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D6.2 Annex 1 - Validation testing and usability results

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Abstract (for dissemination)	<p>This is an annex to TENCompetence D6.2. It contains reports from evaluation activities carried out with the TENCompetence Learning Design Toolkit in Liverpool, Sofia and Barcelona. The focus was principally on authoring and publishing Units of Learning, and the results indicate that while working with IMS LD is demanding for teachers and learning designers it is by no means impossible. The results indicate that users with pedagogical experience who are also competent users of information technology (but not technical experts) can become independent users of the applications if they are given four to eight hours support.</p> <p>The evaluations showed that the creation and management of resources was a particular difficulty for users, and the insights provided by these evaluations led directly to major changes in the Toolkit</p>		
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1 Introduction

The present document is an annex to TENCompetence D6.2, and it contains reports from evaluation activities carried out with the TENCompetence Learning Design Toolkit, described in that deliverable. The evaluations were carried out in Liverpool (UK), Sofia (Bulgaria) and Barcelona (Spain) in the summer of 2008.

The focus of the evaluation was principally on the teacher and learning designer tasks in authoring and publishing Units of Learning. Of the three evaluations the first two, at Barcelona and Sofia, were carried out and after May 22nd. The third, that at Liverpool Hope University, goes into greater depth, moving away from scripted user activities, and containing focused interviews with participants on the problems which they experienced, providing a more authentic and detailed picture of user experience. Consequently the report on the latter evaluation is rather more detailed than for the other two.

There are two principal results

- 1) While working with IMS Learning Design (LD) is demanding for teachers and learning designers it is by no means impossible. The Liverpool evaluation indicates that users with pedagogical experience who are also competent users of information technology (but not technical experts) can become independent users of the applications if they are given four to eight hours support.
- 2) The evaluations showed that the creation and management of resources was a particular difficulty for users, and the insights provided by these evaluations led directly to major changes in the Toolkit.

In considering these reports two aspects of the application should be remembered. Firstly, the LD Toolkit is intended for users who want to create relatively complex Units of Learning, which contain a number of roles and a flow of activities. If this is not the case, then it is sufficient to distribute links to resources and an activity instruction to learners, and this functionality is supported within TENCompetence by the PCM Rich Client application, and by the more recent Web based PDP tool. Consequently it is to be expected that with a powerful application such as this will take a certain amount of time for users to become confident in using it. Secondly, IMS LD includes support for generic XHTML authoring with properties and conditions, and while support can be given to non-technical users, some aspects of this can be will remain the preserve of technical experts.

2 Evaluation of ReCourse and SLeD with the Widget Server at Universitat Pompeu Fabra

2.1 CONTEXT OF THE EVALUATION

The evaluation took place on May 22nd 2008, 13:20 - 15:15. Three learning designers from UPF followed the worksheet. Two of them were familiar with LD and had used Reload and CopperCore before.

2.2 INSTALLATION

- They managed to install and access the widget server through ReCourse.
 - Their expressions were of surprise when seeing for the first time the new graphical design of the authoring tool.
- There were not problems with the installation. Just some questions about the version of the Java JDK that they have to install. It would be necessary to specify that you can use any version from 1.5.0.

2.3 START USING RECURSE

- On the beginning, the user finds that it is necessary to add a screenshot as a figure in the worksheet with the initial screen of Recourse, where you can choose “Start with ReCourse” or “Information of ReCourse”.
- When creating a UoL, you have to create a folder. Specify in the worksheet instructions that it can be anywhere.

2.4 CREATING A UoL: Observations made by two supporting researchers (the creators of the worksheet)

- In the Unit of Learning Window, the prerequisite window cannot be seen if the size of the windows is small. No scroll is available for that.
- One of the users comments that they expect an explanation of the central window (Tab distribution, the Organizer...)
- When adding information about a play, we comment... click on the grey area of the Play... The user doesn't understand where she has to click. Add a signal on the screenshot.
- Two of the users were lost when creating the role-parts for an act. They had to click first over the act where they had to create the role-parts.
- One of the users comment when using the palette that she didn't know where of the environments tab she should click on, on the organizer or the central window.
- One of them asks whether it is only possible to have a manager and a moderator in a chat.
- All the designers had problems when creating a resource. The resources window has still opportunities to be improved. For example, the editing icon is available in

both areas of the window while it can be used in principle just in the right-hand area.

- One of the designers had problems when creating a resource. She clicked over the central window and didn't use the left hand window.
- In general, the designers have found some inconsistencies with the references to the sections and to the tables in the text and they commented that it would be useful to have more screenshots showing the options.
- All the designers comment that, when associating a resource to one of the activities, the Worksheet makes reference to the first activity in the second act. They found that it would be more useful to reference activities in the first act.
- The activities in the organizer should be deleted when deleting an activity from an act. It could be probably an idea to add a confirmation message to delete it completely from the UoL or just from the act (so that the activities can be added to other acts). Otherwise, there can be problems when in the final checking of the UoL.
- One of the users had problems when checking and asked for clarification to interpret the listed errors.
- The users disagree in deleting the activities. They didn't understand that, they have to delete the resources associated to an activity for completely deleting it.
- Only one of the users was able to upload the UoL successfully at the testing time. The three UoLs created in the experience are attached as evaluation data. (*Phil or Paul may check what's wrong with them (?)*)

QUESTIONNAIRES RESULTS “Usability Checklist”

Section 1: Functionality

The three designers agree in all the aspects regarding this part. Just in the security comments, they have no opinion.

Section 2: Reliability

All users agree with all the reliability aspects.

Section 3: Usability

Two of the users disagree with all the usability aspects. They found that it is not very intuitive (this might be probably because they were used to the previous Reload version). In the contrary, the other user (not familiar to Reload) considers the tool strongly understandable and learnable. He generally agrees with the attractiveness of the tool.

Section 4: Efficiency

All the users agree with the efficiency of the system (maturity, fault tolerance and recoverability).

Section 5: Maintainability

All users disagree with the analyzability of the system. They asked for help to the worksheet authors when trying to solve the errors identified by the checker. The errors are not well described and they are difficult to interpret. However they all consider that it is a stable system.

Section 6: Portability

The three designers agree that the software is easy to install. In fact, they don't have any problem during the installation process. They don't have opinion for the other aspects.

In conclusion, the three designers consider that ReCourse is a suitable accurate and interoperable tool easy to install and efficient in terms on time of response. In terms of usability, the opinions are more heterogeneous. Two of the users consider that, in general that the navigation through the menu and through the different screens is not obvious and difficult to understand. They also agree that this system makes demand of some familiarity with this type of tools. In the contrary, the other user agrees with the interface and finds the system easy-to-use. All users agree with the reliability of the systems (maturity, fault tolerance and recoverability). All users disagree with the analyzability of the system. The faults are not well described and they are difficult to be interpreted. However, they all consider that it is a stable system, easy to change and to test.

QUESTIONNAIRES RESULTS “Testing the functionalities of ReCourse authoring tool v. 1.5.1”

Section 0: Installation of the Environment and ReCourse Edition and Activation of the Tools

All users strongly agree with all the aspects. They don't have any problem with any of the installation steps, neither with the creation of the environments, the configuration of the browser or the activation of the CopperCore engine.

Section 1: Creation of Unit of Learning (UoL)

The three designers agree with the management of the Units of Learning. They don't have any difficulty in creating, deleting, cutting, copying or moving to a folder a UoL.

Section 2: Creation of the Main Elements of the UoL

They also strongly agree with all the aspects regarding the creation of the main elements of the UoL. They can handle the functionalities related to the Play, the Act and the different type of Activities and with those related to the Roles and Groups.

Section 3: Filling the Main elements of the UoL

Once created the main elements of the UoL, they fill them. They don't have any problem using the elements in the Unit of Learning Tab in the main window for defining the main elements of the UoL.

Section 4, 5 and 6: Creation of a Play's, Act's and Activities' elements

The three designers make use always of the properties tab for defining the elements of a Play, an Act or an Activity and they all generally agree with the functionalities regarding to these. Only one of the designers expresses disagreement with the Activities' delete functionality. The resources associated to an activity have to be erased before completely deleting the activity itself.

Section 7: Creation Role's element

Any of the three designers use the Role tab to create a new role and there is no information about this point.

Section 8: Creation of an Environment

All users agree with the functionalities related to the Environment creation. All the designers successfully carry out the activities regarding the Environment creation. The especially like the *palette* functionality.

Section 9: Resources

The users disagree with the functionalities related to the resource management. They don't understand which of the options they should use from the various available. However they success when creating the resources and filling their main elements. (See also the observations in the first page of this report.)

Section 10: Completion of UoL

All the designers agree with the functionalities regarding the completion of UoL.

Section 11: Checking and Validating the UoL

This is one of the critical points of the test. The users disagree with the Checker view form the Window-Show view because they cannot find it easily. Only one of them uses this option. The other two use the button on the toolbar.

Section 12: Packaging and Publishing the UoL

Two of the users have problems finding the link for packaging the UoL because it was covered by other functionality tabs. Only one of the designers can upload his UoL to CopperCore. The other two, although having a correctly checked UoL, cannot upload it (*the UoLs are attached so that they can be analyzed by the tool creators*)

Section 13, 14: Opening Existing UoL and Searching UoL in the repository OpenDocument.net

All the designers agree with the functionalities regarding the OpenDocument Repository. They can easily find and use it. They also download a UoL and open it without any difficulty.

Section 15: Connecting to Sled Sever and Running a UoL

All users can connect to the Sled Server. Nevertheless, only the user that hasn't had any trouble uploading his UoL can navigate through it.

3 Evaluation of ReCourse and SLeD with the Widget Server at the University of Sofia

3.1 CONTEXT OF THE EVALUATION

The evaluation took place from May 22nd– June 2nd 2008 at the University of Sofia. A total of 12 learning designers from SU followed the worksheet – four University researchers familiar with LD, five teachers already followed a course about LD (but with limited practical skills), and three lecturers experienced in working with various e-Learning tools (but not familiar with LD).

3.2 INSTALLATION

It is not clear which versions of the JDK and NB are OK, nor how one user can re-use the existing Java installations, and when and how needs a change. An installer automating as many as possible of all configuration tasks will be strongly needed for use of not experienced with Java users.

The fact that the some of the servers are on the local machine (which is not the case in the real life) and some are not (like Opendocument) causes additional confusion for users. It is not clear why we need a player (CopperCore engine) while creating an UoL with the editor.

3.3 START USING RECURSE

For the Multi-language versions we strongly recommend the full use of the chosen language, not only for some commands or some messages. Also, in this respect the user documentation also need to be available in advance (in the same chosen language).

There are problems from time to time with novice users, caused by unexpected visualisation of various views. Sometimes the user can become lost. There is a strong need of special section dealing with this problem, and explaining users how to become more oriented in this complex environment, and how to find the right window again.

3.4 CREATING A UoL:

In the first prototype, there were very big problems for some of the users to publish their UoLs, even all elements were highlighted as OK and validated with green marks. Further on, after discussions with developers, most of these problems were solved. In any case, this is a signal that there is a need for quite more user-centred documentation about all aspects of the tool. LD is a very complex specification, with quite a lot “hidden” semantics, which somehow needs to be made more open and clear for the users, especially when they do something wrong. Even now, users can define “perfect” (from the user’s point of view ☺) UoLs, validated from the ReCourse, but not able to be published.

3.5 PLAYING A UoL:

About half of users signal various problems in playing their UoL. It is not realistic to expect from novice users to create meaningful and error-free UoL in their first experiments. In this case we need to have as rich as possible library with existing UoLs, which need to be used in the documentation in explaining all variations that can be achieved. Most of the users strongly prefer this approach (learning by examples), and maybe the WP6 partners need to pay special attention in this direction (preparing a set of well-thought UoLs examples, covering most of the LD richness and various LD design styles).

GENERAL REMARKS

The environment is very rich and powerful. It is not realistic to be evaluated for less than 2 or 3 months intensive work of experienced evaluators. We need to be quite better prepared for this: (1) to have clear vision what exactly we want to evaluate and validate; (2) to have very stable environment (all tools working well and well combined to work together) with very good user documentation, backed with good methodology examples and rich library of “best practice” example UoLs; (3) to have more time to prepare meaningful and well elaborated evaluation instruments.

Concerning the last versions with mixed BG/EN menus, all testers declare that they were more confused with the last version, maybe because they already have experience with the previous one, and have read the documentation for that one. With the last version almost all testers declare big troubles, as they don't know where to look for functionalities described in English but available with the Bulgarian menu 😊

4 Evaluation of ReCourse at Liverpool Hope University

4.1 Introduction

Objectives

The objectives of this evaluation action were twofold.

1. to establish if teachers would be able to use the ReCourse application to author Units of Learning without long term support from the project team.
2. to obtain insight into the nature of the difficulties which users experience.

User profile

Within the TENCompetence project two kinds of learning activities can be created. Firstly there are simple learning activities, which are defined within the Personal Development Plan tool and consist of resources and activity descriptions. Secondly there are IMS LD Units of Learning which support multiple roles and complex learning flows, created using ReCourse. Thus ReCourse is not designed to support the simplest learning activities, and it is expected that authors will have to make some effort to understand the extensive functionality which is available to them in the application, and an interest in pedagogic modelling. On the other hand they are not expected to have more technical knowledge than that required to publish a simple web page. In this ReCourse is similar to other powerful authoring applications such as the widely used Adobe applications Dreamweaver and Photoshop. It is to be expected that users will not be able to sit down with ReCourse and be immediately able to work with the application, and will require some initial input, either through documentation or through training.

Respondents

The evaluation was carried out at a four hour workshop on the 14th of July 2008 with eight teachers from Liverpool Hope University and St Helens Community College. Two evaluators participated, Dai Griffiths (a member of the project team at IEC, the University of Bolton) and Mark Barrett Baxendale, an expert user from Liverpool Hope University.

Method

In previous evaluations of both the Reload LD Editor and ReCourse¹ respondents have been supported by providing them with a step by step guide to the creation of a Unit of Learning which they can follow. This is valuable for identifying interface

¹ See Annex 1 to TENCompetence deliverable D6.1, available at <http://hdl.handle.net/1820/1149>

problems, but it does little to identify conceptual difficulties or to assess the ability of participants to create Units of Learning independently.

Consequently a smaller but more in depth evaluation session was conducted, including interviews in order to get a richer picture of user experience. The session was conducted as a workshop, with the following approximate timings (departing somewhat from the plan in the instrument) :

- Introduction to the session and signature of informed consent forms (15 minutes)
- Presentation on the fundamental concepts of IMS LD (45 minutes)
- Hands on training (60 minutes)
- Coffee break (20 minutes)
- Participants development of their own UOLs (90 minutes)
- Completion of questionnaires and close (10 minutes)

During the time in which the participants were creating their UOLs the evaluators went around discussing the difficulties which they experienced. When an interesting interaction occurred this was recorded, with participants explaining their difficulties.

Instructions and briefing to the participants were provided to participants, and are reproduced in the following section, together with the questionnaire was distributed (reproduced in the following section), and completed by seven of the eight participants (one had to leave urgently).

Treatment

- The Likert scale responses from the questionnaires were transcribed into a spreadsheet.
- The free text responses from the questionnaires were transcribed into a text document.
- The interviews were transcribed into a text document.

All results were anonymised.

The scores from the questionnaire were consolidated, and totals and averages calculated. The conversations with participants were classified into themes. For each conversation a comment and a recommendation was added.

4.2 Overview of results

4.2.1 Independent use of ReCourse

The first objective of the evaluation was to establish if teachers would be able to use the ReCourse application to author Units of Learning without long term support from the project team. We now review the evidence provided by the responses to the questionnaires.

a) Likert scale questionnaire responses (see section 3.1). All results are on a five point scale, where 5 is the most favourable response.

The results of the Likert scale questions indicate that the respondents could get to grips with the application with only a two hours of demonstration and

presentations. They did not find it easy to use, giving an average score of 2.7 (close to a neutral response), but this was not to be expected, and it is satisfactory that they did not find it hard to use. Three of the seven participants succeeded in building and publishing a Unit of Learning in the relatively short time provided for them to work with the application (90 minutes), while one more succeeded in publishing but did not have time to complete debugging. The remaining participants made good progress towards this goal, as is shown by the score of 4 for the question “I can imagine that I could use the software in future by myself”.

This work was carried out with the support of the evaluators, but this support was not intensive, as shown by the response of 2 to the question “How often did you need to ask for help from the session organisers?” on a scale of “never” to “continuous”.

Thus it seems clear that within the period of the workshop almost all participants were able to reach the point where they could start working independently with ReCourse.

It is worth noting that this finding relates to ReCourse as an editor for IMS LD Level A. Editing of Level B (which includes properties and conditions) requires expertise in authoring XHTML, and will always remain a more challenging task. However two considerations should be borne in mind.

Firstly, some of the more frequently used applications of level B can be facilitated with specialised interfaces (for example branching structures dependent on the result of a test). This will be done in future versions of ReCourse, and there is no reason to suppose that this type of authoring will prove more challenging than the level A authoring evaluated here.

Secondly, the services (forums and messaging) which were authored by participants in this evaluation session would in earlier LD authoring tools have required expert authoring at Level B, or programming work in integrating services².

b) free text questionnaire responses (see section 3.2)

The free text questions provide support for the conclusions from the questionnaire, specifically the responses to the question “Please briefly describe any aspects of ReCourse that you particularly liked. This includes the purpose, functionality and interface of the application.”

- Overall, the package is manageable and useful after some effort in understanding interface...
- Good quick intro, need more time support to actually use.
- Interface (GUI) is particularly attractive.
- Once set up, seems like it would be easy.
- Navigation at first was confusing but after 20 minutes of use this became clear and more logical.

² See for example an earlier evaluation of the Reload LD Editor, Barrett-Baxendale, M., & Groes, S. (2006). Supporting an English tutor in using IMS Learning Design. Retrieved November 14, 2008, from http://bsd1.phosphorix.co.uk/ld4p/images/fcs_englishness.pdf

Again, these respondents indicated that independent work with the application is possible for teachers.

It should however be noted that the respondents were not all convinced that the infrastructure was appropriate for their own practice.

- I can see the potential benefits, but probably only for distance learners. It seems a lot of work when you have access face to face with students, but I would persist if I had distant students.
- Program seems good for distance learning and courses that have large teaching teams.
- The complexity of setting up units, takes a lot of time and for complex and large unit structures.
- Very resource intensive program, not all classes would require such detail.

Thus, it seems that while teachers can deal with the complexity of authoring IMS LD with ReCourse, it is not likely that most of them will actually do this, unless they have a particular reason for doing so (for example authoring distance learning courses, or creating complex learning flows). This is in line with the provision of simple authoring functionality (in the TENCompetence PDP tool) along side the authoring of IMS LD Units of Learning.

4.2.2 the nature of the difficulties which users experience.

a) Likert scale questionnaire responses

Section 2 of the questionnaire (section 3.1) addressed the difficulties experienced by respondents in using the software.

In no case did the average response to any question fall below 2.5, and for five questions it was above 3. Inspection of the detailed responses, however, shows that some respondents found difficulties with certain areas. For example

- two respondents gave a score of 2 to “I had difficulty understanding what the different menus and windows were supposed to do”, while three gave a score of 4.
- three respondents gave a score of 2 to “I didn’t know how to make the elements I needed to build a Unit of Learning”, while two others gave scores of 5.
- one respondent gave a score of 1 to “I could not find my way from one part of the application to another”, while giving high scores to other parts of the interfaces, while another gave a score of 4 to that question, and lower scores to others.

Thus the questionnaire suggests that **while most respondents found the authoring task challenging, there was considerable variation from user to user in the areas of the application with which they had difficulty.** We speculate that may be the result of varying expectations due to differing previous experience of similar applications and of the teaching process.

b) transcripts of conversations with users indicate that in most cases the underlying problems in most cases were twofold:

1. resource management

2. the structure and concepts of IMS LD

All but one of the transcripts of discussions were all classified as relating to one or other of these issues. This is a strong finding of the evaluation, and provides not only insight into the challenges of the authoring process, but also a guide for further improvement in the application.

This is also borne out in the problems identified in the free text responses, for which seven were related to management of resources

- I had slight problems understanding resources and properties, as it was all getting mixed up. I think separating most of the resources in a slightly easier way could well better help, such as separating pic or links and storing it in one place, rather than changing name in 2 different places.
- Would be difficult when organising a large amount of activities, need folders to group files.
- After you create an environment and then add resources etc. it was difficult to remember the name or what environment you are currently working in.
- I think there should be a slight more clarification over resource management and properties.
- Felt uneasy about did I save it or didn't I
- I really struggled with the environment and resources. Also the fact that a service is just a resource was confusing also.
- Organiser: is it possible to have folders/collapsible things in the organiser, because it's going to be a very long list of things, especially for longer courses.

There were also a number of comments on the difficulty of the IMS LD concepts and structure.

- Clarification of the terminologies for novice users.
- Conceptually difficult, prefer paper based notes.
- A bit complex terminology used.
- Not keen on the term Play. Seems strange for what we are doing. Not sure what term should replace it.

We now summarise the conclusions drawn from the transcripts regarding resources and the concepts of IMS LD.

1. Resources

- 1.1. Attention should be paid to improving the support for users in handling resources, as discussed in the following points. (Transcripts 1-10)
- 1.2. Usability would be enhanced if users could edit resources directly without having to worry about whether files are being over-written, and other similar file

- management problems. Ideally such issues should only be visible when carrying out resource management tasks. (Transcript 2)
- 1.3. It is unclear what giving a title to a resource associated with a Forum implies. Does it change the title of the resource itself (or the file) or does it give a name to the reference to the resource. Is it for the benefit of the author, to remind them of what the resource is for, or will it be shown to the learner? (Transcript 3)
Unless there is a strong argument for providing the user with prominent access to this element it should be made less salient. It could perhaps be available as an expert mode, or through the resources tab.
 - 1.4. There is an ambiguity in IMS-LD about where learning activity instructions should be placed: in the activity description, or in the associated learning object (Transcript 4)
 - 1.5. It would be advantageous to indicate the distinction between resources to be used by the learner, and resources used to describe the activity, perhaps by changing terminology. (Transcript 4)
 - 1.6. Editing of resources 'in situ' should be made more transparent, and resource management aspects restricted to the Resources tab. (Transcript 5)
 - 1.7. ReCourse is constructed so that every learning object must have at least one least one learning resource. Usability would be enhanced by including a message to tell the users "you can't delete this because every learning object must have at least one learning resource" (Transcript 6)
 - 1.8. Users would be helped by providing them with feedback which indicates the state of elements without them having to open them up and inspect them. This would enable them to see, for example so that they can see, for example, if it an activity has a role an environment associated with it. This would provide an indication to learners of what authoring actions they still need to take, and where problems with their UOL might lie. (Transcripts 7, 8, 14)
 - 1.9. It would enhance usability and clarity if the resource names generated by ReCourse were related to the names of the original files. (Transcript 10)

2. Structure and concepts of IMS LD

- 2.1 Users repeatedly found difficulties with a small number of IMS-LD concepts. (Transcripts 8, 9, 11, 12, 13, 14, 16, 18). Most commonly this involved environments (e.g. transcript 11, 13, 14) and their relationship to activities, but roles (transcripts 9, 18), runs (transcript 16), and even learning objectives (e.g. transcript 12), also created difficulties. None of these proved difficult to explain, and users were able to continue without problems. However, if help had not been available they might have become blocked. Documentation and workshop materials for ReCourse should focus on the small number of principal issues which cause confusion for novice users, starting with those identified in these conversations. Appropriate error messages could also be of assistance.
- 2.2. The environment element, which caused substantial misunderstandings, (e.g. transcripts 11, 13, 14) is a basic part of IMS LD, and it is difficult to dispense with it in the interface. This may sometimes be achieved by creating a default environment for a new resource, but this creates the problem of
 - a) generating as many environments as there are resources, which is difficult to manage

b) makes it harder for users to make use of the clarity and reusability which organising resources and services into environments brings to IMS LD. Consequently hiding the use of environments in the interface is a strategy which should be used with care.

Conversation 13 suggests that the preparation and classification of learning materials prior to starting work on the UOL would be of assistance to learners in understanding environments. This aspect should be included in the documentation, and could also form part of training and workshop activities (although this would add to the time required)

- 2.3. In order to make the completion conditions work by means of users indicating completion, it is necessary to give either the teacher or the learner the ability to indicate completion. Some users did not see that this would be necessary, assuming (presumably) that this would be done automatically. If practicable, the UOL should be parsed, and users given feedback indicating if they have created an inconsistency between completion conditions.

Two respondents working together (transcript 17) commented that for them populating multiple UOLs over the length of a full year course would be a major task, while creating a single large UOL would reduce flexibility unacceptably. This confirms observations already made within TENCompetence. The problem can be overcome by means of a link tool enabling users to access to UOL, and to register on it themselves.

4.2.3 Conclusions

The results of the Likert scale questions indicate that the respondents could get to grips with the application with only a two hours of demonstration and presentations. Thus it seems clear that within the period of the workshop almost all participants were able to reach the point where they could start working independently with ReCourse.

The results of the questionnaires suggest that while most respondents found the authoring task challenging, there was considerable variation from user to user in the areas of the application with which they had difficulty. However, transcripts of conversations with users strongly indicate that in most cases the underlying problems in most cases were twofold:

1. resource management
2. the structure and concepts of IMS LD

The insight into the nature of users difficulties with resource management provides valuable input for the revision of the ReCourse user interface, particularly with reference to management of resources, and changes to the application are already underway.

The difficulties with the structure and concepts which face users can be addressed both by appropriate improvements to documentation, and in some cases by the provision of feedback on the state of the Unit of Learning under construction (e.g.

flagging when an activity has no environment associated with it). The planned inclusion of a template mechanism will also make it easier for users to get to start work with the system, although it should be remembered that use of templates gains ease of use at the cost of flexibility.

There is a difference between the two principal issues identified. The aim in the management of resources is straight forward: to produce a system which is clear and easy to use. The aim in clarifying the structure and concepts of IMS LD is less simple. The authoring of sophisticated pedagogical plans is a complex matter, even with pencil and paper, and an authoring application cannot protect authors from this challenge. Consequently the goal is to make this task as easy as possible by identifying those aspects of IMS LD which create barriers in this process, and by providing support in the application which reduces or removes those barriers. However, it should not be expected that any application can (or should seek to) remove the basic intellectual task of planning pedagogy, and so some degree of conceptual challenge will remain in any system such as ReCourse.

4.3 Detailed results

In this section we provide the following detailed results of the evaluation

3.1 The consolidated results of the Likert scale section

3.2 Responses to the free text questions

3.3 Transcripts of conversations with users

4.3.1 Results of the Likert scale section

The scores are adjusted so that higher score = better result for all questions

Question text		Reply options	score (high = good)								Total	Average
1	General impressions											
	I enjoyed using the software	Enjoyable – not enjoyable	4	3	4	4	3	3	3	24	3.43	
	The software was easy to use	Easy – difficult	4	2	3	4	2	2	2	19	2.71	
	To the extent that you had difficulty in using the software, please indicate in which areas you had problems, and to what extent.											
2												
2.1	I had difficulty understanding what the different menus and windows were supposed to do	Not a problem – A major problem	4	3	2	4	4	3	2	22	3.14	
2.2	I could not find my way from one part of the application to another	Not a problem – A major problem	4	1	3	2	4	2	3	19	2.71	
2.3	The terminology used by the software was confusing	Not a problem – A major problem	3	3	3	2	2	3	4	20	2.86	
2.4	I didn't know what to do next to build a Unit of Learning	Not a problem – A major problem	4	5	4	4	1	4	4	26	3.71	
	I didn't know how to make the elements I needed to build a Unit of Learning	Not a problem – A major problem	2	5	4	5	2	3	2	23	3.29	
2.5	I didn't know how to set the properties of the elements of the Unit of Learning	Not a problem – A major problem	3	5	4	4	3	3	4	26	3.71	
2.6	I had problems managing the resources for the Unit of Learning	Not a problem – A major problem	2	5	2	4	4	3	3	23	3.29	
3	Building a UOL											
3.1	I successfully created a Unit of Learning	Yes – No (1 = yes, 0 = no)	1	1	0	1	0	0		3	0.43	
3.2	How often did you need to ask for help from the session organisers?	Never – continuously	5	2	2		2	2	1	14	2	
3.2	I can imagine that I could use the software in future by myself	Agree – disagree	5	5	5	5	1	3	4	28	4	
3.3	I can imagine making use of the software if I had support	Agree – disagree	4	5	4	4	2	3	5	27	3.86	

4.3.2 Free text responses from questionnaire

a) If you had a difficulty which was not covered in questions 2.1 to 2.6., please write it down here:

- Presentation and training materials
 - A slight slower pace while demonstrating could have been much better for a proper understanding of various terminologies as that's where I struggled initially.
 - The linking of the applications is a bit complicated. The documentation should specify section with tasks as to which is to be performed first.
- Interface design
 - 2.2 User interface and icons may need improvements.
 - 2.3 Some controls, e.g. Environments, appear at more than one place in the interface, and it is confusing because each of these can be used for different purposes.
 - Is it possible to have pop-up box with message reminding you to save manually as you go along, and also when you click on the upload buttons.
 - The steps and layers made it hard to remember what order to complete creating a unit (1,2,3)
- Conceptual issues
 - Did not click teacher as participant, therefore things could not be seen.
 - The terminology is a bit difficult to understand in the first instance.
- Resource management
 - Unable to delete an unwanted resource, this turned out to be the default resource of the learning object.

b) If in your answers to you questions 2.1 to 2.6 you have indicated that you had problems, please add any comments which may help us to understand your difficulty more clearly, and any suggestions for improvements which you have. Please indicate the number of the question which you are writing about.

- Resources
 - I had slight problems understanding resources and properties, as it was all getting mixed up. I think separating most of the resources in a slightly easier way could well better help, such as separating pic or links and storing it in one place, rather than changing name in 2 different places.

- Comments: Could do with show hide for roles. If you click as a dialogue box is open the dialogue just disappears. When publishing spell check.
- Clarification of the terminologies for novice users.
- When clicking on 'learning objective' can there be a label on the tab that opens that tells you which environment you are in ... as I keep forgetting.
- Organiser: is it possible to have folders/collapsible things in the organiser, because it's going to be a very long list of things, especially for longer courses.
- Also some kind of pop-up reminder to create activity names that relate v.closely to what your week/class is? e.g. Week 1 lecture, week 1 seminar, week 1 tutorial. Week no, important to have in file name.
- After trying out ours we thought we'd done it correctly, but the text and LO's weren't there. Obviously gone wrong!
- After you create an environment and then add resources etc. it was difficult to remember the name or what environment you are currently working in.
- Need a spell check.
- No overall list of what has been completed as a reference point. You have to make a mental note of how or what you have done.
- Would be difficult when organising a large amount of activities, need folders to group files.
- Need overall 'save' before publishing.

c) Please briefly describe any aspects of ReCourse that you particularly liked. This includes the purpose, functionality and interface of the application.

- I think the factor of validation. Checking (i.e. Checker and publisher) before uploading the document is really exciting as it gives you a flavour of what you have done.
- Overall, the package is manageable and useful after some effort in understanding interface...
- Good quick intro, need more time support to actually use.
- Interface (GUI) is particularly attractive.
- Well linked in one window.
- I can see the potential benefits, but probably only for distance learners. It seems a lot of work when you have access face to face with students, but I would persist if I had distant students.
- Program seems good for distance learning and courses that have large teaching teams.

- Ability to take units (or move or save) any place is a good feature.
- Once set up, seems like it would be easy.
- Like “time” access.
- Navigation at first was confusing but after 20 minutes of use this became clear and more logical.

d) Please briefly describe any aspects of ReCourse that you particularly disliked, and any suggestions you may have for improvements. This includes the purpose, functionality and interface of the application.

- I think there should be a slight more clarification over resource management and properties.
- Connection to server may be built into the main window.
- Conceptually difficult, prefer paper based notes.
- A bit complex terminology used.
- Takes a long time to understand.
- Having to manually put each student's e-mail in as a user would take me ages. I have 130 students in one module alone. Will there be a way of importing students' emails?
- It's not very clear what/where the 'run' button is. Maybe if when you hover over the icon it could also say “click on this button when you are ready to upload to the server”. It would be more user friendly.
- On the delete act or play options, can we have act before play? Less likely to accidentally delete the whole play.
- When you get to the screen with publisher, if there's nothing showing (your thing isn't there) could there be a pop up say “if you can't see your package here, click on the green 'connect to server' icon.
- Felt uneasy about did I save it or didn't I
- The complexity of setting up units, takes a lot of time and for complex and large unit structures.
- Not keen on the term Play. Seems strange for what we are doing. Not sure what term should replace it.
- Very resource intensive program, not all classes would require such detail.
- I really struggled with the environment and resources. Also the fact that a service is just a resource was confusing also.

4.4 Transcripts of recorded conversations with users

4.4.1 Resource management

1. Resources are the principal problem

- User: Resources, that's what I need to get my head around
- Evaluator: But you think that given another session you'd get your head around that
- User: Yes, and I tend to be somebody that would need to use it for something. So with a bit of preparation then I would apply it to something
- Comment: *This is an example of the many occasions when users commented that the management of resources was the principal problem which they encountered.*
- Recommendation: *Attention should be paid to improving the support for users in handling resources, as discussed in the following points.*

2. Prerequisites default

- User: When we were in the prerequisites putting the second prerequisite in my brain automatically went to opening up that drop down box and the resource and changing that to prerequisites.
- Evaluator: OK, so you are looking to put in the default one again
- User: So is it possible, or would it make any sense, to have options where it said that the original one said prerequisites and the second and third say "pre-requisite 1" or "pre-requisite 2", because I think other people's brains may well make that link.... Because it seems like it is over writing it.
- Another user: Because the resource to me means something you access
- User: Because the word says prerequisites my brain says that what you have to select next.
- Comment: *The resource structure in IMS-LD involves the creation of files, which are associated with resources, which are associated with items. While this is logical and has advantages in maintaining UOLs, it is too confusing for authors if presented to them directly. These problems arise from users being confused about what it is that they are editing. They appear to feel that they are editing the element directly, but they know that they are not because the interface tells them that they are working with resources. But their understanding is partial, because they do not discuss the underlying file structure.*

Recommendation: *Usability would be enhanced if users could edit resources directly without having to worry about whether files are being over-written, and other similar file management problems. Ideally such issues should only be visible when carrying out resource management tasks.*

3. Names of resources in properties

- Evaluator: Can you sum up what just happened
User: I added a forum widget, and I wanted to give an instruction to the people using the forum. That instruction became a resource. So I put in a title introduction to forum, and I edited the text, but then in the resource column it said resource 2. I wanted to rename it in the properties window and I couldn't. So I had to go to the resources. When I came to rename it in the resources, it told me I already had a file of that name, but I didn't because it wasn't in the list already. It seemed to be taking the fact that I had given it that title to be the name of the file, and it wouldn't let me duplicate it.
Evaluator: So the impression that you have is that the title of the resource in the properties was conflicting with the name of the resource in the resources
User: Obviously I couldn't use that because its got a space in it, so whether that was it, but it didn't say that wasn't a valid name, it said you've already used this once.
Comment: *It seems that the user is unclear what giving a title to a resource associated with a Forum actually does. Does it change the title of the resource itself (or the file) or does it give a name to the reference to the resource. Is it for the benefit of the author, to remind them of what the resource is for, or will it be shown to the learner?*
Recommendation: *Unless there is a strong argument for providing the user with prominent access to this element it should be made less salient. It could perhaps be available as an expert mode, or through the resources tab.*

4. Different kinds of resources

- Evaluator: (Summarising conversation so far) Here what's happening, is you've got this activity and you want to provide some web links for them to use in that activity. That's going to go in an environment. Your instinct is that the links go inside the activity, but they don't go into an activity, they don't go into an activity, they go into an environment which you share with an activity. But

- unfortunately this gets complicated because the activity itself has properties which have resources, but they're a DIFFERENT kind of resources.
- User: So would that be the research question.
- Evaluator: Yes, when you give them this activity, what would you say to them. The words in quotation marks "look at this" or "think about it" go in here. The material which they are going to study goes into the environment.
- User: So this is the description of what they are going to do.
- Evaluator: Even more than the description, it's the instruction itself. "Description" is a bad word here. It's "look at these links", "write me an essay".
- User: So it's the objectives.
- Evaluator: Mmm, I'd reserve "objectives" for "achieve an understanding of such and such", a higher level description. Think of this as the actual words that you would give to your learners when you give them a task.
- User: Well I want them to write a 500 word report to describe a database...
- Evaluator: Yes put in "write a 500 word to report to describe a database..." The confusion is that that in the file structure is a resource, a piece of HTML, but its not a learning resource.
- User: Because its quite complicated. I was thinking that if I had the forum I'd also need an activity, well I do need an activity, but then when the activity is up.
- Evaluator: So you want a forum, and what you are saying is that you do need an activity, because at the minimum... because the forum they g...
- User: But what confused me is that you can double click on the forum.
- Evaluator: But at the moment that is a stand alone entity, which is not linked to an activity then the users won't see it when they go in, won't they
- Evaluator (2):: It's like giving the privileges, but you haven't given them access.
- User: So I've said who can do it, and I went to resources and told them what to do with it there.
- Evaluator (2):: I think here we've got a confusion. This resource really its only there because the specification says we have to have it there. It doesn't make much sense for a forum to have a resource. If you remember what I said is that the only important thing is this bit (the participants). You're thinking of this as the activity instruction,
- User: Yes
- Evaluator (2): ...but that's not really where you want it.
- User: No, I see I need it in that one, which is the forum activity that I created already

- Evaluator (2): So, that needs to go in there. ... this here.... The only thing that's important is that when you give it to these people that they have access rights to the forum.
- User: Otherwise they'll go there, and they can't.
- Evaluator (2):: It'll spit 'em out again.
- User: That was what was confusing me. Because there was a resource there and I put it in and then I thought that doesn't make sense because I can't make it.
- Evaluator (2):: I think what it says to me is that the resource should have a default text which says "You don't really need to put anything in here unless you are really sure that you want to".
- User: Given that that resource is there, does it do anything at all.
- Evaluator (1):: As far as I can see it doesn't. I think it is one of these things that follows the specification. The specification says that all these things must have resources, but a resource for a forum doesn't make much sense.
- User. No because if you put in something like a web link, what I don't understand is how they would... If you put a resource in here how would they view it, can they view it.
- Evaluator (1): You're right, you remember I said at the beginning there are places that you can put things in where actually you don't need to. Because this is allowing you to put in everything that the specification says that you can put in, even if in this particular sense it doesn't make much sense. And then you get confused like you just have. So the answer is, ignore the resources for the forum.
- Comment: *The user is confused about different kinds of resources, descriptions and instructions. Principally it is not clear where the activity instructions go. Should they be part of the environment, or should they be included in the activity description? If they are included in the description, then is the term "description" misleading? The fact that an activity has various types of resources (e.g. Prerequisites) makes this more complex. The user seems to be confused and think that learning objects should be resources associated with a learning activity description. The evaluator was not clear about the function of a resource associated with a Forum.*
- Recommendation: *a) There is an ambiguity in IMS-LD about where learning activity instructions should be placed: in the activity description, or in the associated learning object.
`b) If possible it would be advantageous to indicate the distinction between resources to be used by the learner, and resources used to describe the activity, perhaps by changing terminology.*

5. Problems in creating resources, and understanding the process

User: I want to save this under a different file name so I don't overwrite this pre-existing learning resources, can I do that from here.

Evaluator: Which learning resource

User: This one, this learning resource already existed

Evaluator: Why do you not want to overwrite it.

User: Because it might be something I don't want to change. So would I be able to change the file name from here.

Evaluator: No

User: Because I went to file and file save as, but it doesn't look like it's saving the resource, it looks like it's saving the entire thing.

Evaluator: If you want to... That's the web link, let's take that out... I missed it... Let's say "No". So this resource at the moment says "To do". That's all it says, so if you replace that, no harm done.

User: If I wanted to create one...

Evaluator: If you wanted to create one from scratch, what you would do, you would go to "resources" and you'd create a new one.

User: Oh, OK

Evaluator: It's a pretty horrible name.... So long as you give it an html as a file name then it'll come up like that. So then you can save that. Where's it gone. There it is.... So you need to go through the two stages. Now if you go back to here...

User: It to the list

Evaluator: There it is. It's two ways round. If you do it this way round you can create a new resource here. It doesn't like spaces. And you can edit it here

User: I see

Evaluator: And then it'll appear here, another new one somewhere... It'll be here

User: And the resources can be HTML files...

Evaluator: Yeah

User: And PDF documents.

Evaluator: Well, it can be anything you like

User: Anything...

Evaluator: The only thing is that the runtime system has to be able to understand it. If you give it something truly exotic it'll just throw up an error. OK. This is I think a really tricky thing to understand. You've got the files here, the resources here, and here you can do the same thing, you can create them, in which case it kind of works backwards, creates the resource and the file, or you can create the file and then assign the resource that you want.

User: OK so there are two resources now for this environment

Evaluator: For this learning object.

- User: And how does that learning object, oh, it does have open database technology, so this learning object is for this
- Evaluator: This learning object is in this environment in this unit of learning. Everything is in one unit of learning. All these files are in one Unit of Learning.
- User: OK
- Evaluator: Yeah? Do you want to bash on a bit and I'll...
- Comment: *The user here is seeking to edit the resources for a learning object, but does not understand how to do it. They are trying the 'file' menu (which does not help). They do not know how to create a new resource.*
- Recommendation: *As concluded from other interactions, editing of resources in situ should be made more transparent, and resource management aspects restricted to the Resources tab.*

6. Deleting default resources

- User: We've just discovered we can't delete that one
- Evaluator: Which one
- User..: If I add a new resource here...
- User: I found that before, I thought I'd delete that resource that I've just put in and I couldn't delete it.
- Evaluator: Is it because it's being used somewhere, that its checking. Could it be used in here, ... learning object.. Yes you might not be... no it shouldn't
- User: These resources are associated with these learning objects, aren't they. So if it was being used in here you'd still should
- Evaluator: You should be able to... It's just a reference. I mean it may be just a bug. So the bug, what's happening is you've opened the learning object, you've assigned some resources to it. You've created these.. Was this the one that was in there by default
- Another User: I couldn't delete the default one at all.
- Evaluator: So it looks a bit as if you can't delete the default resource in a learning object.
- Evaluator: I change the resource so its not the default
- Evaluator: Can you change its name
- User: I can change the name and I still cant delete.
- Evaluator: I think what it's telling us is that the application is built in such a way that you must have at least one resource for a learning object. And that rather than checking to see if there is one it says "I'm not going to let you remove this one, you must use this".

Comment: *ReCourse is constructed so that every learning object must have at least one least one learning resource. This makes sense, but caused this user problems because they were not aware of this principal.*

Recommendation: *Usability would be enhanced by including a message to tell the uses “you can't delete this because every learning object must have at least one learning resource”.*

7. Request for an inspector providing feedback on where elements and resources are being used

User: As you are completing it there is not like a list to say, like, this is what you have put in.

Evaluator: “You have done these tasks, now do these tasks”

User: Not necessarily, when we are in the environments we went into them and when you were like say editing we would forget what the environment was called. There was no list of things...

User 2: It was like when the thing popped up at the top, wasn't it, and it came up like that, and I got distracted momentarily, and I thought which one are we in. I couldn't remember whether I was in the intro or the discussion thingy. Obviously the tab thing obviously means something, but I wonder if it could have the actual name.

Evaluator: If you had given it a name.

User: Well we did, we couldn't remember that we were there.

Evaluator: It was this you were editing wasn't it. So that's the name of the resource. That's just telling you the file that you are editing back here. If you had built it the other way round, with a phrase or something

User: And given this a name which was more like these, then you'd know.

Evaluator: I'm not saying that this is “weren't you stupid not to realise” I'm just saying...

User: It's not the software that's the problem

Evaluator: No, I think it may be the software that's the problem, it's because we are thinking that way round rather than ...

User: If we'd labelled them properly in our own files going on, more meaningful names it would have been more obvious then.

Evaluator: This is a new thing that we've put in. Making it inverted commas easier, it sometimes creates problems, but if you impose the kind of methodology of creating the files first...

User: I guess what I was thinking was you create the environment, and we want these environments with this in the topic, and we forgot to tick these. But if it was listed here that this was part of this,

- have you done all these things, to check up. So you can't accidentally miss. Cos' we forgot to
- Evaluator: Well I'm surprised. You might want an activity that didn't have one, just the text environment "talk to your neighbours", then you wouldn't want one of these.
- User: I guess if there was like a condensed folder that popped up and said what was in it instead of having to click on all these...
- Evaluator: OK so you want a kind of cleverer inspector for things.
- User: You know, like when you click on a folder and it's all ch ch ch there
- Evaluator: In a way, I think that's what this is. That's the file structure, but that's not really what you want. You want something...
- User: Something that works just with that page.
- Evaluator: If you had something that was
- User: Oh, you mean then you could see if you had really forgotten to put something in it. Oh dear I've forgotten to...
- Evaluator: There is a window here that I haven't shown you, and I don't really know quite what it does, but he's tried to
- User: If there are six power points, how would I know that I uploaded?
- Comment: *ReCourse is a highly flexible tool, which enables the user to start building their UOL in any way which they wish. It does not impose an order of actions or a methodology on the user. This means that the users have to hold in their memory which actions they have completed, and what names they have used. This is not difficult for a user who knows their way around the application, but for new users it is challenging.*
- Recommendation: *The users requested support in seeing the state of elements, so that they can see, for example, if it has a role assigned, or an environment associated. Some functionality along these lines should be provided.*

4.4.2 The structure of IMS-LD

8. The nature of activities

- Evaluator: So where can you find where you've used your activity. Oh, going backwards?
- User: Yes 'cos I've, maybe I didn't plan it very well, but I know ... I suppose I could go in and have a look, but I'm not sure if I've actually used it, or if I've just created it and not put anything in it yet. Like a site map that says.... Because when you go to here I can see the widgets, but not the activities necessarily that I've associated with them, but I go to here don't I. Cos I've got my discussion forums. So my welcome activity. I thought I'd used that

- somewhere. Maybe I replaced it with a discussion forum. Maybe that's what I did.
- Evaluator: So what would help you here.
- User: Um. Almost, I mean I think this does it, but you're switching through almost a smaller hierarchical list I'd have "Welcome", and then all of the things associated with that. The problem with that is that it may get too big, that's the issue, and obviously I'm just learning. And I think what I did possibly is created this Welcome activity.
- Evaluator: What I've found helps a lot is that if you are more comfortable with the resources tab, to make sure that I make all the resources with sensible names. And then I find that helps a lot.
- User: Right, so that's what I've done. I've just created that, and I haven't used it, so all I need to do is plonk that on here... Teacher description... Which is fine.
- Evaluator: But hang on, we are in "Introductory activity" here, don't you want to be in Welcome?
- User: No, that needs to be changed. The introductory activity is actually a forum, so the name is not appropriate.
- Evaluator: OK so why don't you change it.
- User: So I will.
- Evaluator: But I mean, not change the name of the activity but change the... Or do you want to change the name of the activity.
- User: Yes because
Well maybe no, maybe do you call the Forum the activity, I suppose you do
- Evaluator: Its up to you, but you can change the name of the Activity or the name of the Play, whichever you want. In fact this, if truth be told, no, ignore that, whichever you fancy.
- User: That would make more sense from what I've said I need them to do. So, it's associated with... But they don't want that. Of course I have a .. of the environment don't I. Environments... It's good to have something in it, so I presume I put an Learning Object in, if it's just going to be a list of files.
- Evaluator: Whatever, it's going to need something in it. So learning object may just be...
- User: ..a placeholder. Environment...
- Comment: *This user thinks of the activities being associated with the widgets, rather than vice versa. She would like to have a list which shows in which activities her resources have been used.*
- Recommendation: *a) The concept of activities used in IMS LD (i.e. An action taken by a user) is different from that used in other contexts (for example in Moodle an activity is an opportunity for a user to do something,*

e.g. a wiki). This needs to be clarified in the documentation and in training.

b) An inspector which could show in which activities a resource is used would be a useful tool for authors.

9. Understanding the relationships of roles and acts

- User:assign a role to this act
- Evaluator: All you roles are here. You are trying to assign a role to an act, but you don't assign a role to an act, you assign a role to an activity. So you don't have any activities here, except a default one. But if we drag a default one on then you can assign all these to it.
- User: That's what I didn't do because...
- Evaluator: So you've created your roles, and they are all appearing here, which is a complicated set, lots of roles! But they don't do anything until you have some activities for them to carry out. So you have to define some activities and then associate the roles with the activities. Does that make sense?
- User: Right, yes, yes.
- Evaluator: These are the kinds of concepts that are hard to get your head around
- User: Yes, yes
- Evaluator: Very interesting for me to see the kinds of problems that emerge. Do you want any other hints now?
- User: No, it's OK
- Evaluator: Next thing to do is to set up some activities.
- User: Right
- Evaluator: This one's OK, so give it a name, edit... It says description, but actually its more like the instruction you're going to give to the learner. Set up a few of these and apply them...

Comment: *This interaction is an example of the kind of help which was given to users in the evaluation in order to understand the underlying concepts of Learning Design. Issues like this needed to be explained, but once clarification had been given the users were able to carry on working.*

Recommendation: *The documentation for ReCourse should focus on the small number of principal issues which cause confusion for novice users (for example environments, activities, roles, and the relationship between them). Appropriate error messages could also be of assistance.*

10. Adding files as resources

- User: So you were trying to drag files onto the resources, and you hadn't realised that they were already there. But then if it was really our own sets of files, we'd know that we'd already done that.
- Evaluator: They'd have more sensible names.
- User: Yes we'd know. They might have been like Word documents...
- Comment: *The Resources area was confusing for these users, and it was not clear to them if files had been added or not.*
- Recommendation: *It would enhance usability and clarity if the resource names generated by ReCourse were related to the names of the original files.*

11. Understanding the relationship between environments and activities

- Evaluator (1): How are you getting on.
- User: Not so well. I understand what I want to achieve. I've written down what I want to achieve... I've got an activity, and I've set a question. And the question I've set this activity. Now I want link to some resources to that activity.
- Evaluator (1): Have you got any environments here? The environments is where you create sets of resources, learning packs if you like, and they go in learning objects. You need to give the resources to the learning object.
- User: OK
- Evaluator (1): And then in here the activity in the environments you already have allocated it because by default there is only one environment, so it must be that one. So when the person gets into the activity they'll see whatever is in here. So in environments we now need to put into this the resources that we want. Either we assign them from here, which is what I did with the poems, or we edit it as a piece of HTML and put the links in here. Does that make sense?
- User: It does make sense.
- Evaluator: It's the idea that the files that you're going to use as your learning materials sit in the environment, not inside the activity, and then you associate the activity with the environment.
- User: Yes, that makes sense
- Evaluator: Partly because lots of different activities use the same environments, so you don't want to duplicate it all over the place.
- Comment: *The concept of environment is not intuitive to these users, but they do not have trouble understanding it once it is explained to them.*

Recommendation: *The authors of ReCourse documentation should be aware that this is a problem for users, as should organisers of workshops. The environment element is a basic part of IMS LD, and it is difficult to dispense with it in the interface. This may sometimes be achieved by creating a default environment for a new resource, but this creates the problem of*

- a) generating as many environments as there are resources, which is difficult to manage*
- b) makes it harder for users to make use of the clarity and reusability which organising resources and services into environments brings to IMS LD.*

Consequently hiding the use of environments in the interface is a strategy which should be used with care.

12. What is a learning objective?

User: I've got my activities and my resources, but what's a learning objective for.

Evaluator: The learning objective is so the learner knows what on earth they're doing this unit of learning is for.

User: So you are telling them what you expect them to gain from it.

Evaluator: Yeah

User: So it's a learning outcome

Evaluator: Or so another teacher knows what it was that you designed this thing for.

User: OK

Evaluator: What did you think it might be

User: I don't know. I think I just had an extremely long day and lots of 14 year olds that have given me a headache.

Evaluator: I'm glad it's not us! This is a holiday, is it, in comparison?

User: Java script and cascading stylesheets for 14 year olds. Anyway. Though I don't know, because for me the learning objective would be.. I think I was thinking learning outcomes... and even now I don't think it's fully clear in my mind exactly how these structures fit together

Evaluator: Just think of it as a kind of, you know, what you put on the front page of the course sheet.

User: Yes this is what we want to do. But who?

Evaluator: "Why bother?" is that the question?

User: Well no, because you always say to people "this is what we want to cover today, these are the aims or the objectives of this particular session. You would always say that to them and you would try to ensure at the end of that that you haven't just covered

- that but that they actually have coped with that and understand it. Which is fine but, its jut the way it sits on its own like this.
- Evaluator: I think the reason that it sits on its own like this is that when you've made your unit of learning this will be tagged up in the XML as the learning objectives. That means that any other application looking at this, say, can interrogate it and find out what the learning objectives are without knowing anything else. So when we keep this on a repository, then when you look at the repository and you find an object you can see what its learning objectives are, because we put this in as a discrete piece of xml. If it was just a piece of text you wouldn't know.
- User: No that's right, so it allows you.... if for instance you were going to make these into reusable learning objects, and then someone else comes along for something they can use, then they're going to use this list. Because this is what they will see you are hoping they will get out of it. So you don't even want.. It's not just a list of tags, it's more concise than that, isn't it. It literally is that this unit should at the end of the day have introduced A, B and C kind of thing.
- Evaluator: Yes
- Comment: *This user was in doubt about what exactly a learning objective is, and if it was the same as a learning outcome. This underlines the degree to which terminology which seems transparent may be confusing to users.*
- Recommendation: a) *An brief and easy to understand glossary of terms would be helpful. That developed in UNFOLD might be a good starting point for this.*
b) *'Learning objective' should be added to the list of user definable terms.*

13. Resources and environments

- User: And you could say “do the following portfolio activities”, and you would have support instructions in there. Well they might not need them, so they are simply available, and you might have three or four activities, each of which is a portfolio activity and at any stage those programming support files would be used for that and they would have to sit in the environment, wouldn't they.
- User 2: Are you grouping lots of things in sort of one environment. ...it always confused me
- User: Yes, that's what I'm saying, I think that's what's confused me, as to why I would want it.
- Evaluator: Why would you want what?

- User: And to be honest I've completely forgotten, completely forgotten where we put Dylan Thomas and his bits and pieces. I think that's probably what it is.
- Evaluator: We put him in here
- User: In resources
- Evaluator: We dragged the files on here
- User: Yes we did, and then we associated that with environment? Was it learning... I need a darkened room. Yes, OK. I think it requires more than half a day.
- Evaluator: Yes it does, its a day. I think its a day.
- User: And also it would be really helpful to say if you are going to do this you need to produce yourself a little course and the resources you'd like to be made available, and then come and build the unit with materials that you know, with a plan in mind, because to do it off the top of your head is quite difficult.
- Evaluator: I think if we were, if we actually going to use this with learners that's what you'd do. Or were even thinking about it. I felt a bit hesitant last week, it's already a big favour for people to come and do stuff.
- User: No no. I mean I was highly tempted to go on the web and just nick some of the database stuff and put that in, because that's what we've already developed and most of the stuff was there, and then you'd identify gaps, because this gives you much more functionality doesn't it. I guess captivate and stuff like that you tend to use.
- Comment: *These users are confused about the role of environments, and observe that ReCourse would be easier to work with in the context of an authentic teaching task, where real materials were available to be used.*
- Recommendation: *Where possible training in ReCourse should include the preparation of materials as an initial stage. In the documentation suggestions should also be made about preparing materials in advance.*

14. Failed to associate an environment with an activity

- User: So we thought we had got it all right, because we wrote text in, and we thought it was and when we checked it... and we know we wrote some learning objectives,
- Evaluator: but for some reason they are not showing up.
- User: So we have gone wrong somewhere along the way.
- Evaluator: Well I'll have a sneaky peep at your UOL and work out what it was that has gone wrong.

- User: Because of time constraints we put two acts in, but we deleted one so that we could get all our green ticks. We wrote text in there, and assumed that that would be the text that would come up.
- Evaluator: Which one
- User: That one
- Evaluator: Brainstorm project ideas, environments... You haven't assigned the environment to the... Which I'm sure you would have figured out if you had a bit more time to look at it.
- User: So that was the only thing that was missing. All the text was put in the right place it was just checking the box.
- Evaluator: I guess so. Do you want to see if it works? No, you need to get away.
- User: I guess if you were sitting around doing that you'd be reading the user manual anyway wouldn't you.
- Evaluator: But also I've found myself learning it, you just need a few hours to mess around and think "Why didn't that work" and check through everything
- Comment: *These users successfully built and published a UOL, but had not linked an environment with a learning activity. This is an example of the non-intuitive nature of environments. They had created the activities, and were not conscious of the need to do any more.*
- Recommendation: *The provision of an inspector of some sort which could indicate when an activity has no environment would help with this difficulty.*

15. Managing completion conditions

- Evaluator: So was there a problem
- Eval2: It was the act, where was the completion for it, it was here, he had "when the following has been completed, but not any (conditions???)".
- Evaluator: I found the completion a bit tricky sometimes, because you have to get a lot of different things right in different places. It's not really hard, but...
- Comment: *The problem here was that in order to make the completion conditions work by users indicating completion, you have to give either the teacher or the learner the ability to indicate completion. Some users did not see that this would be necessary, assuming (presumably) that this would be done automatically.*
- Recommendation: *If practicable, this problem could be resolved by flagging to the user that they have created an inconsistency between completion conditions.*

16. Completion, and relative and absolute time

- User: So what I need to do is take it off that and put it on there, which is fine.... So user choice, then
- Evaluator: That means choose to click that you can go on
- User: Right so this then would be appropriate to say to them, you've got a week
- Evaluator: a week
- User: So what's months
- User: So why isn't there a week in there
- Evaluator: Cos you've got days
- User: Can I type... Hours and minutes even. So if you do that then how does know... Does it do it from the first time you go in, it gives you exactly seven days.
- Evaluator: It'll go from when the unit starts running, from when you make it available to them.
- User: Right so its not to do with when they log in, its to do with when you free it up, when you post it to them.
- Evaluator: Yes you say, I've launched this course, you have eight days...
- User: So, how do I do this? It may already be in there, but how do I do this so I don't make it available yet. So if say the welcome activity is the first week...
- Evaluator: It becomes available when you set up the run, so you put it on the server, but it's not available. You click "start a run, and it becomes available"
- User: But that's the launch of the whole unit, isn't it. But what if this unit is going to run, so I can't have this play as my whole course.
- Evaluator: Yes you can.
- User: But if I do that then how can I say that I don't want it to start until a week after I've started the unit
- Evaluator: Your first one lasts a week, then the second one will start a week into the course, so longs you have put the first one, you've got "when the following has been..." completion rule... um... why have we... Oh yeah, the activity isn't it. If the activity in the first... if this activity discussion forum has a week to go, then it'll delay the..
- User: Right.
- Evaluator: So long as you've clicked all the completion conditions. Because unless you click the completion conditions everybody can see everything.
- User: Well that's right, yes
- Evaluator: So you have to put completion conditions here.
- User: But that does mean then that if half way through your course you've just got something you want to last a week, and it needs to start at a particular time, there's no way that...
- Evaluator: If you just put the completion conditions for the teacher, say, click and go on, then you can.. Because it will go through the acts

sequentially. So if the one before the seven days says “don't complete this until I tell you so” then you've solved it.

Right. It's a bit messy that bit isn't it.

Evaluator: It is messy, but

User: If you're running this a number of times, then you're relying that the teacher is not going to click it by mistake.

Evaluator: Well either you want it controlled by time, or you want it controlled by somebody saying “do it”.

User: I think if I wanted it controlled by time then I'd want to create a schedule in one place so I could see all the acts and all of those time constraints for all of them and be able to adjust those, so that I know when it starts. Because again you then.. otherwise you are kind of bounded to potentially not starting just before you use it, if you don't really want it that structured.

Evaluator: A time line might help, just being able to drag it. I think what you are saying is confirming my instinct that this is an area...

User: I think what I'd want is a timeline, and I'm quite happy to put all that in, but there would also want to be able to say, even if I say this is available, actually don't start it until this date. Because assuming that you are going to be available to make something at exactly the right date is a bit of a pain, whereas if you say right I'm happy this is done but I don't want it published until. You put that date in, and all your other constraints remain...

Evaluator: Trouble is that it can't be a date. It has to be a length of time, because it is general. You see what I mean.

User: Yes

Evaluator: You want it every time you publish it you want it to work. You can't be general and specific at the same time.

User: No, I'm not seeing this as a template, I'm seeing it as a single run. It's not going to make sense. There's no way of, when you do decide to run it, that that one event you can actually have something which says “this starts on this date”.

Evaluator: You could design, you could change the system so that you could type in the day, I suppose...

User: I'm asking for a lot

Evaluator: Even then the logic of this is that it is design once and run a number of time

User: OK

Evaluator: Unless you do something like I said “don't start this until I tell you to, watch out for the forum”. You know, which is actually what you'd probably do.

User: So potentially what you could do is have an extra user, and the user would be the person in overall charge.

Evaluator: That's the kind of supporting role that you would have.

- User: So you would publish it ready, but you would be the only one who could access it. You could have a welcome to the thing, this course will start on... And then the over-arching user is the only one who can click to say that this has started.
- Evaluator: That is the kind of thing you can do, yes.
- User: So long as they don't get run over by a bus... Yes I think that is the problem, not thinking of this as a template.
- Comment: *This user is thinking in terms of specific runs when designing their Unit of Learning. They do not find it natural to think in terms of a plan which can be run a number of times, and do now understand why the scheduling must be done in periods rather than by dates.*
- Recommendation: *IMS LD was designed to create plans which can be reused, and this is also the aim of ReCourse. Consequently it is not appropriate for ReCourse to change this focus (although other applications could). This conceptual difficulty should be clearly and simply analysed in FAQs, training materials and workshops.*

4.4.3 Provisioning and workflow

17. Splitting the course into sections

- User 2: Typically because we would have like a 24 week course, and then you might have three things going on per week, and within those things you might have three acts a week p'raps even, that's a lot of things, so if you had all your things rolling down there imagine how many you would have.
- Evaluator: You can nest these things. You can have a UOL inside a UOL which refers to another
- User: OK, so there are slightly tidier ways of doing it.
- Evaluator: and you can have different plays, but yes I see what you mean. There is a limit to how many files you keep in your head.
- User: I think I would go a little bit mental if I tried to put my entire lets say first year module on that because that'd be, there's three sessions a week, four tutors involved, I think you'd have to be quite a good user of that to do that. Whereas it might be better for the play to be week one, then the acts in it are session one session two session three. It'd be too complicated to have the whole module as a play for someone who wasn't a very sophisticated user of...
- Evaluator: I don't know, it would be nice to be able to do them... Perhaps 500 activities, in a module that went on that long with that number of people, plus two sites... I guess it depends how complicated the thing is that you're doing. Maybe that can be advice for people who are at different levels of ...
- Evaluator: You can organise these things in folders. That's fairly easy.

- User: Yes that's something we were asking about.
- Evaluator: That's fairly easy.... can't be same, I'm putting it in the wrong one.
So you can organise this
- User: Yes that would help...
- Evaluator: You would have week one, week two...
- User 2: You'd have to do it like that wouldn't you to make it
- User 1: Possibly
- User: You'd end up with a lot of environments though, because you have to create them all on one...
- User 2: Yeah
- User: So I mean, like, would you run out of space?
- Evaluator: Yes
- User: Because it
- User 2: When you create the environment you have to create all the environments on that screen. So say you had a lot of acts. You have to have all these environments...
- User 1: So would it, you know, help that they just go over the top of each other, or would it just scroll down, so you'd have more room.
- Evaluator: I wonder if you can do this, no you can't.
- User 2: You'd be scrolling for ages, because you can't see them, and you might think you'd lost them. In a normal sort of screen you'd be used to seeing a scroll down thing. As an uninitiated person I wouldn't know, I wouldn't even have thought of dragging them down. But if I'd seen a scroll down bar I know what that means.
- Evaluator: You used to be able to but you can't at the moment. I think that the idea is that you'd have a bank of these over here. Ideally what you'd have, what would be really nice would be, as you do with any huge document would be to do it in bits and then concatenate at the end. I suspect that this tool doesn't do this, in which case your comment is absolutely right.
- User 2: It'd be like "where's that box", and zzzzzzzzz.
- Comment: *These users identified a problem with the practical use of IMS LD with the current infrastructure, i.e. that the need to provision multiple UOLs over the length of a course is a major task, while creating a single large UOL reduces flexibility.*
- Recommendation: *This problem can be overcome by means of a link tool, as discussed in TENCompetence on other occasions. This would enable users to have access to a UOL, and to register on it themselves. The comments of these users, and others at the session, suggest that this should be a priority task.*

18. Need to assign teachers to learning activities

- User: The other thing that confused me a little bit with the Dylan Thomas one I was only seeing one thing, and I thought that there were more things that I'd added that I couldn't see, and you certainly had more. But you kind of whizzed on and I didn't get round to mentioning that. When I logged in I didn't see what I thought I ought to see. That's all I got.
- Evaluator: So, OK, run... support activity...
- User: So I'm assuming that I accidentally only allowed them to do one thing each, and I hadn't realised I'd done it.
- Evaluator: Yes and the other thing you can do, is if you put the condition for this, that is you can't see anything until the teacher has clicked it, but you don't allow the teacher to click it then that would do it.
- User: Yes, that would be why. Where's it all gone.
- Evaluator: You see you would be expecting to find a little box here, when this activity is completed. But that's my guess that this is what's happened here.
- User: That could be really disconcerting for the students.
- Evaluator: What, that you don't see anything else below?
- User: I think that if there is anything else it might be nice for there to be a text that says you know, this module is released in portions, and this activity will be released in a certain amount of time or something. Because I went on that and I thought Oh crap, I've broken it.
- Evaluator: You could have some greyed out ones.
- User: Well yes, so that they know its there but they can't access it. Because that doesn't look like its working properly. And I'd ring up and say I don't really know what I'm doing.
- Evaluator: Well You'd probably want the first activity ...
- User: The support activity would need to say, the first learning activity would say... You see I thought I'd said
- Evaluator: You haven't given the teacher access to the learning activity, you see, that's something that I think often do. You assume that the teacher will have access to the learning activity.
- User: Oh you assume that Louise
- Evaluator: Louise is the teacher
- User: No, no, Terry is the teacher, Louise is my student
- Evaluator: No, Louise is the teacher, because you've made her a teacher, 'cos she's here as a teacher
- User: How do you know she's a teacher
- Evaluator: because if you enter as Louise again, Log in..., It says Role teacher. So you must have assigned her as teacher.
- User: Oh, so I did. I couldn't remember who was who.
- Evaluator: That's why I always give the name the same letter.

- User: So if the problem is allocating her
Evaluator: but you also haven't given the teacher the learning activity. You haven't made them available to the teacher.
- User: No
Evaluator: Which might be good, I mean maybe the teacher doesn't want to know what is going on.
- User: Yes, it said participant, and I thought the teacher isn't going to do this, she's only going to look at it.
Evaluator: Yeah but you have to
User: So do they have to, they don't have to be a participant and everything. Well in the forum if they can manage and so on then they can. But the forum would be OK, but any learning activity, unless you tick the teacher for that learning activity they won't be able to see it.
- User: Right. Obviously. Stupid woman.
Evaluator: Well no, not obviously. We assume that the teacher does the teaching, and that what they do is a learning activity and so therefore it can be seen. But that's not how it works in this.
- Comment: *When they had published their UOL, these users assumed that the teacher would have access to the whole UOL, even if the teacher role had not been assigned to activities. Once this was pointed out the user it became clear to them.*
- Recommendation: *The documentation and workshop materials should clearly and briefly analyse and explained that the teacher does not have access to activities unless they are explicitly assigned to them.*

4.5 Evaluation instrument

I have read this form, and I give my informed consent to participation in this evaluation of ReCourse at Liverpool Hope University.

Name (please print)

Date

Time:

Signature.

Appendix 1: Instrument used at Liverpool Hope University, July 14th 2008

ReCourse evaluation, Liverpool Hope University, 14th July 2008

What is ReCourse?

- ReCourse is an application for creating lesson plans, called Units of Learning (UOLs)
- The plans can then be uploaded to a server which coordinates the lesson activities, and makes sure that all the participants have access to the right resources and services at the right time.
- The format of the lesson plans which ReCourse generates is IMS Learning Design, an open specification for defining and exchanging Units of Learning.

What is the session trying to achieve?

- IMS Learning Design provides teachers and course planners with us much flexibility as possible. As a result it can be rather confusing to use, with many elements and properties which need to be set. In creating ReCourse we have tried to make this process as simple as possible. In this session we will evaluate
 - How far we have been successful in making an IMS Learning Design editor which teachers can use
 - Which parts of the application users find difficult to understand, and why

In participating in this evaluation you will be asked to:

- Listen to an explanation of the application
- Create a UOL with guidance
- Try to create a UOL of your own
- Take notes on the problems you experience and things you do not understand
- Explain the problems you experience to an evaluator. When convenient we will make an audio recording of the key points as you explain them.
- Fill in the evaluation form at the end of this document

What are the evaluators expectations for the session?

- This is the first session of its type that we have carried out. We don't know how difficult the activities will be for people who don't know the application. We will be delighted if you manage to make new Units of Learning which will load onto the server, but it is not a problem if you do not.
- The important thing is that we capture the problems which appear. As you are listening and working, please take notes so that you will remember the things which you found confusing or did not understand. The people running the session will be coming around to help you and will record the problems which you are experiencing.
- The evaluation form, audio recordings and the evaluation report will be anonymous

How the session will be run (approximate timings)

15 m.	Consent forms, personal introductions, introduction to the session
45 m.	An input session, providing an introduction to ReCourse, and a practical guide to its functionality.
60 m.	Guided creation of a Unit of Learning
15 m.	Coffee Break
10 m.	Planning a Unit of Learning with paper and pencil
75 m.	Building a simple new Unit of Learning, with at least <ul style="list-style-type: none"> • two acts • two environments • two roles • one service
20 m	Uploading the new Unit of Learning to the server, and running it.

ReCourse Evaluation at Liverpool Hope University, 14 th July 2008									
User feedback form									
How to fill out this form. Please indicate your agreement or disagreement with the statements on the left by putting a cross in the appropriate box of the five point scale to the right									
1.	<i>General impressions</i>								
	I enjoyed using this software	Enjoyable							Not enjoyable
	The software was easy to use	Easy							Difficult
2.	<i>To the extent that you had difficulty in using the software, please indicate in which areas you had problems, and to what extent.</i>								
2.1	I had difficulty understanding what the different menus and windows were supposed to do	Not a problem							A major problem
2.2	I could not find my way from one part of the application to another	Not a problem							A major problem
2.3	The terminology used by the software was confusing	Not a problem							A major problem
2.4	I didn't know what to do next to build a Unit of Learning	Not a problem							A major problem
	I didn't know how to make the elements I needed to build a Unit of Learning	Not a problem							A major problem

2.5	I didn't know how to set the properties of the elements of the Unit of Learning	Not a problem						A major problem
2.6	I had problems managing the resources for the Unit of Learning	Not a problem						A major problem
3	<i>Building a UOL</i>							
3.1	I successfully created a Unit of Learning	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>			
3.2	How often did you need to ask for help from the session organisers?	Never						Continuously
3.2	I can imagine that I could use the software in future by myself	Agree						Disagree
3.3	I can imagine making use of the software if I had support	Agree						Disagree

Please look at your answers to questions 2.1 to 2.6.

a) If you had a difficulty which was not covered in questions 2.1 to 2.6., please write it down here:

b) If in your answers to you questions 2.1 to 2.6 you have indicated that you had problems, please add any comments which may help us to understand your difficulty more clearly, and any suggestions for improvements which you have. Please indicate the number of the question which you are writing about.

Please briefly describe any aspects of ReCourse that you particularly **liked**. This includes the purpose, functionality and interface of the application.

Please briefly describe any aspects of ReCourse that you particularly **disliked**, and any suggestions you may have for improvements. This includes the purpose, functionality and interface of the application.