



WIKI-LEARNIA: SOCIAL E-LEARNING IN A WEB 3.0 ENVIRONMENT

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Abstract

The current trend in the Massive Open Online Courses (MOOC) is characterized by providing content to an extraordinarily high number of learners. However, no or inadequate communication and cooperation mechanisms tarnish the learning experience, which is considered as one of the main criticisms.

Social networks as a Web 2.0 technology have become a popular information exchange medium which is characterized by diverse, intuitive communication services. Wiki-Learnia as an e-learning 3.0 platform goes one step further by also transparently integrating external portals such as Facebook, Twitter and YouTube. The learner focuses on the essentials and cooperating over different communication channels in parallel to transfer knowledge. Here, not only the usual dialogue between two learners or between teachers and learners should be encouraged, but there's also the intrinsic motivation to organize learning communities. The resulting cross-network information exchange has a strong positive effect on the teaching and learning experience of the community.

Wiki-Learnia serves as an information hub for the communication channels of the linked systems. With the help of various semantic filtering mechanisms, the information overload is contained and relevant knowledge is extracted, acquired and distributed. As an integral part of the cross-network search of Wiki-Learnia the information research of the learner as well as the author is facilitated, which in turn supports the firmly in Wiki-Learnia's philosophy anchored crowdsourcing principle.

Key Words: Social networks, e-learning 3.0, e-learning hub, mooc, semantic filtering.

INTRODUCTION

In times of increasing demands in the workplace and a shorter half-life of knowledge there is an urgent need for flexible, easily accessible knowledge acquisition, an extra-occupational further education on demand and just in time. Here, as soon as possible innovative life-long learning strategies are needed to counteract both the consequent shortage of skilled employees as well as overall demographic change. Wiki-Learnia as an innovative project will help to eliminate these deficits, particularly in the STEM area.

In the current international trend Massive Open Online Courses (MOOCs) try to establish. In addition to a number of positive effects on the perception of e-learning, negative criticisms become more and more burdensome and may not be resolved yet. Particularly relevant defects are the most lacking or insufficient



communication and cooperation mechanisms. Other advantages and disadvantages of MOOCs are explained in more detail in the next section.

To the conceptualization of Wiki-Learnia the shortcomings of the existing methods have been recognized under the original analysis and have been included in the e-learning 3.0.Plattform.

MASSIVE OPEN ONLINE COURSES

In this chapter, the trend of MOOCs is explained in detail and the typology is presented.

Definition

The term 'MOOC' goes back to the course "Connectivism and Connective Knowledge" by George Siemens and Stephen Downes in 2008, who carried out this course for 25 local students and additional 2200 online students. Today there are a number of MOOC portals, which recorded a hundred to a thousand times more participants. For example the platform EDX advertises more than 60 learning modules including the Massachusetts Institute of Technology (MIT), Harvard University and the University of California, Berkeley, and has over one million users (as of August 2013) (<http://www.educationdive.com/news/moocs-by-the-numbers-how-do-edx-coursera-and-udacity-stack-up/161100/>) Other examples of this magnitude are Coursera with over 400 courses and an attendance of over 4 million or Udacity with over 30 courses and 750,000 users [4].

"Massive" thus implies the goal of addressing a broad audience with MOOCs. The number of students should be as high as possible. An exact threshold is so far not given. Some sources use the Dunbar (1992). number (about 148 people) as a measure. This describes from a neurological perspective, the maximum number of people to which a person can build a bond (relationship) permanently.

"Open" points out the free access of the course, which is met by a user-friendly and informal access to the system without particular conditions. The interested person registers with his e-mail address, a user name and password and immediately gets access to the courses. However, this simplicity of registration generates the problem of lack of authentication. That's why a possible certification of learning outcomes is difficult from the outset.

"Online" refers to the use of the Internet to allow the extremely high number of participants. All MOOC portals try to hold low the technical requirements on client-side. Often videos are used, which are mostly hosted on the platform YouTube and are just embedded into the course. On the one hand, this reduces the server administration costs and on the other hand it increases the reliability on different client systems. Furthermore, mobile devices are supported by adapting the user interface, to ensure ubiquitous learning.

"Course" indicates that the content is mostly available in a curriculum. Usually, they are based on the lecture notes of the corresponding universities, which are often adapted for e-learning.

Critical review

Already indicated in the previous section, MOOCs as the latest e-learning trend have significant benefits. As showed by the example edX, MOOCs offer free access to high-quality teaching materials from renowned universities. Content will be distributed via an online platform, so that users can choose when and where they learn. In general, it is optimized for mobile devices ("mLearning"), so that work can continue on the road. In addition, the user can achieve a certificate for his curriculum vitae. Thus, MOOCs offer a flexible way of extra-occupational education and training for lifelong learning.

Despite these advantages, a number of deficits are often discussed. All in all, the e-learning materials are just refurbished lecture notes, which were designed for conventional classroom instruction ("chalk and talk"). Often, the content consists only of simple text slides associated with video recordings of the lectures, as well as self-test exercises to control the learning success. There is no dialogue between teachers and learners. Generally, there is no individual mentoring. Users who do not understand the course are left to rely on



themselves. This fact is especially favored by inadequate or even missing cooperation and communication mechanisms.

Another outstanding issue concerns to the value of the acquired certificates. Can they be credited to a study program at a university? If yes, which universities? Which potential employers will ever know MOOCs and how they rate the certificates?

As a solution to the criticisms and to answer the open questions, Wiki-Learnia as an e-learning 3.0 platform for lifelong learning will be presented in the next section.

WIKI-LEARNIA

Before some concepts and features of the new learning platform are presented, there's an introduction of the overall project, in which Wiki-Learnia is included.

Computer engineering online

The joint project Computer Engineering Online is a cooperation between German universities with the common goal of developing and introducing online learning opportunities in the field of technical computer science. Background of this project is the growing shortage of skilled workers in the STEM area in Germany. In 2012, approximately 210,000 professionals (<http://www.welt.de/wirtschaft/article106368664/Deutschland-beklagt-210-000-fehlende-Fachkraefte.html>.) were absent. Especially in the IT sector, there were about 43,000 (www.bitkom.org/de/markt_statistik/64054_73892.aspx.)

In addition to particular courses for individual training, a complete bachelor's and master's degree of computer engineering was designed. In a blended-learning approach the major part of the study program is available via an online platform, which provides the interactive and multimedia content. These consist of scripts, enhanced with animations, videos, self-test exercises, simulations, virtual labs and many more.

The master's degree is designed as a MOOC, so a suitable platform is required for distribution. To avoid the already identified shortcomings of current MOOC portals, a novel e-learning 3.0 platform called Wiki-Learnia to create and publish MOOCs in a social learning environment was created.

Learning in a web 3.0 environment

To counter the described point of criticism (see section II b) of insufficient communication and cooperation opportunities in popular MOOC portals, extensive Web 3.0 technologies are used in Wiki-Learnia.

As the name suggests, Wiki-Learnia is based on wiki software which also serves as the foundation of Wikipedia or Wikiversity. This enables a fast ("wiki" is Hawaiian for "fast") and uncomplicated cooperation between several users of the community in the preparation and processing of learning content.

By integrating a WYSIWYG editor the learning of a special syntax isn't required. The user can write as he knows from casual office applications. For example, texts can be marked as bold or colored by the touch of a button and images can be added by drag and drop from the local hard disk. The MediaWiki software in the background merges the changes of all users, while providing a versioning mechanism in order to undo changes and look at older versions.

Basically, all users in Wiki-Learnia can create and edit all the content. This approach is used for quality assurance because the community continuously corrects, adds and updates the learning modules. That crowdsourcing works, is shown for example by Wikipedia, which is the most widely used online encyclopedia for years and currently at number 6 of the most visited sites world-wide. (<http://www.alexa.com/siteinfo/wikipedia.org?range=5y&size=large&y=t>). Similar to Wikipedia, there is the concept of sighted learning modules in Wiki-Learnia to prevent vandalism. Only after a certain number of regular authors have highlighted the content for free from obvious blemishes, the learning module is released



for the remaining community. Unlike Wikipedia there is also the attribute "approved content", which indicates that this version is classified as factually correct by technical experts.

For a better coordination of the authors, the MediaWiki-based principle of talk pages was revised. Previously, if any article was created, at the same time an appropriate discussion page was launched automatically which is processed in the same manner as the main content. Each user can edit the text, change user statements and thus distort the actual individual statement or even delete it. For this reason, it's complicated to have structured conversations. That's why in Wiki-Learnia another concept is used. When a new article is created, a new thread will be initiated automatically in the fully integrated forum. Each answer can be assigned definitely to the corresponding user. Also, it can be answered or referenced directly. Authors with special privileges can coordinate the discussion. Moreover, not only author discussions about particular articles can take place in the forum, also the overall context such as the link between individual modules, categorization or naming can be discussed. For this purpose, there have been no separate discussion pages in the standard wiki software. Furthermore, any conversations can be held in the forum, whether it's a discussion about specific learning issues, the clarification of questions regarding specific content of learning modules, help with homework or debating about the current state of research of his favorite specialty. Forum posts can also be inserted as excerpts in Wiki-Learnia learning modules. This, for example, may directly provide answers for frequently asked questions. This feature also favors the processing of cMOOCs in which learning takes place mainly through networking and discussions among the participants.

To distinguish users, each member of Wiki-Learnia has a unique name embedded in a social profile after registering. Additionally to photos and personal information, each user can set a personal learning target which will offer many new opportunities within Wiki-Learnia. For example, users can search other members not only by their name but also by their learning targets and connect with each other to build up learning communities. An integrated bulletin board in the social profile page provides the exchange of public or private messages.

A further possibility for taking private conversations is the built-in messenger. Group chats of any size can be realized. The initiator has special privileges to set and change the group name, for inviting and removing users, and granting these privileges to other group members. Similar to a mailbox the user can browse all messages. At the same time new messages are indicated directly in the Wiki-Learnia interface. The user can respond immediately by taking advantage of the live chat feature from the sidebar, which is available on each page. The online status of each friend can be viewed at any time.

In addition to a textual chat, the Wiki-Learnia service "DiaLook" offers audiovisual communication. Via WebRTC (<http://www.webrtc.org/>), an open standard for real-time communication within a Web browser, users can communicate directly with each other using video telephony without installing additional software. An integrated signaling server connects the communication partner, which use a peer-to-peer data transfer. The bidirectional transmission of audio and video enables live lectures as well as a video chat with more than two people. DiaLook is an instrument to support learning and teaching for c and xMOOCs.

Besides the described Mediwiki editor which allows collaborative editing of texts, Wiki-Learnia offers a blogging feature. Each user can write individual blogs on any topic, which can be commented and rated by other participants. This offers interesting discussions among learners and provides feedback.

In addition to public editing of learning modules a personal editing of the content exists. In analogy to annotate a printed script, users can select and annotate text. Due to the crowdsourcing approach (each user can create and edit content), the learning content can change periodically. An intelligent algorithm ensures that all notes keep their semantically correct position. Users can edit or delete notes at any time. There is also the opportunity to share annotations with friends.

Another way of individualization of the learning content is the tool "Summarizer". Using this function, users can create summaries of the learning materials saved as separate notes. For this purpose, they simply highlight the desired items of several different articles which will be combined in one summary. This can be edited in a WYSIWYG editor, by changing, deleting, adding and formatting the content. The final summary can then be

printed and downloaded in PDF format or as a mobile app for smartphones. Furthermore, the individual documents can be shared with friends within Wiki-Learnia and then edit collaboratively.

All this functionality for creating or editing content within Wiki-Learnia is statistically significant for the users in their social profile visible to others. Each action is awarded by a certain amount of points. The total score and, corresponding to this value, rank (e.g. "beginner", "advanced" or "expert") will also be presented on the profile page of the user for the community. Users should be motivated in an easy way to work actively with the system. The gamification idea is complemented by the ability to collect trophies, which rewards the enthusiasm of the users.

In the previous section many features have been introduced, which are characterized Wiki-Learnia as a social network. Users can present a social profile to other participants and communicate with each other through various channels (e.g. bulletin board, chat, forum, video telephony) and edit, share, comment and rate content. Well, Wiki-Learnia goes one step further. Other social networks like Facebook, Twitter and Youtube are involved in the concept. For this purpose, the user must first connect the required accounts with their own Wiki-Learnia account to exchange data between the platforms. Messages and wall posts can be sent, received and commented across the social networks. This supports the formation of learning groups that extend beyond the boundaries of Wiki-Learnia. Users can share learning modules on Facebook or Twitter and comment embedded Youtube videos.

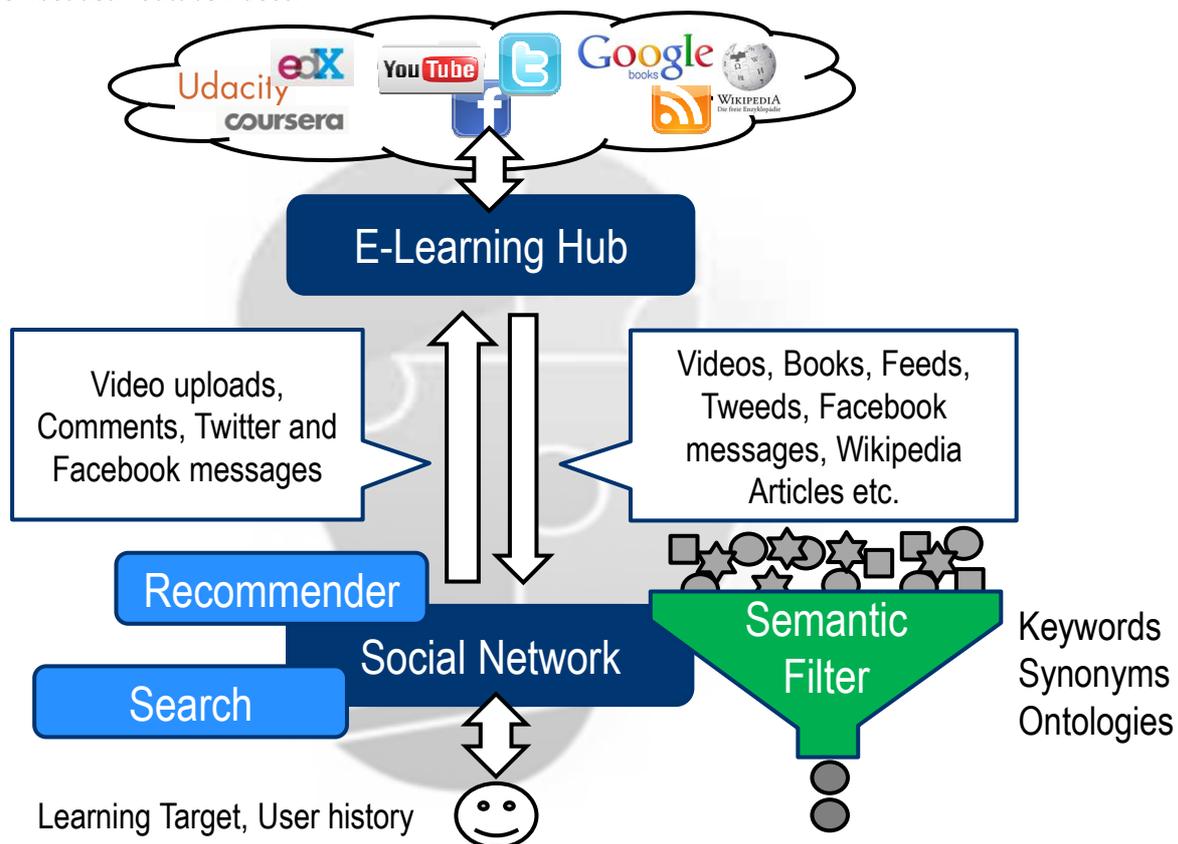


Figure 2: Semantic filtering 1

An e-learning hub (see figure 1) is a focal point on the Internet, which involves different repositories and filters, aggregates and distributes the information on a specific learning topic.

Thus, the e-learning hub component has interfaces to various worldwide repositories such as MOOC portals, online encyclopedias, news sites, video sites and also social networks. The user gets access to the data of the connected entities via the social network of Wiki-Learnia. Since there is an abundance of daily content, it needs

some mechanisms to stem the flood of information. Using semantic filtering algorithms, which based on keyword matching, synonyms and ontologies, the user gets delivered only the information that is required to achieve his individual learning goal. For example, the user can show all Facebook messages of his friends at once or only those which relate to his learning topic. In addition, a network-wide communication takes place, since the Wiki-Learnia users can share data with the associated portals. Learning communities grow across the boundaries of different networks.

Two other practical implementations of this concept can be found in the recommendation system and in the advanced search mechanism. The content-based recommendations also relate to the user context, which includes the self-selected learning objectives and the last read article. The advanced keyword search uses the Wiki-Learnia content and the external repositories e.g. MOOCs, Youtube videos, news or tweets.

Learning institutions such as vocational schools, training institutions and universities provide learning materials on Wiki-Learnia (see Figure 2).

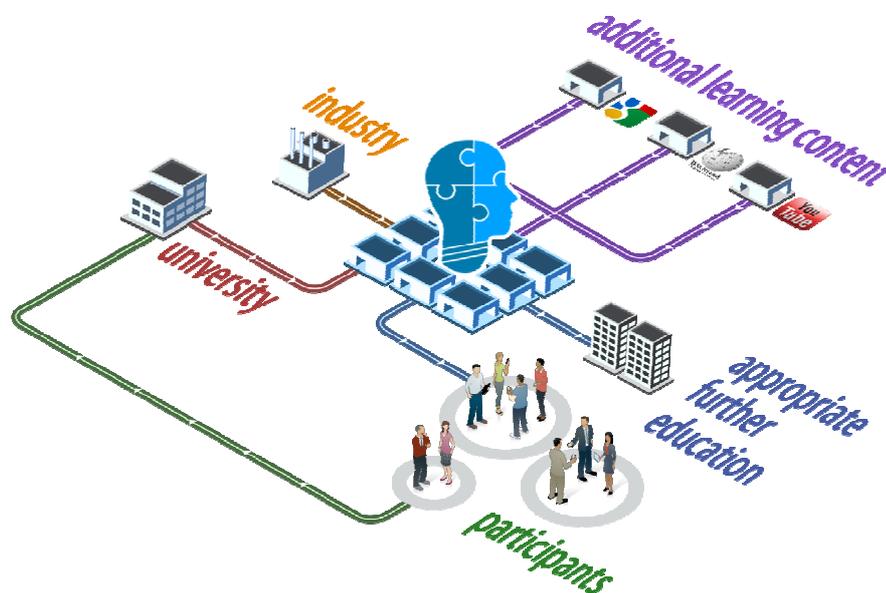


Figure 2: The concept of the elearning hub 1

The advantage is that the corresponding institutions are able to offer a certification process as well as professional mentoring. A university might provide a feeless course on Wiki-Learnia, which can be further processed and used by the community. If a user wants to obtain a certificate for this course, he has to learn the contents of the certifiable (this can also be a reworked version of the original by the community) version.

A simple certificate with less trust level authentication can be achieved for free. A certificate which is accredited by the institution has to be paid to verify the user identification.

CONCLUSION

MOOCs provide a suitable way for lifelong learning. In addition to this and other advantages, there are also a number of shortcomings and open questions.

One solution for this is the new concept of "e-learning hub". Wiki-Learnia as a first practical example application is presented. It is wiki software, which allows you to create and edit collaborative learning content



within the community (crowd-sourcing). It offers various tools of communication such as chat, messaging system and forum. Different types of learning content e.g. MOOC portals, news services, Internet encyclopedias, social networks and various other Web 2.0 platforms can be integrated by using automated methods.

Wiki-Learnia acts as a search engine for e-learning content and can be described as MOOC meta search engine. The participants can expand their knowledge on specific topics. Besides processing the content, authors can use the internal Wiki-Learnia search engine for research.

In future, the (semi-)automatic integration of external content in the Wiki-Learnia modules is possible. For example, appropriate YouTube videos, Wikipedia articles and external links to Google Books can be embedded in a learning module about a specific topic.

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