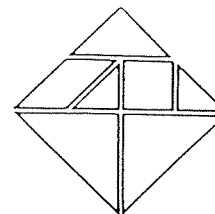*Delta 2*

NEUROPE LAB

EUROPEAN CENTRE FOR RESEARCH, EXPERIMENTATION AND LEARNING FOR THE KNOWLEDGE AGE

20th August 1991

Dear Colleague,

We enclose the penultimate version of our JITOL DELTA proposal.
Again, this paper is passed to you in *STRICT CONFIDENCE*. It includes information about contributions to workpackage and resource allocations.

For the purposes of this draft we have used an average labour rate of 100,000 ecus per person-year. For form M3 we suggest that you define no more than three Labour Rate Categories. Your average labour costs should not differ greatly from 100,000 ecus per person-year. These rates include all overhead costs and each partner must be able to justify costs for the various categories of staff employed to Commission auditors. In most cases you will receive 50% of these and other costs. Please refer to the Model Contract (GE0598MC) Articles 22-35.

It is ESSENTIAL that all non-EFTA partners provide Labour Rates to us *before* the 5th of September.

Your checklist of *tasks before the 5th September is*:

- Labour Rates;
- reaction to the workpackage contributions requested of you;
- reaction to the resources allocated to you;
- reaction to the text of the proposal;
- (if not already provided) a profile of your organisation, what your expertise is related to the task (special reference to previous CEC project involvement) and CVs of at least the key contact person - see the notes sent to you with the previous draft earlier this month.

PLEASE SEND ALL THESE PAPERS BY POST/FAX OR EMAIL to the address below.

The final stages in preparing the proposal will be undertaken by Peter Goodyear, André Boder and me at Lancaster.

Contact: Professor R. Lewis,
             ESCR-INTER Programme,
             Department of Psychology,
             University of Lancaster, LA1 4YF UK

Phone: . (44) 524 65201 Ext.3601 (24hrs with AnswerMachine)
             (44) 524 381998 (direct line form 5th September)

Fax: (44) 524 841710

Email: psg002@lancs.cent1
             (using your EARN/INTERNET path to JANET)

Yours, R. Lewis

500,000 ECU, whichever is the lower. The retention and any other balance due shall be paid within two months of the date of the approval by the Commission of the consolidated cost statement and the last technical report, document and any other deliverable required by the contract.

21.3 If on completion or cessation of the work under the contract the total financial contribution of the Commission calculated to be paid in accordance with this Annex is less than the payments already made by the Commission, the Contractors shall immediately reimburse, in ECU, the difference to the Commission.

21.4 Subject to Article 39 of this Annex, periodic payments made against cost statements shall be considered as advances until acceptance, in accordance with the procedure specified in Annex I, of the appropriate deliverable specified in Annex I, or, if no deliverables are specified, until acceptance of the final report.

Part D - Allowable Costs

Article 22 - Estimated Costs and Transfer of Costs

22.1 Any categories of estimated costs given by each of the Contractors for the work under the contract shall be indicative only and the Contractors may transfer expenditure between categories provided that it does not fundamentally affect the scope or content of the work to be carried out.

22.2 Each of the Contractors shall ensure that no unnecessary cost or unnecessarily high cost is charged to the contract and shall not make any profit or other surplus on account of the financial contribution of the Commission.

Article 23 - Allowable Costs

Without prejudice to Article 27, allowable costs shall include only actual costs borne by each of the Contractors after the Operative Commencement Date of the contract and which are expressly necessary for the performance of the work under the contract. Allowable costs may include all or any of the following categories of costs:

- labour
- overheads
- travel and subsistence
- durable equipment
- consumables
- computing
- external assistance
- other costs in accordance with Article 31 of this Annex.
- taxation and customs duties in accordance with Article 32 of this Annex

Article 24 - Labour

24.1 Labour costs shall be charged in respect of the actual time undertaken by direct labour on the work under the contract and shall be calculated by reference to:

- the actual gross salary, wages, or any other labour costs directly relating to the employment of personnel such as social charges and pension contributions, but excluding any participation in profits, or

- average salaries or wages and such other labour costs specified above, in accordance with the usual policies or practices of the relevant Contractor, where such averages do not deviate significantly from the actual salary or wages and such other labour costs specified above.

24.2 Records of time devoted to the work under the contract must be maintained by staff throughout the contract and must be certified at least monthly by the project manager as designated by Article 1.5 of this Annex or another appropriate senior employee of the Contractors.

24.3 Direct labour costs shall normally include only scientific, technical support or specialised staff and shall not include general administrative, clerical, secretarial or other similar costs.

Article 25 - Overheads

25.1 Overheads may include indirect general costs calculated in accordance with the normal accounting conventions, policies and principles of the relevant Contractor in respect of items such as administration, management, depreciation of buildings and general equipment, accommodation, maintenance, telephones, heating, lighting, electricity, postal services, stationery, staff training, insurance.

25.2 Overheads may be charged only in accordance with such conventions, policies and principles accepted by the Commission, and only if:

(a) they are capable of verification and, for each financial year of the relevant Contractor, do not exceed the actual costs; and

(b) no items are included which are specifically charged to the contract under any other head of costs or which are specifically charged to any other person or project by the relevant Contractor.

25.3 Overheads may be expressed as a recovery on labour or other costs, and resulting recovery rates not exceeding those used by the relevant Contractor for national governments or other public organisations for similar research may be charged provided that the Commission considers that the principles for calculating them do not significantly conflict with the provisions of this Annex and is supplied with the necessary documentation to justify and support the rates.

Article 26 - Travel and Subsistence

Travel and subsistence shall be charged in accordance with the internal rules of the relevant Contractor, but prior approval of the Commission is required for travel outside Western Europe.

Article 27 - Durable Equipment

27.1 Expenditure on equipment which is purchased or fabricated after the Operative Commencement Date of the contract or within the preceding six months and which:

(a) has a life expectancy not less than the duration of the work under the contract, or

(b) is placed upon the inventory of durable equipment of the relevant Contractor, or

(c) is treated as capital expenditure in accordance with the accounting conventions and policies of the relevant Contractor,

shall be allowable costs, reimbursed in a single amount, provided that such costs are not included whether by depreciation or otherwise within any overhead costs.

27.2 For the purpose of calculating such allowable costs, durable equipment shall be deemed to have a life expectancy of three years in the case of computing equipment the purchase price of which is not greater than 10,000 ECU in value, and five years for other equipment. The allowable costs shall be the proportion of the expenditure related to its use on the project that the period of the contract after its delivery bears to such life expectancy.

Article 28 - Consumables

28.1 Expenditure on consumables shall relate to the purchase, fabrication, repair or use of any materials, goods or equipment which:

(a) do not have a life expectancy greater than the duration of the work under the contract, and

(b) are not placed upon the inventory of durable equipment of the relevant Contractor, and

(c) are not treated as capital expenditure in accordance with the accounting conventions and policies of the relevant Contractor.

28.2 No direct charge shall be made for such costs where it is the usual practice of the relevant Contractor to include the costs, whether by depreciation or otherwise, in any overheads.

Article 29 - External Assistance

Subject to Article 3 of this Annex costs of associated contracts, subcontracts, and services shall be allowable costs as external assistance.

Article 30 - Computing

Internal computer costs may include all related costs for staff, connect time, central processor unit time, lines printed, disc storage, material, equipment and charges of outside agencies and may be charged in accordance with the normal rules of the relevant Contractor on the basis of the computer time actually devoted to the work under the contract.

Article 31 - Other Costs

Any other additional or unforeseen cost not falling within any of the aforesaid categories may be charged with the agreement of the Commission provided that it is necessary for carrying out the work under the contract and does not fundamentally affect the scope or the content of the work.

Article 32 - Taxation and Customs Duties

32.1 General provisions

a) The Contractor shall carry out the formalities speified hereinafter in this Article to enable the Community to benefit under Articles 3 and 4 of the Protocol on the Privileges and Immunities of the European Communities which, as regards its financial contribution to the Research, provides that the Governments of the Member States of the Community shall, wherever possible, take the appropriate measures to remit or refund the amount of indirect taxes or sales taxes in the price

of movable or immovable property for the official use of the Community and that the Community is exempt from all customs duties, prohibitions and restrictions on imports and exports in respect of articles intended for its official use.

b) The Contractor shall, prior to any importation from a country not belonging to the Community, contact the relevant Commission departments, which will provide it with all relevant information.

c) Except with the approval of the Commission, goods purchased or imported under the provisions of the aforesaid Protocol may not be disposed of, assigned or used for purposes other than those laid down in the Contract. To enable the necessary taxation and customs formalities to be carried out, the relevant Commission departments shall be informed of any such disposal, assignment or other use.

32.2 Special provisions

32.2.1 In Belgium

a) Where the Contractor is liable to pay Value Added Tax, invoices relating to exempted transactions shall be marked "Exonération de la TVA - Article 42 paragraphe 2.2 du Code Circulaire No. 67/1970".

b) Where the Contractor is not liable to pay Value Added Tax, he shall contact the "Administration Centrale de la TVA, de l'Enregistrement et des Domaines", to secure exemption from VAT in respect of the provisions of goods and services necessary for performance of the Contract.

32.2.2 In France

By order of the Minister of Economy and Finance of 29 July 1980 (Bull. Off. note number 201 of 18 November 1980), the provision of services subject to Article 259B of the Code Général des Impôts for a Community Institution outside France, are exempt from Value Added Tax.

32.2.3 In Italy

Goods and services supplied in Italy for official use by the Community are directly exempt from taxation by virtue of Article 72 of Presidential Decree No. 633 of 26 October 1972, as modified by Presidential Decrees No. 687 of 23 December 1974 (Italian Official Gazette Nà. 338 of 28 December 1974) and No. .288 of 2 July 1975 (Italian Official Gazette No. 183 of 11 July 1975).

32.2.4 In the Grand Duchy of Luxemburg

Goods and services supplied within the country for official use by the Community are exempt from Value Added Tax by virtue of Articles 8 and 9 of the Règlement Grand ducal of 19 December 1969 published in the Journal Officiel du Grand Duché de Luxembourg - Recueil de Législation A - No.66 of 24 December 1969.

32.3 Non recoverable VAT

32.3.1 If a Contractor or an associated contractor has not been, and will not be, able by any means to recover the VAT paid for the purpose of this contract, the VAT amount shall be considered as an allowable cost provided that the said Contractor has:

- taken all action with respect to VAT recovery specified by this contract;

- sought a prior direct exemption from the relevant national VAT administration;

32.3.2 Where the amount of the VAT for an invoice exceeds a threshold specified by the Commission, the Contractor shall comply with the following conditions to enable the Commision to recover the VAT from the government of the relevant Member State of the Community:

- the cost statement shall specify the total amount of VAT chargeable to the Commission

- the VAT form specified in part H of this Annex shall be submitted with the corresponding cost statement.

- three clear and legible copies of the relevant invoices of the supplier showing the supplier's name, the date of the invoice, the VAT amount, the total amount to be paid and the type of service or goods provided shall be attached to the cost statement with the said VAT form;

- any other document required by the Commission to enable it to recover the VAT shall be provided on request.

32.3.3 VAT reimbursed in accordance with Article 32.3.2 shall be in addition to the contribution of the Commission specified in the contract

Article 33 - Items not Allowable

Allowable costs, whether charged directly or indirectly, shall, inter alia, exclude :

- any profit,

- unnecessary, extravagant or wasteful outlays,

- distribution expenses, and marketing and advertising expenses to promote products and commercial activities,

- any provisions for possible future losses or liabilities,

- any interest, or return on capital employed,

- bad debts,

- entertainment expenses, except such reasonable expenses accepted as being wholly and exclusively necessary for carrying out the work under the contract,

- any costs relating to other projects financed by third parties,

- any costs relating to the protection of results of the work under the contract.

Part E - Specific Financial Provisions for organisations charging marginal costs/ additional expenditure

Article 34 - Application of marginal costs/additional expenditure 23x3219Y34.1

This part of the Annex shall apply only to those Contractors whose actual allowable costs are to be the

actual marginal costs/additional expenditure of carrying out the work under this contract.

34.2 For the purposes of this contract "marginal costs/additional expenditure" means costs specified in Articles 22 to 33 of Annex II as modified hereafter, of carrying out the work under the contract which are additional to the normal recurrent costs of the Contractor without the execution of the work under the contract and are not reimbursed by any third party by way of grant, subsidy, or otherwise.

Article 35 - Modifications to Part D of Annex II

Labour

35.1 There shall be added to Article 24 of Annex II the following:

"24.3A Notwithstanding Articles 24.1 and 24.3 of Annex II labour costs shall relate only to staff

(a) who are employed as research staff or assistants with a view to carrying out research, and

(b) who are employed under temporary contracts of employment normally commencing after the date of the commencement of the work under the contract for periods not normally exceeding the duration of this contract, or who are permanently employed support staff whose salaries are not financed by normal recurrent or other support from government departments of the Member States of the Community or other persons or bodies, and who are wholly and exclusively or principally assigned to the work under the contract, and

(c) who are not employed specifically for the purpose of fulfilling any teaching duties.

24.3B Labour costs shall be calculated only by reference to the actual salary in accordance with the first indent of Article 24.1 of Annex II, and such costs may also include full-time registration or tuition fees payable by Contractors for research staff."

Overheads

35.2 No overheads shall be calculated as an allowable cost and Article 25 of Annex II shall be substituted by the following:

"25.A A fixed contribution may be charged in respect of indirect general costs such as administration, management, depreciation of buildings and general equipment, accomodation, maintenance, telephones, heating, lighting, electricity, postal services, stationery, staff training and insurance.

The contribution shall be fixed at 20% (or any lower amount requested by the Contractor in accordance with its normal accounting conventions, policies and principles) of total allowable costs, excluding Associated Contracts and VAT".
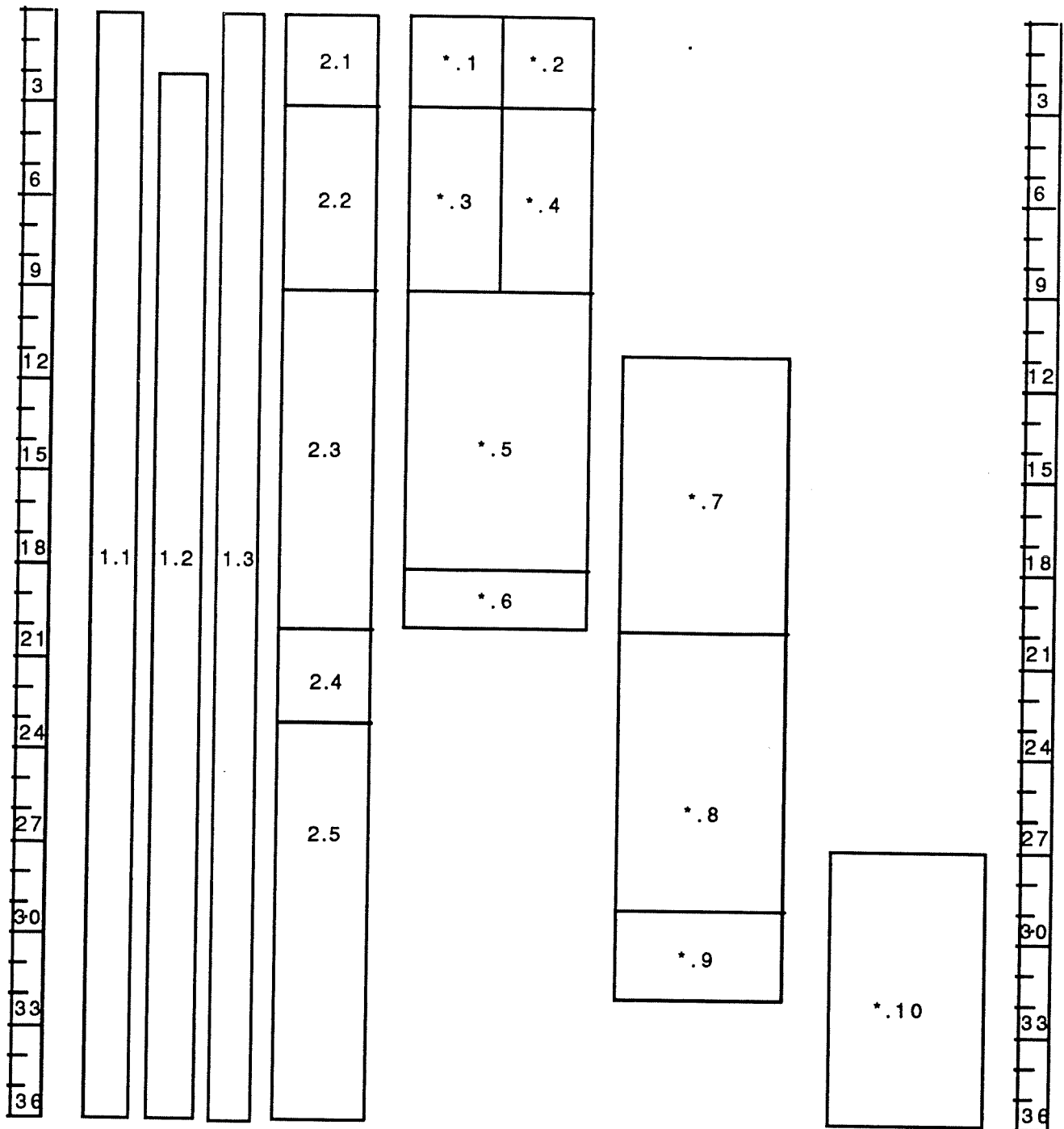
Computing

35.3 Article 30 of Annex II shall be modified to the extent that the costs for routine and minor usage of computer facilities shall not be an allowable cost under the said Article but shall be deemed to be included in the fixed contribution specified in Article 35.2.

Definitive list of WP start & stop timings

Activity	Start Month	End month	Duration
1.1	1	36	36
1.2	3	36	34
1.3	1	36	36
2.1	1	3	3
2.2	4	9	6
2.3	10	20	11
2.4	21	23	3
2.5	24	36	13
*.1	1	3	3
*.2	1	3	3
*.3	4	9	6
*.4	4	9	6
*.5	10	18	9
*.6	19	20	2
*.7	12	20	9
*.8	21	29	9
*.9	30	32	3
*.10	28	36	9

PG   21/8/91
Timings list

| 3 |
| 6 |
| 9 |
| 12 |
| 15 |
| 18 |
| 21 |
| 24 |
| 27 |
| 30 |
| 33 |
| 36 |

1.1 1.2 1.3

2.1

2.2

2.3

2.4

2.5

*.1 *.2

*.3 *.4

*.5

*.6

*.7

*.8

*.9

*.10

| 3 |
| 6 |
| 9 |
| 12 |
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| 18 |
| 21 |
| 24 |
| 27 |
| 30 |
| 33 |
| 36 |

JITOL WP TIMINGS 20/8/91

Resource Allocations for JITOL

<This is an internal document for potential JITOL partners, not part of the DELTA proposal>

1. Assumptions

a. Our target figure for EC contribution will be 3 million ECU

b. Our project average gross labour rate for EC funded partners will be 100k ECU per man year <8.3k ECU per man month>. This is the actual salary, insurance etc costs of labour directly employed on the project PLUS overheads.

c. Travel, equipment + services should not exceed 20% of the budget. This leaves 80% of 3 million for labour <2.4 million>

2. Labour resources available <EC funded>

a. At 50% funding, 2.4million gives fractionally over 288 man months <24 man years>. With a matching contribution from the partners, this gives a project total of 576 man months <48 man years>, or an average of 16 people per year working on the project

3. Additional labour resources <non EC funded>

a. Additional labour will be contributed by non-EC partners <esp. Swiss and poss Norwegian>

b. Additional labour may be contributed by some industrial partners. <That is, they may opt for EC funding at less than 50%>.

4. The overall distribution of labour resources <in man years> will be approximately as follows

Workpackage	EC labour	Additional labour
1 Infrastruct	1 6	4.5?
2 Evaluation	9	1.5?
3 ALTP	9	6??
4 DSHT	3	3 ?
5 CS	5	6 ?
6 ECCTC	6	
Total	4 8	

5. Notes on the above table: EC resources

a. Each domain has   0.5 testing/validation staff
                       0.5 technical staff
                       1   co-ordinator/animator
        Giving 6 man years as the norm

ALTP & ECCTC domains will be hosted from Lancaster. DSHT & CS wil be hosted from Neuropelab.

b. ALTP has an extra 3 man years, being 2 man years because of extra size/complexity/integration with infrastructure work and 1 man year for the small scale work in Portugal

c. DSHT resources are half EC, half Swiss

d. CS balance will be made up by Digital & Credit Agricole

e. *Infrastructure:* the 16 man years of EC effort is made up from:
6 man years project management
3 man years on-going infrastructural requirements work
7 man years tools & knowledge reconstruction software dev.

f. *Evaluation:* the 9 man years of EC effort is made up from:
1.5 man years co-ordination <a 0.5 workpackage leader>
6 man years core evaluation staff <1 full time and 2x0.5>
1.5 man years from other evaluation staff
NB These figures are additional to the testing & validation staff in the domain WPs.

6. Notes on the above table: 'additional' resources

a. *Infrastructure:* this 4.5 man years represents
3 man years Swiss contribution to project management
1.5 man years technical input from Digital & poss Norway

b. *Evaluation:* this 1.5 man year contribution is from Swiss and/or Norway

7. Non-labour resources

20% of the budget should cover travel, services & equipment. This represents an EC contribution of 600k ECU to a total non-labour budget of 1.2 million ECU.

NB Travel will need to cover travel to JITOL project meetings, attendance at DELTA concertation meetings and internal travel related to evaluation, testing & validation. This last item will be ' relatively expensive for a DELTA project, and will be reserved for those directly involved in.evaluation, testing & validation.

The main allowable service item is secretarial support and office services.

Bob to work out cost implications of meetings schedule <project management section> and provide total figure.

We shouldn't use equipment budget for buying kit for the actors in the pilot JITOL systems, unless a very special case can be made. The idea is to build on existing resources & activities. Equipment budget should be reserved for kit needed for infrastructural developments and special small-scale studies.

WP1.1 Requirements specification for JITOL common infrastructure

Starting event   Start of project   Duration: 36 months

Desc:

Elements of the required JITOL infrastructure are already known from previous work (ITOL study; MScITL etc). This activity will produce a precise specification of the infrastructural requirements that will be common to the four test domains. Infrastructure definition includes communications systems, learner and tutor workstation configuartions, JITOL actor lists and descriptions (learners, tutors, resource managers etc), service payment and contractual mechanisms, etc.

Deliverable: No. 1 Requirements specification for JITOL common infrastructure (Yr1 Month 2; Nature R/S; Type P)

New text: It's now envisaged that this activity will not be just an initial 2 month input to the implementation activity 1.2 While making such an input will be a crucial first task, the activity will continue throughout the project. It will make strategic inputs, through new deliverables, to the design of the first and second user trials (eg by suggesting new developments to be tested). It will also contribute to the final report.

The work of activity 1.1 will be structured around a number of "strands". These will need to be well defined in the proposal. The notion is that two or more people will work approx 1 day a week on each strand, to keep a "watching brief" on developments, and to act as a source of consultancy for other workpackages. (Mechanism for this yet to be established). Six strands currently identified: NB we need to include explicit reference to monitoring/liaison with other Telematuics work: notable the "European Nervous System" & Rural Areas

DH   *• communications and tarrifs*   Pµ?

VH   *• learner issues, tutor issues*

NLAB   *• legal, contractual (eg copyright, "contracts" between JITOL actors, fees, creditation)*

DIGITAL   *• learner & tutor workstations*

RiKS {
   • *resources (multimedia databases, structuring of such...)*

   • *HCI*

New deliverables: temporary numbers 1b 1c - timed as inputs to the design of first and second user trials activities.

WP1.2 Implementation of common JITOL infrastructure(s)

Starting event   End of 1.1   Duration: 3 months

Desc:

This activity will set up the infrastructural elements specified in deliverable 1. It will include, for example, establishing appropriate access to communications networks, ensuring the accessibility of on-line learning resources, setting up systems for off-line learning resource and information provision, etc

Deliverable: No. 5 JITOL common infrastructure (Yr1 Month 6; Nature T/O; Type I)

WP1.3 Project management (provisional title)

Starting event   Start of project   Duration: 36 months

Desc:

This activity will manage and ensure appropriate co-ordination within the project. It will also facilitate liaison with other DELTA work, including concertation meetings etc. Resources for 1 or 2 full time (central) project managers, a (central) project administrator, plus resources for management of other workpackages.

WP2.1 Design of common testing and validation methodology

Starting event   Start of project   Duration: 3 months

Desc:

Take text from Murray's draft in version 7 of JITOL paper, revise carefully in light of pp125-50 of workplan.

Deliverable: No. 2 JITOL testing and validation methodology (Yr1 Month 3; Nature R/T; Type P)

WP2.2 Design and implementation of testing and validation instruments

Starting event   End of 2.1   Duration: 6 months

Desc:

In line with the methodology specified in deliverable 2 (WP2.1), this activity will design, implement and pre-test all the testing and validation (=evaluation??) instruments needed for the first user tests. These will include interview schedules, evaluation questionnaires, cost and activity monitoring tools, experimental designs, etc.

Deliverable: No: 6 Evaluation toolset for first user tests (Yr1 Month 9; Nature T; Type P)

WP*.1 Requirements specification for domain-specific infrastructures

Starting event   Start of project   Duration: 3 months

Desc:

A proportion of the infrastructural requirements for each testing domain will be unique to that domain. *.1 activities will produce requirements specification for domain-specific infrastructures. Liaison with 1.1 and input of deliverable 1 will ensure a clean interface between 1.1 and *.1 activities.

Deliverable: No. 3 Requirements specification for domain specific infrastructures (Yr1 Month 3; Nature R/S; Type P) One chapter per domain.

WP*.2 Requirements specification for domain-specific resources

Starting event   Start of project   Duration: 3 months

Desc:

The JITOL system includes access to a rich variety of learning resources, information and knowledge sources, etc. These include: courseware, texts, academic/scientific and professional literature; case study material, exercises, databases, etc. Some of these materials will be directly accessible on-line, others will be available off-line. Resources also include human experts: a key element in the JITOL system. *.2 activities will specify the domain-specific resources that will *need* to be in place for the first user tests. They will also identify resources that it would be desirable to add for the second user tests.

Deliverable: No. 4 Requirements specification for domain specific resources (Yr1 Month 3; Nature R/S; Type P) One chapter per domain.

WP*.3 Implementation of domain-specific infrastructures

Starting event   End of *.1   Duration: 6 months

Desc:

This activity puts into place the domain-specific infrastructural features specified in Deliverable 3 (WP*.1)

Deliverables: No. 7 JITOL domain-specific infrastructures (Yr1 Month 9; Nature P/T/O; Type I)

WP*.4 Implementation of domain-specific resources

Starting event   End of *.2   Duration: 6 months

Desc:

This activity puts into place the domain-specific resources specified in Deliverable 4 (WP*.2)

Deliverables: No. 8 JITOL domain-specific resources (Yr1 Month 9; Nature P/T/O; Type I)

WP*.5 First user trials

Starting event   End of *.4   Duration: 9 months

Desc:

The four? JITOL systems will go live in month 9 of the first year. A nine month user testing period will allow *(list ...) Add text on (a) how the 4 won't all start with the same level of development (eg the ALT domain will prob be more elaborate than the others), (b) what different questions the four domains will allow us to ask. These differences are crucial, in that without them we can't demonstrate the added value of having more than 1 test domain.*

*There probably won't be a deliverable (per se) from this (see *.6 and 2.4).*

WP*.6 Analysis of first user trials

Starting event   End of *.5   Duration: 2 months

Desc:

Application of the tools produced in WP2.2 during *.5 will collect and begin the analysis of user trials data. *.6 activities will complete the analysis of the first user trials data in each test domain.

Deliverable: No: 9 Interim report on first user trials (Yr2 Month 8; Nature R; Type P) (4 chapters)

WP2.4 Synthesis of first user trials data

                             MONTH 21 TO MONTH 23
Starting event   ~~End of *.6~~   Duration: 3 months

Desc:

This activity will report on the commonalities and differences in the results of the four? user trials and will produce a synthesis report, serving two purposes (a) public dissemination of the results of the first user trials (b) information for fine-tuning the design of the second user trials.

WP2.4 takes *.6 deliverable (No. 9) as input + ??

Deliverable: No: 12 Final report on first user trials (Yr2 Month 11; Nature R; Type P) *There may be an argument for having two deliverables - 1 easily accessible and relatively brief, the other comprehensive and primarily for internal project purposes.*

WP*.7 Implementation of infrastructural and resource enhancements for Second user trials

Starting event   ~~Yr1 Month 12 or crit event?~~   *(handwritten: MONTH 12 TO MONTH 20)*   Duration: 9 months

Desc:

It will not be possible (or desirable) to implement everything we would like in the first test JITOL systems. While there will be some scope for incremental enhancement of the systems during the first test, this will have to be carefully monitored. Otherwise we are trying to evaluate a changing system, which will get very complicated. Hence we will take the "second level" requirements (deliverable 4, WP*.2), plus requirements from the on-going activity of 1.1 (name deliverable?), plus additional features (informally) identified as desirable during the course of the first field test, and implement these for the second user test JITOL systems. NB it is NOT the intention to use outputs from the evaluation of *.6 and 2.4 as inputs to *.7 This is not an iterative design, implement, test, re-design ... style of project. Rather (this must be stressed), there are many JITOL features we want to implement by the time of the second user trial, that we already know about (or expect to emerge clearly in 1.1, 1.2, *.1 & *.2)

Redraft to make this abundantly clear and reverse the unnecessary negatives.

Deliverable: No. 10 JITOL revised infrastructures and resources (Yr2 Month 8; Nature P/T/O; Type I)

WP2.3 Design and implementation of testing and validation instruments for Second user trials

Starting event   ~~Yr 2 month 3 some critical point in *.5 & *.7?~~ *(handwritten: MONTH 10 TO MONTH 20)*

~~Duration: 6 mon~~ths

In line with the methodology specified in deliverable 2 (WP2.1), *plus concertation meetings (100 series) plus informal/interim reports of experiences in *.5, plus new questions put on agenda in preps for 2nd user trials*, this activity will design, implement and pre-test all the testing and validation (=evaluation??) instruments needed for the second user tests. These will include interview schedules, evaluation questionnaires, cost and activity monitoring tools, experimental designs, etc.

Deliverable: No: 11 Evaluation toolset for second user tests (Yr2 Month 8; Nature T; Type P)

WP*.8 Second user trials

Starting event   ~~End of *.7 & 2.3~~ *(handwritten: MONTH 21 TO 29)*   Duration: 9 months

Desc:

Base text around that used for *.5 and modify to make clear what extra we expect to get out of *.8

*There probably won't be a deliverable (per se) from this (see *.9 and 2.5)*

WP*.9 Analysis of second user trials

Starting event ~~End of *.8~~ [handwritten: MONTH 30 – 32] Duration: 3 months

Desc:

Base text around that of *.5, modified in light of *.8

Deliverable: No: 13 Interim report on second user trials (Yr3 Month 7; Nature R; Type P) (4 chapters)

WP2.5 Synthesis of second user trials data; final reports of testing & validation

Starting event ~~Yr3 Month 6 (crit event?)~~ [handwritten: MONTH 24 – MONTH 36] ~~Duration: 6 months~~

Desc: This activity has two main functions. Firstly, to synthesis the reports emanating from *.9. Secondly to produce summative statements about the whole project, emphasising testing and validation aspects.

Deliverable: No 14 Final Report on the JITOL Project (Yr3 Month 12; Nature R; Type P)

WP*.10 Implementation of demonstrator systems; plans for full implementation etc

Starting event ~~Yr3 month 4 crit event in *.8?~~ [handwritten: MONTH 24 – MONTH 36] Duration: 9 months

Desc: *300 projects must have a demonstrator available and must produce plans for exploitation of the tested system(s). Write some text to meet this requirement through *.10 activity.*

Deliverables:

No 15 JITOL Demonstrator(s) (Yr3, Month 12; Nature P/T/O; Type P?)

No 16 Plans for full implementation of JITOL (Yr3, Month 12; Nature R; Type P?)

EVALUATION, TESTING AND VALIDATION

ADVANCED LEARNING TECHNOLOGY PROFESSIONALS (ALTP)

DOCTORS INVOLVED IN DIABETICS SELF-HELP THERAPY (DSHT)

CORPORATE STAFF (CS)

EUROPEAN COMMUNITY CREDIT TRANSFER COORDINATORS (ECCTC)

INFRASTRUCTURE

21 August, 1991

SECTION 2 PART B

1   Project Objectives and Background

1.0   Project Rationale: learner needs

The objectives of this proposal are based on what have been identified as specific learning needs in Europe.

It is broadly accepted (see, for example, Hague, 1991) that continuing professional development and updating of highly-skilled personnel will be a critical factor in determining Europe's economic growth during the last decade of this century, and for the foreseeable future. Such a general focus has been identified at first hand by the co-ordinating partner of this proposal during negotiation of learning needs with its supporting enterprises and institutions.

Discussion with many leading national and international companies has made it clear that

> the professional development of individuals is an urgent need

Even with apparently sophisticated tools such as courseware, databases and libraries, companies are confronted with many problems. Individuals are unable to use these resources efficiently to improve their professional development. A more efficient learning environment needs to be set up in order to cope with today's challenges. In particular, one should capitalise on human mediation in the learning process.

One should set up environments where

> experts meet with learners through electronic networks, in order to bring learning issues closer to professional requirements and closer to the place of work.

Such environments do not only imply human mediation but should also include methods to deal with the

> explosion of knowledge

which should be harnessed to improve their capacity to compete in Europe and Worldwide. Even those companies which make sophisticated use of information technologies find that existing methodologies and tools fail to address the needs for handling knowledge which exists within their organisations. They are seeking quite new ways to represent and allow access to knowledge so that it becomes available to those, at all professional levels, who should be capitalising on it to promote the effectiveness of their operations. The most frequently expressed requirement is that information changes too quickly for professionals to keep up to date, and that information becomes so complex that it is difficult to formalise and identify key aspects.

An experimental way of addressing such needs through information technology based open learning form the objectives of the proposal.

1.1 Objectives of the project

The objective of this proposal is to undertake and evaluate large scale pilot implementations of an IT-based open learning environment for the professional development of individuals in a number of different domains. The studies will in particular address the issue of "just in time" access to appropriate knowledge through the use of electronic communications networks giving access to multimedia resources, experts, learners, counsellors, and tutors.

Two basic elements are at the core of the model. One is the human-human interaction and negotiation process mediated by IT & T. The other is the progressive construction of appropriate knowledge bases structured according to learners' requirements. The unique nature of the open learning environment proposed comes from building up appropriate knowledge bases by constantly integrating learners' requirements. More concretely, representations of the interactions between participants in the system are stored and thereby become additional knowledge resources for subsequent use. Since the interactions will mostly emerge from problems that arise in the course of learners' professional work, indexing of these knowledge bases can be problem-oriented. In this way, learners will benefit both from actual interactions on the network and from subsequent up-dating and customising of resources. These two actions will respond both to the necessity of assisting professionals in solving actual problems and to their need for more general development and continuous training.

The objectives will be achieved both by implementing and extending a model of IT & T-based open learning already existing and by exploiting the outcomes of the DELTA Exploratory Action, interim outcomes from the new DELTA program, and outcomes of other EC programs such as, Esprit, ORA, RACE and ENS.

1.2 Relationship with DELTA Programme objectives

The proposed work meets Programme objectives in two task areas, namely Task 320 (Systems for delivery of learning services) and Task 330 (Systems for remote access to learning resources). As well as carrying out large-scale pilot testing and validation work in the Task 320/330 area, the project will facilitate testing work from Series 200 projects (see Section 2.1.5 below) and will make inputs to Series 100 projects (see Section 2.1.4 below).

More specifically, the JITOL project will:-
- carry out pilot experiments in four domains, each involving a target group of learners with distinct learning needs and characteristics, each making use of a different configuration of the JITOL model, and collectively

supporting a variety of modes of learning in a range of learning situations;

- conduct these pilot experiments through collaborative action between enterprises with clearly demonstrated learning needs and institutions with experience of meeting such learning needs;

- establish a rigorous framework for gathering evaluative data from the pilot experiments, in order to measure the cost-effectiveness and economic viability of the different configurations of the JITOL model, to validate the model itself, and to gather specific information about causes of success or failure - about effective and less effective modes of operation - in the JITOL environment.

The JITOL model offers a hybrid service, comprising both distance learning (320) and remote access to learning resources (330). In the context of task 330, the project will carry out testing and validation of two classes of products. The first of these classes consists of prototype knowledge bases and tools that are intrinsic to the success of the JITOL model. These products exist already or will - on a small scale - be created within the project. The second class consists of prototype information bases and tools that are not necessary to the operation of JITOL itself, but for which the JITOL system provides an ideal testing environment.

Further details of this valuable 'add on' role for DELTA testing and validation are given in section 2.1.5 below.

This needs a final check against 320/330 text and against general approach text in the WP document - PG

1.3   Background to the Proposal
There are two main areas of development which need to be described, in order to locate the work proposed here. The first of these may be called "pedagogical", in that it is concerned with ways of supporting learning. The second is "technological" and is concerned with the rapidly evolving technological infrastructure and technological resources which can be harnessed to facilitate new pedagogical approaches.

1.3.1 Pedagogic Approach
In our proposal, we are primarily concerned with pedagogical approaches that support open learning: forms of learning which are learner centred and collaborative, and which escape many of the constraints of time and space (Hodgson, Mann and Snell, 1987). We advance the notion of "just in time" (Merrill, 198?) knowledge, to mean knowledge which the learner acquires at the time it is most needed. The combination of "just in time knowledge" and open learning gives us "just in time open learning" or JITOL.

In the "state of the art" review provided in Appendix A, we describe recent and on-going developments in the use of open-learning approaches - paying particular attention to OL as a

method for continuing professional development and updating of highly-skilled workers. We describe recent experiences in projects in Europe and the rest of the world. We emphasise the results of OL projects which have made use of IT&T.

However, even though OL projects have made good progress, major potential concepts of OL are still to be demonstrated In particular, we emphasise the dynamic and interactive aspects of learning. There are a number of ways in which technology can support this process, but most methods used so far fail to capitalize on human mediation. One reason is that electronic delivery of courses defined by authors (either distance learning courses or learning software packages) fail be sufficiently responsive to users' requirements. In order to be effective, such feedback from users' requirements should be captured on a permanent basis, in a working situation and in the context of continuous interaction between learners and experts. Therefore, only technology flexible enough to allow this constant updating to occur is effective. It turns out that it is both the protocols of human-human interactions and the protocols of human engagement with knowledge sources, which provide the key to dynamic development of increasingly learner-oriented OL systems.

Apart from course-based approaches, more flexible existing Open Learning environments still lack two important elements. Namely, learners are often isolated and individual learning activities are predominant. Furthermore, resources are updated almost only on the basis of updating in the domain of application and not on the basis of actual use of the resources.

Recent research in cognitive science show that collaborative and peer learning are essential (cf. Vygotsky, Light). Also, situated learning (cf. Lave, Scribner, Wenger & Lave, Pea) embedded help and job-aids (cf. Harmon & Kearsley) and cognitive apprenticeship (cf. Collins, Brown, Gott) all show the importance of integrating learning into actual professional issues. Earlier, Piaget developed an interactionist paradigm to demonstrate the progressive construction of intelligence (cf. Piaget, equilibration of cognitive structures ....1975).

Such research clearly suggests that the interaction and negotiation process occuring between learners and between learners and experts have important functions. Hence, these interactions should be captured and special use should be made of them. In particular, outcomes of interactions should be reified within the learning resources themselves, in order to build up more adequate knowledge bases. Apart from the obvious benefit of enabling users to share more appropriate knowledge bases, the process of integrating learners' interactions into further learning has a theoretical basis demonstrated by Piaget who put forward the process of "reflective abstraction" (cf. Piaget....).

1.3.2 Technological Approach

Two technological resources are most directly relevant to JITOL.
The first are those concerned with electronic communications.
Partners in this proposal already have made extensive use of
electronic communications (especially electronic mail and
asynchronous computer conferencing) in supporting open and
distance learning. The direction and momentum of change in the
European IT&T infrastructure suggest that increased bandwidth
and cheaper communications costs will have a very significant
impact on the educational use of such facilities. In
particular, increasing bandwidth will allow much richer forms of
communication between learners and tutors and will allow much
richer learning resources (such as multimedia knowledge bases)
to be made available to learners.

The second technological aspects which are also of central
interest to the development of JITOL systems include: use of
advanced workstations with customised HCI to support the work of
JITOL tutors; knowledge-based guides to learning resources, to
help learners and tutors locate useful material; retrieval
methods for accessing very large databases, etc. The process of
reifying users' interactions into new knowledge basis naturally
entail non trivial technological support.

The second part of the state of the art review, presented in
Appendix B, deals with issues related to the technological base
for this Open Learning approach.

2 PROJECT PLAN

2.1 Technical Approach

2.1.1 Introduction
The main objective of this proposal is to undertake and evaluate four large scale pilot implementations of an IT-based open learning environment called JITOL (just in time open learning).

This objective is based on an analysis of learning needs in the critical area of continuing professional development. The conceptual and physical resources needed to implement JITOL come from:

a) experience in the design and operation of open learning systems;

b) innovative ideas from knowledge-based systems research;

c) technical and infrastructural outcomes from the DELTA EA and from related EC programmes (such as Esprit and RACE).

(insert figure xx about here: the why, what + how diagram)

Section 2.1 describes the technical approach to be adopted by the JITOL project. That is, it identifies the methods we will use to realise our objectives.

In summary, we plan to

a) implement configurations of the JITOL model in four carefully selected test domains;

b) run two user trials, of nine months duration, in each domain;

c) use a rigorous evaluation, testing and validation methodology to monitor the user trials (and the preparations for them) in order to assess the cost effectiveness and economic viability of the JITOL model and its constituent parts.

Work in each domain will extend and accelerate developments which are already underway. In the first 9 months of the project we will identify and provide infrastructural and learning resource for each domain, and set in place the evaluation methods and instruments for the first user trials. These trials will last from month 10 to month 18. In parallel with the first user trials, further enhancements of the JITOL systems and evaluation methods will be made, in preparation for the second user trials (months 21 to 29).

In section 2.1.2 we offer a brief description of the four test domains and an explanation for their selection. This is followed by a description of the JITOL model which we will implement (2.1.3). Our approach to evaluation, testing and validation is documented in section 2.1.4. Since the details of the implementation and testing activities are important to an understanding of the proposal, and since these necessarily differ from domain to domain, we have provided an account of each domain in sections 2.1.5 to 2.1.8. These have a common structure. Each begins with a description of the present

situation, emphasising learning needs in the domain. This is
followed by a description of the proposed large-scale
implementation and testing activity and then a summary of any
smaller-scale studies. An indication is given of the key
questions or hypotheses in each domain, and of the kinds of
evidence and measuring instruments that we propose to use in
order to assess the value of the activity. Finally, section
2.1.9 describes the technical work that will be necessary to
provide the JITOL infrastructure, particularly the tools to
support JITOL learners and tutors and methods for restructuring
knowledge within the JITOL system.

Further details of the proposed work can be found in the goal,
workpackage and activity descriptions in Sections 3 and 4.

2.1.2 The Learning Domains

In this proposal, professional learning needs in four areas will
be addressed through pilot projects involving the testing,
improvement and validation of an experimental model of
technology-supported open learning. The four areas have been
identified for very precise reasons.

On the one hand, we selected these domains because the needs
expressed above (i.e. rapidly changing knowledge, knowledge
becoming increasingly complex) are manifest in all four domains.
These needs in all four domains call for multiple, more
permanent and more dynamic access to knowledge. What we want to
test is the extent to which the JITOL model can provide an
adequate answer to these issues independently of the domain of
application.

In other words, we want to validate the model in so far it is
able to allow the learners to overcome difficulties linked to
rapidity of changes and complexity of knowledge. As a result,
learners should be able to access the most appropriate knowledge
in a reasonable time and at a reasonable cost. This should be
demonstrated independently of the domains, because the same
parameters are provided in all four domains. Namely, learners
are kept at their workplace; a permanent long term access to the
learning environment is allowed; learning themes stem from
learners themselves; and finally, these learning themes are
generated by problems and difficulties learners-practitioners
actually undergo and not by the curriculum defined by teachers.
The detail of the methodology which allows comparative studies
taking into account these parameters will contribute to the
overall validation of the model. It is described in Section
2.1.4.

On the other hand, the selected domains represent quite
contrasting cultures, which call for a comparative analysis.
Namely, the four areas differ along important dimensions of
learner need, learning context, access to technology, scale of
operation and tightness of focus. Consequently they allow

different sets of questions and issues to be explored in the testing validation and evaluation process as illustrated in the goal description for each domain below Sections 2.1.5 to 2.1.8.

The four "test-domains" which have been selected all consist of a well-defined set of learners, a core set of learning goals, and a relatively well-developed understanding of which learning processes, supported by which learning technologies, might best match those goals. There are good reasons to believe that these combinations of learners, goals, processes and technolgies are found in many other situations, so that we can be confident that the results of our pilot studies will be open to generalisation.

Each domain will be used for large scale pilot studies using relatively stable technologies, such as PSTN/X25 WANs. But in addition, each domain will also be used for carefully designed small-scale tests of leading-edge technolgies. This will enable us to gather data about the usability and utility of learning technolgies of the mid- to late-90's, whose functionality we can only simulate at the present time. As an example, we will use LANs to simulate broadband transmission over WANs. In running these smaller-scale tests, we recognise that we are temporarily diluting the conception of open-learning (eg by imposing a spatial constraint) in order to learn more about the possibilities of JITOL that will be fully realisable in the near future.

The four pilot domains are:
- Advanced Learning Technology Professionals (ALTP)
- Doctors involved in Diabetics Self-Help Therapy (DSHT)
- Corporate Staff (CS);
- European Community Credit Transfer Coordinators (ECCTC)

We describe each briefly here and more comprehensively in Sections 2.1.5 to 2.1.8 below.

Domain 1: (Advanced Learning Technology Professionals - ALTP)
This covers the professional development and updating of all those who are employed in the advanced learning technology industry. These people work for courseware production companies, or in the training technology sections of large end-user organisations, or in R&D labs, etc. They may be involved in the design, development, production, implementation and evaluation of technology-based learning resources, as well as in the planning and supervision of their use. Or they may be involved in the creation of new tools for the courseware production process. In other words, this is potentially the whole of the ELTA community.

The majority of these people work in SMEs. Their learning needs were identified in the DELTA EA START-UP project. These needs include ways in which advanced tools and authoring systems may be integrated into existing production methodologies. A major barrier is that of the scale of investment required in changes to working practice, both in terms of technical facilities and

of employee up-dating. They also need to keep up to date with developments in learning theory, pedagogy, instructional design, authoring methodologies, new technology, evaluation techniques, etc. A further need, typical of a young profession, is that of establishing transferable qualifications which will stimulate mobility of labour and hence exchange of expertise.

Domain 2: (Doctors involved in Diabetics Self-Help Therapy - DSHT)
The learners in this domain are doctors and nurses who are involved in the treatment of chronic disease, specifically the treatment of diabetic patients. There is a specific focus on involving the patient in the treatment of his own disease (hence the notion of "self-help therapy"). The need is to find ways to improve the level of communication between patients and doctors so that patients obtain a better understanding of their disease.

The experiment has two aspects. One involves interaction and exchange of experience between doctors and nurses in eight specialist units across Europe, all members of an existing network of DSH therapists. The second, anticipating technology of the late-nineties (fast WANs), will use simulations of transmission both of videos and of software. The former is essential for doctors to communicate about, and get feedback on their interaction with patients.

Domain 3: (Corporate Staff - CS)
In this case the learners are widely dispersed staff in large corporations. It will include both practitioners in a European-wide high technological enterprise and apprentices in a large bank.

Such staff currently operate with a variety of support mechanisms:
  a in the high technological enterprise, they have access to
     open-learning centres which, however, lack any element of
     human interaction at a content level and may not address
     needs for "just in time" information on products;
  b in the case of the large bank, apprentices follow a common
     course, dependent on paper documentation, but need access
     to specialist tutors who work in different regions.

Domain 4: (European Community Credit Transfer Coordinators - ECCTC)
In this domain the learners have a need to understand qualification systems across the whole of the European Community. Such professionals may be personnel officers in enterprises or those responsible for courses in higher education. We are taking the special case of learners who are ECTS Coordinators for Business Administration. In order for them to place their own students and take in students from other member states they need to know about other members' institutions and qualifications, other countries educational state systems and many other educational and legal differences between member states.

Thus they have significant and complex learning needs with no
existing authorities other than themselves to consult. Each
coordinator has to both exchange their own understandings of
their own national situation and seek to obtain an understanding
of the situation of their partner institutions. Thus each
coordinator is at one and the same time an expert and a learner

Resumé

In each of these situations the need is to bring additional
experience and expertise to professionals at times when it can
be made use of as close to the place of application as possible.
The sources of knowledge may be other professionals (members of
a peer group or those with a particular knowledge transfer
function) and knowledge bases. In the next section the open
learning model to be used is described in detail. It is
sufficient here to emphasise that knowledge is viewed as
essentially dynamic, much of it emanating from the sharing of
group expertise.

In the following section, we describe the JITOL model. Since
some of the features of this description are necessarily rather
abstract, we think it may be helpful to precede this description
with some illustrations what involvement in a JITOL system might
be like. These concrete examples have been created in order to
convey, as vividly as possible, some of the key features of
JITOL. We have provided an illustration - a scenario - for each
of the four domains. Each should be treated as just an example
of the functionality (etc) of JITOL. Many of the features of
JITOL are not unique to the domain concerned, and may be
applicable for many learners, many organisations, and many
configurations of JITOL. Not all the functionality of the JITOL
systems described is currently realisable, but can be taken as a
realistic picture of opportunities for the mid 1990s and beyond.
In line with the DELTA intercept strategy, we need to be able to
simulate some of the functionality of JITOL, in order to
evaluate the learning benefits and costs of leading edge
technologies in the JITOL environment.

Scenario 1 (ALTP)
Elizabeth is an instructional designer working for a small,
successful, courseware production company. She is the company's
most experienced designer of computer-based training (CBT)
courseware. Like many professionals working in the advanced
learning technologies (ALT) field, Elizabeth has no formal
specialist qualifications. Elizabeth is also aware that the
future success of the company for which she works depends on the
staff keeping up to date with the latest developments - in
cognitive and pedagogical research, technology, professional
practice, etc. For these reasons, Elizabeth has enrolled on an
innovative Masters degree programme. The degree is awarded to
ALT professionals who can demonstrate that they have an
appropriate level of competence, knowledge, skills etc in the
various areas of the field. In order to meet some of the
requirements of the programme, Elizabeth studies materials
recomended by her academic tutor, and she completes related

assignment work. But much of Elizabeth's work for the degree is based on problems that emerge in her job.

Today, her boss has given her a new task - to prepare an outline design for some Interactive Video (IV) courseware. Nobody in her company has experience of designing for IV. Elizabeth decides to email her academic tutor for advice about what she might read in order to understand the main differences between design for CBT and design for IV. She has a PC with a modem on her desk at work and connects over the PSTN system to the computer at the University which runs the Masters programme. (The University is 300 kilometres away.) She sends an email message to her tutor. But while she is connected to the system she thinks that some of the other members of the Masters programme (other learners working for other organisations, some of them located in other countries) must have experience of IV design. She interrogates the database of learners' interests and discovers that three of them have completed IV projects. She sends them an email too.

Next day she logs in again and finds a reply from her tutor. The tutor has recommended two recent articles on IV design methods, a DELTA EA report on IV authoring methodologies, and a study pack about IV (produced by a university in Australia). , His message includes abstracts of the articles. Elizabeth emails an order for the articles and the report. She also finds a reply from Freda - one of her co-learners (who happens to be an expert on IV). Freda says she will post Elizabeth a copy of an IV design handbook that she has helped to write. Elizabeth decides she will ask her tutor whether she can do a small project on IV design as part of her Masters programme. Before logging out, she looks in on the 'Instructional Design' electronic conference and finds an urgent request for help from another of her co-learners. It concerns the use of a computer-based design aid with which Elizabeth has had some experience. Elizabeth adds a suggestion to the conference and logs off.

Scenario 2 (DSHT)
Dr Spock is a general practitioner who has a special interest in the treatment of diabetic patients. He knows that many of the patients who have the longest and best quality of life do so because they have a good understanding of the nature of their disease. For Dr Spock, sharing information with patients - patient education - is a very important activity. It is also an activity for which he's had no formal training. Dr Spock has joined a group, founded by a leading practitioner in the field of diabetes treatment (Professor Kirk). This group of doctors meets each year to share ideas about helping patients understand (and thereby help in the treatment of) their illnesses. These annual meetings are enjoyable and productive. But Dr Spock also finds that he sometimes has a good idea, or has some particularly successful session with a patient, that he feels it would be valuable to share with other members of his group. At other times, he hits a problem, and wonders whether any of his colleagues might have faced a similar dilemma and have come up with a solution. At such times he usually resorts to the

telephone. But Dr Spock's colleagues are as busy as he is, and
Professor Kirk is even busier. So it's not often the case that
Dr Spock is able to talk with them.

But recently Professor Kirk has chosen Dr Spock's group to try
out a new means of communication. Each doctor has a PC in his
office already. Now each buys a modem and, using some simple
free communications software, can connect up to a computer
conference hosted at the Professor's university. At first Dr
Spock likes this new medium. He can send messages, or add items
to the conference, at any time of day or night. And because his
busy colleagues also have some (emph) free time, he often finds
replies waiting for him the next day. Browsing through the
various items in the conference, Dr Spock realises how much more
efficient a knowledge-sharing mechanism this is. He can pass on
a good idea, or a request for help, to all his colleagues
simultaneously. But after a while he begins to have
reservations about the system. While it seems to be good for
exchanging straightforward, factual information, it's not so
comfortable a medium for exchanges of a subtler or more complex
kind. When he's trying to describe a patient's attitude or
behaviour, he finds that the text he's forced to write just
doesn't capture what he wants to convey.

Meanwhile Professor Kirk is beginning to get excited about a new
research project in the educational technology department of his
university. It's concerned with a combination of electronic
conferencing methods and the transmission and storage of voice
and moving image data. It supports many of the functions of the
electronic conferencing software with which he's familiar
(indexing of items by subject, easy browsing, etc). But as well
as text entries, one can also add and access voice entries and
even video entries. The prototype system can only be used over
small distances at present. But Professor Kirk enthusiastically
offers himself as a test subject to help the researchers
evaluate the usability of this new system.

Scenario 3 (CT)
Maria works for Analog — a high-tech electronics company. It's
one of the biggest in Europe and has offices and sales outlets
in more than a hundred cities. Maria is a sales manager. She
heads a team of five salespeople who spend most of their time
visiting customers. Analog has an enormous product range, which
is continually changing in response to new technical
developments and customer demand. Keeping up to date with the
products is a considerable problem for Maria and her team.
Fortunately the company recognises that its sales force must
have up to date product knowledge or the money it spends on
developing new products is largely wasted. It encourages staff
to improve their product knowledge by running regular courses at
its 50 open learning centres. (These are equipped with
multimedia workstations that can access a graphical database of
the current Analog product range.) Staff can be tested on their
product knowledge. Continuing success on such tests can be
helpful when it comes to the annual performance review.

Maria doesn't often get chance to visit her nearest open
learning centre (it's nearly 3 hours drive away). And though
she finds the product database easy to use and to learn from,
she often misses having someone around who she can ask about
some of the more technical details. (However carefully written
the specifications are, there always seems to be something they
forget.)

Analog's training department are aware of this, however. So
they are just now installing an additional system to supplement
the resources in the open learning centres. All of Analog's
offices (including the open learning centres) are linked on a
high performance comunications network. The training department
is setting up an email and conferencing system so that users of
the OL centres, members of the sales force, and a carefully
selected set of technical specialists, can correspond with each
other about new products.

*(add something about inter-salesforce items as a hidden
resource?)*

Scenario 4 (MT)
Albert is the personnel officer of an engineering company in
Lyons. He is responsible for managing the recruitment of new ,
technical staff. Recently, the company has had difficulty in
filling its vacant posts with personnel from the local region.
Indeed, the company has begun to receive job applications from
all over Europe. Albert is puzzled because he sometimes finds
it difficult to know what some French qualifications mean. The
applicant may have a qualification on paper, but what does it
mean that the applicant can actually do? Now his problem is
multiplied by the number of strange qualifications from other EC
countries.

Albert is a wise man. A year ago he joined a network of
European personnel officers. Members of this network use
electronic mail and computer conferencing to communicate among
themselves. One of the busiest computer conferences is
concerned with qualifications. It even has a sub-conference on
engineering qualifications. Now, when Albert reads an
application which includes a qualification which he has not
heard of before, he can log in to the computer which hosts the
network, join the engineering qualifications conference, and
search the text of the conference items for mention of the
qualification. He often finds a number of items about the
qualification, and from the text of the item he can get some
information about the meaning (emphasise) of the qualification.
Of course, he realises that this information is rather
subjective, but it is much better than no information at all.
Sometimes Albert finds a qualification that doesn't appear in
the conference, so he adds a question about it to the items in
the conference.

(Add so that we bring in some of the learning flavour of the
domain 4 proposal of Viv, which we see as a case study)

2.1.3 The JITOL Environment

(In the final version of this Section, we aim to clarify the model by presenting two views of it. One of these is physical and describes the actors, equipment, etc. The other is conceptual, shows how all system components can be seen as resources, and explains the dynamic evolution of resources.)

Introduction and Origin

In the rationale we suggest that the development of professionals is an urgent need. In particular, we acknowledge that learning issues should be brought closer to professional requirements. We also point out the explosion of knowledge. Namely, knowledge is becoming complex and must be updated permanently. Therefore, organization of knowledge should take these parameters into account and in particular, it should allow quicker access to more appropriate resources.

The answer JITOL proposes to solve this problem is based on building up appropriate knowledge bases by constantly integrating learner s' requirements. More concretely, representations of the interactions between participants in the system are stored and thereby become additional knowledge resources for subsequent use. This section aims to show exactly how this will be achieved.

The outline design of the JITOL environment builds upon a government-funded feasibility study (undertaken by one of the partners) which led to the development of an information technology-based open learning model.

Out of this work has grown a model for a JITOL environment which seems feasible and educationally viable and beneficial. The outline of the original Model is shown in Figure 1 and described in detail (including a more precise description of the actors) in Appendix C. Fundamentally, it allows any individual learner to communicate with:

- a tutor or tutors, or facilitator(s) (most likely university based people, but not exclusively so);
- other learners;
- a distributed series or collection of both university and non-university based learning resources. In addition, learners may have available to them a counsellor from outside the university system, most likely someone from inside their own employing organisation;
- a resource manager, responsible for overseeing the maintenance and enhancement of the JITOL system resources.

Insert: Figure 1: The Information Technology-based Open Learning Model.

The Model can be simply described in terms of:
- various actors and objects (as identified in Figure 1);
- the interaction between them the dynamics of which are described below;

counsellors

learners

resources
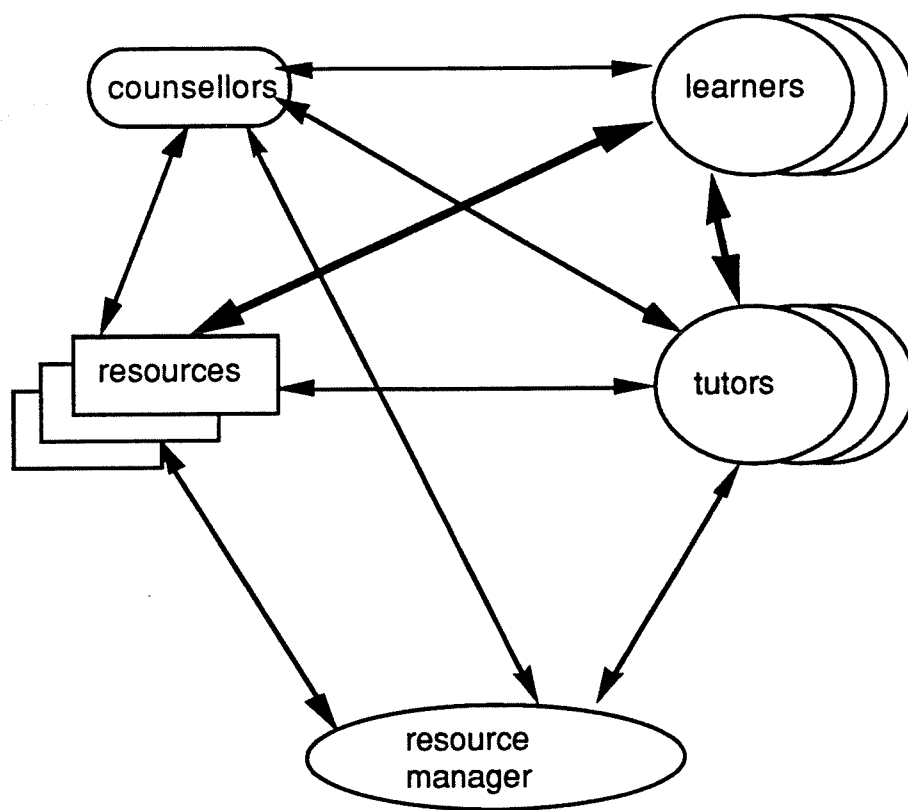
tutors

resource
manager

fig. 1

- their needs and the contributions they make to the system;
- the resource environment which demands that knowledge be organised to allow quick and appropriate access;
- the relevance of the model in so far as it provides "just in time" solutions to actual needs of companies and individuals.
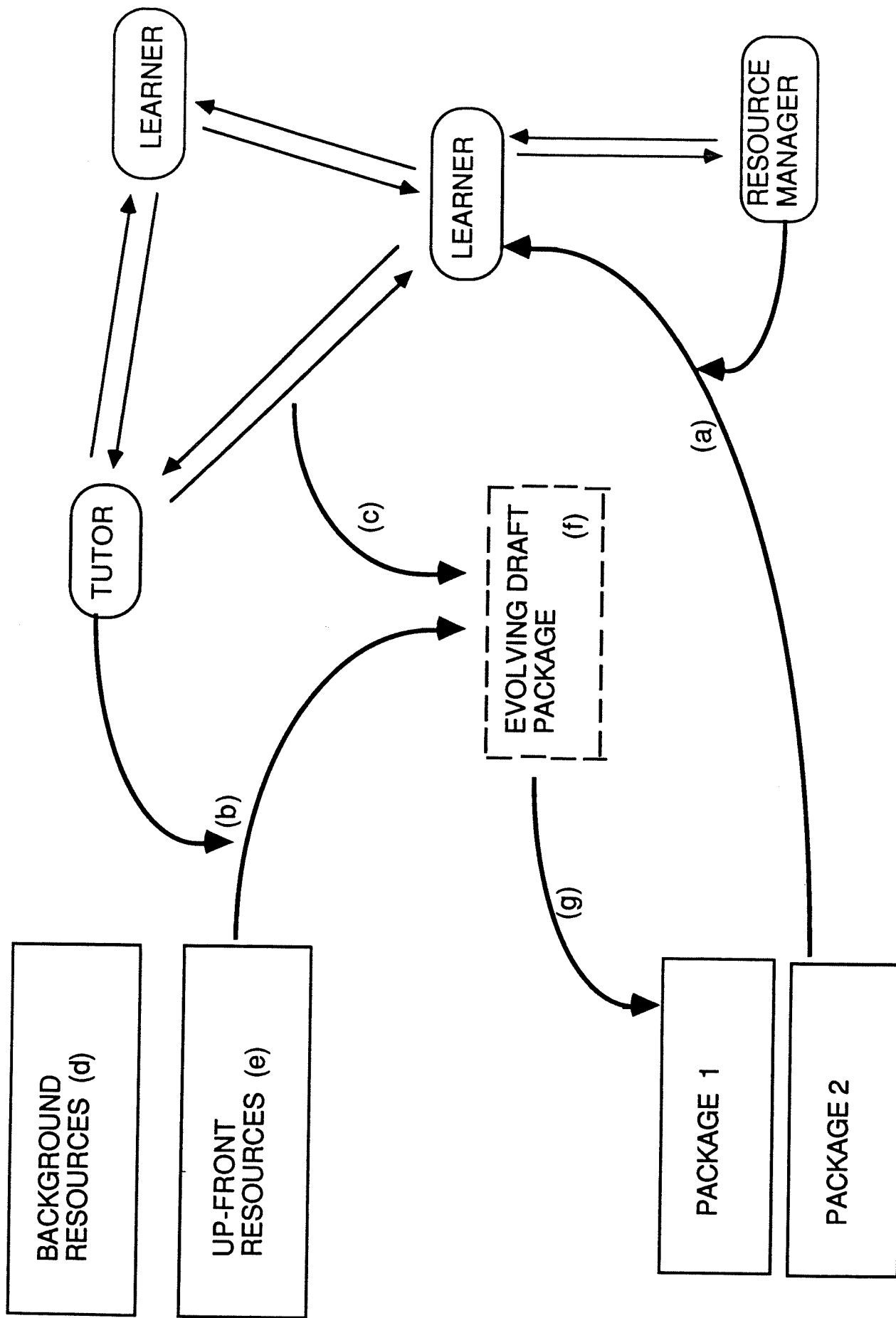
The Dynamic Nature of the Environment
We believe that the strength of the environment is to consider the actors and objects, not as passive entities but continually changing in response to workplace and, hence, learning needs. Specifically, the constituents of the environment are dynamic as the mechanisms of interaction and the objects themselves are evolutionary.

The dynamicism of the JITOL environment is best understood by examining the actual interactions between the actors and objects, and the influence these have on the evolution of the knowledge resources. In addition, this reciprocal influence between the actors and the knowledge modules will be captured in order to build a history of the evolution. This history is a major element in the validation of the environment itself. The processes occurring on the JITOL network can be described with a flowchart-like representation in which, needs, actions, reactions, including all of the evolutionary aspect of the environment, are demonstrated (cf. figure 2).

Starting from a particular learner's need — not necessarily fully formalised — access is made to a particular package for consultation:
a) we define packages as being made up on a series of modules. Some of these modules are created or assembled by individual tutors who suggest access to initial material.
b) others may be formed dynamically from interactions/discourse between actors.
c) typically, the exchanges which take place between a tutor and a group of learners is in itself a valuable resource for future learners and, on analysis, provides new insights into learners' perceptions which aid future tutoring responses.
d) in any case, packages will include information about relevant resource material which can itself be either background resource if it is not frequently accessed.
e) or up-front resources in case it happens to be rather often called upon.
f) over time, the packages assembled in this dynamic way — temporarily called "Evolving Draft Packages" while they are in the process of being built up — will make a much more useful knowledge base, structured according to use, than one which is predefined and static.
g) as the system "learns" from the use made of it, it will be found that certain "off-the-cuff" packages will need to have more ready access than others. Such a distinction will emerge over time and as a consequence, learners' dependence

LEARNER

LEARNER

RESOURCE MANAGER

TUTOR

(a)

(c)

EVOLVING DRAFT PACKAGE

(f)

(b)

(g)

BACKGROUND RESOURCES (d)

UP-FRONT RESOURCES (e)

PACKAGE 1

PACKAGE 2

Section 2.1.3   Fig. 2

on tutor support will diminish as the system as a whole
becomes "partly intelligent".

In order for the system to be able to manage and update all
knowledge transactions, objects and actors are attached to
records of different types, acting as parameters. Hence, a
package includes parameters such as its purpose, the index
terms, the relevant tutors, its constituent resources and the
network of links between them.

The overall management of the resource access is taken care of
by the resource manager. But it is worth mentioning here that
as the knowledge bases evolves, therefore including more and
more "pointers" towards potential problems, learners' dependence
on resource manager support will diminish in the same way as for
tutor support. There are three levels in which the system takes
over in providing assistance to users.

—   at the lower level, it will take the form of a "super-help"
facility integrated into the system. This help facility will
indicate pathways to make searching easier. This level should
be implemented on a routine basis in the JITOL studies.

—   at the medium level, the key is the standardization of the
knowledge bases, themselves moving towards the more general
concept of knowledge assets (see Special feature on Brainpower,
Fortune, June, 3 1991); secondary is the set of facilities for
interactively navigating and searching therein, while offering
relevance feedback. The most significant standard development
is IMKA (Initiative for the Management of Knowledge Assets).
Next, the navigation aids using information stored and updated
in IMKA format, use the frame-based links to do path searching
based on visual icon based queries (a query is a "bag" of icons
assembled together as an image). Relevance feedback is what
this flexible in terms of application domains, in that cognitive
machine learning will select the search paths dependent on what
the user thinks of the previous results.

—   at the higher level, specific knowledge bases are to be
exploited for customization of the learner's dialogue, and of
the tutor's as well, all again IMKA compliant. Possibly some
selection rules will allow for concept refinement or
aggregation, so that the skills levelprofiles can be
accomodated, and that relevance feedback is dynamically
exploited.

INSERT FIGURE 2 ABOUT HERE

The situation is somehow more complex as needs may also stem
from the company itself and not only from individuals in the
company. This is where the company counsellor comes in.

Learner
The learner is the person who wishes to use JITOL. The learner
will typically be someone at professional and graduate level

employm ent. They may wish to use JITOL for a variety of professional development reasons, eg. to tackle some new work related task; to fur ther their own personal development; to enhance their career prospects and so on. The learner's needs may be defined by themselves, by the needs of their employing company or by some external source (eg. by the standards set by a professional body which the learn er may be planning to join or whose external professional examination the learner is working towards). The learner will need information about the purpose of the system, its scope (the degree to which it covers areas of concern in thei r work and professional development), how to access it via the telecommunications system, how to navigate through it once accessed (including details of information resources, communicating with tutors and other learners, requesting further information and delive ry of resources, and so on). The learner will also need considerable support from the system itself, for example by way of on-line help advisers and software.

Each learner will require the use of a workstation to access and use the JITOL system. The basic requirements for a workstation are a stand alone personal computer with 1 Mbyte of internal memory and fixed hard disk storage capacity (eg. 20 Mbytes or higher); hig h resolution monitor; keyboard and mouse device; suitable text processing and communications software; printer and modem (the modem connected to a PTT telephone system or some other computer network which would allow data access to JITOL). Further details on reso urce requirements are given in the four domain descriptions below. [ensure this happens]

Tutor
Tutors will normally be academics or other subject specialists who will help learners with their learning. The tutor will not take on the traditional role of 'leading' the learner in an exploration of the subject matter; he or she will act as a resource to be cal led upon by the learner when necessary. The relationship between the learner and the tutor will be one of professional partnership and co-operation, not teacher and taught. The tutor will establish friendly contact with the learner and will help him or her think through their issues of concern and seek to establish a supportive relationship. Tutors will also be drawn for industry and the pu blic service sector. A major advantage of the JITOL approach is that it allows access to experts in industry who have up to the min ute practical knowledge of developments in their field of expertise.

Tutors may help learners find their way through the various JITOL resource materials in order to help them resolve the problems or i ssues at hand; they may answer queries and questions concerning learners' work and professional development, and generally take part in on-going electronic discussions with learners; they may lead, or take part in, computer conferences (electronic seminars; tutorials; group discussions) dealing with whatever issues have emerged from the various discussions with individual learners. The purpose of this relationship will be to try and meet as many of the needs

of the learner as possible, by a variety of methods and resources and establish a constructive learning and development relationship with learners.

In order to fulfill this role, tutors will require professional development in the use and purposes of JITOL. The role of an on-line (electronic) tutor has much in common with the more traditional, face-to-face tutoring activities. However, the JITOL medium will be new and strange to most tutors, and we cannot expect them to see immediately how to transfer their normal professional activitie s to the medium without some form of briefing and training in the scope, purposes and uses of the system. Implicit in this will be a need to explore with them the nature of the 'open' educational philosophy underpinning the JITOL system.

It is likely that after any initial briefing and training, tutors will require on-going support in the educational uses of JITOL. This might best be achieved by perceiving the professional development of the tutors as a form of educational action research which i s on-going and developmental, with spirals of learning activities emerging from considered and reflective analysis of their professi onal JITOL practice.

Each tutor will require, as a minimum, the use of an 'JITOL' workstation, as described above for learners.

Company Counsellor
Learners may use JITOL for their own personal benefit, with no relationship to, or sponsorship by, an employing company. Self employed people may come into this category.

In situations where learners are participating in JITOL for company as well as personal benefits, the needs of the company will be t aken into account and the person termed here the "company counsellor" may well have a role.

Such learners will be sponsored by their company and will be working towards meeting the needs of their company as much as their own needs. In situations like this, it would be necessary for a company counsellor to liaise with the learner and with those running JITOL. This counsellor will be in a supportive role to the learner, helping him or her in their quest for self and professional development.

The relationship between JITOL and the company will be important in these situations since the company will be a stakeholder in the learning enterprise. Such a relationship could take several forms, and be at several levels. For example, special resources could be made available on JITOL for particular company needs; groups of learners from one company, perhaps working on a particular proble m or issue, could be accommodated by assigning them to one tutor with a specialist interest in that area of work; tutors could take on the role of consultant to learners in a company, working closely with the company in defining its

needs and acting as a broker for putting the company in contact with resources and people of use to it; requests by the company for access to known tutors and resources not already available on JITOL could be considered.

The level at which this relationship may take place will vary from situation to situation. In some companies, it may be appropriate for senior management to be involved; in others, line managers may be involved; in some, it may be that the individual learner will be the person best suited to establishing this relationship (for example, the learner may be a senior manager). Some companies may wish to deal with JITOL via a training officer or manager.

No matter what the form or level of contact with a company, the overall purpose of the relationship between the company and JITOL wo uld be to negotiate the needs of the company in relation to learners' needs and uses of JITOL, and work out strategies for ensuring that the JITOL system could help meet those needs.

Resources
The resources available on the JITOL system will be defined largely by the domains of application. These will include the following forms of resources:
- resources specially developed and made available by the institution(s) of higher education running JITOL. For example, on-line addresses and phone numbers of relevant specialists (tutors, etc);
- on-line addresses and phone numbers of people with similar needs and interests; references to useful textbooks, or sections thereof; references to recent review articles; details of existing and upcoming courses; access to relevant databases; access to electronic tutoring packages; access to electronically browsable texts; access to pictorial information and video sequences.

Access to some of these is possible at the moment (eg. it is easy to access online databases, electronic tutoring packages and so forth). Access to others will be possible in the near future (eg video sequences will be accessible when digital telecom lines are available). Where learners cannot access the appropriate resource direct, it may be possible for them to request a copy (for loan or purchase) via JITOL which will be sent to them by conventional mail or fax.

- resources offered on-line by other institutions, and/or agencies which can be accessed via a gateway at the host JITOL insti tution. For example, the BLAISE (British Library) online system in London, and DIALOG in California could be accessed. Both of the se provide access to a variety of databases in themselves.
- human resources in the form of on-line tutors and other JITOL learners. In addition to the various resource

databases and g ateways available to JITOL learners, there
will be a sophisticated interactive electronic mail and
computer conferencing system at the core of JITOL. This
will facilitate communications between JITOL learners and
tutors, allowing them to treat each other as a learning
resource. The collective intelligence, knowledge and
experience of JITOL users will be a natural and highly
important organic learning resource.

- other resources not specifically made available by the JITOL
  host, but available elsewhere, might include video sequences
  (e g. tutored video instruction); tape slide sequences;
  audio tapes; computer software applications and so on.
  These would be made available through the post at the
  request of the learner.

- there will be be some software development work (and
  trialling) intended to enhance the usability of JITOL
  systems. These w ill include some tools to help JITOL
  actors deal with the complexity of the resources in a JITOL
  network including specialisations of these for tutor and
  learner workstations. One approach which will be considered
  builds on some of the work Felisa Verdejo on abstract
  descriptions of entities in a networked learning environment
  (EPOS project?), and would need some prototyping work on HCI
  aspects. Two of our partners from the advanced software
  engineering industry will play a leading role in this.
  Access to the resources will be made easier with the help of
  a resource manager described below. Nevertheless, in order
  for learners to have quick and appropriate access to
  knowledge, it should be organised in a way that helps to
  make the mapping between actual ·learners' problems or
  queries and the resources available. Knowledge organisation
  may take several dimensions:

  - at the lower level, it should take the form of a "super-
    help" facility integrated into the system. This help
    facility would indicate pathways to make searching
    easier. This level should be implemented on a routine
    basis in the JITOL studies throughout th e wide-area
    network (WAN).

  - at the medium level, it will entail a hypertext-like
    interface were learners can match their queries with
    pathways (hierarch ical or cross-referential) describing
    effective access to the knowledge base. This would
    include rather sophisticated matching faci lities with
    which learners can refine their queries according to
    feedback from the system. In other words, this utility
    is a kind of automatic navigation aid. This part of the
    study will probably have to be limited to certain
    domains.

- at the highest level currently envisaged in this project, the knowledge base itself will be organised taking account of learners' characteristics. It is not only the domain structure which determines how knowledge is organised, but also the context in whi ch it is intended to be used. It is essential that new structures for knowledge representation be created; these structures need to be dynamic and based on actual utility.

Resource Manager

The resource manager is the person who mediates between those making decisions about the resources to be made available on the system, and actually putting them onto the system for learner access. This person maintains records of resources and updates and adds to them when necessary. He or she may also be responsible for a group of tutors in a particular domain, counting the tutors as key re sources in addition to database and other learning resources.

In addition to the Resource Manager, a systems manager and technical adviser to learners and tutors is needed. The systems manager will oversee the whole JITOL, mainframe based system and it's effective and efficient running. The technical adviser will deal with problems and difficulties associated with accessing the system and using its various facilities. Technical advice may be given by a variety of methods, eg. by voice telephone or by electronic mail, depending on the nature of the query.

2.1.4 Approach to evaluation, testing and validation

For the purposes of this proposal we are using the generic term "evaluation" to denote considerations of the "worth" and "value" of the project and its effects. Testing and Validation refer to the process of formation and development at a more specific and operational level. In non-technical terms, testing and validation are associated with finding out "if things work" which is a subset of more general considerations of "value" and "fitness for purpose".

The evaluation of the model will indicate its effectiveness using today's technologies but will also provide indications of key issues, human, economic, organisational and technical, which need to be addressed if technology supported open-learning is to capitalise on the rapid developments in information and communications technologies. Many of the technological elements required are in place today but there is a need to find ways of integrating them and of developing a better understanding of their use by people for learning purposes.

The four domains in which testing and validation of the JITOL model will take place represent areas in which *real user/learner interest* is already evident. These are:

i   the continuing professional development and updating of skilled workers in the advanced learning technology industry;

ii   the enhancement of the interpersonal skills of doctors involved in diabetic self-help therapy;

iii   the continuing professional development of individuals in corporations;

iv   the continuing professional development and inter-working of management development tutors with special regard to European Credit Transfer.

In each of the four domains, developments are already under way to support the learning needs of the individuals concerned. The domains vary in the extent to which IT&T is being used for such support. But the main goal of this proposal is to test and validate key aspects of the JITOL model, and assess how far the model accelerates and supplements on-going developments. The resources requested are not intended to fund activities which would be going on anyway. Rather, the funding will allow deeper and more timely exploration of the JITOL model than would otherwise be possible.

Details of the requirements analysis, design, implementation, user trialling and data analysis cycle will vary between the four domains. However, the approach we propose to adopt involves:

a)   establishing a common methodology for testing, validation and evaluation, involving the putting in place of tools, new practices and equipment;

b)   tailoring the implementation and testing to the needs of the four contrasting domains.

The three year workplan involves two large-scale user trialling phases in each of the four domains (see Figure xx). The first trial will be preceded by specification of JITOL requirements (both infrastructure and learning resources). A subset of the identified requirements will be implemented and then trialled. The start date for the first trial will be month 10 of the first year. Trials will last for 9 months. In parallel with the first trials, enhancements to the four JITOL systems will be considered, designed and implemented ready for the second user trials at the end of year 2, start of year 3. Details of our current understanding of the requirements of the four JITOL systems are given in sections 2.1.5 to 2.1.8 below, as is an indication of the kinds of questions (the kinds of testing activities) for each domain. *(ensure that this happens)*

In order to maximise the value of the trialling data emerging from each domain, a workpackage has been designed to co-ordinate the testing work across the whole project. While establishment of a testing, validation and evaluation methodology is one of the first tasks of the project (and one which must be done in concert with the line adopted in Task 120).

Our approach to evaluation, testing and validation operates at three levels.

Level One is oriented by the global concerns of DELTA and is aimed at producing evaluative information about JITOL within the common framework set by the overall programme, and especially by Task 120.

Level Two is oriented by the particular concerns of the JITOL project and will gather evaluative information *across* the four test domains.

Level Three is oriented by the evolving requirements of each of the four test domains and is essentially testing and validation work. Level three testing and validation will take place *within* each test domain. It is partly concerned with establishing whether (and how) individual components of JITOL work and partly concerned with quality assurance. In this sense Level Three activity is part of the formative evaluation of work in each of the JITOL test domains.

At the basis of the methodology for testing and validation is the idea to build in the infrastructure of the JITOL model itself. Testing, quality assurance mechanisms and validation are not seen as static processes clearly fixed in time, but as a principle inherent to and feeding into the JITOL system.

It is widely recognised by the IT&T community that a major problem of formative evaluation or quality assurance is to implement the resulting modifications — they modify so fundamentally the system that they cannot often be taken into account. However, the JITOL quality assurance frame is directly

based on the interactions of the users of JITOL and, reciprocally, modifies their practices and objectives. Consequently, the quality assurance frame aims at controlling the evolution of the JITOL system and its processes, rather than just analysing its results.

(May insert here some cost analysis as undertaken at Lancaster for the UK case)

Evaluation Designs at Levels 1 and 2
Evidence of Performance will be gathered from the four principal participants in the JITOL project:
   The learners
   The tutors
   The counsellors
   The resource managers

Performance for these participants will be determined by:
1. the quality of the resources and technology they are required to use;
2. the nature of the operational procedures they develop;
3. their own pedagogical culture and expectations;
4. the quality and nature of the support procedures and practices they can access.

These four variables will be researched using the participants' experience and perceptions as the main evidence. The indicator dimensions at work are those associated with enabling (how participants experience the resources and procedures established for the project) and process (what actions, practices, interactions are occuring).

The indicators in the enabling process and outcomes dimensions will be developed across the four domains of the project during the first nine months of the workpackage to establish the project-wide methodology. Indicators will be developed using a methodology which will ask each domain to identify what it considers "good Practice" under a series of headings. For example, the way issues associated with the "use of time" are experienced by the learner.

To access the outcomes of the project we will be developing indicators which will identify, specifically, *Learner Outcomes*. These will be:

—   cognitive/affective learning outcomes;
—   reconstruction of learning in the workplace;
—   increases in institutional effectiveness (better work practices).

Evidence will be from learner tests, interviews, observations; tutor interviews; workplace visits and interviews with line managers.

Project contribution to market aims. These are all essentially associated with outcome indicators at Level 1 and are addressed by the following:

a) the extent to which the four domains of JITOL activity have developed a common approach (evidence will be project participants' experience and perceptions);

b) the extent to which participants in the four domains are able to plan training interventions more effectively using JITOL (evidence will be the quantitative and other manifestations of future plans);

c) the integrative procedures designed to enable the participants to work effectively together (evidence will be the experience and perceptions of participants and the formal enabling structures (meetings, consultations etc) set up between the participating agencies);

d) the cost in time, money, space and resources the JITOL model uses (evidence will be participants' logs, costs and budgets);

e) finally, the innovative nature of the project will be indicated by comparisons with other similar projects, by responses by peers to acts of dissemination and by the experience and perceptions of participants.

No attempt as yet has been made to set these ideas into a time frame or to give a more detailed account of the evaluation instruments.

In all these dimensions it is expected that full use can be made of the expertise of the MEDA * methodology in creating contextualy specific evaluation instruments. The evaluation team is drawn from three of the original members of the MEDA development group who have the advantage of long experience in the field of evaluation.

Evaluation Design at Level 3
Whilst each domain team will have responsibility for the evaluation of pilot experiments in their domain, the ethos, the framework, the methodology and the evaluation instruments will be in common as described above, and centrally managed. The testing and validation questions likely to be addressed in each domain are indicated in Sections 2.1.4 to 2.1.8 but will be subject to negotiation with the domain teams during the first nine-months of the project and reviewed/modified for the later experiments.

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* a EuroTecnet project in which the core of partners now form the basic team for the JITOL evaluation.

2.1.5 DOMAIN 1: ADVANCED LEARNING TECHNOLOGY PROFESSIONALS (ALTP)

a)   the current professional development scenario:

The existence of serious skill shortages in the ALT sector is widely documented, not least through EC initiatives such as DELTA. [ref??] Recognition of the strategic importance of skill shortages (among all aspects of ALT work, from analysis and design to implementation and evaluation) at member state level has led to a number of initiatives. One of the partners in this proposal has been running a Masters-level course specifically to train ALT practitioners. This course is offered to a national client group, using distance learning techniques - including substantial use of electronic mail and computer conferencing. The course is offered both full-time and on a part-time basis as a means of supporting the professional development of those working in ALT jobs. Based on experience in setting up and running this course, liaison with ALT organisations, and through information gathered in the DELTA EA Startup project, the learning needs and learning situation of the ALT practitioner community can be described as follows:

1.   Learners are distributed throughout 1000 - 2000 producer and/or user organisations in the EC member countries. The Action Line 1 project START-UP has 800 profiles of producers on its database.

2.   Most of these organisations are SMEs, though ones which are relatively well-equipped with IT facilities. Some are relatively small and relatively isolated production units within very large organisations (such as banks, insurance companies)

3.   Most learners are not in organisations which have the resources to mount their own in-house training, updating, professional development courses for staff

4.   Practitioners in the ALT field need a unique blend of expertise, drawn from diverse and not well-integrated sources. They need up-to-date knowledge on learning theory, pedagogy, instructional design, development methods, authoring tools and systems, prototyping aids, computer hardware and software, communications, graphics, multimedia resources, the organisational politics of training and training system implementation, evaluation methodologies etc. Not all ALT practitioners can be equally skilled in all these areas. But the vast majority of them must know enough about recent developments and trends in each area to work as an effective member of a multidisciplinary team. The sources of new knowledge and expertise in these areas are diverse. New knowledge comes from basic research in cognitive science and pedagogics, from commercial producers of authoring tools, from producers of computer and multimedia hardware, from the best practice of forward-looking ALT production companies, etc. The

sector is too new and dynamic to have well-entrenched channels
to convey up-to-date information to the practitioner community.

5.   Many practitioners have no professional qualifications in
ALT or even in instructional design.   (There are very few such
qualifications.)   The lack of a widely-understood system of
qualifications makes mobility of ALT workers a problem: relying
on their reputation within a local community.   Much ALT practice
depends on experience and intuition rather than tested theories
and principled methodologies.   This is seen as another symptom
of the sector's immaturity.   There is a strong demand for
professional training, continuous updating and recognised
qualifications.

b)   the LARGE-SCALE pilots in the project:
Work in domain 1 will focus on an extension and enrichment of
the networked facilities that are currently available to
participants in the Masters Programme in advanced learning
technology run by one of the project partners.   This programme
is taught by distance learning methods and makes extensive use
of email and electronic conferencing.   Several additional
learning resources have been created — such as a specialist on-
line bibliographic database.   Distance tutors involved in the
course are drawn from a wide geographic area and from industry
as well as universities.   Students are widely dispersed (and
currently work in 3 EC member states).

The implementational goal will be to establish a JITOL system
that can both — support the needs of ALT workers for continuing
professional development and up-dating, and — provide an
accreditation framework that can be used to certify the skills
and knowledge of ALT workers participating in the JITOL system
(to enhance professionalism within the field and to aid the
mobility of labour through the creation of recognisable
qualifications in ALT).

We envisage ALT professionals taking part as learners within
this JITOL system for two reasons — it will act as a source of
guidance, knowledge etc for problems they face that emerge from
their on-going work (ie it has an immediate use value), and they
will get qualifications that will help them in the career
(future exchange value).   Clearly, two motives map onto the twin
functions of the ALT JITOL system, as described in the previous
paragraph.

The implementation goal will be met by: — extending access to
the ALT JITOL system throughout the EC (by determining the
optimal electronic communication paths and documenting these and
other access requirements, by establishing appropriate
membership mechanisms) — bringing into the system a significant
number of additional JITOL tutors (these will mainly be
experienced practitioners and academics, working part-time for
the ALT JITOL system, distributed throughout the EC) — enhancing
the existing on-line and off-line learning resources and other
aids to professional development — putting in place a system of

accreditation which can be used to recognise the skills and knowledge of ALT professionals enrolled as learners in the system.

The existing course makes substantial use of company-based project work. We envisage that much of the learning that goes on within the ALT JITOL system will be of this kind. That is, learners will work on tasks defined through a process of negotiation with their academic tutors and their employers. This kind of responsiveness to the emergent problems of the employing organisation and the learner is an important aspect of our open learning model.

The first large scale user trials will focus on technical, operational, organisational, economic and usability issues that surround the implementation of the ALT JITOL system. If the system is to support learning both effectively and efficiently, much needs to be discovered about methods of harmoniously integrating the various human and technical elements of the system. The second user trials will then be able to gather more reliable data on the costs and learning benefits of the ALT JITOL system. They will also provide an opportunity to measure the value of enhancements to the ALT JITOL infrastructure and resources.

We also see an important role for ALT JITOL in supporting the trialling of prototypes from DELTA 200 series projects. In negotiations with various actors from the DELTA EA (especially in Action Line 2), and with partners in prospective DELTA 200 series consortia, we have made a case for JITOL as a mechanism for the focussed and supported (emphasise all 3 words) trialling of prototype tools. The argument runs as follows: - trialling by representative and knowledgeable users external to the consortium is a desideratum for 200 series projects (feedback from the courseware producers who might be the eventual users of authoring tools, for example, is an essential part of the validation of the tool's design) - the lack of integration and communication between advanced tool designers and the courseware production companies was recognised as a major problem by the EA project Startup, and will be a significant obstacle to technology transfer within the European ALT community - 200 series teams will be reluctant to distribute prototypes for testing, because:

a) prototypes are always fragile,
b) intentions for their mode of use may not be immediately apparent,
c) their usability may lag behind their technical functionality - external users may be reluctant to become involved in trialling because this may be frustrating and time consuming.

What is needed is

a) a method of linking tool prototype development teams with
   experienced ALT professionals (ie potential future users
   of those tools);

b) such that the development team can both provide a focus
   for testing and provide technical support for the use of
   the prototype during its testing.

Some form of social or professional 'contract' will be needed to
ensure the prototyping team and the testers operate together
succesfully. We argue that this can be provided within the ALT
JITOL system by engaging the participation of both sets of
actors. Participation in a focussed and supported user trial of
a 200 series prototype would be a valuable, credit-worthy ALT
JITOL learning activity for the ALT professional(s) doing the
testing. The 200 series team members would temporarily act as
ALT tutors.

In this way ALT JITOL becomes a key part of the infrastructure
of technology development and transfer within the EC ALT
community.

c)   the advanced SMALL-SCALE pilots in domain 1
Large scale testing of the JITOL model will be restricted to
stable technologies. We will use some small scale trials to
gain strategic evaluative data about the potential utility of
some leading edge technologies that can contribute to the JITOL
environment.

A central feature of a JITOL system is the incremental,
collaborative construction of domain-specific databases. The
logical structure, indexing and access methods, protocols for
making contributions, and the nature of the material stored in
the databases (text, graphics, programs, moving images, etc) are
all variable. Depending on their combination, the result could
be a hierarchically structured computer conference or a
distributed hypermedia database, for example.

We intend to use small-scale trials to simulate wide-area access
to such databases. That is, we will evaluate the costs and
learning gains associated with various kinds of collaboratively
constructed databases relevant to the ALT domain. Where these
databases contain quantities of information (eg. in graphical
form) such that wide-area access is currently difficult, we can
still gain a great deal of useful evaluative data by running the
system on an advanced LAN. (That is, we relax the distance
constraint, for experimental purposes, in order to simulate the
functionality of future WANs that will have much greater
bandwidths.)

Specific small scale trials are planned, for example:

The incremental collaborative construction of a database
concerned with the distributed trialling of a new courseware
product. This courseware trialling is being carried out by a
group of ALT professionals supervised by another of the project

partners (at no cost to DELTA). The ALT professionals call in to the supervising organisation's site at different times. They will share their trialling experiences by recording results, comments, etc on a local hypermedia database. The value of work with the database in furthering the professional development of this subset ALT professionals will be assessed, and projections made about the utility of this kind of resource and activity in a WAN-based ALT JITOL system.

2.1.6 DOMAIN 2: DOCTORS INVOLVED IN DIABETICS SELF-HELP THERAPY (DSHT)

a) the current professional development scenario:

Even though great progress has been made in medicine in recent years, it has been mostly at the biotechnological level that advances have been achieved. This technology has had an impact on only 10% of the patients, those who suffer from acute diseases. Now doctors must be stimulated to acquire new skills, such as those which are needed to treat chronic diseases.

Amongst the critical issues, one is to ensure that adequate explanation is being provided to the patients. How can patients be taught to look after themselves in the long term? The skills needed do not only cover doctors' typical domains of expertise; they are interdisciplinary. Moreover, such skills are hard to formalise. Communication between doctors and patients is fundamental and includes psychological and sociological issues. Several studies show that quality of treatment is linked to the quality of information and training to patients. This is particularly true in some forms of asthma, hypertension and diabetes (Assal, 1987).

Diabetic patients have particularly needs of this kind. Therefore, the actors involved in our proposal are doctors and nurses who work in Units for treating and educating diabetic patients in various hospitals. We have identified ((a dozen)) Units in Europe, both in the EC member countries and in some EFTA countries. These Units include doctors and nurses who have previously been in contact with the world leading group in the domain (who is our lead partner) and therefore begin to understand the real needs. But the knowledge within these Units could be broadened and made more imaginative by more frequent peer interaction.

Doctors in Diabetic Units need expertise from diverse sources. Knowledge stems from theories of communication, psychology, cognition, didactic sciences, medical and biomedical sources. Not all doctors have have enough knowledge in these domains in order to instil in patients efficient self-help behaviours. For instance, the issue of insuline rate and related factors, such as food, physical activity and timing are hard to explain in a way which can be direcly translated into operational behaviours by patients. Bio-medical information in itself is not enough

for this purpose. Adequate communication between doctors and patients is needed and is not just a matter of finding the right words. It entails a deep understanding of the patients' representation, and misconceptions, of their disease. Also, issues such as compliance of patients to diagnostics is important: basic acceptance and degree of compliance to treatment (efficency and interference with patients'life).

The way in which these issues are currently addressed by the leading group is two-fold:

-- they hold regular roundtables involving doctors, nurses and patients in the Unit. Apart from providing actual therapy to patients, these roundtables aim to train doctors and nurses in this new form of patients' self-help therapy, which induces doctors to review their therapeutical behaviour (Lacroix & al., 1987)

- they hold yearly four-day seminars aiming to sensibilize doctors to this new medical paradigm. These seminars are essential in the sense that they allow doctors from different Units to share human-human interactions, impossible to convey through articles or books.

These practices should certainly be pursued. But they are limited in several ways. For instance, the extent of interaction doctors have in the round-tables is limited by the nature and amount of people involved. Also, the feedback doctors have about seminar interactions is limited in time whereas it should be continual, particularly because actual effect of seminars occur when practitioners are back at their work places.

b)   the LARGE-SCALE pilots in the project:

The objective of the JITOL experiment in this domain is to show the added value of technology (because of its potential to enhance human interactions) by extending (not replacing !) the current practice described above. The most obvious added-value we hypothesize includes three aspects:

-- a more permanent feedback can be established throuh the network;
- more people and a larger diversity of specialists may be involved. The consequence is a qualitative and quantitative extension of the issues discussed;
- the current behavior proposed by the leading group will itself benefit from the JITOL model, in the sense that besides what technology may bring, another important aspect is emphasized, namely, new ways of interacting and new methods of formalizing and organizing knowledge, which may have a strong impact on the current model used.

The objective of the experiment is to show that learning - specifically a dynamic and continuing process - may benefit from an environment which enhances interactions between acrtors in a non-hierarchical way. In other words, the experiment does not just allow distant doctors to talk to each other. Rather it suggests that to interact on a permanent basis will generate a conceptual change in the professional development of doctors.

Such a scenario engages us in several research issues. Namely, precise criteria will be set up to validate the approach. The best management strategies will have to be found, in order for doctors gain maximum benefit from the environment in the shortest time possible. In addition specific research issue about communication and negociation will be undertaken.

This is the large scale part of the experiment, based upon stable technologies. The technology required is simply a standard PC workstation in each Unit to link to the network and to have access to any type of expert advice or resources which may be needed in developing this new medical paradigm. Source material which will be used to initiate and orientate the nature of the interactions on the network is organized around a series of "notecards" developped by the leading group.

c) the advanced SMALL-SCALE pilots in the project:

The major limitation of this technological base is that transmission of video sequences are not possible. Currently, video has to be transmitted by satellite or through traditional mail. Therefore, in addition to the large scale experiment, small scale experiments based upon local area networks (LANs) will be established. Their objective is to simulate future wide area networks (WANs) which will be available later in this decade.

The LAN should make it possible to demonstrate further interactions where both video clips showing doctors' behaviour with patients and dedicated software (animated graphical models of patients' behaviour) can actually be transmitted on the network.

2.1.7 DOMAIN 3: CORPORATE STAFF (CS)

a) current professional development scenario:

This domain covers both practitioners in a European-wide high technological enterprise and apprentices in a large bank. The two have common global needs and common approaches dealing with corporate training. In both cases there is a search for efficiency and competitiveness of the enterprise. In both cases the concept of a learning organisation is suggested. Competancies of individuals are emphasises. More specifically, these is a search for mapping learning requirements with companies objectives.

The strategy involves individuals in the enterprise to
understand the way knowledge is organised and the way it can be
accessed. This should help induce corpoate identity and
corporate knowledge to learners whether they are apprentices or
experienced practitioners. In other words the goal is to
develop a learning environment that both contributes to company
goals and is consistent with employees' abilities and
personalities, developing the latter through motivation and
personal empowerment.

The high technology enterprise has 90 open-learning centres
distributed throughout Europe which provide support for the
general up-dating of staff with materials from the European
headquarters in accordance with corporate needs. Being a world
leader in the high-technology field, it provides this JITOL
project with a ready-made pilot environment for both LARGE-SCALE
and advanced SMALL-SCALE studies.

Its present open-learning centres have videocassette equipment
and satellite communications. Both resources will be
supplemented by the entreprises for the JITOL study. In
particular, advanced workstations with PSS communications (at
all sites) or ISDN (at selected sites) will be made available.

The present mechanisms of open learning centres, distribution of
paper documentation, and telephone or infrequent peer and mentor
personal interaction are not adequate if the goal is to
capitalise upon information, knowledge and skills which ALREADY
EXIST AT THIS MOMENT within the enterprise amongst various
levels of personnel. Also, even though electronic communication
is dominent in the enterprise, the interactions in the network
do not correspond to actual learning needs. The reasons are
that the protocols of accessing infromation and not designed on
the basis of practitioners actual problems and the way current
information is organised lacks functional principles. For
instance, a major property of information is to be linked to
other pieves of information; pointers and cross-references
should exist. But these links should be made in accordance with
the way users actually access information rather than on the
basis of structural characteristics of the data.

The bank currently designs 25 printed courses each year, which
are distributed to 9000 learners (employees of the bank).
Learners access this information in a classical manner (books,
etc) followed by an examination and diploma. The problem facing
these distributed, often isolated, learners is that specialist
tutoring is located well away from them and can only we accessed
by traditional means which entails long time delays. Tutoring
is not interactive.

b)   the LARGE-SCALE pilots in the project:

The JITOL field environment of stable technologies which will be provided by the supporting enterprise will allow experimentation with the goals:

- of obtaining a clearer understanding of personal professional development needs of those who operate remotely from their central headquarters and who may feel isolated as they have little peer interaction. The latter aspect is particularly important if there is an aim to provide a corporate identity and committment and a sense of being part of a peer community (club) of experts;

- of providing a precise methodology within which protocols of communications and access to knowledge will be built. The efficiency of corporate knowledge transfer does not depend upon the technical specification of any particular platform, but rather upon the extent to which the overall learning environment is able to map learners competancies and motivations with the knowledge requirements of the corporations.

- to identify limitations of textual interactions which is a limitation of what current technologies can provide at "acceptable" cost in the endeavour to provide just-in-time human tutor support, backing up the distribution of technical documentation.

In the case of the high technology enterprise, networks already exist. What is needed is the protocols of communication, namely, the following issues will be addressed:

- learners' self-assessment techniques;
- knowledge requirement mapping protocols;
- protocols for organisation, management and access to resources on the network;
- facilities for the representation of business strategies, job profiles, bevioural indicators;
- processes to govern self-assessment, learning requirement identification, and career plan formulation.

In the case of the bank, a network will be set up by the corporation. This will allow for interactive learning which will greatly enhance the effectiveness of access to information because experts, councellors, and tutors are dispersed. Also, difficult concepts where peers need to interact and to consult councellors require a network with good interactive facilities and appropriate interfaces.

In these large-scale experiments, we will be limited to the use of PSS narrow-band communications lines and standard PC-based workstations for the main activities of database access and conferencing. _The characteristics of this environment in terms of user attitude, effectiveness of human-human interaction as well as slow speed access to information sources will be monitored.

c) the advanced SMALL-SCALE pilots in the project:

The high technology enterprise has developed a number of tools which will be used. Some of these tools are straightforward and can be integrated in the simple technological environment for the large-scale pilots. For instance, utilities to extract and index different learner inputs in order to highlight possible contradictions or gaps in the terminology as understood.

The SMALL-SCALE pilot studies will prototype experimental ways of supplying new and up-date product technical information by the creation of a central multi-media database (likely to have a hypermedia structure including graphical representation) and conferencing-type interaction accessible from advanced workstations with ISDN communication. These experiments will be contrasted with the narrow-band interactions of the large-scale pilots.

Some other tools of the high technology company, such as a hypermedia description language, will be integrated in the small-scale pilots and will serve to simulate more advanced environments. For instance, the design of a compound learning document (CLD) based on a hypermedia language is typically a tool which can be experimented with in the small-scale pilots. '

2.1.8 DOMAIN 4: EUROPEAN COMMUNITY CREDIT TRANSFER COORDINATORS (ECCTC)

a) the current professional development scenario:

The learners in this domain are ECTS Coordinators. ECTS is the European Community Course Credit Transfer System, a six-year pilot project forming part of ERASMUS.

It has just completed the first three years of its pilot phase and is about to move into a last and expanded three years. If this later phase of the pilot is successful ECTS will become the main vehicle for transfering academic credit between member state institutions and an increasingly significant mode of student mobility.

Currently ECTS operates in five subject areas with either one or two institutions from each member state. The lead partner in the domain is one of two national contributors to the Business Administration subject area. ECTS is "managed" through a decentralised network comprising an institutional and departmental coordinator from each institution and one overall subject area coordinator.

Essentially through the vehicle of student mobility and credit transfer, ECTS is seeking to promote and devlop the following areas of learning and devlopment.
i   most pervasively, learning about each others' culture within the European Community;

ii developing fundamental understandings of the various
   meanings of different subject areas and disciplines within
   different member states;
iii developing the principles and practicalities of creit
   transfer both inter-institutional and, most significantly,
   cross-culturally.

The co-ordinators themselves, as professionals learning about
this initiative, all have learning needs in each of these three
areas. In order for them to place their own students and take
in students from other member states they need to know about
other members' institutions and qualifications, other countries
educational state systems and many other educational and legal
differences between member states.

Thus they have significant and complex learning needs with no
existing authorities other than themselves to consult. Each
coordinator has to both exchange their own understandings of
their own national situation with respect to each of the three
areas identified above, and seek to obatin an understanding of
the situation of their partner institutions. Thus each
coordinator is at one and the same time an expert and a learner.
Consequently, JITOL offers to them the idea model for both
bringing together all their understanding which is fundamental
for the success of ECTS.

The lead partner both participates in the Business
Administration domain and is also the European coodinator in
that domain. It is proposed to run a pilot JITOL implementation
for Business Administartion coordinators.

The coordinators are distributed throughtout member states and
as currently organised are only able to meet on three occasions
per year for plenary discussions of the group to deal with
clearing house procedures, evaluation and the theoretical and
practical problems with credit transfer in Europe.

Most other communication between coordinators takes place on a
one-one basis by telephone and fax. Thus each coordinator is
left to develop his/her own understanding of each member state's
institutions with minimum opportunity for cross-transfer of new
understandings and learning. If much of this communication was
to take place within an JITOL network there would be a greatly
enhanced opportunity to both learn from each other's enquires
and questions and to examine what would to all intents and
purposes become an organic and emergent database.

There already exists basic information packages about member
institutions which could ve put on-line, together with such
things as:
−   pro-forma student application forms for on-line completion
    and transfer to central storage;
−   on-line analysis of student data, availablity of places in
    institutions, entry qualifications, etc.

-   information packages about available courses from each
    member institution;
-   names and addresses of institutional contacts and central
    ECTS administration contacts;
-   the ECTS Guidebook;
-   details of each member state's legal legislation,
    qualification structures and so on.

Thus, communications between ECTS coordinators would be greatly
enhanced, alongside their ability to learn more thoroughly and
efficiently about each others' institutions and educational
systems.

b)   the LARGE-SCALE pilots in the project:

In the first instance we would want to restrict our pilot to the
Business Administration area and at first to a group of six
coordinators. This will later be extended to include all the
Business Administartion coordinators that wished to participate.

The added-value of the project will include:
-   the creation of a dynamic forum for learning about each
    others' cultures within the European Community - this will
    occur through computer conferencing and collaboratively
    created knowledge bases - and will greatly enhance the
    existing ad hoc knowledge transfer opportunities;
-   the development of understandings of the various meanings
    of different subject areas and disciplines within
    different member states;
-   developing the principles and practicalities of credit
    transfer both inter-institutionally and cross-culturally.

The objective is to experiment with an environment (JITOL) for
enhanced communications and knowledge transfer, and to examine
the effects on learners oof such an environment. The action
research model adopted for the evaluation of the pilot will
allow us to monitor this experiment closely as it proceeds and
use this data to feedback into the design of the on-line
environment.

Some of the research questions which will be explored are:
-   issues surrounding the use of English as the main language
    of communication;
-   issues concerned with dispersed learners from different
    countries organising their own learning in ways that
    benefit them collectively and contribute to the knowledge
    and understanding of ECTS generally;
-   analysis of the various management straegies adotpted and
    required for this group of dispersed administration
    coordinators in ECTS;
-   issues to do with the management of negotiation and
    cooperation in an on-line learning environment.

We will be working predominently with existing STABLE technologies. Each coordinator will have a PC with at least a 20Mbyte hard disk, text and communications software, printer and modem. Communications for learning activities and knowledge base exploration will occur through IPSS, IXI terminal links and/or through INTERNET terminal links. CAUCUS conferencing software will be used for group interaction and for person to person (email) communications.

If this trial implementation proves to be successful during the first pilot period, its application will be extended thoughout the Business Administration ECTS and, after the end of the DELTA programme, to other subject areas and the whole of the ECTS programme.

c)   the advanced SMALL-SCALE pilots in the project:

(If we are to include advanced small-scale pilots the text needs to go in here)

2.1.9   Plan for technical work on the JITOL infrastructure
The necessary technical work can be summarised under two headings: enhancing the usability of JITOL workstations and supporting the dynamic restructuring of knowledge in the JITOL system.

2.1.9.1 JITOL workstations
The base-level hardware and software used by JITOL actors (learners, tutors, counsellors, resource managers) is very widely available. More efficient and effective participation in a JITOL environment can be made possible by enhancing the functionality of the actors' workstation. We will concentrate on enhancing the workstations used by learners and by tutors, through the implementation of software that will run on these workstations. There will be a considerable degree of commonality of function between workstations used by learners and tutors. We will call the additional software 'learner tools' and 'tutor tools'.

Initial work on such tools has been carried out under the DELTA EA and elsewhere (refs from final report). We do not propose to duplicate such work, or to duplicate related work going on under the latest phase of DELTA. Rather, we will implement learner and tutor tools that we believe will make the greatest difference to the usability of the JITOL system. In so doing, we will build on related DELTA work as far as possible. (NB the intention is to build tools only to the extent necessary for testing within the context of this project. This is a much smaller scale activity than that which will take place in task 250.).

Example learner tools would be a JITOL system help facility, a JITOL study advisor, a structured notepad facility, etc. Tutor tools would include aids to maintaining an up-to-date understanding of the resources available on the JITOL system,

and tools for keeping track of learners' needs, progress, interests, etc. Tool implementation will be consistent with the JITOL design philosophy of sharing tasks appropriately between human and software agents.

Requirements for JITOL tools will be derived from initial work with experienced and less experienced ITOL users during the first two months of the project (WP1.1). After implementation of the most urgently needed parts of the common JITOL infrastructure during months 3-6, WP1.2 will concentrate on JITOL tool production. Prototype tools will be fed into appropriate domain testing activities (WP*.5 and *.8) and will be integrated into the demonstrator systems in WP *.10.

2.1.9.2 Mechanisms for knowledge restructuring
A unique feature of the JITOL environment is the way in which representations of interactions between users of the system can be transformed into learning resources. A concrete and rather low level example of this is the indexing of computer-conference items. Another example is the automatic storing of patterns of tutor advice, such that one-off or ad-hoc consultations can become reusable resources.

We propose to develop and test software which will support some of these kinds of functions within a JITOL system. In the remainder of this section we provide some technical detail which is necessary in order to make sense of the proposed software development work.

Chris Paice's text (to be reduced) goes here or it gets used in either 2.1.3 or an appendix and we refer from here to it. NB ensure Chris's text is consistent with the text of 2.1.3 and any appendices.

In a JITOL system, resources would normally be provided to learners as 'packages'. This is not to say they would be provided all in one lump, but rather in pieces as deemed appropriate by the tutor and/or system. Nonetheless, the packages will play a central role. The resources (or rather, the records which respresent the available resources) will exist as independent objects. Thus any given resource may be included in several packages, or in none at all. Of course, the number of resources which might be accessed is indefinitely large, but we assume that a JITOL system will contain a more manageable set of 'upfront' resources, which have been from time to time identified by tutors as of definite or potential usefulness.

Packages are initially constructed primarily by tutors, who are able to identify what resources are relevant to a given learning need, and how (in what order and at what time) they should be presented to the learner. Packages may be designed and constructed deliberately, in reponse to a clearly defined future or non-urgent need, or they may develop during the exchanges between a tutor and one or more learners. The latter applies when the learners' needs cannot be fully specified or predicted,

so that a great deal of interactive exploration takes place, with the tutor identifying further possible resources or approaches in response to problems/questions as they arise. During this process a constantly evolving 'draft package' effectively exists, and it will be important for the system to capture this for future use.

The system must maintain a catalogue of 'stock packages' which are available off-the-peg. These will include both deliberately designed packages, and packages captured during exploratory learning, as above. Tutors will be encouraged & assist ed to review the latter, and tidy them up to form part of the 'permanent' stock. In response to a request from a new learner, a stock package may be used straight off the shelf, or the tutor may take a stock package and edit it to produce a new version. If neither is possible, of course, a new package must be constructed, as discussed earlier. Though they may be relatively settled in content, the stock packages may of course be modified from time to time (a) to replace resources by better or more up-to-date ones, and (b) to add resources to cope with newly-discovered problems.

A package is not just a linear list of resources. Primarily, it will contain a weakly ordered set of core resources, dealing with the central topic. Some at least of the core resources must be presented to the learner - though some might be skipped, depending on the learner's inital state of knowledge. But there may also be a number of supporting resources, to be provided if the learner lacks certain prerequisites for understanding the core material. A crucial aspect is keeping a proper balance for the learner between interaction with the tutor (highly effective but costly) and independent use of resources.

An implication of the above is that packages, resources AND tutors will all need to be indexed to record their subject relevance. More of this anon.

In view of the way that learning package s may sometimes have to be thrown together in a hurry, and in view of the remote nature of the contact between tutors and learners, it seems most important for the system to capture and store feedback on the usefulness of the packages and resources provided. The system will need, at suitable points, to go into a brief "How useful was that?" dialogue, and to elicit information on the nature of specific problems. Insofar as this can be formally codified, it should be possible for a background module to review the performance of packages & resources, and to alert the resource manager and/or tutor to problematic areas. Mantaining information of thi s kind will of course be invaluable for the evaluation of the JITOL project itself.

The various components and participants in an JITOL system will need to be represented as records. I will list what seem to me the main information heads for the four most central types of record. Of course, this is just a first attempt — a lot of careful analysis and discussion will be required.

Package Descriptions: — description of purpose — index terms — relevant tutor(s) — constituent resources, and the network of links between them — feedback information for each constituent resource.

Resource Descriptions: — medium, mode of use, time for use or perusal — topic (index terms etc.) — date, source etc. — packages which currently use this resource — refs. to strongly related resources. Note that feedback information is attached to packages rather than individual resources; this is because a resource which is unsatisfactory in one package may work quite well in another. In appraising the performance of a resource, the feedback information for all the packages which use it would be considered.

Learner Descriptions: — identity, status, company, phone number etc. — statement of information need — tutor to whom assigned — package to which assigned — resources so far used, + feedback — resources currently being used Information about past learners must also be stored, since this may help if a learner returns to the system at a later time.

Tutor Descriptions: — identity, status, affiliation, phone number etc. — expertise (index terms etc.) — relevant packages & other materials — currently assigned learners I would have liked to follow this up with an analysis of some of the software modules which would be required for operating on these records — but all I have time for at this moment are a few general comments.

I imagine that for much of the time JITOL would operate on a simple mail-passing basis. Clearly implementation of a souped-up mail-passing system is much more of an achievable prospect — so just how ambitious do we really want or need to be?

In concluding, can I just pull out from the above what I feel to be the two most important issues:
- *the importance of packages, and of a system which is able to capture them 'on the fly'.*
- *the importance of capturing and suitably codifying feedback from users and tutors.*

(Now need to add something about how we will do what needs to be done in this part of the infrastructural work)

(Final note on section 2.1 — the purpose of this description of the technical approach to be taken in our project plan is to specify HOW we will meet our project objectives. Is it specific enough? Is it comprehensive? Is it coherent?)

5. PROJECT MANAGEMENT STRUCTURE AND TECHNIQUES

The Proposal includes resources for a full-time Project Manager and a full-time Coordinator both of whom will be supported by a full-time administrative assistant and a secretary. Formal financial management will be undertaken by the parent organisation though the project itself will maintain day-to day financial monitoring and control. Such a structure is common in research institutions.

Each Partner has, within the budget, been allocated resources to support a minimum, yet adequate, management function including travel and subsistence costs for internal concertation meetings.

Each Workpackage and Activity in the proposal has been carefully specified to give clearly defined responsibility to an identified person from each partner or sub-contractor. In addition to formal deliverables, internal targets will be set to ensure that phased internal concertation can take place efficiently and effectively. A warning system of yellow and red flags will be established as is common practice within CEC projects.

The focus of activities is around the four pillars which represent the four professional development learning domains, the central pilot elements of the proposal as a whole.

The horizontal elements:
    of testing and validation ;
    communications and resources;
    manangement, concertation and infrastructure
are fed from the domain pillars of experimentation.

Elements of each horizontal element has internal delivery targets informing the management element of its findings. In order to establish a framework for decisions with a minimum of administrative overhead, each horizontal element team will have one or two members with responsibility for a specific domain. So we will create "domain teams" which for much of the activity will be autonomous whilst working to a jointly established set of criteria.

At key times (ahead of the 1st pilot phase; ahead of the 2nd pilot phase and during the final report writing and demonstrator establishment phase) the "domain teams" and overall horizontal teams will come together for two-day workshops to produce the guidelines for the specifications of the following event.

There will be a need for one-day meetings of those engaged in each of the strands in the communications and resources horizontal element. These will take place, on average, every four months.

Every two months there will be a full-day meeting of the persons responsible for:
- the pilot work in each domain;
and - the leader of each of the horizontal elements that is, of four + three leaders.

Concertation meetings will be schedules to minimise travel costs.

Bootstraping onto the open learning communications platform which is central to the project, the domain teams and horizontal teams will each have computer conferences and information bases open to all members of the project.

There will be a complete review of the management structure at the end of the first year.

6. VIABILITY ANALYSIS?

The project will demonstrate just a small number of possible configurations, in terms of technical and human resources, which attempt to meet professional development needs though IT supported Open Learning.

However, from these experiences, and through incisive testing and validation, it will be possible to identify the key features which together constitute a viable platform for the exploitation of the model. The analysis of our experiences will enable us to predict the vaibility of the model being used in a way which demonstrates the economies of scale anticipated with the technologies of the mid-1990's. Such factors as tariff levels and structures, made more favourable by increased demand, will be analysed.

Such analysis will allow us to undertake an assessment of the market demand for our model of Open Learning, both from a corporate standpoint and from the perspective of individual, truly open-learners.

PERSON MONTHS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Duratio	Target	Current	N'Lab	Lancas	Digital	Credit	RIKS	Logica	Irpeacs	Didael	Uni Lisi	Uni Namur	CH
1															
2															
3	Activity														
4															
5	1,1	36	36	36	6	12	6		12						
6	1,2	34	84	84	3	9			36	36					
7	1,3	36	72	72	72										
8	WP1 Total		192	192	81	21	6	0	48	36	0	0	0	0	36
9	2,1	3	9	8,5		4,5					1	1	1	1	
10	2,2	6	18	18		9					3	2	1	3	
11	2,3	11	33	33,5		16,5					6	3	2	6	
12	2,4	3	9	8,5		4,5					1	1	1	1	
13	2,5	13	39	39,5		19,5					7	5	1	7	
14	WP2 Total		108	108		54					18	12	6	18	

Activity	Durn	Target EC Total	N'Lab	Lancs	Digital	Credit	RIKS	Logica	Irpeacs	Didael	Lisb	Namur	CH	Norway
3,1	3	6			3		1	1			1			
3,2	3	4			3						1			
3,3	6	16			12		2	2						
3,4	6	12			12									
3,5	9	9			9									
3,6	2	2			2									
3,7	9	22			13		3	3			3			
3,8	9	15			9						6			
3,9	3	4			3						1			
3,10	9	18			6		6	6						
WP 3 Total		108	108		72		12	12	0	0	12	0	36	72
6,1	3	3			3									
6,2	3	3			3									
6,3	6	12			12									
6,4	6	12			12									
6,5	9	12			12									
6,6	2	2			2									
6,7	9	16			16									
6,8	9	9			9									
6,9	3	3			3									
6,10	9	9			0									
WP 6 Total		72	72		72									

All figures are man months

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1																
2	Activity	Durn	Target	EC Total	N'Lab	Lancs	Digital	Credit	RIKS	Logica	Irpeacs	Didael	Lisb	Namur	CH	Norway
3																
4	4,1	3		1	1											
5	4,2	3		2	2											
6	4,3	6		5	2		3									
7	4,4	6		4	4											
8	4,5	9		6	6											
9	4,6	2		1	1											
10	4,7	9		7	4		3									
11	4,8	9		6	6											
12	4,9	3		1	1											
13	4,10	9		3	3											
14	WP 4 Total	36	36	36	30		6								36	
15																
16	5,1	3		1	1		1	1								
17	5,2	3		2	2		1	1								
18	5,3	6		2	2		2	2								
19	5,4	6		4	4		2	2								
20	5,5	9		6	6		2	3								
21	5,6	2		1	1		1	1								
22	5,7	9			4		1	3								
23	5,8	9			6		1	3								
24	5,9	3			1		1	2								
25	5,10	9			3		0	0								
26	WP 5 Total	60	60	60	30		12	18								
27																
28																
29																
30	All figures are man months															