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## **Content-Development Methodologies Survey**

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***eContentplus***

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<sup>1</sup> OJ L 79, 24.3.2005, p. 1.

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1	Wirtschaftsuniversität Wien	Austria
2	The Open University	UK
3	University of Cyprus	Cyprus
4	University of Leicester	UK
5	Open Universiteit Nederland	Netherlands
6	Jyväskylän yliopisto	Finland
7	IMC Information Multimedia Communication AG	Germany
8	Tallinn University	Estonia
9	Chambre de Commerce et d'Industrie de Paris - Hautes Etudes Commerciales	France
10	Jožef Stefan Institute	Slovenia
11	National Centre for Scientific Research "Demokritos"	Greece
12	Groupe des Ecoles des Télécommunications	France
13	Universität Wien	Austria
14	Universidad Carlos III de Madrid	Spain
15	Akademia Górniczo – Hutnicza – University of Science and Technology	Poland
16	Kauno technologijos universitetas	Lithuania
17	Knowledge Markets Consulting Ges.m.b.H	Germany
18	Høgskolen i Oslo / Oslo University College	Norway
19	Synergetics N.V.	Belgium
20	Giunti Interactive Labs S.r.l.	Italy
21	Katholieke Universiteit Leuven	Belgium
22	Umeå University	Sweden
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## **Abstract**

This paper presents a qualitative survey of methodologies and systems which are used for “content-development for reuse” within the ICOPER best practice network community. It aims to outline the key topics represented in this community, that illustrate a small set of best practice issues for developing educational resources open for remixing and repurposing, tailored to the European dimension. The survey is structured by the existing view of quality standards in the area of e-learning such as ISO standard guidelines, and by a simple thematic analysis methodology. Each topic used in the survey is clearly thematically present in some parts of the ICOPER community, but not consistently for all of the issues that we would have expected to see. For example, whilst the standards theme is not well represented in the case studies of this community, the sub-topic of ‘rights and licensing’ is clearly very important. It is clearly that case that most content development in this community is still driven by ‘first use’ design, rather than by ‘reuse’ principles.

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## 1. Introduction

The purpose of this document is to survey the best practice experience of content development for reuse within the ICOPER community, henceforth CDfR. The survey work took place during late 2008 to early 2009. ICOPER partners have described their experiences of producing either content or tools for reuse.

This document outlines the wide variety of those experiences, describing the emerging best practices and highlighting recent examples of the work driven by concrete experiences in the working case study examples of this community.

Why is this a challenging topic? An informal survey of partners conducted via extensive email exchanges at the start of the ICOPER project indicated that there was very high awareness of content development issues with respect to any content's first use, but 'reuse' thereafter was often not considered in depth in many projects.

An extensive literature exists on the 'design for usability' of educational materials of all types and varieties. Design for use vs design for reuse is echoed through the (recent) history of the concept of a 'learning object' (e.g. Wiley, 2000); and there is even a variety of ideas around the development of standards for such things (e.g. Pawlowski, 2002). Historically, the 'learning object' literature focuses on the effective design of objects, that can be treated as objects that can be reused (e.g. JISC, 2004). This literature has commonly focused on the concept of the object, assuming that the 'objective' treatment alone will encourage and in some way 'support' reuse. This suggests significant reason to believe that creating learning content in 'object like' chunks is not in itself leading to greater or more effective reuse. In his article on 'Design, Standards and Reusability' (Downes, 2003), Stephen Downes argues that standards based projects like SCORM and Learning Design should be providing a benchmark in helping the creation of reusable materials, but that they are demonstrably failing to do so. Downes provocative thesis notes that from some commentators reusability may be intrinsically flawed.

*"... what we are after is not reusable objects, but disposable ones. This, it seems to me, is the approach favoured by more and more institutions and corporations, as they begin to look at an instructional design system, not as a means of reusing objects, but as a means of producing them to be used once, then discarded". (Downes, 2003).*

Downes does not associate himself with this view. Indeed few researchers in this field are ready yet to embrace this challenge, and to so readily discard with their 'created content' the concept of disposable instructional design. Instead, it is more usually argued that effective 'design for reuse' will allow for the creation of material that is 'from first principles' more suited to being applicable to different contexts, users and uses.

In this survey we sought to explore this issue to capture, from the concrete case studies of the ICOPER community, the issues that need to be addressed in order to outline the 'best practice' of a Content Development for Reuse (CDfR) methodology.

In this report the term reuse is based upon the work of Wiley (2000) with respect to Open Educational Resources (OERs): thus "reuse" can be seen in terms of using material as-is; a second version of reuse is "reworking" where a learner or educator might download materials, adapt them slightly and make small changes; alongside a third version of reuse: "remix" whereby a user takes materials and substantially changes and/or adds to them.

## **2. Methodology**

The intent of this survey was to capture the existing practices within the ICOPER community with respect to ensuring that when content is created, the reusability of that content can be enhanced. We aimed to provide a picture of how partners are currently approaching the area of content reuse, and describe whatever they consider to be best cases in their creation practices for new content or tools in this area of eLearning. Such information will inform future eLearning content and tool development with a special emphasis on the role of standards and issues related to interoperability and reuse of content.

### ***Phase 1: Methodology Selection***

In order to explore the appropriate methodological framework for this survey we asked each partner to complete two “Content Development for Reuse (CDfR) Templates” (see Appendix A). The template collection phase was designed to capture a core set of ICOPER community topics related to the use of standards and other eLearning specifications in the partners’ experience as well as establish how content or tools were being used to redevelop and disseminate eLearning educational materials. The templates were then used, in negotiation with partners to identify a key sample of contributions towards this issue. All communication at this stage was via email and document exchanges. A repository was provided via the EducaNext platform (<http://www.educanext.org>) to allow participants to upload supporting documentation and other materials for the templates regarding candidate case studies for this work. Some case studies provided only a little supporting data, whilst others such as the UKOU OpenLearn project had very detailed CDfR related supporting materials.

Had a large proportion of partners identified a strongly overlapping set of common themes, we would have designed an appropriate quantitative instrument, such as a set of questionnaires to explore the issues over a large group. In fact, a smaller number of partners with relevant case study data, with initial topics over a diverse set of issues was identified during this phase. This required the design of a more qualitative set of instruments.

### ***Phase 2: Sample Selection***

Interviewees for the in-depth qualitative process were selected based on the relevance of the case studies they represented and the issues they raised to the ‘development for reuse’ concept. We also used a threshold for participation based on the quality of the evidence that they could contribute to any of the common themes identified in the two template refinement iterations.

### ***Phase 3: Topic Refinement Interviews***

The ICOPER community of 23 was reduced to some 16 who were invited to a topic refinement interview, of which 14 were successfully completed before 2009. All interviews were conducted using online technologies where available; this was mostly via the EATEL FM service (<http://fm.ea-tel.eu>).

There was a special emphasis in gathering information pertaining to the adoption of quality standards in the area of eLearning. Both the templates and the interview questions were based

around the structure proposed in the ISO/IEC 19796-1:2005 (Information technology for learning, education and training – quality management, assurance and metrics). This not only guided the creation of templates 1, 2 and 3 as well as the questions asked during the interviews but underpins the entire investigation into the area of content for reuse. However, the ‘topic refinement stage’ was aimed at extending the parameters of the enquiry, from these core themes to additional ones, which were emphasized by interviewees.

#### ***Phase 4: Thematic Interviews***

The ‘topic refinement’ interviews were used to structure the subsequent common thematic interview format. Having refined the structure and topics in our survey methodology, 12 of the 14 community sample then successfully completed the formal thematic interview in 2009. Two participants withdrew their case studies from this process.

This second investigation, conducted 2-4 months after the first, was a formal semi-structured interview lasting approximately 20-50 minutes.

A list of interviewees and their organisations can be found in Appendix B.

#### ***Phase 5: Thematic Analysis***

All interviews were transcribed and coded by the coordinating author according to the core themes established in Phase 2. Thematic issues were grouped together; again using the ISO/IEC structure to evaluate the evidence that the ICOPER community surveyed could bring relevant experience to each of the CDfR issues. A discussion of these findings makes up the body of this report.

#### ***Key themes of the survey***

Each partner was requested to describe one or more projects that they felt met the criteria of “content for reuse” and that might act as a detailed ‘case study’ for this survey. Some partners offered information about e-learning tools, whilst others described primarily content-based areas. Some partners were able to describe both categories: tools for reuse and also content for reuse. The following five themes were highlighted in the initial ‘phase 1’ survey:

<b>Best practice in the area of content for reuse</b>	Interviewees were invited to describe this main theme in relation to their chosen project(s). Examples were gathered from all participants.
<b>Technical features (design and methodology)</b>	All partners described how their project(s) were developed as well as giving examples of the original design specifications and methods used to develop either their tools or contents for reuse.
<b>Licensing &amp; policies</b>	A number of issues were explored in this area. All partners described the relevant licensing agreements that were associated with their

project(s). A variety of licenses and agreements were outlined.

### Standards

Each partner was also invited to describe what standards had been adopted or adhered to when developing their project(s). A range of standards were described.

### Teacher/Learner Support

Examples were gathered from all partners illustrating how both teachers and learners were supported whilst using either the eLearning tools or content in terms of reuse.

### *ICOPER partner case-studies*

The following list outlines a short description of the projects surveyed alongside the names of the originating ICOPER partner institutions or companies who participated in this survey of content development for reuse methodologies:

<b>Project title</b>	<b>Short description</b>	<b>Audience, Target group</b>	<b>Partner</b>
Adaptive search engine	Personalisation: searching for learning resources (tool)	Students	University of Leicester (UK)
author 42 & Media library	Authoring software & digital library (tool)	5 author roles, from producers to users	Humance (Germany)
SIMAR	Teaching marketing using Competitive simulation scenario software (tool & content)	Masters/MBA students	HEC (France)
EMERGO	Methodology & generic toolkit for games (tool & content)	Education providers using game based learning	Open Universiteit Nederland (Netherlands)
Lecturnity	Recording Tool for Lectures, e-Lectures Portal (tool & content)	Lecturers as authors; students as end users	IMC (Germany)
OpenER	Open content repository (content)	Open Content Community,	Open Universiteit Nederland (Netherlands)

		students	
OpenLearn	Open content repository (content & tools)	Open Content Community, web users, learners, educators, educational institutions, professional agencies & institutions, commercial companies	The Open University (UK)
PHAIDRA	Digital asset management system (tool)	All University members, all University students & guests.	Universität Wien (Austria)
PowerTrainer	Authoring technology for interactive content (tool & content)	HR Professionals in company training departments	IMC (Germany)
Widget integration	Extended reusability of contents by means of widget integration (tool)	Media specialists, Teachers, Learners, Tutors, Learning advisors, Bloggers & social networkers	Giunti Labs (Italy)

### 3. General Survey Thematic findings

Best practice in the area of content for reuse appears to emerge over varying time-frames as well as in a variety of wide ranging educational scenarios. There does not appear to be a “one size fits all” answer to either the development of educational tools or content for reuse purposes. It is important, therefore, to gain an understanding of the many different aspects of developing such tools or content for reuse, for example, the intended target audience; acknowledge their expectations (which may be known or unknown); provide clear guidelines for licensing; establish baseline standards to enhance interoperability opportunities; present appropriate training and encouragement to share with fellow interested parties. These appear to be the key elements emerging from this survey that help to promote a thriving and open education-based community that reuses both its tools and content.

There were 7 “general themes” coded from the ICOPER community sample. These included: understanding your audience, where many different user categories needed to be taken into account for effective design for reuse; attempting to meet the expectations of a wide variety of users, in that perspective; providing appropriate ‘accessible and reusable’ tools in any system; offering relevant accessible and reusable content; supplying clear licensing details – ideally as open as possible; adhering to current interoperability standards where appropriate; and fostering a community of practice for learners and educators, in the tools and systems produced.

#### ***Who is the audience? The context and scenario***

Each ICOPER partner project had a different target audience but there were similarities across partners, namely that content producers were either educators or media specialists and that end users were either commercial professionals or students at higher education institutions.

The following topics from the ICOPER interviews with project specialists outline the variety of contexts, different scenarios and audience members that together form the content for reuse community:

*“three distinct groups ... there’s an overlap between (them) ... (a) group which ... actually are people who are interested in the whole process of what you need to get involved in (to develop) ... educational resources and research time ... Then there’s... ‘educators’ ... people who are looking for materials, looking for things that they can use to help other people learn and ways they might operate in the new... aggregated world where they define very good results as being available on the internet either through an open education resource or just out there in the world in the education community. And then there’s the learners ... (who) come to us because they are interested in a subject”. (McAndrew, OpenLearn)*

Equally, however, the same project partner also suggested that:

*“The use side is a very tricky area to report ... it (is) very hard to track what use is going on but it’s labelling and feedback models, sharing the models on how things were used, just recording incidents ... so that people can see from an analytic stage ... about what is happening with the materials”. (McAndrew, OpenLearn)*

This highlights the importance of project reporting mechanisms, feeding back the findings of such work and helping to promote best practice to the wider community. Other interviews described different scenarios for their content and tools. The University of Vienna, for

example, offers the PHAIDRA (Permanent Hosting, Archiving and Indexing of Digital Resources and Assets) service to:

*“(the) target group ... consists of all the people who go to our universities or who study at our universities. So every single student, as well as every teacher, every researcher, but every other person who has some kind of contract with the University of Vienna is allowed to upload digital objects into the repository”. (Oberheumer, Universität Wien)*

In contrast the Humance company, offering the author42 software and media library, suggest that:

*“The audience for this tool (is) ... mainly ... companies who need to develop some sort of learning courses for their employees”. (Fischer, Humance)*

Additionally the same interviewee also suggested that:

*“there are all different kinds of authors ... teachers maybe who are making courses for their students ... authors from companies who make courses for their employees, and... further education (learners)”. (Fischer, Humance)*

Some ICOPER community partners offered statistical evidence of who the end users were, how they used the tool(s) or content offered and also an indication of “engagement” with those tool(s) or content. The OpenLearn project (The Open University, UK), for example, had noted that it had experienced: 3 million unique visitors; 75,000 registered users; 69% of visitors from outside the UK; and a number of emerging formal partnerships or collaborations.

Data collated by OpenLearn over a one year period, for example, showed that 35% of visitors returned to the site and 50% of repeat visitors were ‘new to the OU’, meaning they had never signed in to the OU main website with an Open University username.

It was also recorded that at least 4,400 people by April 2008 (growing to over 7,000 by November 2008) had registered on OU courses in the same online session that they were on the OpenLearn site. In this respect engagement was a key factor: as a visitor who had used both the LearningSpace and LabSpace of OpenLearn was five times as likely to register.

### ***Meeting user expectations***

The Survey of Content Development for Reuse Methodologies also revealed that end users of educational content or tools had varying expectations of them. More than one ICOPER project partner indicated that frequently their end user’s objectives and needs were often different, for example:

*“...the mismatch between the users goals and needs and the results returned by a search engine (for example) ... we identified underlying reasons ... technological ... metadata ... (as well as) ... formulation of search queries”. (Law, University of Leicester)*

Thus indicating that not only was there an inequality in the user’s expectations but also that the producer (in the previous example a personalized search engine) must attempt to anticipate fundamental and essential causes to allow the end user to make their own good sense of the educational content or tool before attempting to reuse it.

In terms of meeting producer expectations another ICOPER partner suggested that it was valuable to share the less than good practice too because the failed challenges were as important to understand as the successes:

*“In saying best practice, I think we’ve also got to pick up on the war stories as well ... (that is) what you’ve been finding particularly difficult (to do)”. (McAndrew, OpenLearn)*

Searching and finding appropriate educational tools and content for reuse to meet set learning objectives also emerged from the survey – again as a strong expectation on behalf of the learner or educator that discovering their intended tool or content should be easy:

*“... searching is quite a significant component for the individual learner, especially as they (spend) ... a lot of time to find the relevant stuff to support their learning goal”. (Law, University of Leicester)*

The same partner also remarked that:

*“... lessons learned are also about how to enable users to formulate the search query. ... for those who are very experienced in searching learning resources, they can be very effective or efficient to locate the learning resources they need, but for the novices, they may type too general (a query) ... (and so) they will get hundreds and hundreds of learning of the items returned by the search engine. So the skill of formulating, their search query, can be one of the things we can train the students or the novice learner (to do)”. (Law, University of Leicester)*

This highlighted what many other ICOPER partners also had noted - how the actual content or tools for reuse are presented to the end user is most important.

Another user expectation that transpired from the survey was the probability that there would be breadth and depth of educational tools or content available to the end user. One example:

*“... there is a whole range of disciplines covered by Educanext, but the number (of materials) ... for (each) ... discipline is rather uneven”. (Law, University of Leicester)*

### **Reusable tools**

The survey of ICOPER partners who have created educational tools for the purposes of reuse indicated that there was established and emergent best practice. There are many different measurements or evaluations produced, some with an academic basis and others either anecdotal or peer-reviewed.

One ICOPER partner, for instance, confirmed the importance of referring to other projects:

*“... extract or reuse the best practices and the know-how that emerges from ... other project(s)”. (Parodi, Giuntlabs)*

Another ICOPER partner concentrated on the re-usability aspect of the educational tool:

*“(the software can be) ... re-programmed in different kinds of environment ... a certain number of extensions made to it and the simulation which at the beginning was intended for mainly marketing strategy became a kind of general competitive simulation which could be used for marketing but also for general management ... not only for business student but also for example, for engineering student”. (Klein, HEC)*

Thus emphasizing the significance of flexible tools that can be reused in a variety of educational or subject environments. This idea led to another significant and emergent feature of reusable educational tools: the adoption of web-based delivery for the tools.

*“... web-based tools, so you can enter author42 just with the browser and develop the courses”. (Fischer, Humance)*

Indeed, the experience of many ICOPER partners collaborated this idea of creating easy access to tools; a simple learning curve and accessible training materials to support the tools’ use. (Section 8 outlines teacher/learner support in more details)

### ***Reusable content***

Educational content covers a vast range of subject areas across the Higher Education sector. Equally reusing it can take the materials outside of the HE sector into the commercial arena. ICOPER partners produce content that can be used in both areas. With reference to reuse of such content, however, some references were made to the type of content, how it was created and suggestions about the intended audience and implicit pedagogical method therefore adopted to suit that method may have a bearing on its ease of reuse in other arenas. For example:

*“...(referring to the Massachusetts Institute of Technology MIT) In terms of the usability or reusability of some of their material, then in some ways I think its less... its more limited than it is for us (OpenLearn), in terms of self study material. By that I mean going back to the fact that the university writes materials which are meant to be open access for self study”. (Lane, OpenLearn)*

This clearly indicates that the form and style of the content can have an influence upon its potential reuse. Whilst lecture note equivalent materials are useful, materials that are written for the purposes of self-study contain much more information which in itself may encourage the end user to reuse them in preference to the less information rich lecture notes. Another colleague from the same project also remarked:

*“Open Learn itself (has) ... a different basis to many open education resources in that we were coming from a distance learning base, so the material we were working with, taking our own legacy of materials and using with students, was on the idea that they fundamentally are able to study things themselves”. (McAndrew, OpenLearn)*

Once again ICOPER partners reported that the breadth and depth of content available appears to have an influence on the end user in terms of reuse of materials:

*“... (content can be) limited by the number of learning resources available in distributed repositories”. (Law, University of Leicester)*

Others suggested that accessible repositories were significant as they housed material in a central area:

*“... (providing a) media library because this application can be used for the reuse of different versions or different variants of media sources (by) the author”. (Fischer, Humance)*

The same partner continued to elaborate, adding:

*“the media library is the key because (all) content you develop in author42 is stored ..., so every version, (is stored). You also can make versions in different languages and*

*different content-wise variants ... So you have out of one course, different variants”.*  
(Fischer, Humance)

Again highlighting a different aspect of reuse: that of ‘target language’. The facility to store different translations in one “place” is valuable to the end user. In addition the same author remarks that it is:

*“also possible ... to reuse the content in other courses’ context or give it free for other authors”.* (Fischer, Humance)

Outlining the influence of repositories that are accessible to groups of users. In the case of author42, a commercial project, the access is limited to registered users of the software but the so-called media library associated with the software aims to support the working process of those authors: by allowing reuse of already created media-elements and secondly by authors creating and working with different variants (e.g. languages) of those media elements. Thus versioning of materials is a significant factor in the reusability of content. It can also accelerate the production process as well as, possibly, reducing the production costs.

### ***Clear licensing details***

The survey revealed the use of a variety of license types (see Section 6 for full details). A notable remark, however, that indicates the importance of clear licensing details in respect to promoting best practice of content and tools for reuse, was given by one ICOPER partner:

*“I think one of the things that really does make the whole world of open education and resources best practice for a reuse purpose is the openness”.* (McAndrew, OpenLearn)

This demonstrates a key feature of such best practice is that, as far as possible, it is of great value to offer content and tools for reuse in an open environment.

Equally another ICOPER partner recognized the importance of clear licensing details for both content and tools for reuse purposes:

*“I think the key concepts are the legal issues ... what are the rights the users have when they use the service ... every single person has to assign a licence ... a specific licence model to each digital content”.* (Oberhuemer, Universität Wien)

Thus by labeling content or tools for reuse clearly, the end user can fully understand what they can and cannot do with such materials.

### ***Interoperability standards***

The survey also revealed the value of supplying either tools or content in a variety of standards-based formats, where possible, so that the end user could adapt the materials to suit their own purposes. The following quote indicates this factor in practice:

*“... providing the material which we had in a variety of formats, for people to choose which most suits their needs.”* (Lane, OpenLearn)

In addition a colleague from the same project (separately) went on to suggest that:

*“Making open education resources to really fulfil their potential”.* (McAndrew, OpenLearn)

Again indicating that a key theme of best practice was one of openness.

Further details about interoperability and standards can be found in Section 5.

### ***Communities of practice***

One clear emerging theme from this work was of content development for reuse was that of fostering communities of practice. Taking the theme of openness first, a number of ICOPER partners acknowledged the importance of disseminating best practice to as wide a community as possible, for example:

*“... many different publications, both journal articles, book chapters, books, conference publications and presentations are there, and most of those are openly available”.*  
(Lane, OpenLearn)

Additionally a colleague from the same project links this to the idea of sustainability and continuation of an open approach:

*“... the key stage in sustainability has been recognising the benefits of openness to the Open University, it helped us test technology, it helped build up a particular research area”.* (McAndrew, OpenLearn)

Thus it appears that fostering communities of practice not only helps to widen participation but also encourages collaboration and promotion of the content and tools for reuse elsewhere:

*“... offering a platform for people to use this has proved a good route to collaboration.”* (McAndrew, OpenLearn)

It also emerged from the survey that there are also challenges to acknowledge and this is also recognized by ICOPER partners:

*“I think the most difficult part is to convince people to share learning resources, because for those, especially the learner ... or even the lecturer themselves when they come to this kind of platform, they expect to search something for free... But this sharing, the gift economy concept, not everybody accepts it, so ... somehow we still have to promote this kind of attitude ... (a) sense of community that shares the learning resources with the people who work in the same field, I feel this is not yet very successful. Those people are still very sceptical about who will use my learning resources, how they will use it”.* (Law, University of Leicester)

### ***Continuing research and evaluation***

Another important aspect of the survey were the references made to continuing research and evaluation of the individual tools and content for reuse. One ICOPER partner, who had moved on to a new project during the survey period, remarked about such aspects of this new project:

*“(OLNet) is building the social research environment, social research network, to bring together researchers and other people who are interested, how the education resources work”.* (McAndrew, OLNet)

He went on to elaborate that it is the actual evidence of experience that, in his case, is the most important aspect to report:

*“(OLNet is) very instrumental and they (the funders) are also very interested in this issue of what (is the real) evidence experience”.* (McAndrew, OLNet)

Once again emphasizing that aspects of best practice in content and tools for reuse can be captured through research and evaluation that is underlined by stressing the user's experiences, both good and less so, and reporting them to a wider audience.

#### 4. Focus on technical features: design and methods

There are many crucial components to successful projects through promoting best practice of educational tools and content for reuse. With respect to the technical aspects it is important to focus on the best practice in relation to both good design and appropriate methodology.

The following sections outline these aspects in further detail using descriptions from ICOPER partners who have designed and delivered a wide variety of tools and content for reuse in the educational arena. The design and methodology adopted for the variety of tools and content for reuse demonstrated many different results in the survey although an emergent theme of “variety” did become quite clear. Variety in the sense that both content and tools needed to be offered in different formats in order that they be more likely to be reused. This is demonstrated in the following quote:

*“... (we have been) able to generate eight different ways in which people can take away and re-use the content, as well as obviously its use in situ on screen... (including) lots of people are printing units out, either for reading offline or for reference.” (Lane, OpenLearn)*

The same partner also went on to describe some further meanings of the term “reuse”:

*“... two other aspects of use which need to be thought about. One is reworking and one is remixing. I'm very much taking what David Wiley thinks about the content, thinking about there's reuse, reworking and remix. Reuse is using the material as-is. Reworking is where somebody might download material on a particular study unit course, and they might want to just modify that unit, they adapt it, it might be to change some things. The furthest one, remix, is where somebody might want to take parts of one of those units and mix it with their own material or parts of another unit, so its closer to the mash up philosophy that a lot of people talk about in other spheres”. (Lane, OpenLearn)*

This emphasizes the importance of defining terminology, promoting standard use of such terms and understanding how their context may influence their use. The same partner went on to elaborate some of the issues faced by the user in this scenario:

*“So to be able to rework material, it does require some sophistication in using media tools and the things that not many people had, and so some of the most extensive reworkings we've seen have been around projects within institutions, within other universities, where they have either had funding or have granted people the time and the space to be able to spend a lot of time and effort as a team, not just as an individual, engaging with material, learning how to do it'. (Lane, OpenLearn)*

Again expressing the necessity to foster communities of practice, in the broadest sense, provide dedicated time for users to rework materials or reuse tools as well as granting access to training opportunities. Another ICOPER community participant remarked upon the technical aspects of tool generation for reuse, in this case widgets:

*“... the widget needs to be appealing and another feature that is often taken into account ..., especially for the free Open Source widgets, is the ability to be viral, that these appeal for the users that can see the widget and can choose freely to take it and put it somewhere else”. (Parodi, Giunti Labs)*

Looking more closely at the practical aspects of creating content and tools for reuse, a number of ICOPER partners focused more closely on the design and methodology adopted in their projects that enhanced opportunities for users to take the content or tool away and rework it for their own purposes:

*“... a good structured ... design of the material works together ... to such a great extent that people are a bit loathed to change it. They see the value in trying to reuse it as much as possible ... (with respect to) learning we’re not just sharing content, we’re sharing actually what is going to assist a project by people picking up on what were the aspects of the design that worked.” (McAndrew, OpenLearn)*

Other ICOPER partners described the different colleagues who had contributed to the design and methodology development of their content or tools for reuse. Again promoting the idea of collaboration rather than developing such features in an isolated community:

*“The design and the concept of those features have been developed in close cooperation with the faculty people ... we have a very broad range of functionalities which were requested by the faculty people ... sometimes very subject specific “ (Oberhuemer, Universität Wien)*

Thus cooperation between various subject and technical specialists emerged as a key theme of the development of content or tools for reuse. This led to a further discussion of how such content or tools could be delivered to the wider institution as well as highlighting some of the contexts that exist:

*“Several faculties use their own systems, and we try to implement those or integrate those systems by offering them the integration with the PHAIDRA service, so they can use IDs, they use IDs, the centrally provider user IDs, also with central services”. (Oberhuemer, Universität Wien)*

Interoperability, therefore, is also a key issue to resolve for the developer of content or tools for reuse. One approach to this challenge was described by the same partner both in terms of the human-facing aspects as well as, secondly, the technical aspects:

*“... when we had a lot of communication with the faculty people, we asked them or we suggested them to use in future PHAIDRA to archive their contents and to use the learning management system for managing the courses, so we tried to separate the courses and the content.”. (Oberhuemer, Universität Wien)*

*“ ... a very critical point in the development, we have to develop the interface between PHAIDRA and the two learning management systems we use at the University of Vienna, so that there is a push-pull between PHAIDRA and the learning management systems”. (Oberhuemer, Universität Wien)*

Other ICOPER partners described their tools or content for reuse in more detail firstly the specific context:

*“... a simulation to model 3 things, the first thing is a firm model because in such a simulation a group of learners are going to manage simulated companies so you have to simulate the way this company works ... So you need a model of the company which is going to be simulated. The second function is ... there is also a relationship between the market, the simulation of the market and the decision of the companies and this is the role of the firm model ... which is the market allocation function so in such a simulation ... you will have I would say 3 sub-models, one for the company, one for the market and one for the allocation and there are of course different ways of doing this and but this was a key ingredient in such a model”. (Klein, HEC)*

Then going on to describe the technical practicalities of implementing this scenario:

*“... this model was initially programmed in FORTRAN then it was programmed in PASCAL ... (the) object (of) this separation of the different kind of knowledge so there was clearly two goals, one was to maintain the system running under the different environment available in the different school or educational institution and (the other) ... objective which was to re-program the application to obtain a better separation between the different kind of knowledge so that the learning ability of the application could be nicely increased and also ... that (the) different institution or user could independently develop a different (variation) of the application “. (Klein, HEC)*

## 5. Focus on Standards

The survey of content development for reuse methodologies has placed a special emphasis in gathering information pertaining to the adoption of quality standards in the area of eLearning. Both the templates and the interview questions were based upon the findings of ISO/IEC 19796-1:2005 (Information technology for learning, education and training – quality management, assurance and metrics). This not only guided the creation of initial templates for the survey as well as the questions asked during the interviews but also underpins the entire investigation into the area of content for reuse.

In this section the use of the term “Standards’ is also examined in a broader sense that includes both specifications and standard or best practice relating to the reuse of content or tools in the wide educational arena. A number of new themes were emergent from the respondents in this survey, such as the need to recognise data standards and compliancy; and the issues of making tools/content available in a wide variety of standard formats. All surveyed ICOPER partners acknowledged the importance of adhering to standards and recognized specifications where possible when developing either content or tools for reuse purposes, for example:

*“... all the site is built to be compliant”. (Parodi, Giunti Labs)*

Recognition was also given to a potential variety of data formats as well as emerging standards:

*“... (a) key aspect is that providing material in formats, mainly the standard formats that are available today in communications standards or emerging standards.” (Lane, OpenLearn)*

In addition it was also understood that there were a range of appropriate standards available to ICOPER partners:

*“... there is a family of specifications that should describe the different features and aspects to be taken into account (for widget development) ... (for example) the digital signature for the widget ... Security model ... and ... the specification (for) automatic updates “. (Parodi, Giunti Labs)*

Standards and specifications did vary according to the context of the ICOPER partner’s project, for example:

*“(There are) several standards or specifications ... including the service we implemented already at the University of Vienna... The other thing we use is a kind of education profile of the learning object metadata standard, which was slightly modified*

*to our request ... we (also) re-use web services, which kind of a standard”.*  
(Oberhuemer, Universität Wien)

This also highlighted the idea of modifying or adapting standards according to specific needs. Additionally there was a recognition that on occasion a mixture of standards were necessary:

*“We used quite a mix of metadata standards like LOM and Dublin Core, and then at some point also modified these metadata (standards) to meet our specific needs ... mixed them in a way (by selecting) ... some of the attributes from (one) standard and then select a sub-set of attributes from another standard, because not one standard can meet all our needs”.* (Law, University of Leicester)

Again another ICOPER partner focused on the idea of standards interchange or interoperability:

*“... the possibility is there to interchange with other applications into a product standard ... with the new development, it will be possible to interchange with other applications, for other services”.* (Fischer, Humance)

## 6. Focus on the topic of Licensing and Policy

This is a dynamic area. Licensing can vary enormously between content or tool producers who offer their products for reuse. Licenses may also vary between institutions as well as within institutions. Presented content or tools may, or may not, have obvious licensing details visible to the end user. Additionally it is important to note that the end user may or may not choose to "see" or indeed adhere to those embedded licensing details.

### *ICOPER partner licensing types*

The ICOPER community sample discussed 5 different types of licenses which were part of their experience in the cast studies: Commercial licenses; Creative commons license; Universal Open License (based on Creative Commons); Fedora commons license; and GNU Free Documentation License. Each participant in the survey was requested to describe the licenses that were adopted for their chosen project(s) and outline the rationale for these choices in relation to their tools or content for reuse. For example:

*“... it is required that you acknowledge the rights and the ownership of the widget ... you are an Open Source developer, then probably you wish to have an Open Source widget”.* (Parodi, Giunti Labs)

Licensing is an important issue that needs to be understood to some extent both by the producer and the end user. Many ICOPER partners acknowledged this as a very important and challenging issue:

*“There was a big question simply at the copyright permissions level; so the whole approach of open education resources, choosing a creative commons licence, making it very clear, giving permission upfront, is an important link”.* (McAndrew, OpenLearn)

*“We kind of ‘force’ the people to read the licence text at that time, and think it over very carefully, and assign the licence type to the object they upload”.* (Oberhuemer, Universität Wien)

The same partner then went on to describe why their choice of license was adopted:

*“(the) creative commons license is chosen most frequently, which states that the user is allowed to download the content, to modify it and to redistribute again”. (Oberhuemer, Universität Wien)*

Legacy information is also important and one ICOPER partner described the history of their particular tool and content for reuse:

*“... this simulation (model) was used over of period of nearly 30 years so it had a very long life cycle and ... with respect to the licensing ... I was involved in the development of its model with a company specialising in developing software and it was in a way the standardisation of one of my research and so since the development was made within a pilot ... software company, then the licensing was done in the same way as a lot of software initially ... but still commercialised which is through licensing contract with different kind of educational institution ... it’s a very straightforward and simple experience of licensing a piece of software”. (Klein, HEC)*

Another ICOPER partner focused on the implications of the particular licenses for the end user, the idea that some licenses allow a greater level of reuse than others, as well as the amount of information that may be retrieved during their searches:

*“... of the learning resources the learner can only see the metadata, ... (although) some (licenses) allow the users to download the whole learning resources. So ... the users, if they look at their search results ... will have different irregularities, some of them they can just see the metadata, some ... can see the whole course. So this is a very inconsistent presentation to the learner themselves”. (Law, University of Leicester)*

The same partner also acknowledged that the content or tools for reuse producer can make decisions about licenses that may affect its future reuse:

*“(there are) different types of licenses, so for the provider they can choose this free to download, you can also modify the learning resources they download ... the users can download the learning resources, but they’re not supposed to modify it (another) ... type is basically a commercial one, so if you want to download a whole lot, you can reveal some mediator descriptions, but if you want to use the whole learning resources you have to pay a certain fee ... mostly they’re willing to share them for free”. (Law, University of Leicester)*

Likewise there was also a recognition that even if license agreements were clearly labeled and accessible to the end user there is no guarantee that they will adhere to them:

*“... even though we have the license in the platform, people just make a tick or just make a click there, so ... (one) still cannot guarantee (to) the learning resource provider that its really safe to share the learning resources in this way, even with the protection of a license”. (Law, University of Leicester)*

Another ICOPER partner described the licenses used in their particular project and the advantages of adopting site-wide licenses for larger organisations:

*“... you can get the licence for one person/author and you get an account on our server but (for) a big company (it’s) ... more use is to get (a site) licence for (all) authors. (It’s important to note that all) the contents are strictly divided (between) other companies”. (Fischer, Humance)*

### **Terms of use**

Another emergent key theme with respect to licensing was the use and implications of the terms of use associated with particular projects. The PHAIDRA project (Austria), for

example, invoke their terms of use to include the duties and the rights of the service-provider (which is deemed to be PHAIDRA) on the one hand and of the system's use on the other hand, thus implying that the usage of logfiles, the user's commitment to appropriate conduct (e.g. be aware of copyright issues) are implicit within the terms of use.

### ***Licensing policies: implications***

Focussing on one particular ICOPER partner project, OpenLearn, as representative of many of the general licensing issues for both content and tools, it is important to understand what an individual license actually means in reality to the potential end user and how that may affect their attempts to reuse either content or tools. The following text is reproduced from the OpenLearn website (under a Creative Commons Attribution-NonCommercial-ShareAlike 2.0 Licence).

*OpenLearn content is published under a Creative Commons Attribution-NonCommercial-ShareAlike licence. This means that anyone may make use of OpenLearn content freely and without charge. Users are, therefore, free to amend, rework and combine OpenLearn content with any other content issued under a similar licence for non-commercial purposes.*

*The only condition is for any reuse to acknowledge our original work. The resources used in an OU course may include a varying proportion of third-party materials, with copyrights not owned by the University. It is common practice to include text-based resources from the relevant subject literature and broadcast audio-visual material we have commissioned.*

*One of the aims in managing the intellectual property elements of OpenLearn was to retain as much as possible of the third party materials in our original courses. Thanks to the support of rights holders and the efforts of our University clearance team we have successfully cleared over 97 per cent of all third party content offered and kept within the designated budget.*

*Software tools are by default released under an open source license, depending on the software's history and configuration. Where a tool includes embedded proprietary software (such as FlashMeeting), this restricts our ability to distribute open source. Although we use the term 'proprietary' to cover all non-OU software, we have avoided the use of commercially produced proprietary packages released under restrictive commercial licenses. Instead, we identify two kinds of proprietary software within OpenLearn: freeware and shareware (for example Moodle) and packages developed by commercial developers but with simple packages and run-time rights made available freely (for example Flash).*

*Our use of these should have no impact upon the ability of our user community to make use of our reversion content and indeed in the case of video and audio formats, users have a choice of file types for video and of freely available players (for both). We have structured content released under Openlearn so that interactive activities use Flash or other similar freely available software packages embedded within the content itself, and do not depend upon commercially licensed packages held on the user's hard drive. Sharing content in XML format also means it can be used/remixed in a variety of free non-proprietary software tools.*

*Some multimedia components which are rich in third party content may not be available in their entirety because of restrictions placed upon us by rights holders. We are, however, already in discussion with representative rights organizations – including the UK talent unions – with a view to negotiating blanket licensing agreements which will free us to make*

*rich content of this kind available as open content. Part of what we hope to achieve in the project is to identify ways of making more embedded third party content freely available as part of products of The Open University released under the license and to move forward the thinking and practices of major rights holders so that they might release more of their own material under a more open license. (OpenLearn 2009)*

## **7. Focus on Teacher and Learner support**

A framework to support the end-users: teachers or learners appears to be a necessary requirement in terms of the emerging best practice from the experience of tools or content for reuse amongst ICOPER community members. The key themes that emerged from this topic were: of widening participation, to draw others into new forms of learning; the challenge of motivating the users of learning materials and systems; of more fully engaging project staff in the case studies presented by interviewees; and the issue of the very varied ‘audience’ of any planned reuse of the materials and systems.

The main teacher and learner support issues that became apparent from the survey of content development for reuse can be summarized via 5 main themes: Widening participation; Motivation of end users; Project staff – commitment and time frame; Focus on learner and/or teacher support; and provision of training materials, workshops and, or, tuition

### ***Widening participation***

*“One of the founding aspects of Open Educational Resources is about unlocking knowledge and making these education materials and knowledge available to everybody worldwide”. (Lane, OpenLearn)*

This idea of “unlocking” knowledge can apply equally to the producer as well as the end-user. Raising awareness about developing content or tools for reuse amongst producers e.g. teachers or trainers is encouraging them to further develop their content or tools in such a way that future users can more easily use those materials. It is described further by a colleague from the same project:

*“... benefits ... we are able to move a bit beyond simply the idea that we were being open in order to transfer material from one institution to another to cross over and offer an environment that people could learn from themselves as well as allow educators to see the material and transfer it”. (McAndrew, OpenLearn)*

It is not limited to producers either as another ICOPER partner describes:

*“(one) kind of learning (is) the practical aspect that encourages students to learn by doing... the widgets into this kind of context where students are invited to do...to learn by doing and to experience what they study”. (Parodi, Giunti Labs)*

This can lead onto a combination of widening participation and motivating those participating in the respective projects in terms of content or tools for reuse.

### ***Motivating users***

It became clear from the survey that ICOPER partners adopted many different methods of motivating both their own staff or colleagues in terms of developing tools or content for reuse as well as attempting to motivate end users (students) to take up the tools or content for reuse.

*“We wanted to motivate the researchers as well as the teachers, as well as those people who work ... (in) management positions at our universities”. (Oberhuemer, Universität Wien)*

The following quote from an ICOPER partner outlines this idea from a student perspective as well as questioning how the producers or teachers can aid this process:

*“(learners may be) setting out to study and don’t yet want to make the commitment to join as a paying student or a formal institution. They might well have come across open learning because they’re interested in a particular niche subject and typed that into a search engine and come to OpenLearn just as they might have come in other circumstances to Wikipedia and they are interested either finding out just a simple answer or exploring more deeply... where (as there is a different) response ... from people who were really engaging with the material and we found that it was very useful ... (for our) research that we can contact these people ... who (demonstrate) by their communication aspect and wanted to meet other people like them. They wanted to communicate, they wanted to leave their mark on the materials. (Possibly) terminology ... (such as) social learners, that they were there to join a learning community with other people ... (although there is no) label for a voluntary student because they behave very much like people who would join a course, that they study things that they were very keen to complete. They were very interested in ... trying to find more material ... (relevant to) their curriculum ... (possibly) behaving more like formal students, while the variation is (a) combination”. (McAndrew, OpenLearn)*

Once again this highlights a number of related issues: fostering communities of practice, increasing communication and research to collect evidence.

### ***Project staff***

*“the persons who are involved in the project ... there is ... a Project Manager, because PHAIDRA is still under development, it is still a project. ... a Project Manager ... who is developing the concept and who is responsible for the implementation and so on. ... (also a) Customer Manager, who takes care of all those faculties and seclusions department who might be interested in using the system. ... several software developers and system architects, and ... people who work very closely with the faculties, these are to develop the concepts, how the faculty people might want to use the repository. So you see there is quite a range of different people working within the project.” (Oberhuemer, Universität Wien)*

Thus each surveyed ICOPER project contained a variety of personnel, with differing responsibilities. In terms of best practice for content development for reuse, however, there were essentially roles that were critical in this regard in the case studies: a Project manager; and a Project developer (programmer/academic/subject specialist). The same partner went on to describe one of the roles in more detail:

*“The Customer Service Manager was ... one of two persons who were hired especially for this project, and ... (is on the) regular staff ... responsible for further development*

*of the system, for developing new concepts, new functionalities and so on ... (other) people, the software inventor, they are (also) regular staff, ... but our computer centre only hires people who they take into the regular staff after the end of the project". (Oberhuemer, Universität Wien)*

Again this highlights some of the dilemmas of project work: whether staff are hired full time or on contract may effect the long term objectives of the project itself.

### ***Learner and teacher support: the audience***

Whilst the common denominator for all surveyed ICOPER project partner's actors could be summarized as 'Teachers and Learners' it is important to acknowledge that there was a wide variation in the interpretation of these terms, for example:

*"... the intended audience is the human resource manager ...the target groups with their industrial partner, the corporate learners ". (Law, University of Leicester)*

Trying to support such variety in an appropriate manner can sometimes prove to be challenging:

*"(one) challenge ... is to map the users' needs to the learning resources ". (Law, University of Leicester)*

One ICOPER partner also described the implicit pedagogy built into their particular educational materials and how this supported the learner as well as the teacher when designing materials for reuse:

*"The Open University has a framework called 'supported open learning' where this all fits together so we're still removing a lot of the elements that a student gets in terms of support and the tutors but the tier itself is very much what it encourages people to do, tasks they can do, material they can study through, it's got guidance built into it and design." (McAndrew, OpenLearn)*

Another issue is encouraging participating teachers to look at others' materials to seek to encourage an increase in sharing content. In addition, when learner objectives were incorporated into the design of a system, an improvement for the end user also took place, for instance via a search engine delivered via a learning management system.

*"The lecturer or the teacher ... can re-use the material they share in Educanext and then also support the higher education administrator, somehow they can establish this sharing culture among the academic staff ... but then later on we brought in the scope of the learner objectives to enable the users to use this platform to support their learning goals and needs ... originally we focused on the academic staff". (Law, University of Leicester)*

The same interviewee also highlighted the issue of reuse directly in relation to the location of the potential materials:

*"... we think the content itself depends on the provider (who) ... gives some supplementary material to guide the potential users how to re-use their learning resources". (Law, University of Leicester)*

Again, this was also emphasized by another ICOPER partner but in terms of the type of training that could be made available:

*“(training can be via) ... telephone calls or live and of course, face-to-face training”.*  
(Fischer, Humance)

Finally, using the OpenLearn case-study again, a number of important issues relating to emergent best practice teacher and learner support can be summarized by acknowledging a process that was developed over the lifetime of the OpenLearn project and drawing from the project’s published research literature:

The repurposing of materials in OpenLearn that has happened often is a product of collaboration. It has become apparent in the years of operation of the project that individual users often do not feel comfortable to repurpose the materials on their own. They tend to lack the confidence to make changes in something that has not been initially written by them. In fact, the OpenLearn team recognise that many educators are simply not used to the concept of repurposing materials, especially when they are written at a high standard and ready to use, as it is in the case of the content provided by the UKOU.

OpenLearn decided to address these pertinent teacher/learner issues in various ways, such as:

- By reviewing the concept of reuse to allow reuse offsite through syndication
- Building up a range of illustrative examples
- Running a competition encouraging reuse
- Developing alternative formats and toolsets
- Building partnerships for further work.

The OpenLearn experience, as a result of these measures, demonstrated a few different reactions. There is now significant evidence of ‘reuse success’ both under the original model of individual download and re-editing, leaking of content to other ways to host and present material, use of direct editing on site and work in partnership. In addition, there was also acknowledgement in the project that there was one very large barrier to reuse: technology itself.

There is also the technological barrier. Initially, in OpenLearn users could only make units available by downloading them from the website, making the necessary changes, and uploading the unit again, but in the XML format. OpenLearn would only accept reused content in the XML format because this would enable the unit to be available in a variety of formats to the end user, such as OU XML package, IMS Content Package and IMS Common Cartridge. This would enable the interoperability of systems and the easy travelling of the content the systems that support such packages.

What had been noticed, however, was that the majority of users were not familiar with XML and did not have the time to learn how to use it so that they could upload units onto the website. This meant, therefore, that most users did not return content to OpenLearn, and the users who did so were either a scarce XML literate users or higher education institutions that were collaborating with OpenLearn and had specific staff to convert the repurposed materials into XML. Having recognised the need for a more user-friendly way of repurposing materials, the OpenLearn technical team has developed the in-situ editing tool, which was launched in July 2008 and appears as ‘Make a Copy for Revising’ in the LabSpace. This allows users to make changes in the units directly onto Moodle, and to and have them published immediately.

Some knowledge of how to use Moodle is necessary, and detailed guidelines are provided in the OpenLearn website.

Many of the issues described in the previous sections were also highlighted, in one way or another, by the surveyed ICOPER partners too. Technology – both tools and content – must be easily accessible to end users and simple straightforward instructions are required in order that an increasing number of people contemplate reusing either content or tools for their own purposes.

## 8. Summary

The thematic analysis of our survey has revealed a variety of methodologies and systems that are currently employed to advance “content –development for reuse” within the ICOPER best practice network community. These include creating educational resources, both content and tools, that are open for remixing and repurposing often adapted with a European dimension.

This summary also highlights the issues that need to be addressed in order to shape that ‘best practice’ of a Content Development for Reuse methodology. In this respect the following points encapsulate these emergent themes not only from our survey, but also serving to emphasise the important issues that need to be understood and acted upon in order that educational resources are and can be reused effectively and efficiently by such a community comprising of a wide range of actors, both learners and educators.

It appears from our survey that there is a need to offer:

- Openness and accessibility for all users with comprehensive and relevant content  
“**Teacher and learner support** to promote communities of practice”
- Good design (simple, easy to use) plus choice, location and flexibility of platform  
“Enhancing **accessibility and reusability** of materials”
- Interoperability with other systems including adherence to **standards**  
“Encouraging the **sharing and reuse** of materials”
- Clear **licensing** details  
“Increase opportunities for legitimate and approved reuse”

In respect of our survey the general topic of **standards** did not evoke many consistent themes from the ICOPER sample. Interviewees universally agreed on the theoretical importance of the standard concept to guide their CDfR work, but some found it to be very challenging to point to elements of strong or good practice within their own case studies. By contrast, the **licencing and reuse policy** topic was one significant aspect related strongly to the standards issue that did raise a number of common and consistent themes in this community.

The topic of **learner and teacher support** in the design for reuse raised a number of consistent themes in the ICOPER sample. These themes included: widening participation, motivating users, engaging project staff and that of understanding the nature of the learning ‘audience’.

Further work on this CDfR topic should widen the data collection beyond the ICOPER partnership to the extended community of learning researchers worldwide. Whilst this community has been able to speak to some very interesting and important topics in reuse, many case studies presented reveal more issues about ‘first use’ quality rather than

specifically 're-use' quality. We have sought to exclude this from the current analysis, to focus on a relatively small data set of best practices in which the ICOPER community have clearly worked on issues of reuse quality. A wider sample would provide a more detailed picture of what is clearly a very complex and challenging issue for the future of learning.

## 9. References and Links

The following are a selection of papers, training materials and associated links outlining the best practice of content development for reuse offered by ICOPER partners during the survey period.

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Wiley, D. A. (ed. 2000). *The Instructional Use of Learning Objects*: Online Version. Accessed April 2009: <http://reusability.org/read/chapters/wiley.doc>

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#### *Useful links*

Digital Asset Management an Hochschulen. <http://lehrentwicklung.univie.ac.at/index.php?id=603>  
(German language)

OpenLearn Production process map.  
<http://labspace.open.ac.uk/blocks/compendium/browsemaps.php?context=15&id=2623>

Phaidra Best practice guide (German language)  
<https://phaidra.univie.ac.at/static/pdfs/PhaidraBestPractice.pdf>

Phaidra Digital Asset Management (German language).  
<http://lehrentwicklung.univie.ac.at/index.php?id=603>

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<http://kn.open.ac.uk/document.cfm?documentid=10652> Online copy accessed May 2009

Emergo [http://145.20.173.22/emergo/community/EN/emergo\\_en.htm](http://145.20.173.22/emergo/community/EN/emergo_en.htm)

Emergo <http://www.games2learn.nl/EMERGO> (Dutch language)

Lecturnity. <http://electures.informatik.uni-freiburg.de/portal/web/guest/home>

Lecturnity tool: <http://www.lecturnity.de/en/products/lecturnity/overview/>

OpenLearn website <http://www.open.ac.uk/openlearn/about-us/our-story.php>

OpenLearn LearningSpace website: <http://openlearn.open.ac.uk>

OpenLearn LabSpace website: <http://labspace.open.ac.uk>

Phaidra Website <https://phaidra.univie.ac.at/> (German language)

Phaidra Service <http://phaidraservice.univie.ac.at/> (German language)

PowerTrainer: <http://www.im-c.de/en/products/dynamic-powertrainer>  
[http://www.dynamicpowertrainer.com/english/03\\_servicecenter/download/pdf/powertrainer\\_folien\\_en.pdf](http://www.dynamicpowertrainer.com/english/03_servicecenter/download/pdf/powertrainer_folien_en.pdf)

## Appendix A: CDfR template 1

# Content Development for Reuse - Best Practices

Template for quality standards & technical requirements

Report developed by: \_\_\_\_\_ from \_\_\_\_\_

## FIRST PART

### 1a. PROJECT DESCRIPTION

- Title:
- Institution:
- Launch Date:
- Goals:
- Target groups:
- Context, Scenario:
- Applications:

### 1b. RELEVANT FACTORS

- Impact
- Effort x Achievements
- Unique feature
- Strength
- Weakness
- Limits
- Challenges
- Changes / Innovation
- Updates / Next Steps
- References

## CDfR template 2 & 3

# Content Development for Reuse - Best Practices

Template for quality standards & technical requirements

Report developed by: \_\_\_\_\_ from \_\_\_\_\_

## SECOND and THIRD PART (for the interview)

### 2. DESCRIBING FEATURES AND REQUIREMENTS

- **Team involved:** Project Manager, Curriculum designer, Accreditation authority, Content writer, Screenplay writer, Didactic experts, Media specialists, Teacher, Learner, Tutor, Learning advisor, Moderator, Didactic and technical Support, Test expert, others...
- **Definition of roles** (e.g. tasks, responsibilities and rights between the actors )
- **Learners / Users - description:**  
Context/Scenario:  
Needs and demand of learners:  
User experience:
- **Technical features**  
**Aspects:** (e.g. technical requirements, software, interfaces, integration with existing structures)  
**Design:** (e.g. Media design, Communication, Interaction design)  
**Methods:** (e.g. Ergonomics, Human Computer Interaction, Usability,
- **Licencing policies**
- **References**

### 3. DESCRIBING CONCEPTION AND DESIGN

#### 3a. Learning objectives

**Aspects:** (e.g. objectives, competences & qualifications/ skills & abilities, outcomes)

**Criteria:** (e.g. needs in real practice )

**Standards:** (e.g. taxonomies-ontologies )

#### 3b. Contents (presentation and formats)

**Aspects:** (e.g. topics, objects, duration, learning time, different levels, semantic networks  
Security, password,

**Didactical aspects design:** ( e.g. process plan, curriculum, script, production, peer-review)

**Components:** (e.g. explanations, summary, exercises, tests, transparency of assessment,  
solvability, hints, feedback, explanations of feedback, differentiated  
feedback, information on test results, references, interactive components)

**Features/Format:** hypertextual, non-linear, sequential, non sequential...  
degrees of difficulty / complexity

**Standards:** (e.g. National Curriculum Standards)

#### 3c. Didactic / methods

**Approach:** (e.g. programmed instructions, explorative learning, investigations by learners,  
simulation through content, learning through deeper insight, learning by doing,  
learn learning, reflection on work habits – time management, self monitoring,  
Collaborative learning, situated learning, Self-assessment support,  
Self-created certificate)

**Media functions:**

- *Presentation and Distribution of Information*
- *Collecting and filtering of information*
- *Information editing, interaction*
- *Constructive representation of own learning results*
- *Performance support tools, Communication*
- *Templates for media*

**Media Formats:**

- *Audio, video, graphics, animation, photos, voice recording-play back*
- *Formats, security, clearance rights*

**Communication:**

- *Actors*
- *Medium*
- *Communication objectives*
- *Tools*
- *Tutor / moderator / trainer instruction*

**3d. Tests and Evaluation**

**Aspects:** (e.g. Test, validation, scoring)

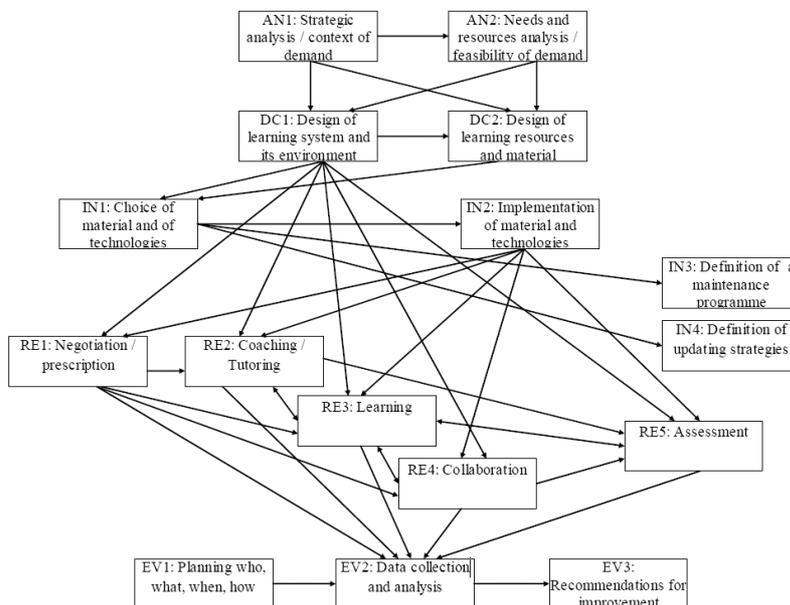
Classification, diagnostics, learning success and proficiency / competence

Goals, Approach, time frame, parameters & criteria, methods & instruments

**3e. Maintenance**

- *Didactical / methodological updates (adaptation of learning methods)*
- *Content updates*
- *Technical maintenance*

**3f. Process Map for CDfR (example)**



## Appendix B

### ICOPER participants in the CDfR interviews

<b>Interviewees</b>	<b>Institutions</b>
Andy Lane	The Open University, UK
Effie Law	University of Leicester, UK
Elisabetta Parodi	Giunti Labs, Italy
Katrien Verbert	KU Leuven, The Netherlands
Marion Fischer	Humance, Germany
Michel Klein	HEC, France
Patrick McAndrew	The Open University, UK
Petra Oberhuemer	Universität Wien, Austria
Piotr Aghust	Akademia Górniczo – Hutnicza, Poland
Roland Klempke	Open Universiteit Nederland
Sebastien Kelle	Open Universiteit Nederland
Voler Zimmerman	IMC, Germany