



# UNIVERSITÄT PADERBORN

*Die Universität der Informationsgesellschaft*

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Institut für Informatik  
Fachgruppe Didaktik der Informatik

## **Bachelorarbeit**

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## ABSTRACT

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Short summary of the contents in English. . .

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## ZUSAMMENFASSUNG

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Kurze Zusammenfassung des Inhaltes in deutscher Sprache. . .



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## DANKSAGUNG

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Put your acknowledgments here.



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## ABBILDUNGSVERZEICHNIS

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## ABKÜRZUNGEN

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## EINLEITUNG

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Eine Masterarbeit ist international eine wissenschaftliche oder künstlerische Arbeit die für den Abschluss eines Master-Studienganges verfasst wird. Die Masterarbeit dient dabei im Allgemeinen als Nachweis darüber, dass der Prüfling in der Lage ist, eine wissenschaftliche / künstlerische Arbeit selbständig, aber unter Betreuung zu verfassen. Der akademische Mastergrad wird in der Regel mit einer Hochschulprüfung verliehen. Die staatliche Abschlussbezeichnung Master wird in der Regel durch eine staatliche Abschlussprüfung verliehen. Diese Abschlussprüfung eines Masterstudiengangs besteht in Deutschland in der Regel aus einem studienbegleitenden Teil, der Abschlussarbeit, der mündlichen Abschlussprüfung (an manchen Hochschulen) Zur Qualitätssicherung sieht die Kultusministerkonferenz für Masterstudiengänge obligatorisch eine Abschlussarbeit (Masterarbeit) vor, *“mit der die Fähigkeit nachgewiesen wird, innerhalb einer vorgegebenen Frist ein Problem aus dem jeweiligen Fach selbständig nach wissenschaftlichen Methoden zu bearbeiten”*.

Die Masterarbeit ist in der Regel entweder die letzte Prüfungsleistung oder die vorletzte Prüfungsleistung vor der mündlichen Abschlussprüfung. [Wikipedia](#) (2009)

**TODO 1.1**  
Zitate entweder in  
kursiv setzen oder  
die Umgebung  
quote verwenden

**Definition 1** *Das ist eine Definition.*



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## INTRODUCTION

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The Internet has evolved as the most frequently used medium in the 21st century and is continuously growing. The increasing amount of information on the Internet enables people to access almost anything they need. On the other hand, the Internet opens the door for a plethora of information that makes it difficult to get an overview and to select the most suitable information. This selection problem also applies to learners who get lost on the Internet. Learners use the Internet to find suitable information for their learning needs. Nowadays, they even can create, share, and use learning activities in Learning Networks. In Learning Networks learners are connected with each other and can benefit from the contributions of their members. This especially applies to informal learning that takes place during daily activities that are related to work and private life and does not lead to a certain accreditation. Furthermore, learning is no longer only a part of youth and adolescent but also it may happen during the whole life of a person – Lifelong Learning. Promising technologies to support people, in order to navigate to the most suitable information, are recommender systems. They are successfully applied at e-commerce web sites like Amazon.com, where people receive recommendations based on the products they are interested in. The recommender system matches customers with a similar taste of products and creates a kind ‘neighborhood’ of like-minded customers. It looks for related products purchased by the neighbors and recommends these to the current customer. This navigational support by recommender systems may help us to reduce time and costs involved in selecting suitable information on the Internet. They inspired us to improve the selection of suitable learning activities. This will help learners in selecting learning activities according to their individual needs, preferences and learning goals.

In this thesis we explore the potential of recommender system technology to recommend learning activities to lifelong learners in informal learning settings. The general research question of this thesis is:

*How can we best recommend suitable learning activities to lifelong learners in informal Learning Networks, taking into account their personal needs, preferences, and learning goals?*

This general introduction now first describes the Knowledge Society and the concept of Lifelong Learning. It will introduce the needs of individual learners to select more personalized learning activities. The second section explains the changes that have appeared within the Web 2.0 development efforts and their impact on the Knowledge Society and Lifelong Learning. The third section describes recommender systems which enabled a paradigm shift in economy by fostering an individual taste-driven digital market. The fourth section introduces the concept of Learning Networks, which describes the future of personalized learning in the Knowledge Society, with the use of Web 2.0 tools. The fifth section presents some more specific problems within the general research question. The sixth and last section gives an outline of the content of this thesis.

## 2.1 THE KNOWLEDGE SOCIETY AND THE CONCEPT OF LIFELONG LEARNING

In 1998 a first dawn of a change in the educational system was initially formulated by the UNESCO committee headed by Jacques Delors. The committee explained that the distinction between initial and continuous education will become outdated, and with the advent of the Knowledge Society, a new concept of learning is needed to support learning throughout the whole life. In the year 2000, the European Commission (European Commission, 2000) took over this new educational concept and presented a kind of 'Marshal Plan' for Europe to become a Knowledge Society for the highly competitive global market of the future. The so called Memorandum of Lifelong Learning describes the high demands for the Knowledge Society like highly educated people, higher qualification and accreditation possibilities, better inter-

operability between work and education, and enhanced support for personalized ways of learning. The Lifelong Learning concept became the central idea to shape the future of the educational system. In the future, the traditional formal school system will remain important to educate young people, but as the education is an ongoing process, they will need to learn throughout their whole life. Learning no longer remains limited to the context of a regular school or university, but is becoming increasingly integrated into workplace learning and personal development, where formal and informal learning activities have become intertwined. Especially informal learning has a major impact on the Knowledge Society as it is frequently used by adults to improve their competences. Lifelong Learning demands the educational system to adapt its organizations to the prior knowledge, habits, and preferred media of the learners to offer better opportunities for personalized learning activities throughout the life. This thesis aims to increase the amount of suitable learning opportunities to lifelong learners by offering navigation support for selecting more tailored learning activities. In the future, learning will become lifelong and the Knowledge Society will be increasingly based on information technology and the Internet (Cornu & Wibe, 2005). The Internet is already being used as 'the additional alternative learning resource' at educational institutes. The main characteristic of the Knowledge Society is that the learners, teachers and available learning activities are combined in networks which means that many activities like learning activities, course planning, and selecting learning activities are no longer organized in top-down hierarchical ways. Instead, activities emerge, and are created from the bottom upwards, which means that they originate from the interaction of learners, teachers and learning activities.

## THE WEB 2.0 DEVELOPMENTS

The networked Knowledge Society is more than ever empowered by the Web 2.0 development efforts. The so called Web 2.0 lifted the barrier of adding information to the Internet and enables people to contribute information to the Internet. It forces a tremendous change in society by democratizing the creation and dissemination of, and access to information for all people. The

passive audience of the Internet is becoming more active and strongly interconnected. The Web 2.0 technology enables loose collaboration between people, which changes the usage of the Internet from a passive, consumption-driven user model to an active, production-driven model. For instance, people can interact with each other in fast and cheap ways by using publicly available blogging services like [blogger.com](http://blogger.com) or exchange information in social networks like [facebook.com](http://facebook.com). They can publish and follow each other by receiving short status messages on [twitter.com](http://twitter.com) and are therefore increasingly informed about detailed activities of others in their network. The Web 2.0 tools will have influence on our educational system and the way we learn. In our view the networked Knowledge Society will soften institutional boundaries and strengthen informal learning. For instance, learners do no longer have to limit themselves to the lecture on the 'Introduction to the Semantic Web' at their local university. They can also surf to web sites like [videlectures.net](http://videlectures.net) or [youtube.com/edu](http://youtube.com/edu) and look for the best rated lectures about the semantic web. They can participate in the local forums and comment on the online lecture. As a consequence, they become free to study whatever and whenever they want. In addition, they receive recommendations for related and additional lectures on the web site, thus they have wider learning offers and options on the Internet than at their local university. Furthermore, the learners can use the Internet to find the experts on semantic web and follow their blog or twitter messages to get the most recent information about the semantic web. Also, they can publish their own learning experiences and conclusions and share them with others on the Internet. Institutional boundaries consisting of fixed time schedules, locations, local peer students, and limited lecture possibilities will become outdated.

On the other hand, all the advantages of Web 2.0 tools will not replace traditional learning arrangements. Also in the future, learners have to pass an assessment to receive a certain certification. Therefore, the Web 2.0 tools will not replace the way we learn something from the very beginning. Especially, beginners need guidance and personal support to master a new competence. But the Web 2.0 tools offer new possibilities to further develop expertise and to stay up-to-date with the increasing amount of information in the Knowledge Society. Current business models of universities have to be reconsidered to meet the demands of the-

se possibilities. Learning activities will be increasingly accessible for free on the Internet. Thus, universities have to offer more additional educational services like guidance and assessments instead of investing in lectures and learning activities. The next generation learners will naturally use the Web 2.0 tools, they will group themselves around topics in learning communities and learn from and with their peer learners. The learners will act as experts and beginners at the same time on different topics. They take advantage of the user-generated content that will be created, shared, rated and adjusted by the use of Web 2.0 technologies. Consequently, the learners can benefit of content provided by others (user-generated content), they can choose from a huge amount of suitable content on various competence levels and languages. As a result, the problem of getting access to the resources is becoming less important because there are multiple providers (other users) that offer similar information for free. For that reason, supporting the selection of the most suitable information for personal needs becomes ever more important. The work described in this thesis strongly builds on the application of Web 2.0 tools when recommending user-generated content to lifelong learners. Recommender systems on top of Web 2.0 technology are therefore central to support learners in informal Learning Networks.



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## ZUSAMMENFASSUNG UND AUSBLICK

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## KAPITEL IM ANHANG

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## LITERATURVERZEICHNIS

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[Wikipedia 2009] WIKIPEDIA: *Masterarbeit*. <http://de.wikipedia.org/w/index.php?title=Masterarbeit&oldid=62960043>, eingesehen am 12.08.2009. August 2009



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## EIDESSTATTLICHE ERKLÄRUNG

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Hiermit versichere ich, die vorliegende Diplomarbeit ohne Hilfe Dritter und nur mit den angegebenen Quellen und Hilfsmitteln angefertigt zu haben. Alle Stellen, die aus den Quellen entnommen wurden, sind als solche kenntlich gemacht worden. Diese Arbeit hat in gleicher oder ähnlicher Form noch keiner Prüfungsbehörde vorgelegen.

*Paderborn, 16. März 2011*

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Name des Kandidaten