

ID 7.17 – Implementation of the Learning Path Manager and Editor

Citation for published version (APA):

Herder, E., Kärger, P., Berlanga, A., Janssen, J., & Heyenrath, S. (2010). ID 7.17 – Implementation of the Learning Path Manager and Editor.

Document status and date:

Published: 06/01/2010

Document Version:

Peer reviewed version

Document license:

CC BY

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

<https://www.ou.nl/taverne-agreement>

Take down policy

If you believe that this document breaches copyright please contact us at:

pure-support@ou.nl

providing details and we will investigate your claim.

Downloaded from <https://research.ou.nl/> on date: 16 May. 2025

Open Universiteit
www.ou.nl





Internal Project Deliverable Report

ID 7.17 – Implementation of the Learning Path Manager and Editor

Work package	WP7 – Competence Development Programs		
Task	Task 7.2		
Date of delivery	Contractual: 31-05-2009	Actual: 08-07-2009	
Code name	ID7.17	Version: 1.0	Draft <input type="checkbox"/> Final <input checked="" type="checkbox"/>
Type of deliverable	Report		
Security (distribution level)	Public		
Contributors	Eelco Herder, Philipp Kärger, Adriana Berlanga, José Janssen, Stef Heyenrath		
Authors (Partner)	UHANN, OUNL, FBM-UPF		
Contact Person	Eelco Herder (UHANN)		
WP/Task responsible	Eelco Herder (UHANN)		
EC Project Officer	Martin Májek		
Abstract (for dissemination)	The development of a Learning Path Editor.		
Keywords List	Learning Path Description, Learning Path Editor		

Table of Contents

EXECUTIVE SUMMARY	2
1 LEARNING PATH EDITOR	3
1.1 BASIC CONCEPTS OF THE LEARNING PATH EDITOR	3
1.2 USER INTERFACE AND INTERACTION RUN-THROUGH.....	4
1.2.1 <i>Master View – Overview of available learning paths</i>	4
1.2.2 <i>Metadata view</i>	5
1.2.3 <i>Design view</i>	7
1.3 CONCLUSIONS.....	9
REFERENCES	10

Executive Summary

Based on preliminary evaluation results and peer review of the schema, a second iteration of the Learning Path Specification has evolved (ID7.12). Its applicability and benefits are currently demonstrated by the development of a **Learning Path Editor**, which allows authors to create learning paths that are structured according to the learning path specification. These learning paths are used by the PDP Planning tool for presenting lifelong learners with a personal development plan that they can further edit toward their needs.

1 Learning Path Editor

The Learning Path Editor is the tool that is being developed within the TENCompetence project to enable creation of learning paths according to the learning path specification, as described in the previous chapter. The Learning Path Editor is designed as a tool to be used by ‘experienced authors’. Even if the specification is to be used to describe informal learning paths as well, it is not evident that learners will do this themselves since it appears hard for instance in workplace learning to separate learning activities from actual work [2].

So who are these ‘experienced authors’, the targeted end-users of the Learning Path Editor? First of all they could be teachers or study counsellors employed by educational institutions or education and training brokers [9] to design curricula and provide study guidance to students. Or they could be human resource consultants and trainers employed by large companies and non governmental organisations that make considerable investments in training and workplace learning. Finally they could be professionals employed by local social services to advise unemployed citizens on opportunities for further professional or personal development. They all might use the Editor to document formal, non-formal and informal learning paths which seem interesting or have proved successful, so that they become readily available for the purpose of recommending them to others.

In the next section we introduce the basic concepts of the Learning Path Editor – a bird’s eye view on its functionality. In section 1.2 the user interface and its intended usage are explained in more detail. In the concluding section 1.3 we discuss the connection with the Learning Path Specification and explain how the editor will be used for the evaluation of the specification.

1.1 Basic Concepts of the Learning Path Editor

The Learning Path Editor was developed to support experienced authors in describing learning paths. The Learning Path Editor consists of three different ‘views’. The first *master view* provides an overview of all learning paths the author has (co-)created. From this view the author can zoom in on a particular learning path or add new learning paths, which will activate the *metadata view* which presents the metadata connected to the learning path. Here the author describes a learning path in terms of goals (competence profile) and other metadata. The competence profile (a set of Competences at particular levels of proficiency) is selected from a standardised competence description. The *design view* finally enables the author to describe and organise the actions to be performed for the learning path to be completed.

The graphical user interface of the design view was developed by extending the interface of the tool developed to visually support the creation of personal development plans by learners (Melero, Hernández-Leo, Arroyo, Aguilar, & J., 2009). The interface combines aspects of concept mapping with a ‘bubble metaphor’: both competences and learning actions are represented by bubbles and they constitute a match when they have the same colour. With visual cues like these the interface supports the functionality in a straightforward way. The learning actions to be used for a selected competence are organised in sequences and selections by dragging and dropping them into a separate area in the interface describing the learning path. In the design view the author can select from existing actions but also can add new actions as well as edit the metadata for both existing and new actions.

1.2 User Interface and Interaction Run-Through

The user interface of the Learning Path Editor provides three different views:

- The *master-view* page lists all learning paths created by an author with an indication of whether or not a path is shared with other users (i.e. other users can co-edit the learning path asynchronously). Besides the overview separately lists learning paths which others have shared with the author.
- The *metadata view* is responsible for presenting a form describing information about a particular learning path. Here the author describes a learning path in terms of goals (competence profile) and other metadata (title, description, prerequisites and startconditions).
- The *design view* shows the competences (related to the competence profile selected in the metadata view) addressed by the learning path, the learning actions used for attainment of these competences, and the way these learning actions are organised/ordered in a workflow.

The following sections describe each of these views in more detail.

1.2.1 Master View – Overview of available learning paths

The overview of all learning paths distinguishes between learning paths owned by the author and those the author has co-created (Fig. 2). Both types of learning paths can be edited and copied, whereas only owned learning paths can be deleted and shared with others. For each learning path, some key information is provided through the collapse/expand controls:

- a. description
- b. delivery-mode
- c. workload
- d. names of co-authors.

When an author chooses to edit a learning path (by clicking Edit) or to create a new learning path (by clicking New) the metadata view is activated first.

The master page (Overview, Figure 2) offers an overview of all learning paths created by an author with an indication of whether or not a path is co-edited by other users (asynchronously). Besides the master page separately lists learning paths owned by others and co-edited by this author.

Learning Path Editor - Overview

LEARNING PATH	CO-EDITED	DATE	CONTROLS
OWNER			
▼ Title for the Learning Path LP1	<input checked="" type="checkbox"/>	4/15/2009	Copy LP Edit LP Delete LP Add User
DESCRIPTION	DELIVERY-MODE	WORKLOAD	CO-AUTHORS
An example of description for the Learning Path 1	<input type="checkbox"/> Face-to-face <input checked="" type="checkbox"/> Distance <input type="checkbox"/> Mixed	Workload - LP 1	José Janssen Anton Finders Eelco Herder Stef Heyenrath
▼ Title for the Learning Path LP2	<input checked="" type="checkbox"/>	4/15/2009	Copy LP Edit LP Delete LP Add User
▼ Title for the Learning Path LP3	<input checked="" type="checkbox"/>	4/15/2009	Copy LP Edit LP Delete LP Add User
▼ Title for the Learning Path LP4	<input checked="" type="checkbox"/>	4/15/2009	Copy LP Edit LP Delete LP Add User
CO-EDITOR			
▼ Title for the Learning Path LP1	<input checked="" type="checkbox"/>	4/15/2009	Copy LP Edit LP Delete LP Add User
▼ Title for the Learning Path LP2	<input checked="" type="checkbox"/>	4/15/2009	Copy LP Edit LP Delete LP Add User
▼ Title for the Learning Path LP3	<input checked="" type="checkbox"/>	4/15/2009	Copy LP Edit LP Delete LP Add User
▼ Title for the Learning Path LP4	<input checked="" type="checkbox"/>	4/15/2009	Copy LP Edit LP Delete LP Add User
▼ Title for the Learning Path LP5	<input checked="" type="checkbox"/>	4/15/2009	Copy LP Edit LP Delete LP Add User
New Learning Path			

Figure 2: overview of learning paths

The current state of the master-view page provides the ability to show both the owned and co-edited lists, the control to expand/collapse each row to access to show some key information (description, delivery-mode, names of co-authors, workload), the possibility to create new learning paths and copy an existing learning path. Besides, on our agenda we have extensions towards ordering the lists of learning paths alphabetically or according to date.

1.2.2 Metadata view

The *metadata view* provides a ‘form’ which contains information about the learning path (Fig. 3).

In case the author clicked “New Learning Path” to create a new learning path from the master-view page, the form is empty and the author first has to minimally specify a title, description and competence profile before he or she can actually start selecting and organising learning actions in the design view.

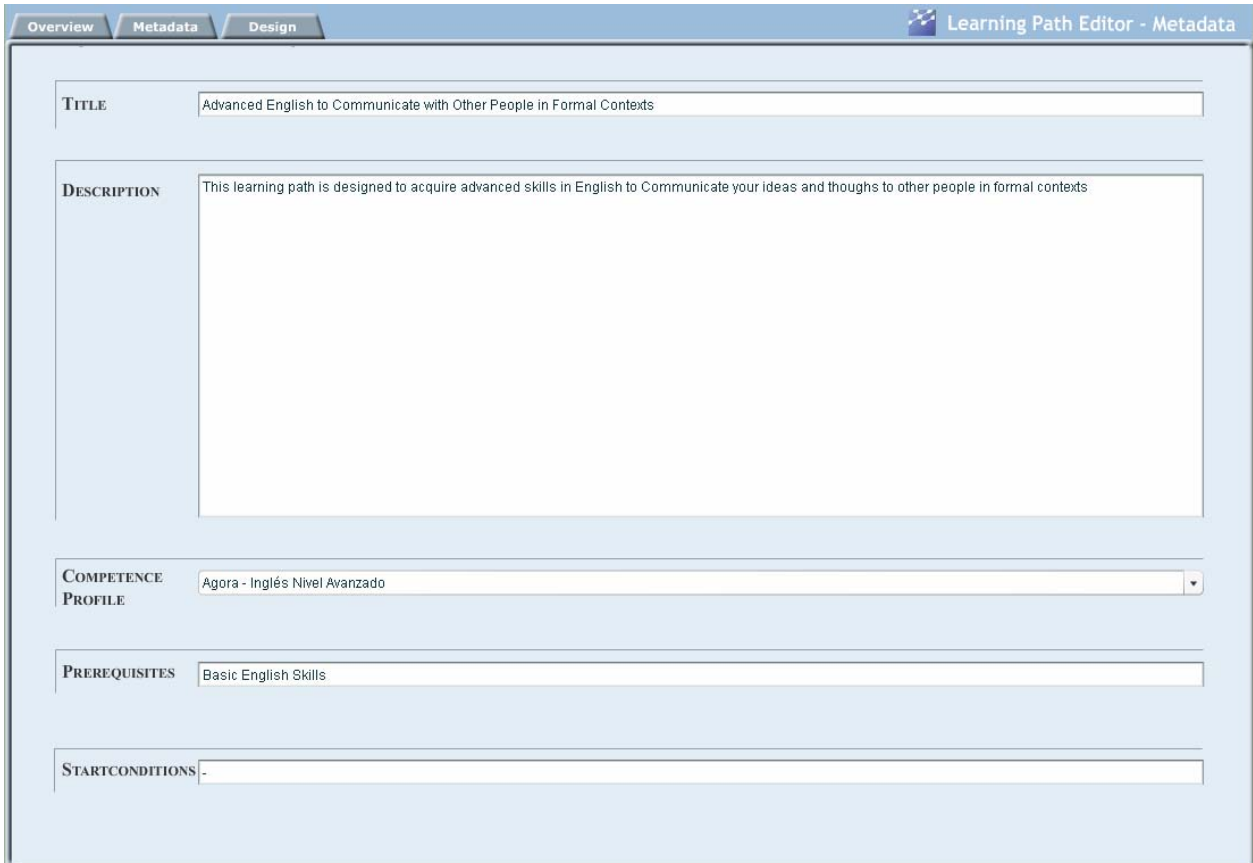
Straightforward though the metadata view may seem, it merits a closer look before directing our attention to the design view. Table 1 describes all the metadata defined through the metadata view. (Note that the screenshot of Fig. 3 allows only a partial view on the set of metadata). Several other metadata (ID, URI, and Creator) are generated automatically and remain in the background.

Metadata	Description
Title	Title of the learning path.
Description	Short general description of the learning path.
Competence profile	One or more competences and associated proficiency levels which constitute the targeted endpoint of the learning path.
Prerequisites	One or more competences and associated proficiency levels which the learning path presumes the learner has already attained.
Start conditions	Specification of practical, pedagogical and technical issues that must be satisfied to be able to follow the learning path, e.g. minimum age, minimum group size, computer equipment.
Workload	Estimated workload of the learning path specified in hours.
Costs	Total costs of enrolment and specific expenses (books, tools, et cetera). The Costs element contains an attribute 'currency'.
Start date	Optional attribute to specify fixed starting dates for the learning path.
End date	Optional attribute to specify fixed end dates for the learning path.
Completion	Specifies whether it is up to the learner to decide the learning goals have been reached or whether some kind of assessment is in place.
Language	Language of the learning path.
Provider	Provider of the learning path. If the learning path involves more than one provider this element contains the main provider.
Delivery mode	Mode(s) used for the delivery of the learning path: distance learning, face-to-face, or mixed.
Recognition	Specifies whether successful completion of the learning path leads to a formally recognized diploma or certificate.
Guidance	Description of available support in terms of tutoring, counselling, feedback, et cetera.
Attendance hours	Estimation of number of hours for real-time learner attendance the learning path requires. Note that attendance may be on location or virtual.
Assessment	Description of the formative and/or summative assessments available to determine to what extent the learner has acquired the competence(s) at the specified level.
Further information	Description of more detailed information on the learning path (may contain URL's).

Table 1: Metadata of the learning path

It is noteworthy that the metadata from Table 1 serve various functions in the processes of designing, selecting and presenting learning paths. The title of a learning path for instance will be used for keyword search and for the presentation of the learning path for instance in search results. Costs might be used in an advanced search to enable learners to specify maximum costs they are willing to pay. Workload might be used in the same way by both learners and authors: to filter the amount of learning actions possibly suitable when only the competence profile is taken into account. Start conditions on the other hand, provide crucial information for learners, but can hardly be used in an advanced search since they vary widely and are hard to categorise. Still this information can be crucial for a learner to decide the learning path is not suitable despite the fact that it constitutes a match in terms of the competences and levels it helps to attain.

An important feature of the metadata view, hinted at earlier, is the fact that the competence profile addressed by the learning path is selected and included from an external source. A competence profile must be selected before a learning path can be designed because the design view needs this information in order to present relevant learning actions, as will be further illustrated in the next section.



The screenshot displays the 'Metadata' view of the Learning Path Editor. It features a light blue header with three tabs: 'Overview', 'Metadata', and 'Design'. The 'Metadata' tab is active. The main content area contains several input fields:

- TITLE:** A text box containing 'Advanced English to Communicate with Other People in Formal Contexts'.
- DESCRIPTION:** A large text area containing 'This learning path is designed to acquire advanced skills in English to Communicate your ideas and thoughts to other people in formal contexts'.
- COMPETENCE PROFILE:** A dropdown menu showing 'Agora - Inglés Nivel Avanzado'.
- PREREQUISITES:** A text box containing 'Basic English Skills'.
- STARTCONDITIONS:** A text box containing a hyphen '-'.

Figure 3: Metadata view of a learning path

Regarding the functionalities of the metadata view, currently it allows filling each field of the form, selecting a competence profile from a repository, and it also advises the author in case he/she didn't select at least one competence profile. In this case, following message appears: "A competence profile must be selected before a learning path can be designed". Besides, we are considering extending the functionality of this view by having further information in the sense that upon selection of a competence profile, the interface shows all (most popular/highest rated....) 'public' (reusable) learning paths related to this profile, as well as key metadata about these learning paths (description, provider, workload, delivery mode) similar to the list of learning paths in the Learning Path Editor (with collapse and expand control).

1.2.3 Design view

The *design view* is responsible for the creation of learning paths in a way of sequences and selections. The activities for creating each learning path are related to the competences of the selected competence profile from the metadata view. For this reason, When a competence profile is selected in the metadata view this will result in an import of the competence profile in the Learning Path Editor in such a way that:

- the competence profile field of the metadata view (Fig. 3) is filled with the title of the competence profile
- the profiles competences and associated proficiency levels are presented in the top pane of the design view (Fig. 4)
- available learning actions leading to the attainment of these competences and associated proficiency levels are presented in the left hand pane of the design view.

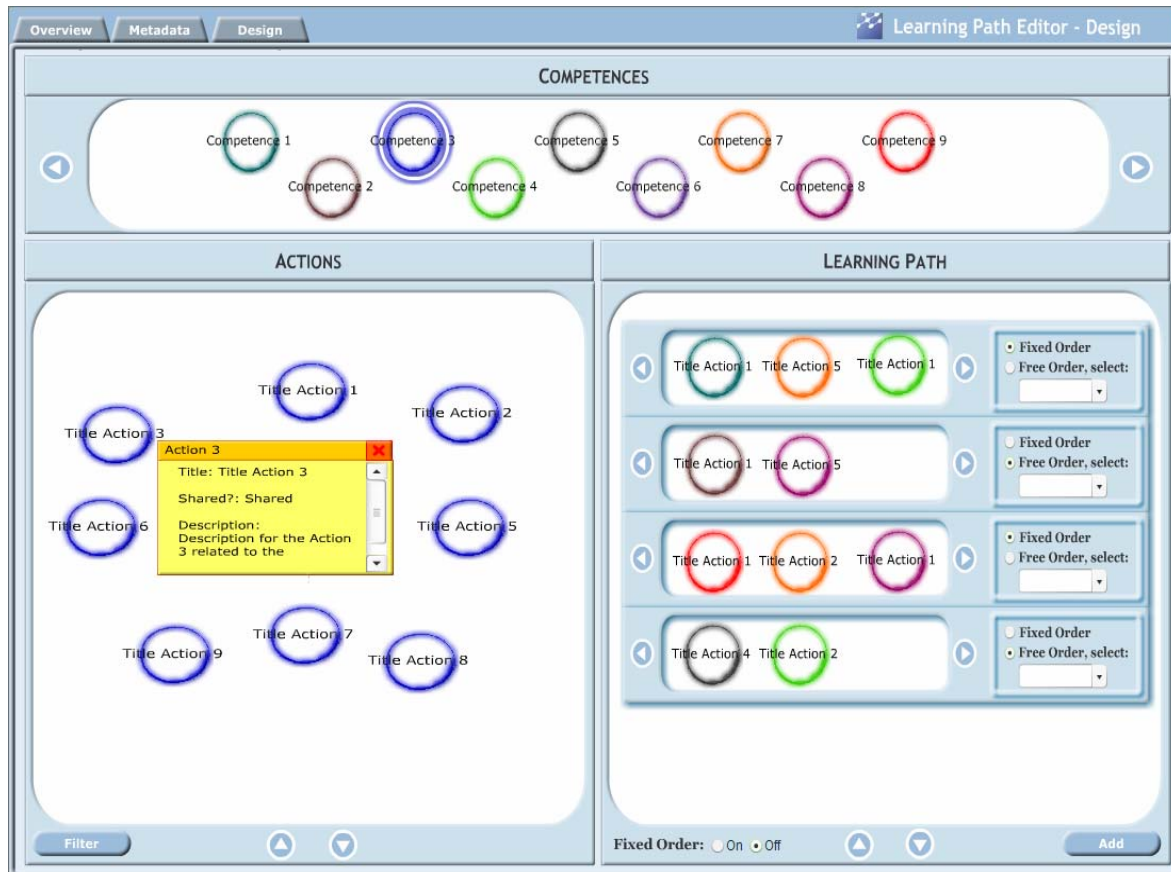


Figure 4: Design view of a learning path

The graphical user interface of the design view (Figure 4) was developed reusing the interface of the tool developed to visually support the creation of personal development plans by learners [21]. The interface combines aspects of concept mapping with a ‘bubble metaphor’: both competences and learning actions are represented by bubbles and they constitute a match when they have the same colour. With visual cues like these, the interface supports the functionality in a straightforward way.

This view is divided into three panes: the top pane containing the competences related to the competence profile selected in the metadata view; the left hand pane which contains the activities related to each competence: and, the right hand pane where the paths of activities would be created. Moreover, moving the mouse over a competence in the top pane, highlights the coloured circle that represents it as well as the learning actions in the left hand pane which have the same colour, i.e. which lead to attainment of the selected competence. When clicking on a learning action, a small pop-up window appears providing a short description of the learning action, its workload, delivery mode, start date, and start conditions (if specified).

Note that the Learning Path Editor relies on a repository of metadata describing learning actions to fill the left hand pane with learning actions that match with the competences of the competence profile selected in the metadata view. The author can further filter the learning actions shown in the left hand pane by clicking the button ‘filter’ which enables specification of the language, delivery mode, location, workload, recognition, provider, and start date for the learning actions to be shown in the left hand pane. Especially when large numbers of learning actions are available this offers a means to select learning actions in line with the author’s intentions and learner preferences. One by one the author selects the competences in the top pane as well as learning actions to be used in this learning path for the attainment of this competence. The learning actions to be used for a selected competence are dragged and dropped to the right hand pane describing the learning path. Here the learning actions are organised in sequences and/or selections. Switching to another competence the filter can be used again if necessary to specify different requirements for the actions desired for this other competence.

Thus a learning path can consist of a mixture of formal and non-formal and informal learning actions, or a learner can be offered a choice from these for the development of particular competences.

By default the sequences and selections that are subsequently modelled constitute overall a sequence, but the author can change this into a selection by setting 'Fixed Order' to 'off'.

1.3 Conclusions

The Learning Path Editor is a tool that enables the description of all kinds of personal and professional development, whether consisting of formal, non-formal or informal learning, in accordance with the learning path specification. An important asset of the learning path specification and of the Editor is the fact that they draw on standardised competence descriptions, which not only serves to guide the design of learning paths but also to enhance comparison, choice and personalisation of learning paths. Both the specification and the tool assume that competence profiles have been described and can be included by reference. The tool further relies on a repository of metadata that describe and point to learning actions.

Further functionality we plan to implement in the design view is recommendation of a learning action in case it addresses the competence currently being designed while it has been included in the learning path already to cover a previous competence. This learning action will then be recommended for the current competence, since this would increase efficiency for the learner.

In addition we will improve the functionality of the Learning Path Editor by promoting reuse of learning paths: upon selection of a competence profile in the metadata view the interface shows all (most popular/highest rated) existing learning paths related to this profile as well as key metadata about these learning paths. The author wants to create a learning path for this competence profile, but maybe a suitable learning path already exists which could be used perhaps with some minor adaptations. Selecting an existing learning path will result in an imported copy of this learning path and the author can subsequently adapt its metadata and/or design.

We are currently developing a framework for the evaluation of the learning path specification, based on theories and research regarding conceptual model quality [22]. This framework starts from the familiar distinction between syntactic, semantic and pragmatic quality of conceptual models [23]. A current investigation of lifelong learners' choice processes using semi-structured interviews was designed to assess semantic quality: does the learning path specification address key aspects of these choice processes without being redundant? The Learning Path Editor described in this paper will serve to evaluate pragmatic quality of the learning path specification: is the specification easy to understand/apply and is it considered useful? Inevitably, this represents a situation not unlike Plato's allegory of the cave, for the Learning Path Editor is merely a reflection or representation of the learning path specification rather than its 'real' Form, as was illustrated in this paper. In other words, we will have to rely on users' evaluation of the purpose of the learning path specification as conveyed by the Learning Path Editor to assess its pragmatic quality. The challenge will be to disentangle evaluation of the specification, the functionality of the Editor, and the user interface.

References

1. Livingstone, D.W.: Exploring the Icebergs of Adult Learning: Findings of the First Canadian Survey of Informal Learning Practices. NALL Working Paper No. 10, <http://www.nall.ca/res/10exploring.pdf> (1999)
2. Skule, S.: Learning conditions at work: a framework to understand and assess informal learning in the workplace. *International Journal of Training and Development*, 8 (1), 8-20 (2004)
3. Colley, H., Hodkinson, P., Malcom J.: Informality and formality in learning: a report for the Learning and Skills Research Centre. Learning and Skills Research Centre: London (2003)
4. CEC, A Memorandum on Lifelong Learning. Commission of the European Communities: Brussels (2002)
5. Chen, S.Y., Fan J.-P., Macredie, R.D.: Navigation in hypermedia learning systems: experts vs. novices. *Computers in Human Behavior* 22, 251-266 (2006)
6. Lea, S.J., Stephenson, D., Troy, J.: Higher Education Students' Attitudes to Student-centred Learning: beyond 'educational bulimia'? *Studies in Higher Education*, 28 (3), 321-334 (2003)
7. Yorke, M.: Leaving Early. Undergraduate Non-completion in Higher Education. London: Falmer Press (1999)
8. Simpson, O.: Access, Retention and Course Choice in Online, Open and Distance Learning. In: Third Eden Research Workshop. Oldenburg, Germany (2004)
9. Kilpatrick, S., Fulton, A., Johns, S.: Matching training needs and opportunities: the case for training brokers in the Australian agricultural sector. *International Journal of Lifelong Education*, 26(2), 209-224 (2007)
10. Klink, M.v.d., Boon, J., Schlusmans, K., Boshuizen, E.: Learn as you like. Research into informal learning of employees. Paper presented at AERA, San Diego (2009)
11. TENCompetence Integrated Project, Building the European Network for Lifelong Competence Development, <http://www.tencompetence.org> (2005)
12. XCRI, eXchanging Course-Related Information, <http://www.elframework.org/projects/xcri> (2006)
13. CDM, A Specification of Course Description Metadata, <http://cdm.utdanning.no/cdm/cdm-2.0.1/doc/courseDesc201004.pdf> (2004)
14. MLO-AD, Metadata for Learning Opportunities (MLO) - Advertising, <http://blogg.skolverket.se> (2008)
15. IMS-LD, IMS Learning Design Information Model. Version 1.0 Final Specification, <http://www.imsglobal.org/learningdesign/index.cfm> (2003)
16. Janssen, J., Berlanga, A.J., Vogten, H., Koper, E.: Towards a learning path specification. *International Journal of Continuing Engineering Education and Lifelong Learning*, 18(1), 77-97 (2008)
17. Janssen, J., Hermans, H., Berlanga, A. J., Koper, E.: Learning Path Information Model, <http://hdl.handle.net/1820/1620> (2008)
18. Van Assche, F.: Linking Learning Resources to Curricula by using Competencies. In: First International Workshop on Learning Object Discovery & Exchange (LODE'07). Crete, Greece (2007)
19. Kickmeier-Rust, M.D., Albert, D., Steiner, C.: Lifelong Competence Development: On the Advantages of Formal Competence-Performance Modeling. In: International Workshop in Learning Networks for Lifelong Competence Development, TENCompetence Conference. Sofia, Bulgaria (2006)
20. TENCompetence, TENCompetence Domain Model, <http://hdl.handle.net/1820/649> (2006)
21. Melero, J., Hernández-Leo, D., Arroyo, E., Aguilar, A., Blat, J.: An approach for visually supporting the creation of Personal Development Plans. In: The 9th IEEE International Conference on Advanced Learning Technologies. Riga, Latvia (2009)
22. Moody, D.L.: Theoretical and practical issues in evaluating the quality of conceptual models: current state and future directions. *Data & Knowledge Engineering*, 55, 243-276 (2005)
23. Leung, F., Bolloju, N.: Analyzing the Quality of Domain Models Developed by Novice Systems Analysts. In 38th Annual Hawaii International Conference on System Sciences. Hawaii (2005)

24. IEEE/LOM. (2002). Standard for Learning Object Metadata. Learning Technologies Standards Committee of the IEEE 148.41.21. from http://ltsc.ieee.org/wg12/files/LOM_1484_12_1_v1_Final_Draft.pdf
25. Janssen, J., Berlanga, A., Vogten, H., & Koper, R. (2008). Towards a learning path specification. *International Journal of Continuing Engineering Education and Lifelong Learning*, 18(1), 77-97.
26. GeORSS simple. <http://georss.org/simple> (version of 22 April 2009).