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Knowledge Sharing in a Learning Resource Centre by Way of a Metro Map Metaphor

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Abstract:

This paper presents a Knowledge Sharing project at the Aarhus School of Business. As a result of a close co-operation between the Faculty of Modern Languages and the Library of the Aarhus School of Business a Learning Resource Centre (LRC) is being established. The LRC serves as an exploratorium for the development and the testing of new forms of communication and learning, at the same time as it integrates the information resources of the electronic research library. The Library of the Aarhus School of Business acts as a facilitator and is the hub of the learning environment responsible for the development of methods and tools for the common platform of knowledge sharing. In an interaction between the professional learning environments, the Library and an external IT development environment, it is the objective to create models for Intelligent Knowledge Solutions that can contribute to form the learning environments of the School in the 21st century.

Keywords
Knowledge Management, Knowledge Sharing; Guided tour; Navigation; Hypermedia; Metro Map metaphor; Library portal; Learning Resource Centre, LRC; Intelligent Knowledge Solutions

1. Introduction

This paper presents the results of a co-operation so far achieved between the Faculty of Modern Languages at the Aarhus School of Business and the Library of the School. The objective of the co-operation is to create a room for knowledge sharing and at the same time to develop tools that contribute to facilitate knowledge sharing in a modern international environment of education and research at the Aarhus School of Business. With the Library

of the School as the centre of rotation the co-operation has up to now resulted in the establishment of a Learning Resource Centre (LRC) which primarily is aiming at servicing students, teachers, and researchers at the Faculty of Modern Languages of the School. The LRC is placed in close connection with the premises of the Library of the School and is in process of continued development.

The LRC has been established in close co-operation between researchers, teachers, and library. The co-operation has been impelled by an urgent need of initiating experiments with new forms of learning and education, new forms of evaluation of the studies, and new ways of giving students, teachers, and researchers access not only to quality-assessed information resources, but also to selected learning resources and to the related technology support. Realizing that the information resources of the electronic research library constitute an increasingly important supplement to the study preparatory work of the university students and to the facilitation of learning, to the acquisition of knowledge and to the spreading of research results for the education, the Library develops a range of new services that bring the Library into the central position as a natural facilitator in the learning environment. The LRC is first and foremost thought as an "exploratorium for new forms of learning".

The exploratorium makes knowledge available via a web-based user interface. The user interface has associations of a METRO map. The metro metaphor has proved suitable because it is simple and at the same time a fascinating model that most people know from their everyday lives. The metaphor gives a general view and is useful for structuring a very large amount of web sites. With a metro map it is difficult to get lost. All along you can follow a predefined search route for the drive of the journey from station to station on a key map. You can even get off and on as you like, without losing track of where you are. The chosen Metro metaphor is based on the use of the open hypermedia system called Webwise. The Library has chosen to use the metaphor as a basis for constructing paths in the form of guided tours to the learning and information resources in the LRC.

2. The Need for New Learning Environments

In recent years the study and learning environments at the institutions of higher education in Denmark have changed character. The students still follow the conventional courses of lecture, but the responsibility for own learning is constantly increasing, and to a large extent they work problem-based and project-orientated. They primarily work in groups or teams. New forms of study make heavy demands on the teachers and the students as to organize and co-operate to solve the tasks set. For example, today the students need more than earlier to meet between the lectures. They need to be able to get information and source material for preparing their seminars and projects. In this serious working process, they have a constant need for being able to contact teachers as well as information specialists in order to get advice and guidance. New and different physical and intellectual demands on facilitation of the study and working process thus arise, something that is a quite natural consequence of the modern teaching methods.

The frames earlier set by the traditional classroom and lecture-room education do not suffice. The students of today need to meet in seminar rooms with facilities, and where access is given to a wide range of quality-assessed information resources – printed and electronic – and user support tools side by side with teaching materials and learning tools. Add to this the need for having the opportunity to consulting professionals – preferably all the 24 hours.

This draws a picture only of the traditional students studying in the daytime at the universities and the institutions of higher education. Distance learners and students studying part time have specific needs. Not to speak about the students of tomorrow of, for example, Denmark's Virtual University. These last mentioned groups are students with whom the learning environment and the Library can only interact via the internet – via electronic user interfaces and in virtual net-based learning environments. To support studies and learning of such dimensions is a new and enormous pedagogical challenge to all institutions of higher education and research libraries, and it is a challenge that we have to prepare ourselves to meet.

2.1 Demands on the Research Library in the New Learning Environment

The research libraries do what they can to develop and to adjust facilities and frames to the changed study and learning conditions. The libraries have always provided reading desks and access to literature. But most institutions have had to admit that in recent years it has been more than difficult to satisfy the massive demands from the students on multi-faceted study facilities.

- On one hand silent reading rooms for individual concentration and, on the other, group rooms for loud discussions and talk.
- Access to printed as well as electronic information resources. The latter requires lots of hardware.
- Continued wish that the Library gives access to different kinds of software that are used in connection with the study, again something that requires lots of hardware.
- Wish that the supervisors are regular visitors to these combined libraries/study facilities – in order to guide the students in professional matters – or that it is possible to establish an electronic dialogue – preferably all the 24 hours.
- Unlimited opening hours.
- Last but not least, a wish for the Library to be a drop-in centre. A place where you can concentrate, but at the same time a place where you can take refreshment while reading today's paper. Food for the mind does not suffice – even for intellectual youngsters!

The new rooms of the research library are to a higher degree to be formed as modern learning workshops. Facilities for library services, education, and breaks are to melt into a whole. It is time to admit that the students of today have a changed profile and changed study behaviour. Therefore, the new demands and the changed behaviour have to be taken into account when establishing the learning environments of tomorrow.

2.2 The Changed Typology of the Students and the Framework for Learning

The typology of the students has changed concurrently with important changes in society and on the labour market. A typical staff member has six to eight jobs in the course of his or her career. In future, appointed on a contractual basis and for a limited period of time, one will actually be a student following courses of further education all through life. The variation in age, social status and ethnic extraction will be much wider than today. Many new users will attend the system of higher education all through their working lives. To the young people on the educational market it applies that they often are active on the labour market as well. The need for access to more flexible learning environments is therefore rapidly increasing.

The students will to a still larger extent need to have the options of tailored educational programmes – "just in time – just for me". From being passive recipients of learning the students of today are more active players who are critical of the learning situation and will consequently contribute to change the performance of the teacher. A new generation is on its way into the system of higher education, the so-called "Nintendo Generation". It consists of young people who during their childhood have learned by non-linear methods. A characteristic of this generation is that they take a look at the graphics first and do many things in parallel. They seek interactive and funny learning experiences. If the institutions of higher education shall be able to provide meaningful and relevant educational options, it is a must that learning environments are developed to improve improvisation, exchange of ideas and which offer an educational substance that is generated by bringing the total knowledge capital of the educational environment in play – i.e. researchers, teachers, information specialists – and that all this takes place through a barrier-breaking co-operation across the professional environments – educations and library.

In the 1990's many beautiful and functional research libraries have been built in Denmark. Everywhere it has been tried to take due account of the development and to look into the crystal ball. This has resulted in fantastic buildings. However, we also experience that it has been difficult to foresee the new needs of the users. At any

rate, we must realize that the organization that today forms the framework of many Danish research libraries is tightening in relation to the news users' wishes and needs.

2.3. Learning Resource Centre – what is it?

The demands made by the users on modern study and learning facilities cross not only the organization of the individual library, they challenge the organization of the entire institution of higher education – across professional areas. A close co-operation to solve the total facilitation task is therefore not only an opportunity, but a mere necessity, if it is to succeed. The centre of rotation of such a co-operation can physically be a Learning Resource Centre, which just now is being realized in various disguises.

There is no unambiguous definition of what a Learning Resource Centre is. In the US learning resource centres have been known for years, but the concept has been given a somewhat different meaning, and the contents have been a little different from what we in the Nordic Countries like to acknowledge. Our differentiation between what is offered in the traditional library and in a LRC normally is the following:

	Learning Resource Centre	Traditional library
Relation to the learning environment	A LRC is based on interaction with teachers and pedagogical support functions. The "teaching and learning"-concept implies that it is not directly assumed that education alone leads to learning.	The contact to the educational sector has so far primarily been based on one-sided servicing of research and education. The library has facilitated the education without having been directly involved in the learning situation.
Guidance	Guidance also includes the use of IT in connection with the traditional reference service.	Only to a limited extent has the guidance included IT-technical support.
Holdings	Dynamic net-based information resources and printed media side by side with electronic educational programmes and courseware for e-learning.	More static holdings
Work stations	Large number of work stations for groups of students, teacher-controlled work stations, seminar rooms, exploratorium for learning.	Work stations and traditional reading rooms
User behaviour and premises	The students can work in a LRC all the 24 hours as a learning workshop. Open and flexible framework and organization.	The users can use the library in the opening hours. Traditional framework of a library.
Staff to service the users	Librarians, information specialists and staff with specific IT professional qualifications.	Librarians and, to some extent, staff with professional qualifications.

Comparison of a Learning Resource Centre and a traditional library
Source: Guldbraar 2000: 36-37 .

2.4 Learning Resource Centre (LRC) at the Aarhus School of Business

In September 2000, the Library of the Aarhus School of Business opened a LRC. As already mentioned the centre was established in close co-operation between the Faculty of Modern Languages and the Library of the School. In the centre attempts are made to meet a plurality of new demands on learning facilitation. Thus the centre at a time becomes a physical entity, as is the Library. But at the same time the aim is to make electronic information resources and learning tools available via a portal that has a well-arranged and clear user interface accessible all the 24 hours.

The centre has primarily been organized as a workshop for learning. It is used as an exploratorium for development of new forms of education, learning and evaluation as well as a laboratory for training of teachers who are to act as facilitators in the new learning environments. The resources of the centre are a lot of hardware

– i.e. 70 IT workstations – but most important is the lot of software in the form of study tools, CALL programmes, dialogue tools, course packages, and user support tools as well as the access to the quality-assessed information resources that can be reached from here. All tools and information resources are accessible via the METRO – a user interface developed in co-operation between teachers and researchers at the Faculty of Modern Languages, a research environment emerged from the Department of Computer Science at the University of Aarhus – Hypergenic A/S – and the Library of the Aarhus School of Business.

The METRO allows a graphically oriented user an easy navigation round the information and learning resources displayed in the show window of the electronic study of the LRC. The interdisciplinary co-operation between philologists, the Library, and IT developers has been a great and exciting challenge. The entire concept of the LRC is based on a strategy for KNOWLEDGE SHARING across professional competence and development environments.
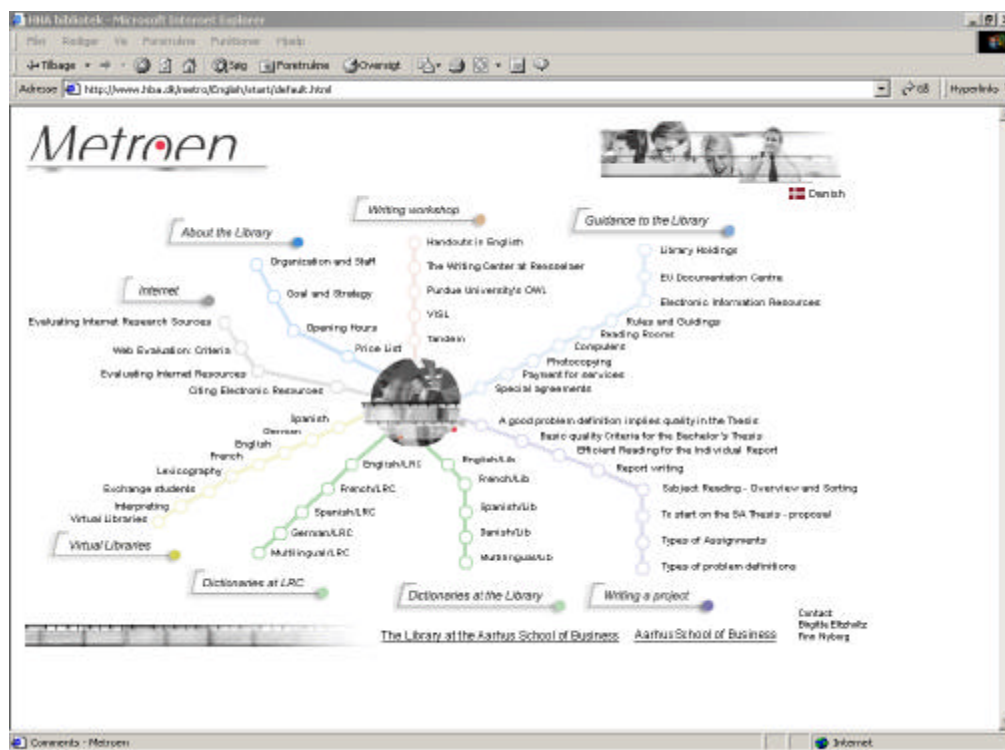

Source: The metro map metaphor used as guidance system in the Learning Resource Centre at the Aarhus School of Business

3. Knowledge Sharing in a Learning Resource Centre

The Learning Resource Centre of the Library of the Aarhus School of Business rests basically on six columns. The columns are pillars in the strategy that underlies the decision of organizing a co-operation about knowledge sharing between the educational environment and the Library as the central foundation for the establishment of the learning exploratorium.

The fact is that the LRC is more than a matter of the library, it is also more than just a physical reorganization of the library. The LRC calls for fundamental changes of the pedagogical rationale of the Aarhus School of Business, and the establishment of the learning exploratorium will therefore have enormous professional, organizational and educational implications for the learning environment of the Faculty of Modern Languages and of the School as a whole. And not only that – the exploratorium will also gradually influence the co-operation with the surroundings of the School, including the ministries responsible, among other things, in relation to the future planning of study programmes and evaluation methods. For these reasons alone, the establishment of the LRC demands new thinking of the pedagogical practice. Discussions have thus been started

about change of organizational forms and new demands on organization of future classrooms. Precisely because of the many complications that surround the establishment of a LRC, it takes a long time. Quite naturally, the LRC idea meets with reservation and resistance in some circles and with enthusiasm in others. It is therefore of utmost importance that the professional environments and the management of the whole educational institution have an eye for the organizational challenges that follow in the wake of the establishment of a LRC and take their time to have this debate.
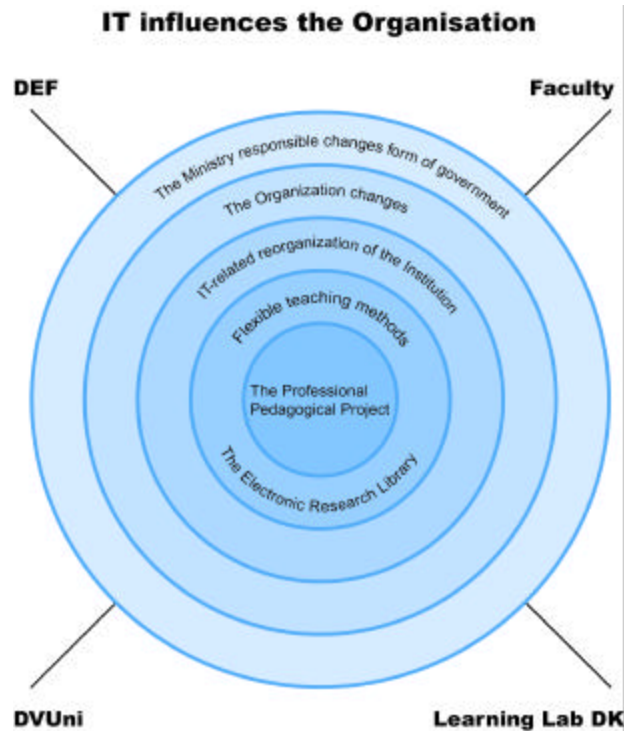
The model illustrates how the professional pedagogical project and a knowledge sharing project influence the internal and external environment of the organization.

### 3.1 Strategy for Knowledge Sharing in the Learning Resource Centre of the Arhus School of Business

The six columns mentioned form the foundation of the knowledge sharing strategy upon which the Learning Resource Centre of the School and the co-operation between the Faculty of Modern Languages and the Library are based.

The starting point of the establishment of the LRC has been to get in step as to the aim of the strategy:

- Why share knowledge in the LRC of the School?
- Which knowledge do we want to share?
- With whom to share the knowledge made available?
- How is the knowledge going to be shared?
- How are knowledge sharing and learning going to be integrated?
- How is knowledge sharing going to be facilitated?

The purpose of the School in establishing a LRC is to create the best possible framework for facilitation of the learning environment of the students and of the teachers and researchers. It has been agreed that the best way to achieve this is to collect and share all the knowledge that exists in the two environments and thus establish a barrier-breaking co-operation that builds upon the multi-faceted qualifications that the environment contains.

Add to this a close dialogue and a development co-operation with experts from the internal and external IT environment who have know-how and knowledge of the tools that can support the expertise that the two environments contain, then a basis is constituted – other things being equal – for creating "Intelligent Knowledge Solutions". Intelligent Knowledge Solutions are solutions that arise in the synergy of the interaction between people and in consideration of the surroundings that the solutions are to be a part of. With the general view and the user orientation as constant components of the intelligent solutions an *increased value* is created for the users – the students and the learning environment.
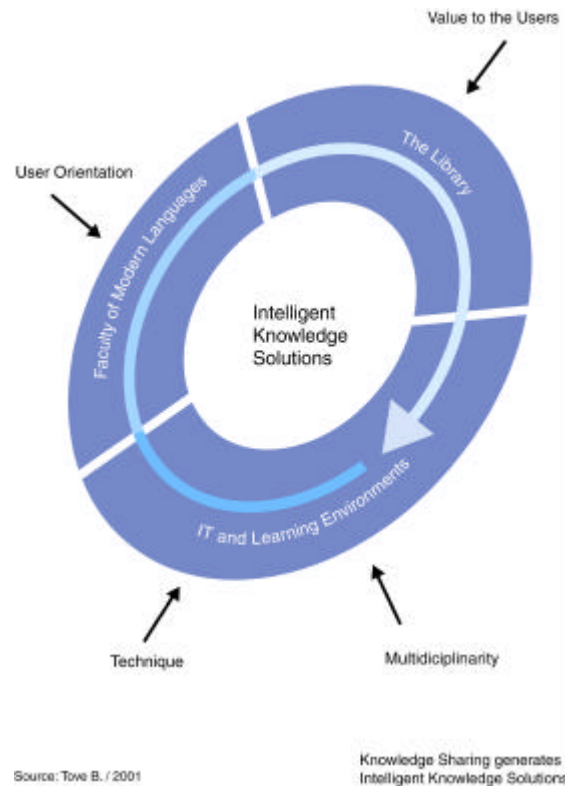
Knowledge sharing is a means to generate Intelligent Knowledge Solutions.

Demanding new students and the need for the development of new forms of learning, examination, and evaluation, as well as the ability of the educational establishment to continue to attract the best students in the intensified and global pursuit of the competent students, is a challenge to every institution of higher education in these years – and also to the Aarhus School of Business. The electronic research library will experience its actual breakthrough when the rapidly increasing number of net based information services are capable of facilitating the learning environment with learning and information services that are *tailored* for the users and experienced as an *integrated part* of a learning portal. With their basic competence within quality assessment, sorting, classification, and making materials accessible, the librarians are qualified for a close interaction with the teachers regarding the selection of the contents of the learning portal and the technological opportunities to facilitate teachers and students. In the dialogue between teacher and library the Library of the Aarhus School of Business has experienced the emergence of quite new role models for learning that can only develop in environments where there is a *will* to share knowledge.

3.2 Facilitation of Knowledge Sharing in the LRC of the Aarhus School of Business

IT is well on the way to be fully integrated and a principal platform in all respects at the Aarhus School of Business. Knowledge sharing and team management are new forms of co-operation with which experiments have been done in the new learning environments. The learning and the communication of knowledge are

individualized, personalized, and democratised. New concepts are on the way for the teacher's new role as coach, initiator and facilitator, and also the new role of the individual learner as the actual centre of education – with the pedagogical, psychological and social aspects involved, is new in the learning environment.

Also the development of the research, nationally as well as internationally, can be strengthened considerably by technology support. The existing internal and external, national and international researcher networks and groups can optimise the co-operation far more by including, for example, client and web based conference systems as well as video conferences, and the spreading of research results can take place at a markedly more rapid pace and to a markedly larger circle, whereby the scientific discussion can go into quite another depth and to quite another extent than is known today. Here the Library has an important role to play.

However, knowledge sharing does not only take place in the physical meeting between teacher and library. Knowledge sharing also takes place virtually through the electronic tools that, for example, support the selection of materials, the personal contact arrangements, maintenance of the virtual libraries, by the composition of the electronic course packages and regarding the composition and the clearing of the information made available in the teacher's syllabus. At the Library of the Aarhus School of Library we have gained rich experiences by presenting and communicating in virtual surroundings. Both in relation to distance learning students and part-time students and to a limited extent in relation to virtual university students. It is our belief that precisely these two target groups to an increasingly higher degree will represent our group in the future, and the librarians will have to gear up for offering the corresponding service. The electronic research library is ready to be fully integrated in the virtual offers of education and courses of the future. The bid of the Library of the Aarhus School of Business for this integration implies a close co-operation with the teachers regarding the creation of electronic educational packages.

As was the case in creating the best possible physical framework for study and learning, the interdisciplinary qualifications have to be in play in order to obtain the best results. To prepare the best electronic educational offers, with parts of the electronic information resources of the Library integrated, these have to be taken into account early in the process, and the dialogue between teacher and library is to start already here. Experience shows that the partners can inspire one another in this course and thus enrich the finished educational offer. An intensified interdisciplinary co-operation between the professional environment and the library is therefore crucial, in case the study and learning environments of the future are to offer the optimum service.

4. Take the Metro to New Knowledge – The Software Used to Create the METRO

The Library of the Aarhus School of Business has chosen to develop a knowledge distribution platform for its Learning Resource Centre – called the METRO. The METRO is developed as a portal and a guided tour that - as already mentioned - are based on the use of the software application Webvise, now marketed under the name of WebNize 1000.

The Webvise system is a full-blown open hypermedia system, which has been extended by an integrated guided tour editor and viewer as well as a generator to export guided tours in plain HTML and PNG formats for access through a browser only. The Webvise Guided Tour Systems are inspired both by the classical hypertext research and the recent initiatives on the WWW, and it attempts to take further steps in the direction of supporting users in navigating through prepared presentations of subjects. Besides the inspiration from the classical hypertext system, we have been inspired by ideas of simplified metro or bus maps to communicate information on routes in a complex city. An idea inspired by a handcrafted library web page at Chalmers, Sweden.

4.1 The Metro Map Metaphor

Usage of the metro metaphor in guided tours has shown to be a highly successful technique for providing an overview over a set of web documents because the metaphor is very intuitive. Everybody knows how to read route maps for metros and busses. The main idea in using the metro map in the guided tour in the LRC is to

consider each major subject in the web information as a route on the metro map. When the reader wants to know something about a certain subject he just "takes the metro" on the route that deals with the subject. If the student is quite unfamiliar with the subject he could start at the central metro station – in the middle of the map – whereas more experienced readers can get on the metro further out on the route.

Metro maps are used to provide an overview when entering the information infrastructure, by showing an general view of all the routes. But the metro map has more to offer. Inside the metro wagons a horizontal map is shown with the stations on the route, which stations have already been visited and which stations are yet to be visited. This has inspired the presentation of a route map above the web document that is associated with each station, as will be shown in the following.
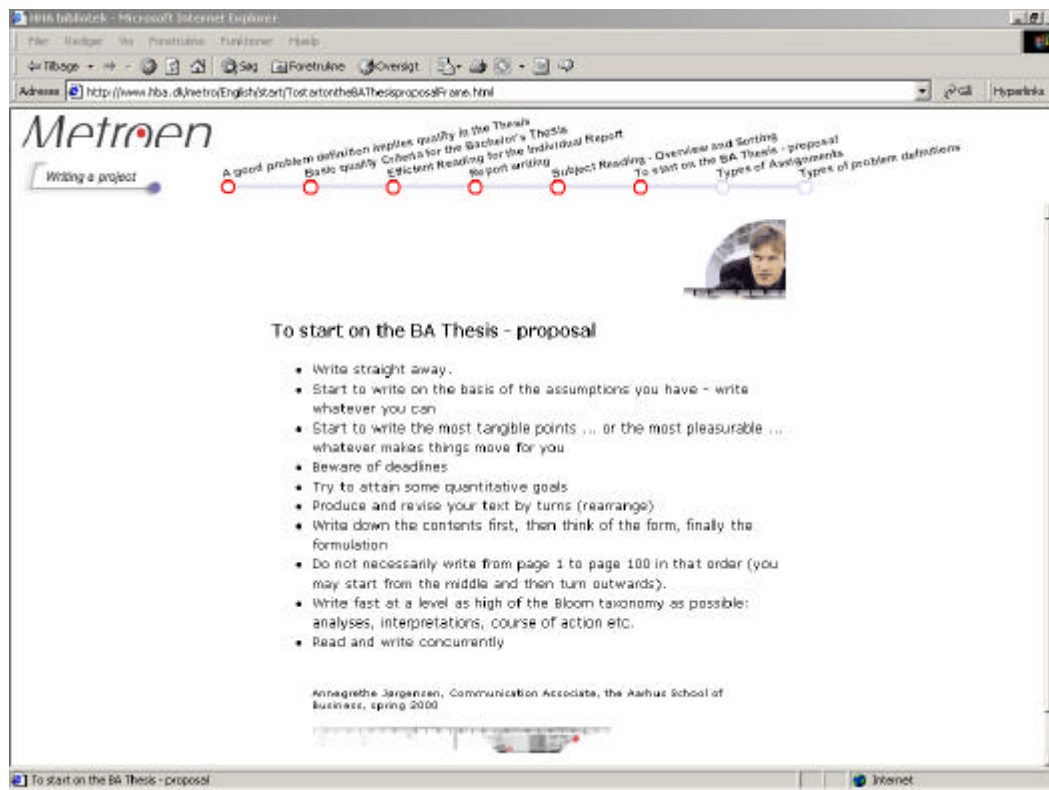
The figure illustrates the route map generated from the guided tour editor
Source: LRC The Aarhus School of Business 2001.

The learning and information resources of the LRC at the Aarhus School of Business are presented to the users as Guided Tours, as exemplified above.

5. Conclusion and Future Work

This paper has presented the experiences from a knowledge sharing project initiated at the Library of the Aarhus School of Business in the autumn of 2000. The Library and the Faculty of Modern Languages have established a Learning Resource Centre that builds upon a jointly accepted strategy for knowledge sharing resting on six pillars where the Library of the Aarhus School of Business has the role as the hub of the development of the frames and the facilities that are to secure an integration of the information resources of the electronic research library and which create new learning environments and a common platform for knowledge sharing.

At present the LRC forms the framework of the facilitation of learning and serves gradually as an exploratorium for learning. A learning workshop where teachers, researchers, meeting the new demanding types of students, can test new forms and methods of education, where new methods of evaluation and test forms can be

developed, where new pedagogical conquests can be tested in experimental forums, and where relevant resulting research can be initiated.

It is the aim that the LRC is gradually to develop Intelligent Knowledge Solutions. Intelligent learning and knowledge solutions are often complex. The solutions can therefore be made by utilizing all the multi-faceted qualifications that are among the teachers, researchers, and information specialists at the Faculty and the Library, and in consideration of the surroundings that the solutions become a part of.

The technological platform used by the Library of the Aarhus School of Business to establish a knowledge sharing system is a guided tour system integrated in the Webvise open media system. The Library chose the Webvise tool because it includes a series of the qualities that make it suitable for structuring large amounts of information and make them accessible in a clear and user friendly way. Status of the guided tour system is now that it is an integrated part of the Webvise system, which is being developed and used for a number of portal projects. The tool is now marketed under the product name of WebNize 1000 and WebNize 100. In connection with the further development of the LRC the development co-operation with the software company Hypergenic A/S will be continued and intensified. In this way, Intelligent Knowledge Solutions can be created in the future as a result of knowledge sharing and development co-operation, not only between researchers, education and the Library of the Aarhus School of Business, but through knowledge sharing that also includes involvement of experts from external IT development environments.

Acknowledgements

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Vitae

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The Library of the Aarhus School of Business is one of the twelve large research libraries of Denmark that is a main actor in the establishment of Denmark's Electronic Research Library (DEF). The Library has a staff of approximately 35 full-time equivalent, is experimental and, in recent years, has taken the initiative in carrying through a series of important development projects together with the professional environment of the ASB and with the electronic research library as the hub of the development. www.lib.hha.dk