We are IntechOpen, the world's leading publisher of Open Access books Built by scientists, for scientists

6,300

Open access books available

172,000

International authors and editors

190M

Downloads

Our authors are among the

154

Countries delivered to

TOP 1%

most cited scientists

12.2%

Contributors from top 500 universities

WEB OF SCIENCE™

Selection of our books indexed in the Book Citation Index
in Web of Science™ Core Collection (BKCI)

Interested in publishing with us?
Contact book.department@intechopen.com

Numbers displayed above are based on latest data collected.
For more information visit www.intechopen.com

Supporting learning in online communities with social software: An overview of community driven technologies

Stefanos Ziovas¹, Maria Grigoriadou¹ and Maria Samarakou²

¹*Department of Informatics & Telecommunications,
University of Athens*

²*Department of Energy Technology,
Technological Education Institution of Athens
Greece*

1. Introduction

The notion of communities has been widely studied and recognized as an increasingly important social structure for creating, sharing and applying knowledge in organizational and educational settings. Current developments in Information and Communication technologies (ICT) have provided the means for interacting across boundaries both in space and time and have greatly enhanced the development of online communities.

With the advent of Web 2.0 Internet users are not only consuming information from the World Wide Web but they are also participating in the production of Web content. Web 2.0, which is often called social web due to its social nature, is driven by an “architecture of participation” that allows users to collaboratively create and share information resources. In this context, online communities are formed in an emergent way through social interactions between peers without intentional design or structure imposed from above.

The term social software has emerged alongside with Web 2.0 and comprises a wide range of community driven technologies. One of the promises of social software is the aggregation of community knowledge through many contributions by individuals. Although, the most familiar forms of social software are likely to be Wikis or Weblogs, recently a range of technological approaches such as collaborative filtering, social tagging and social navigation have enhanced and broadened the scope of the term. The role of these technologies is dual fold in the sense that they focus on creating communities by bringing people together and they also exploit the community around an individual as a valuable resource to guide information seeking.

An important feature of social software is self-organization. Members of online communities supported by social software are able to organize their activities with little or no central control. Systems empowered by community driven technologies are characterized by a bottom-up mode of organizing information rather than top-down design.

This chapter will provide an overview of the above mentioned emerging technologies while focusing primary on social navigation, collaborative filtering and social tagging. The chapter will examine the strengths and weaknesses of these technologies and it will present examples of their application in the field of e-learning.

2. Learning in Online Communities

Information and communication technologies (ICT) provide the infrastructure to connect members of a community across the geographical or the institutional barriers. Thus, one can distinguish between traditional communities, where connections are based on conventional face-to-face interactions and online communities (Johnson, 2001), where connections are closely intertwined with the use of network technologies. Participating in a online community is first and foremost a social experience that changes according to who is present, the number of people involved, and the type of discussion that occurs (Preece et al., 2004). This social experience has been enhanced the last years with the advent of Web 2.0 applications. The openness of these applications to user-generated content supports the formation of online communities where users can share opinions, ideas, bookmarks and other information resources.

Anna Sfard (1998) has distinguished two metaphors of learning, the acquisition metaphor and the participation metaphor. The acquisition metaphor refers to learning as a process of acquiring knowledge. Once acquired knowledge becomes a property of an individual it may be applied, transferred and shared with others. The participation metaphor examines learning as a process of becoming a member of a certain community. While the acquisition metaphor emphasizes the individual mind and how it operates with knowledge, the participation metaphor shifts the focus to the evolving connections between the individual and others in particular social and physical contexts. A third metaphor, named as the knowledge-creation metaphor proposed by Paavola, Lipponen and Hakkarainen (2002) as an attempt to integrate the two metaphors in order to understand innovative knowledge communities that are emerging within the modern knowledge society. In this metaphor, learning is seen as a social process of creating and advancing knowledge.

The knowledge-creation perspective tries to explain how a community is able to transform, surpass and expand existing achievements through collaborative activities that take place within and across community boundaries (Lipponen, Hakkarainen, and Paavola, 2004). Thus, besides the examination of closed systems (individual, team and community) it addresses also the complex relations that occur when people and artefacts cross the boundaries of activity systems or communities. Such situations require learning about different knowledge domains. Members of a community have to step into unfamiliar territories in order to seek and bring information, knowledge and practices from other communities. They have to engage with members of other communities and face the challenge of negotiating and combining ingredients from different contexts to achieve hybrid solutions. In this mode of activities, namely boundary crossing (Engeström, Engeström and Karkkainen, 1995) learning should be understood both as a vertical process of development in which individuals increase and transform their conceptual understanding and as a horizontal process of development in which individuals expand their ability to act in new and different environments (Engeström, Engeström and Karkkainen, 1995; Tynjälä and Häkkinen, 2005).

The knowledge-creation metaphor is characteristic of how learners engage in social interaction with peers worldwide in order to create and share content with the use of Web 2.0 technologies – and all this is done bottom-up with an extremely high degree of self organisation (Rollett et al, 2007). Communities are formed in an emergent way through social interactions between peers without intentional design or structure imposed from above. These communities cannot be described with what constituted “community” in online learning where artificial and often contrived “discussions” are supported by learning management systems (Downes, 2005). They are better understood as Online Self Organising Social Systems (OSOSSes).

OSOSSes were first defined by Wiley and Edwards (2002) as systems that allow “large numbers of individuals to self-organise in a highly decentralised manner in order to solve problems and accomplish other goals”. With the advent of Web 2.0 and social software, Wiley (2006) revised the definition. According to the new definition an Online Self-organising Social System exists when: (1) A large number of people engages in a large number of direct or indirect interactions via the network; (2) These interactions help individuals accomplish things they have reason to value; (3) No central authority provides extrinsic incentives for participation in the system (4) No central authority regulates or controls the interactions (Wiley, 2006 p. 291)

3. Social Software

Social software has emerged alongside with Web 2.0 and comprises a wide range of community driven technologies. The term was coined by Clay Shirky who defined social software as “software that supports group interaction” (Shirky, 2003). Several traditional software applications supports group interaction, however they approach the relationship of users to groups from a top-down fashion. Social software enables groups to form and self-organize in a bottom-up manner (Boyd, 2006). According to Stowe Boyd the term social software can distinguish software built around one or more of the following premises:

- Support for conversational interaction between individuals or groups – including real time and “slow time” conversation, like instant messaging and collaborative teamwork spaces, respectively.
- Support for social feedback – which allows a group to rate the contributions of others, perhaps implicitly, leading to the creation of digital reputation.
- Support for social networks – to explicitly create and manage a digital expression of people's personal relationships, and to help them build new relationships.

Social software supports social networking and community building. *Social networking sites* like MySpace, Cyworld and Facebook allow users to present themselves and their interests, articulate their social networks, and establish or maintain connections with others (Ellison et al., 2006). Participants have the ability to list other profiles as “friends” or “contacts” or some equivalent. This generates a social network graph which may be directed (“attention network” type of social network where friendship does not have to be confirmed) or undirected (where the other person must accept friendship). This articulated social network is displayed on an individual's profile for all other users to view. Each node contains a link to the profile of the other person so that individuals can traverse the network through friends of friends of friends (Mason, 2007).

Wiki software allows users to easily create and upload content on the internet but also allows this content to be edited by other users. Users of Wiki's software can create and edit documents collaboratively, in a simple markup language using a Web browser. One of the most well known examples is Wikipedia, a free content multilingual online encyclopaedia written collaboratively by contributors around the world. The goal of Wikipedia is to create an encyclopaedia that can be shared and copied freely while encouraging people to easily change and improve the content. Wikipedia provides a model of how knowledge creation may happen in a self-organised, collaborative, "wisdom of crowds" style. Users are allowed to add edit or delete content to any page of Wikipedia. However, what would surely seem to create chaos has actually produced increasingly respected content which has been evaluated and revised by the thousands of visitors to the site over time (Lih, 2004).

Weblogs are another example of social software. They are easily updateable personal websites that allows the authors to publish to the Internet. The entries (posts) in a Weblog are usually short and listed in a chronologically order. Most Weblogs are written by individuals and thus in general a weblog is not considered as a collaborative tool. However, readers of a weblog can add their comments on the posts or link them with other weblog posts using their permalinks. When a weblog is related to other weblogs, the weblogs become social, and communities or networks are formed (Dalsgaard, 2006).

Several authors have examined the potential benefits of social software in the context of e-learning. Rollett et al (2007) investigated the potentials of integrating lightweight Web 2.0 applications for the purpose of facilitating self-directed, collaborative and responsible learning in educational settings. Downes (2005) has strengthened the potential of social software to transform the current model of e-learning where content is produced by publishers, organized and structured into courses, and consumed by students to a model of e-learning where content is created, aggregated, remixed and repurposed by students. Dalsgaard (2006) argues that social software supports self-directed, problem-based and collaborative learning processes. According to Dron (2006a), social software offers great potential pedagogic and practical benefits to e-learning, both through the amplification and creation of social ties, and through allowing learners to choose whether they want to control or to be controlled in a learning transaction.

Although, the most familiar forms of social software are likely to be Wikis or Weblogs, recently a range of technological approaches such as collaborative filtering, social bookmarking and social navigation have enhanced and broadened the scope of the term (Dron, 2006). The role of these technologies is dual fold in the sense that they focus on creating communities by bringing people together and also they exploit the community around an individual as a valuable resource to guide information seeking.

4. Community-driven technologies

Online communities provide the ground for knowledge creation, social negotiation of meaning and learning through the collective participation of their members. In order to participate effectively to these processes community members need guidance to find and synthesize information. Over the past few years several community-driven technologies have been developed to address this issue. This section will focus on three of these technologies: collaborative filtering, social navigation and social tagging.

4.1 Collaborative filtering

Collaborative filtering or social recommender systems recommend data items to a user by taking into account the opinions of other users (Schafer et al., 2007). Instead of recommending data items because they are similar to items the user preferred in the past (content-based recommendations) collaborative approaches generate recommendations about data items that users with similar interests liked in the past. In order to estimate user's preference for an item collaborative filtering systems collect ratings through explicit means (e.g. the user is asked to rate the item), implicit means (e.g. the system infers user's preference by observing user's actions) or both.

Goldberg et al., 1992 first coined the term collaborative filtering while describing Tapestry, which later became known as the first recommender system (Resnick & Varian, 1997). Tapestry was an email-filtering system which allowed users to store annotations about messages. A user could filter the messages by writing queries on these annotations. This approach was later called pull-active collaborative filtering, because users who desire recommendations manually pull them by writing the relevant queries. Soon after Tapestry collaborative filtering approaches focused on generating automated recommendations led by systems such as Grouplens (Resnick et al., 1994; Konstan et al., 1997), Ringo (Shardanand & Maes, 1995) and Bellcore's Video Recommender (Hill et al., 1995). In general, automated approaches follow a process of gathering user ratings on items, identifying users with similar interests or tastes and combining the ratings of similar users to provide recommendations. With the growth of e-commerce, collaborative filtering techniques have become well known through their use in commercial web sites such as Amazon.com. When a potential customer visits a web page with information about a product A in Amazon.com the system recommends a list of similar products that have been bought by other customers who bought the product A.

One of the first applications of collaborative filtering in e-learning was done by the Altered Vista system (Recker & Walker, 2003). Altered Vista attempts to leverage the work of many people to capture and propagate the opinions of its user community. Users of the system submit reviews about the design, quality, and usefulness of Web resources for online education. These explicit ratings become part of the recommendation database. When a user requests recommendations the system first determines a neighbourhood of like-minded users for the active user and calculates a predicted rating for each of the recommended resources. The predicted rating is a weighted average of the ratings of users in the neighbourhood, based on their correlation level with the active user. Another system that produces recommendations based on explicit ratings is the Questions Sharing and Interactive Assignments (QSIA) system (Rafaeli et al., 2005). The QSIA system was designed to promote collaboration and formation of communities with interest in assignments and tests. Users of the system can rate any of the available resources on a five-level scale. The recommendation process is mostly user-controlled: the user can choose whether the recommendations would be based on a neighbourhood of anonymous users predicted by the system or on a group of friends. The second choice involves the user's selection of the characteristics of the friends to participate in the advising group.

Explicit ratings provided by users offer the most accurate description of the user's opinion about a resource. However this approach requires extra effort from the user in order to provide the rating. Implicit ratings could be inferred by observing the user behaviour but may be imprecise. The errors introduced by uncertainty of implicit ratings can be reduced

through aggregating a large number of ratings (Schafer et al., 2007). This approach is followed by the CRICOS system (Ziovas & Grigoriadou, 2008). CRICOS integrates several community-driven technologies in order to support the members of a community to create and share learning resources. The system calculates the utility of a resource by aggregating both explicit and implicit ratings. Explicit ratings are provided by users who rate the quality of a resource on a 1 to 5 rating scale. Implicit ratings are inferred by observing the user behaviour with a resource and collecting the relevant data. Data from observations include the number of visits on the resource's page, the number of times the user directly recommends the resource to others and if the resource is included in the user's personal collection. Both explicit and implicit ratings are combined into a single estimated rating which represents the utility of the resource for a particular user.

Another e-learning system which combines explicit and implicit ratings is presented in Tang and McCalla (2003, 2005). The system provides individualised recommendations for learners chosen from a dynamically evolved paper repository. In order to provide recommendations the system uses a two-layered collaborative filtering approach. At the first layer, learners active assessment of the papers and their browsing sequences, are used to group them into clusters of users with similar interests. At the second layer a Pearson-correlation similarity based collaborative filtering is used to make recommendations for the target user.

Social recommender systems constitute a good approach for providing recommendations when a large number of ratings are available. However, when they are not enough ratings the performance of the systems is significantly reduced. This problem, known as the "cold start" problem, can occur under three scenarios (Schafer et al., 2007):

- When a new user is registered to the system and the system have no ratings of the user to calculate a neighbourhood of similar users.
- When a new item is added to the system and it can not be recommended as it does not have any ratings.
- When a new community should be formed and without ratings the system can not provide sufficient differentiating value in order to keep users long enough to build up ratings.

Another problem comes up with the application of collaborative filtering systems for recommending learning resources. Recommendations on these systems are mostly based on users' interests. However items liked by learners might not be pedagogically appropriate for them (Tang and McCalla, 2005). In educational settings, learning resources should be recommended to the learner not only because they are rated high by other learners but also because they fulfil a pedagogical goal (e.g. a learning resource is a prerequisite of another one). Approaches that combine collaborative filtering with pedagogical requirements still need to be developed (Vassileva, 2008)

4.2 Social navigation

Social navigation systems help users to navigate in a community information space by making the aggregated behaviour of the community visible. The concept was introduced by Dourish and Chalmers as moving "towards" a cluster of other people or selecting objects because others have been examining them (Dourish & Chalmers, 1994). Social navigation can be either direct or indirect (Svensson et al., 2000; Dieberger, 2002). In direct social navigation users are guiding each other by giving navigational advices directly (e.g. through chat or email). In indirect social navigation navigational advices are inferred by historical traces left by other

users, as done in the Footprints project (Wexelblat & Maes, 1999). In this form of social navigation, communication between users is indirect, mediated through signs left in the information space.

Fig. 1. The knowledge map in Knowledge Sea II.

In the field of e-learning several systems utilise social navigation to assist learners. EDUCO (Kurhila et al., 2002) is a collaborative learning environment which visualises the information space as clusters of documents. The documents change their colour according to how much they have been read in relation to other documents. Live users presented in the learning environment as coloured dots located next to the documents that they are currently viewing. The system supports both synchronous and asynchronous communication among users. Knowledge Sea II (Farzan & Brusilovsky, 2005) focuses on helping students of introductory programming courses to find relevant readings among hundreds of online tutorial pages distributed over the Web. The system represents clusters of pages in a knowledge map of varying shades of blue (Figure 1). Every cell of the map includes links to web pages that are related to keywords presented in the cell. The number of visits and the time spent on a page are used to calculate the level of attention of a user for the page. The colour saturation of a human figure in the cell represents the user’s level of attention for the pages belonging to this cell while the background colour of the cell represents the group attention.

Another approach that employs the colour saturation of icons to provide social navigation support can be found in CRICOS (Ziovas & Grigoriadou, 2008). The system represents the utility of a resource for a user with the background colour of an icon: the higher the rating the darker the colour. Besides the utility of a resource for a single user, the system averages the estimated ratings for two clusters of users that their opinions about the resource could

be valuable for the user; user's friends and users with similar interests. The system represents these ratings with the colour of the relevant icons (Figure 2).

Fig. 2. A web page for browsing resources in CRICOS. Different icons represent the estimated utility of a resource for the user (A), the user's friends (B) and the users who have similar interests with the active user (C).

Social navigation systems attempt to visualise the accumulated actions of a community of users. However, social navigation systems will work poorly when there is little information about the actions of users in the information space. Thus, there is a problem to start a social navigation system before any user behaviour has been collected.

Another problem of social navigation systems is known as the snowball effect. The snowball effect arises from the "following the crowd" style that characterises these systems. If a user starts following a wrong path, this will affect the behaviour of other users. The path will be considered a good path for the system and lead more and more users down a path they do not perceive valuable in the long run (Svensson et al., 2001).

4.3 Social tagging

Social tagging or collaborative tagging is one of the latest popular social software approaches for information management and sharing. The approach became popular on the Web as part of the social bookmarking systems. Social bookmarking systems allow users to create personal collections of bookmarks and share their bookmarks with others. Moreover users of these systems may organise their collection by entering keywords which are meaningful to them. This type of manual indexing is called tagging with index terms referred to as tags. As these tags are shared a user may click on a tag and see the list of bookmarks which are linked with the tag. The tag clouds that are found in many of these systems can assist users in browsing the information space. Tag clouds are visual representations of tags in which attributes of the text such as size, weight, or colour are used to represent features of the associated terms (Rivadeneira et al., 2007). When the user clicks on a tag within a tag cloud the system provides a list of the bookmarks that are associated with the tag (Figure 3).

Fig. 3. An example of a tag cloud from the Del.icio.us system

The social tagging mechanism have been implemented in a number of online resource sharing environments, some popular and some academically oriented (Hammond et al., 2005), since the idea was first adopted by social bookmarking system del.icio.us in 2004. Such systems facilitate the organisation and sharing of digital resources including photos (e.g. flickr), blogs (e.g. technorati) or scientific publications (e.g. CiteULike). A critical characteristic of these systems is that the classification of resources is based on the uncontrolled vocabulary (also called folksonomy from folk and taxonomy) which emerges from the set of tags used by members of a community without any a-priori controlled vocabulary to conform to. This approach on subject indexing comes as an alternative to the traditional taxonomies. Taxonomies provide a controlled vocabulary for the classification of resources. However they often reflect one group's perspective of the knowledge domain and

may become inflexible as the community evolves. On the other hand folksonomies consist a more flexible and scalable approach, since the contributors are those who provide the tags that best describe their recourses according to their perspective.

According to Bateman et al. (2007) social tagging has potential to be useful tool for e-learning systems because of the following:

- Learning managements systems currently lack sufficient support for self organization of learning content.
- Collaborative tagging has potential to further enrich peer interactions and peer awareness, centred around learning content.
- Tagging, by its very nature is a reflective practice, which can give students an opportunity to summarize new ideas, while receiving peer support (through viewing other learners' tags; tag suggestions).
- The information provided by tags provides insight on learner's comprehension and activity, which is useful for both educators and administrators.

There have been limited attempts to combine social tagging with e-learning. CoFIND (Dron et al., 2000, Dron 2006b), is a resource sharing system which allows students to provide feedback about resources and classifying them using several topics. The system encourages not only the tagging of resources according to topics, but also with pedagogical metadata known as qualities. OATS (Bateman et al., 2006a) is a tool, which was designed to enrich the functionalities provided in Learning Management Systems. The tool allows a user to highlight pieces of the learning content provided by a course and add tags or notes to them. The user assisted in browsing the information space by utilising either the tags created by her or the community's tags. In the second case the most popular tags are shown in descending order of number of times used. This gives the user an idea of what are the most important terms at the course level.

The problems inherent in an uncontrolled vocabulary lead to a number of limitations (e.g. ambiguity, synonyms) in folksonomies (Mathes, 2004). Ambiguity of the tags can emerge as users apply the same tag in different ways. Moreover, the lack of synonym control can lead to different tags being used for the same concept. Inconsistency among the terms used in tagging can make it very difficult for one to be sure that all the relevant items have been found (Golder & Huberman, 2005). In addition, folksonomies invite deliberately idiosyncratic tagging, also called meta noise, which burdens users and decreases the utility of the systems that employ them (Wu et al., 2006).

Another issue arises from the lack of relational information in folksonomies. When the learners construct their knowledge about a certain domain is essential to learn the concepts of the domain and how these concepts are related. However, even by tagging learning resources with the relevant concepts of the domain will not provide more information about how these concepts are related. Moreover the tags produced with social tagging are not machine understandable. Tags are useful for human consumption but computational entities can provide only limited reasoning in a social tagging system. Thus it would be difficult for a machine to automatically aggregate learning content based on the tags provided by a community of learners. Research towards this issue aims primarily on the integration of taxonomies and folksonomies (Bateman et al., 2006b)

5. Conclusion

This paper provided an overview of several community-driven technologies incorporated under the concept of social software. Community-driven technologies are becoming increasingly pervasive in e-learning. They hold considerable potential for facilitating and stimulating knowledge creation and sharing with a decentralised and self-organised manner. Thus, they provide the infrastructure for the development of learning environments where the student is in the centre of activities. In this sense they may better fit to the new generation of students, what is called the net generation (Oblinger and Oblinger, 2005), who has grown up with technology and values experiential learning, working in teams, and social networking.

Community-driven technologies work well in grown communities where they can harvest community intelligence to assist the learners. However, their performance is significantly reduced when they can't collect enough information to build the community intelligence or to apply it for a new user or a new resource. Therefore, researchers are working on combining approaches, in order to overcome the weaknesses associated with individual techniques as in the case of hybrid recommender systems (Burke, 2007) which integrate content-based and collaborative recommender mechanisms.

The role of the community-driven technologies is to assist the learner to find the appropriate learning resources. Learning with the use of community-driven technologies happens both by consuming and producing knowledge. Learners who produce knowledge have significant impact on the learning of the whole community as their contributions are used to recommend learning resources to other learners. Particularly in the early steps of the community development the influence of those who make the first contributions is disproportionately large, shaping the behaviours of those who follow (Dron, 2006a). When the contributors do not have sufficient knowledge of the domain then the learning environment will provide misleading information. Thus, a certain level of control should be given to more knowledgeable members (e.g. teachers) in order to keep the contributions relevant with the community's domain.

6. References

- Bateman, S., Farzan, R., Brusilovsky, P. & McCalla, G. (2006a), OATS: the open annotation and tagging system, *Proceedings of I2LOR 2006*, Montreal, Canada
- Bateman, S., C. Brooks and G. McCalla (2006b). Collaborative Tagging Approaches for Ontological Metadata in Adaptive ELearning Systems, *Proceedings of SW-EL 2006 in conjunction AH2006*, Dublin, Ireland
- Bateman, S., Brooks, C., McCalla, G., and Brusilovsky, P. (2007) Applying Collaborative Tagging to E-Learning, *Proceedings of the Workshop on Tagging and Metadata for Social Information Organization*, held in conjunction with the 16th International World Wide Web Conference. May 7, Banff, Canada.
- Boyd, S. (2006). Are You Ready For Social Software. Retrieved May 20 2009 from: http://www.stoweboyd.com/message/2006/10/are_you_ready_f.html
- Burke, R (2007). Hybrid Web recommender systems. In: Brusilovsky, P., Kobsa, A., Neidl, W. (eds.) *The Adaptive Web: Methods and Strategies of Web Personalization*. LNCS, vol. 4321, (pp. 377–408). Springer, Heidelberg

- Dalsgaard, C. (2006). Social software: E-learning beyond learning management systems. *European Journal of Open, Distance and E-Learning*. Retrieved June 22 2008 from: http://www.eurodl.org/materials/contrib/2006/Christian_Dalsgaard.htm
- Dieberger A. (2002). Social Connotations of Space in the Design for Virtual Communities and Social Navigation. In K. Höök, D. Benyon, and A. Munro (eds.), *Designing Information Spaces: The Social Navigation Approach* (pp. 293-313). Springer.
- Dourish, P., and Chalmers, M. (1994). Running out of Space: Models of Information Navigation, *Proceedings of Human Computer Interaction*, Glasgow, Scotland.
- Downes, S. (2005). E-learning 2.0. *eLearn Magazine*, Vol. 2005, Issue 10 Retrieved June 22 2008 from <http://elearnmag.org/subpage.cfm?section=articles&article=29-1>
- Dron, J., Boyne, C., Mitchell, R. & Siviter, P. (2000). CoFIND: steps towards a selforganising learning environment. In: Davies, G., Owen, C. (eds.) *Proceedings Of WebNet'2000, World Conference of the WWW and Internet*, pp. 75 – 80, San Antonio, Texas, US: AACE.
- Dron, J. (2006a). 'Social Software and the Emergence of Control', *Proceedings of the 6th International Conference on Advanced Learning Technologies*, pp. 904-908, Kerkraade, Netherlands:IEEE.
- Dron, J. (2006b). The way of the termite: a theoretically grounded approach to the design of e-learning environments, *International Journal of Web Based Communities*, 2(1), 3 – 16.
- Ellison, N., Steinfield, C. and Lampe, C. (2006). Spatially Bounded Online Social Networks and Social Capital: The Role of Facebook, Paper presented at the Annual Meeting of the International Communication Association, Dresden, June 19-23.
- Engeström, Y., Engeström, R., & Karkkainen, M. (1995). Polycontextuality and boundary crossing in expert cognition: Learning and problem-solving in complex work activities, *Learning and Instruction*, Vol. 5, No. 4, pp. 319-336.
- Farzan, R. and Brusilovsky, P. (2005). Social navigation support through annotation-based group modelling, *Proceedings of 10th International User Modeling Conference*, pp. 463-472, Berlin: Springer Verlag.
- Goldberg, D., Nichols, D., Oki, B. M. & Terry, D. (1992) Using Collaborative Filtering to Weave an Information Tapestry, *Communications of the ACM*, 35(12), pp. 61 – 70.
- Golder A. S., Huberman A.B (2005) "The Structure of Collaborative Tagging", Retrieved April 25 2009 from: <http://www.hpl.hp.com/research/idl/papers/tags/tags.pdf>
- Hammond, T., Timo, Hannay, Lund, B., and Scott, J. (2005). Social bookmarking tools (I), *D-Lib Magazine*, Vol. 11, No.4, Retrieved July 18 2008 from: <http://www.dlib.org/dlib/april05/hammond/04hammond.html>.
- Hill, W., Stead, L., Rosenstein, M., Furnas, G. (1995). Recommending and Evaluating Choices in a Virtual Community of Use, *Proceedings of ACM CHI'95 Conference on Human Factors in Computing Systems*, pp 194 – 201, USA: ACM Press.
- Johnson, C. M. (2001). A survey of current research on online communities of practice. *The Internet and Higher Education*, Vol. 4, No. 1, pp. 45-60.
- Konstan J. A., Miller B. N., Maltz D., Herlocker J. L., Gordon L. R., & Riedl J. (1997). GroupLens: Applying Collaborative Filtering to Usenet News, *Communications of ACM*, Vol. 40, No. 3, pp. 77 – 87.
- Kurhila, J., M. Miettinen, P. Nokelainen, H. Tirri. (2002). EDUCO - A Collaborative Learning Environment Based on Social Navigation, *Proceedings of Adaptive Hypermedia and Adaptive Web Based Systems*, pp. 242-252, Malaga, Spain: Springer, Verlag

- Lih, A. (2004). Wikipedia as participatory journalism: reliable sources? Metrics for evaluating collaborative media as a news resource, *Proceedings of 5th International Symposium on Online Journalism*. Austin, TX
- Lipponen, L., Hakkarainen, K., & Paavola, S. (2004). Practices and orientations of CSCL. In J.-W. Strijbos, P. Kirschner & R. Martens (Eds.), *What we know about CSCL: And implementing it in higher education*, pp. 31 – 50, Dordrecht, Netherlands: Kluwer Academic Publishers.
- Mason, R. & Rennie F. (2007). Using Web 2.0 for learning in the community. *Internet and Higher Education* 10, Vol. 10, No. 3, pp. 196-203
- Mathes, A. (2004) Folksonomies – Cooperative Classification and Communication Through Shared Metadata. Retrieved June 25 2008 from:
<http://www.adammathes.com/academic/computer-mediated-communication/folksonomies.html>
- Oblinger, D., & Oblinger, J. (2005). Is it age or IT: First steps towards understanding the Net generation. In D. Oblinger & J. Oblinger (Eds.), *Educating the Net generation*, Educause. Retrieved June 15, 2008, from:
<http://net.educause.edu/ir/library/pdf/pub7101.pdf>
- Paavola, S., Lipponen, L. & Hakkarainen, K. (2002). Epistemological foundations of CSCL: a comparison of three models of innovative knowledge communities, *Proceedings of the Computer Supported Collaborative Learning 2002 Conference*, pp. 24 – 32, Hillsdale, NJ: Lawrence Erlbaum.
- Preece, J., Abras, C. and Maloney-Krichmar D. (2004) 'Designing and evaluating online communities: research speaks to emerging practice', *International Journal of Web Based Communities*, Vol. 1, No. 1, pp.2-18.
- Rafaeli, S., Dan-Gur, Y. and Barak, M. (2005), Social recommender systems: recommendations in support of e-learning, *International Journal of Distance Education Technologies*, Vol. 3, No. 2, pp.29-47.
- Recker, M., & Walker, A. (2003). Supporting "word of mouth" social networks through collaborative information filtering, *Journal of Interactive Learning Research*, Vol. 14, No. 1, pp. 79-98.
- Resnick P., Iakovou N., Sushak M., Bergstrom P., & Riedl J. (1994). GroupLens: An Open Architecture for Collaborative Filtering of Netnews, *Proceedings of the ACM, Conference on Computer Supported Cooperative Work*, pp. 175 – 186, New York: ACM Press.
- Resnick P. & Varian. R. H. (1997). Recommender systems. *Communications of the ACM*, Vol. 40, No. 3, pp. 56 – 58.
- Rivadeneira, A. W., Gruen, D. M., Muller, M. J., & Millen, D. R. (2007). Getting Our Head in the Clouds: Toward Evaluation Studies of Tagclouds. *Proceedings of the SIGCHI conference on Human factors in computing systems*, pp. 995-998, San Jose, CA, USA.
- Rollett, H., Lux M., Strohmaier M., Dösinger G. & Tochtermann K. (2007). The Web 2.0 Way of Learning with Technologies. *International Journal of Learning Technology*, Vol. 3, No. 1, pp. 87 – 107
- Schafer, J. B., Frankowski, D., Herlocker, J. & Sen, S. (2007). Collaborative filtering recommender systems. In: Brusilovsky, P., Kobsa, A., Neidl, W. (eds.) *The Adaptive Web: Methods and strategies of Web Personalization*. LNCS, Vol. 4321, pp. 291-324. Springer, Heidelberg.

- Sfard, A. (1998). On two metaphors for learning and dangers of choosing just one, *Educational Researcher*, Vol. 27, No. 2, pp. 4 – 13.
- Shardanand U. & Maes P. (1995). Social Information Filtering: Algorithms for Automating ‘Word of Mouth’, *Proceedings of ACM CHI’ 95 Conference on Human Factors in Computing Systems*, pp. 210-217, Denver, Colorado, USA: ACM Press.
- Shirky, C. (2003). A Group is Its Own Worst Enemy. Networks, Economics, and Culture mailing list, Retrieved May 21 2009 from: http://www.shirky.com/writings/group_enemy.html
- Svensson, M., Laaksolahti, J., Höök, K., Waern, A. (2000). A recipe based on-line food store, *Proceedings of 5th international Conference on intelligent User interfaces*, pp. 260-263, New Orleans, Louisiana, USA: ACM Press
- Svensson, M. Hook, Laaksolahti, J. and Waern, A. (2001): ‘Social navigation of food recipes’. *Proceedings of CHI’01*, pp.341-348, ACM
- Tang, Y. T. and McCalla, G. (2003) Mining the implicit ratings for focused collaborative filtering for paper recommendations., Workshop on User and Group Models for Web-based Adaptive Collaborative Environments, 9th International Conference on User Modeling (UM 2003), June 2003, Johnstown, U.S.A.
- Tang Y. T and McCalla G (2005) Smart Recommendation for an Evolving E-Learning System: Architecture and Experiment, *International Journal on E-Learning*, Vol. 4, No. 1, pp. 105-129.
- Tynjälä, P. & Häkkinen, P. (2005). E-Learning at work: theoretical underpinnings and pedagogical challenges, *The Journal of Workplace Learning*, Vol. 17, No. 5, pp. 318–336.
- Vassileva, J. (2008) Toward Social Learning Environments, *IEEE Transactions on Learning Technologies*, Vol. 1, No. 4, pp. 199-214.
- Wexelblat, A., and Maes, P. (1999). Footprints: History-Rich Tools for Information Foraging. *Proceedings of ACM Conference on Human Factors in Computing Systems*, pp. 270-277, Pittsburgh, USA: ACM Press.
- Wiley, D. A. & Edwards, E. K. (2002). Online self-organizing social systems: The decentralized future of online learning. *Quarterly Review of Distance Education*, Vol. 3, No. 1, pp. 33 – 46
- Wiley David (2006). Online self-organising social systems Four years later, in In R. J. Luppigini (Ed.), *Online learning communities*, pp. 289-298, Charlotte, NC: Information Age Publishing
- Wu H., Zubair M., Maly K. (2006). Harvesting social knowledge from folksonomies. *Proceedings of the seventeenth conference on Hypertext and hypermedia*, pp 111-114, New York, NY, USA, ACM Press
- Ziovas S, Grigoriadou M. (2008). “CRICOS: A web-based system for creating interconnected communities”, *Proceedings of International Symposium on Applications and the Internet (SAINT 2008)*, pp. 313-316, Finland

Advanced Learning

Edited by Raquel Hijn-Neira

ISBN 978-953-307-010-0

Hard cover, 444 pages

Publisher InTech

Published online 01, October, 2009

Published in print edition October, 2009

The education industry has obviously been influenced by the Internet revolution. Teaching and learning methods have changed significantly since the coming of the Web and it is very likely they will keep evolving many years to come thanks to it. A good example of this changing reality is the spectacular development of e-Learning. In a more particular way, the Web 2.0 has offered to the teaching industry a set of tools and practices that are modifying the learning systems and knowledge transmission methods. Teachers and students can use these tools in a variety of ways aimed to the general purpose of promoting collaborative work. The editor would like to thank the authors, who have committed so much effort to the publication of this work. She is sure that this volume will certainly be of great help for students, teachers and researchers. This was, at least, the main aim of the authors.

How to reference

In order to correctly reference this scholarly work, feel free to copy and paste the following:

Stefanos Ziovas, Maria Grigoriadou and Maria Samarakou (2009). Supporting Learning in Online Communities with Social Software: an Overview of Community Driven Technologies, *Advanced Learning*, Raquel Hijn-Neira (Ed.), ISBN: 978-953-307-010-0, InTech, Available from: <http://www.intechopen.com/books/advanced-learning/supporting-learning-in-online-communities-with-social-software-an-overview-of-community-driven-techn>

INTECH
open science | open minds

InTech Europe

University Campus STeP Ri
Slavka Krautzeka 83/A
51000 Rijeka, Croatia
Phone: +385 (51) 770 447
Fax: +385 (51) 686 166
www.intechopen.com

InTech China

Unit 405, Office Block, Hotel Equatorial Shanghai
No.65, Yan An Road (West), Shanghai, 200040, China
中国上海市延安西路65号上海国际贵都大饭店办公楼405单元
Phone: +86-21-62489820
Fax: +86-21-62489821

© 2009 The Author(s). Licensee IntechOpen. This chapter is distributed under the terms of the [Creative Commons Attribution-NonCommercial-ShareAlike-3.0 License](https://creativecommons.org/licenses/by-nc-sa/3.0/), which permits use, distribution and reproduction for non-commercial purposes, provided the original is properly cited and derivative works building on this content are distributed under the same license.

IntechOpen

IntechOpen