Suggestions were made on the format, content and distribution of the LTDI Final Report. Arrangements for year 2 of LTDI were discussed, including MANs, new subject areas and recruitment.

