Chapter 11 Web 2.0 Services

11.1 Social Software

In the early 21st century, services in the World Wide Web develop which are predicated upon the active participation of broad masses of users. The keyword for such services has come to be accepted as "**Web 2.0**" (O'Reilly, 2005). This should not be regarded as akin to an update number, as of software, but rather as signifying the growing importance of the WWW after the collapse of the "first" internet economy (O'Reilly & Batelle, 2009). The focus of Web 2.0 is the hoped-for or actual intelligence of the masses. Tim O'Reilly and John Batelle (2009, 1) define:

> Web 2.0 is all about harnessing collective intelligence. Collective intelligence applications depend on managing, understanding, and responding to massive amounts of user-generated data in real-time.

The term "Web 2.0" is a hyperonym of "social software", the corresponding technical basis (such as Ajax or RSS) and the information-legally significant aspect of open access (such as Copyleft or Creative Commons) (Peters, 2009, 15).

In Web 2.0 services, the user acts both as producer of information and as its consumer–a role that Toffler (1980) described as that of the "**prosumer**". The kinds of information thus produced are various; they range from short biographical statements (e.g. on Facebook), films (YouTube) and images (Flickr) up to one's personal genome (e.g. in 23andMe, a genetics company tied to Google, which executes genome analyses for customers and wants to make the data–which is first rendered anonymous–available to scientific research (Prainsack & Wolinsky, 2010).

How can Web 2.0 be evaluated from a sociological perspective? Collectives are, following Tönnies (1887), either societies or communities. If the individual orients himself by the collective and shares its goals or purposes, we have a "community". In a "society", the individual tries to achieve his own personal goals or purposes. Prosumers in Web 2.0 are characterized by shared goals (e.g. to create a comprehensive encyclopedia in Wikipedia, or to make images available for

use by the collective on Flickr), which means that what we have is a **community**. Since these activities principally take place online, they are "virtual communities" or "online communities". Long before the advent of Web 2.0, Rheingold (1993, 5) defined:

Virtual communities are social aggregations that emerge from the Net when enough people carry on those public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace.

In online communities, it is not to be expected that its members share the workload equally. Rather, the opposite is the case: very few (let us say: 1% of the community) are responsible for a large part of activities (e.g. writing articles for Wikipedia), a few (roughly 9%) collaborate by contributing small services (e.g. correcting Wikipedia entries), and the majority of members (i.e. the remaining 90%) are mostly users, or "lurkers", following Jakob Nielsen (2006).



Figure 11.1: Classification of Web 2.0 Services.

We speak of "**social software**" if there are information services in which the prosumers (and not the "lurkers") form a virtual community. In many cases, of course, others can also profit from these services. We distinguish, roughly, between four classes of social software (Figure 11.1):

- Sharing Services allow for the depositing, online, of certain types of resources (such as videos or images), thus sharing them with others,
- Social Bookmarking Services serve the management (one's own as well as others') of any (Web) resources of one's choosing,
- Knowledge Bases create collections of documents, which are made available to others-some of them in real time,
- Social Networks are, in their narrow definition, platforms for communicating with other members of the community.

Since the resources always carry statements about their producers (such as their real name or a pseudonym), all sorts of social software allow for the construction of networks between the parties involved, i.e. social networks in their broad definition.

Social networks, broadly defined, have two manifestations. On the one hand, prosumers collaborate directly (digitally, which means that they do not have to know each other in person) and create a shared product. The paradigm of this form is a Wiki: an author writes a first draft of an article, a second author adds something, a third corrects a detail, which is deleted again by the first, etc., until the article temporarily "stands". We call this "collaborative intelligence", following Vander Wal (2008). In the second manifestation, prosumers act independently of each other. A clear example of this is provided by the bookmarking service del.icio.us. Here, users tag Web documents with keywords of their own choosing, everybody for himself. In their totality, these tags form "typical" distributions, which allows the system to distinguish important keywords from unimportant ones. This is what is called "collective intelligence" (Peters, 2009, 166-170), which is the exclusive result of (e.g. statistical) algorithms. Only in this way-thus Peters (2009, 169)-is the "wisdom of crowds", and nothing else, at play. This is in contrast to collaborative intelligence, which can also (under bad circumstances) mutate into the "madness of crowds". Surowiecki (2005, 10) names four criteria that tendentially preclude the madness of crowds: diversity of opinion (each individual should have his or her own subjective background information), independence (each person acts independently of all others), decentralization (the individuals are spatially separated from each others and can thus bring in local knowledge) and aggregation (the algorithmic processing of single pieces of information mentioned above). However, there is no guarantee that this will result in a wisdom of crowds. "One cannot simply state that a definition is incorrect only because it is hardly used", Spyns et al. (2006, 745) point out. All information gleaned from social software services thus require a critical examination.

All **business models** in Web 2.0 presuppose free usage of the platforms. Only sporadically are costs incurred by the users for premium offers, which provide services that exceed the standard applications' by far. A source of income for providers of lucrative databases lies in the licensing of their content for search en-

gines. For the microblogging service Twitter, the provision of its database for use in Bing and Google represents its main source of income (Talbot, 2010). Occasionally, donations improve the financial basis of a platform (e.g. for Wikipedia). A method that is used almost continuously is the marketing of users' attention via advertising, in the form of both context-specific (the superimposed ads match the search request or the displayed content) and context-independent ads (e.g. banners that are displayed in certain areas of the screen with no relation to the specific content on show).

11.2 File-Sharing Services

We distinguish sharing services by their type of document: we will provide an example of a service for each type. Selecting such a paradigmatic service was not hard, as the markets tend to be dominated by one single platform:

- videos (YouTube),
- images (Flickr),
- music (Last.fm),
- further services.



Figure 11.2: Display of a Video on YouTube.

11.2.1 Video on Demand

YouTube (a subsidiary of Google) is a platform for videos, in which the prosumers can upload (original as well as third-party) content (Peters, 2009, 80-87). YouTube accepts various media formats for uploads, but the clips are always played back in Adobe's Flash Video Format (FLV) (Figure 11.2). Every Web user can view the videos; uploading, rating or commenting, though, is only possible after registration, by creating one's own "channel". Apart from a few older or certain specifically designated accounts, users are not allowed to upload videos that are longer than ten minutes or larger than 2 GB. The average clip length is four minutes (calculated from a sample), the average rating (from a maximum of five stars) is relatively good for most productions, with an average of 4 (Gill et al., 2007). The videos are either created by the prosumers themselves or taken from other sources (legally or-in terms of copyright-illegally). Sometimes, films are uploaded to YouTube multiple times, which leads to duplicates. Even audio content that is already available elsewhere can be found on YouTube, occasionally enhanced with original animation. The work is done by laymen as well as professional media enterprises (Kruitbosch & Nack, 2008). The films are described, content-wise, by the uploader-and no-one else-with a title, a short description and tags, in the sense of a Narrow Folksonomy.

On the user side, there is a massive selection of videos. The first 10% of clips (arranged by views) make up for a total of 80% of all clicks, so that usage of the resources is distributed with an extreme slant to the left. This typical power-law distribution is explained by the well-known Matthew Principle ("the rich get richer, the poor get poorer"). 90% of the videos are viewed at least once on their up-load date; 40% even get more than ten views. If a clip does not manage to be viewed enough times in its first few days, it is improbable that it will grow popular in the future (Cha et al., 2007).

Prosumers' interaction on YouTube-be it via video posts, reciprocal comments or lists of subscribers and friends-creates communities (Rotman, Golbeck, & Preece, 2009). In such social networks, defined broadly, two tendencies can be detected (Lange, 2007): in the first variant ("publicly private"), the author reveals his identity (by stating his real name), whereas in the second variant ("privately public"), the emphasis is on anonymity.

11.2.2 Images

Flickr is a sharing service for digital images and is operated by Yahoo! (Peters, 2009, 69-80). Registered prosumers upload their photos to Flickr, choose their status (only private, only for friends or family and publicly, as the standard, respectively), put them into photostreams (if they wish to do so) and index them via tags of their own choosing (as well as–for photos regarding specific locations–with geotags, i.e. latitude and longitude data). Friends can add further tags, which makes Flickr's method of knowledge representation an Extended Narrow Folksonomy. Camera information (such as type of camera or time and date of photography) is

adopted and saved automatically. It is also possible to place images into thematically oriented "groups". The service is used by both laymen and professional photographers. Flickr can also be used for one's own, exclusively private purposes, e.g. for organizing one's photos and sending them only to certain other persons (if at all). Flickr's API (Application Programming Interface) is used frequently in order to embed resources saved there in other services, as mash-ups (combinations of content from various different sources). Thus, one can enter suitable photos, as sights, for display on a service for maps (such as Google Maps).



Figure 11.3: Research for Geographically Relevant Images on Flickr via Map and Geotags.

Quantitatively, Flickr must be regarded as a success, in the face of its gigantic amount of resources (several billion photos). However, the majority of images is viewed, or commented, very seldomly (Cox, 2008). Similarly to YouTube, it is very few resources that are viewed very often, which means that here, too, the predominance of a power law is demonstrated impressively. All images will reach their maximum number of views per day after around two days. The (eventually) successful images are discovered as early as three hours after being uploaded, which is mainly due to the uploader's networking. Van Zwol (2007, 190) reports: "People that are highly interconnected will have their photos viewed many times". If an image manages to be viewed very often, this will be due to users around the globe. Less successful images (less than 50 views over 50 days) only appeal to viewers from one geographic area (Van Zwol, 2007).

A special search option is the use of maps. Here, images with geotags, or whose (language) tags specify a location, can be researched by clicking on the map (Figure 11.3). A further usage option provided by photos' sense of place is represented by the informetric compression of spatial information. Thus, for instance, the

most-photographed metropoles (at the moment: New York City), or the most photographed sights in a metropolitan area (e.g. the "Cloud Gate" sculpture in Chicago) can be named (Crandal et al., 2009). In this way, representative images for a region can be created, or the photographers' movements be charted (via the time of creation of photographs with geographic information). The latter is used for the discovery of typical tourists' routes: "One can even see the route of the ferries that take tourists from Lower Manhattan to the Statue of Liberty" (Crandall et al., 2009).



Figure 11.4: Display of Albums, Tracks, Listeners and Current Information as the Result of a Search for Pink Floyd on Last.fm.

11.2.3 Music

Even though not every user can upload music on this platform, **Last.fm** (belonging to CBS) is still a typical Web 2.0 service (Peters, 2009, 49-55). Artists and record labels are invited to make their music available for broad usage, all others participate via content descriptions or comments ("shots") (Haupt, 2009). Last.fm is thus a file-sharing service for **music** as well as an internet radio (as signified by the domain ".fm", which designates the website of the London-based company as originating in the Federated States of Micronesia). Prosumers' tags are often genre descriptions. As each user may re-allocate already used tags, this is a Broad Folksonomy, which allows for a ranking of the resources via number of tags. This fact,

and the number of music titles listened to, provide the criteria for arranging hit lists. Thus, in Figure 11.4, we see displays for albums and single tracks arranged by popularity. If available, a suitable YouTube clip will be played as a mash-up feature. An aspect of social networks (in the broad definition) lies in the recommendation, based on a user's preferences (music played, tags allocated etc.) of other, similar users, which facilitates personal contact. The most important aspect, though, is discovering new good music.



Figure 11.5: Display of Users on 43Things with the Goal of Returning to Kauai at Some Point. Displayed on the Right: Context-Specific Ads.

11.2.4 Further File-Sharing Services

A very specific sort of "resource" is managed collaboratively on **43Things**: personal **goals** and the ways of reaching them (Peters, 2009, 90-95). The users upload to-do lists (with a maximum of 43 goals) to the platform; if they are accomplished, this can also be stated (Smith & Lieberman, 2010). In Figure 11.5, we learn that nine people pursue the goal of returning to Kauai, and that they have taken this step after twelve months on average. On 43Things, it is less the saving and sharing of resources which is at the center of attention, but the creation of virtual communities based on certain goals.

From the multitude of further sharing services, we will point to the collaborative compilation of an **event calendar** (Upcoming) and the selection of **news** (Digg or Reddit).

11.3 Social Bookmarking

Social Bookmarking services collect prosumers' **bookmarks** in one single platform (Peters, 2009, 23-36). For the individual, this has the advantage of being able to manage his bookmarks outside of his own computer; for the community, this collection of resources represents a search tool with intellectually indexed content for Web documents and-depending on the service-for printed resources. We distinguish between general Social Bookmarking platforms with no domain-specific restrictions (Hammond et al., 2005) and services for scientific resources. Among general platforms, a standard service has already established itself in del.icio.us, whereas several scientific bookmarking services are in co-existence.

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26 FEB 10	As social tagging applications continuously gain in popularity, it becomes more and more accepted that models and			d peters	3
tools for (re-)organizing tags are needed. Some first approaches are already practically implemented. Recently, activities to edit and organize tags have been described as 'tag gardening'. We discuss different ways to				article	3
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	subsequency revise and reedit tags and thus introduce different, gardening activities, among them models that			weller	2
	knowledge organization systems. Moreover, nower tags are introduced as	tagcare	2		
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11.3.1 Bookmarking in General

Figure 11.6: Hit List with Trend Information on Indexing Date and a List of Tags Used on Del.icio.us.

Del.icio.us, a Yahoo! company, allows registered prosumers to collect and manage their bookmarks (Peters, 2010, 26-30). Since every prosumer may tag any resource multiple times, this is a Broad Folksonomy, the statistical analysis of which impressively demonstrates Collective Intelligence. In the example in Figure 11.6, we see a classic example of an inverse-logistical distribution for the list of tags arranged by frequency: two terms (*folksonomy* and *tagging*) dominate the entire list pretty evenly, serving as "power tags" (Peters & Stock, 2010). A few tags lie in the vicinity of the curve's turning point (*tags, tag-gardening*), after which begins

the "long tail" of entries that are used very seldomly to describe the content of this resource. The list also shows some problems of folksonomies. Entries such as *peters* or *weller* refer to the authors, 2008 to the year of publication and *article* to the document type–none of which are characteristics that represent the content. In the broad column on the left, all tagging prosumers are displayed with all of the tags they have used (in descending chronological order), so that the user is able to click on other users as well as on other tags.

Social Bookmarking is a complement to algorithmically operating **search engines** (Lewandowski & Maaß, eds., 2008). While the latter process far larger amounts of documents due to their automatic processes, Social Bookmarking services have advantages for particularly active sites (those where the content is often changed) as well as new resources that have so far remained hidden to the search engines (Heymann, Koutrika, & Garcia-Molina, 2008).

11.3.2 STM Bookmarking

Bookmarks for **STM literature** (Reher & Haustein, 2010) are managed, among others, by

- BibSonomy (independent) (Hotho et al., 2006),
- CiteULike (with support by Springer) (Emamy & Cameron, 2007),
- Connotea (run by the Nature Publishing Group) (Lund et al., 2005),
- 2collab (run by Elsevier) (Liu & Wu, 2009).

With the exception of BibSonomy, the STM bookmarking services are produced, or at least supported, by the big scientific publishers. These services work analogously to del.icio.us, i.e. allow the saving and tagging of URLs (here: of scientific-technical-medical literature). Many scientific journals provide users with the option of storing an article, whose bibliographic citations are currently being viewed, on Social Bookmarking services "with one click of the mouse", provided the prosumer has an account with the service in question. Here, the article's entire metadata (magazine title, DOI, statements on volume and page numbers etc.) are adopted automatically. Entering the metadata–even of non-digital documents–manually is also an option (e.g. on BibSonomy).

Among the scientific bookmarking services, none has asserted itself as the standard as of yet (mid-2010), allowing us to observe a "combat zone" (Figure 11.7). At the beginning of or time series, all four platforms we observed were on pretty much the same, very low, level. Then, CiteULike was able to pull clear temporarily, but remained at its new level until mid-2010, while Connotea and BibSonomy steadily increased their usage and moved past CiteULike. 2collab was not able to significantly increase its usage figures over the entire time span. Critical mass, apparently, has not been reached by any of the platforms (for contrast: in Alexa's statistic, del.icio.us is positioned above Conotea and BibSonomy by one decimal place, with a value of more than 0.01% of all page views).



Figure 11.7: Relative Frequencies of Site Views of CiteULike, Connotea, BibSonomy and 2collab between Mid-2009 and Mid-2010. Source: Alexa.

11.3.3 Collective Compilation of a Library Catalog

Beside the digital world, there exists the realm of printed resources. The management and content description of books is granted by the platform **LibraryThing** (Peters, 2009, 61-68). LibraryThing is an electronic catalog, known from actual libraries, only that the "library" here only exists virtually and that prosumers (not librarians) do all the work. Here, too, Collective Intelligence is used via a Broad Folksonomy. The cataloguing of up to 200 books is free for private individuals as well as companies, with (small) charges being incurred for any more resources than that. The (commercial) version for libraries (LibraryThing for Libraries) permits a mash-up of the local catalog with information from LibraryThing. From the librarians' perspective, such a procedure has been described as "helpful", as the tags provide new access paths to resources and additionally recommend the user similar books to the ones he searches for (Westcott, Chappell, & Lebel, 2009).

The use of Social Bookmarking services is very cheap in comparison with commercial cataloguing or documentation software. As a consequence of the "digital divide", there are countries in the world whose information facilities and library systems do not work very effectively. The use of proprietary software is hardly an option, purely for economic reasons. Trkulja (2010) expressly recommends such countries to use Social Bookmarking, e.g. BibSonomy (for represent-

ing the content of scientific articles produced in those countries) and LibraryThing (for cataloguing the books available in their libraries).



Figure 11.8: Recommendations of Similar Resources on the Basis of a Search Result on LibraryThing.

11.4 Collaborative Construction of a Knowledge Base

We now come to the collaborative services. These do not deal–as collective platforms do–with the statistical processing of single pieces of information, but with the actual collaboration between members of a community with the goal of collaboratively working out a common knowledge base. We distinguish the following four approaches to reaching such a goal:

- Wikis (Wikipedia),
- Weblogs (Blogger, WordPress) as well as search engines for blogs (such as Technorati),
- Microblogging (Twitter),
- Others; among them recommender services and further collaborative services in e-commerce, such as "Social Shopping" (Grange & Benbasat, 2010), which we will not address here, however, and which do not figure among i-commerce.

11.4.1 Wiki

A **Wiki** (Hawaiian for *fast*) collects-similarly to an encyclopedia-articles on concepts and entities, while providing users with the option of continuously editing these articles. There is a mass of domain-specific wikis, the most famous of which being the domain-spanning internet encyclopedia **Wikipedia**. Wikipedia is structured according to language; within the linguistic areas, articles range from thousands to hundreds of thousands in number. The German version of Wikipedia contains 1.1m articles as of mid-2010, while the English-language variant already boasts 3.3m entries. The authors remain anonymous; everybody can work on the articles and discuss their evolution up to date. According to Wikipedia's editing policy, no new (research) results are published; instead, existing knowledge about a subject is compiled and backed up via sources. Adherence to these criteria is guaranteed by (equally anonymous) "editors". Collaboration is (relatively) simple; from a technical point of view, it merely requires rudimentary knowledge of HTML. Many templates facilitate the formatting work. A typical Wikipedia entry is shown in Figure 11.9.



Figure 11.9: Entry on "Cloud Gate" on Wikipedia.

Can the user rely on the veracity of the statements in the articles? A small sample of articles on scientific subjects displayed an error rate that was only insubstantially above that of the established "Encyclopaedia Britannica" (Giles, 2005). Neither do further comparative studies–e.g. with the German "Brockhaus" encyclopedia–result in evidence of any serious flaws in Wikipedia's content (Hammwöhner, 2007). However, gaps–and blatant ones at that–can be detected in

the way the statements are supported. This concerns both the number of references as well as the selection of sources backing up the specified data. Luyt and Tan (2010, 721) report:

Not only are many claims not verified through citations, those that are suffer from the choice of references used. Many of these are from US government Websites or news media and few are to academic journal material.

However, it is an open question as to what constitutes information quality in the first place. Stvilia et al. (2008) thus do not refer to individual specific quality dimensions (such as the citations mentioned above), but evaluate the way Wikipedia's quality assurance is organized. They arrive at a positive result (Stvilia et al., 2008, 1000):

Results of the study showed that the Wikipedia community takes issues of quality very seriously. Although anyone can participate in editing articles, the results are carefully reviewed and discussed in ways very similar to open source programming projects.

What must be emphasized is the open discussion on revisions to articles, which can be viewed, with no restrictions, by every reader-this is a significant difference to traditional encyclopedias, where nothing is reported on the selection and editing of their entries. Haider and Sundin (2010) describe this open discourse as a "re-mediation" of the genre of encyclopedias:

This remediation brings with it a change of site and the encyclopaedic notion is transferred from its personification in the printed book to being a space in which people meet, quarrel, negotiate and collaborately build knowledge.

In traditional encyclopedias, there is selection (if only for reasons of space), which is why only particular, or "top-priority" (Anger, 2002, 41) knowledge, and no specialist knowledge, is included. Thus it was "something special" to be included in the Brockhaus. This has been left out of Wikipedia. In the English version of Wikipedia, we find–as we do in the Brockhaus, or the Encyclopaedia Britannica–an entry on *Chicago*, but there is also an extensive entry on *Midway (CTA)*, a subway station of the Orange Line in Chicago (e.g. with the information that there are 299 parking spaces available). Where readers of printed encyclopedias had to wait for the next edition in order to learn new knowledge, this happens almost in real time on Wikipedia; knowledge is processed and made retrievable quickly (hence *wiki*).

In view of these assessments, it is hardly surprising that in a survey of students, 100% of those asked admitted to using Wikipedia. These students are, for the most

part, aware of the risk of possible misinformation (Denning, et al., 2005) and do not "blindly" trust the entries, instead using them as their entry point into a new subject matter in order to then research further (possibly more reliable) material (Lim, 2009). Scientists also use Wikipedia, as well as other wikis. In a survey by Weller et al. (2010), a total of 6.3% of respondents stated that they did not consult wikis. Concerning their motives, the researchers state (Weller, et al., 2010):

(O)f those participants who use wikis or Wikipedia 78.3% stated to use 'Wikipedia as a work of reference', 17.0% use wikis for 'knowledge organization within working groups' and 22.6% for 'personal knowledge management', 4.7% claimed to use wikis for collaborative editing of publications and finally 30.2% use Wikipedia for 'checking students' texts for plagiarism' (another 1.9% 'other purposes').

11.4.2 Blogs

Weblogs are sites on the World Wide Web with single entries (posts) that are arranged in descending chronological order. These posts have a fixed URL (permalink), which is sometimes created for each individual post or for the entire blog (with a jump label to the individual post). If a post is discussed on another blog, this will be recorded on the cited post as a trackback. It is possible to allow comments on one's posts. Users are offered the option of subscribing to blogs (e.g. via RSS or Atom Feeds), so that they will be informed of the latest posts as they are published. There are platforms on the Web (such as Blogger or WordPress) that facilitate the publishing of weblogs. The totality of all weblogs is called the "blog-osphere". Blogs represent a genre on the internet, which has established itself between the medial form of a fixed website and computer-mediated communication (e.g. via e-mail or instant messaging) (Herring et al., 2004). Blogs and posts are researchable via specialist search engines such as Technorati (Peters, 2009, 96-100) or Google Blogs.

We separate weblogs analytically into four classes:

- personal blogs (documentation of daily life in the sense of a diary, posting of private comments, "outlet" for thoughts or feelings or even artistic contributions, like poetry or prose; Nardi et al., 2004),
- blogs by companies and other institutions (PR campaigns on behalf of the company or individual products, e.g. "Frosta-Blog"; blogs by political parties or individual politicians, e.g. the "Obama Blog"),
- political blogs (blogs with political content, occasionally-especially in countries with authoritarian governments-with highly critical views),
- professional blogs (thematically oriented contributions aimed at a professional audience, e.g. "resource shelf" as a blog for information professionals).



Survey Results: Social Software in Academia: Three Studies on Users' Acceptance of Web 2.0 Services

Access the Complete Report (8 pages; PDF)

By: Katrin Weller, Ramona Dornstader, Raimonds Freimanis, Raphael N. Klein, and Maredith Perez (2010) Department of Information Science Heinrich-Heine-University Dusseldorf

In: Proceedings of the WebSci10: Extending the Frontiers of Society On-Line, April 26-27th, 2010, Raleigh, NC: US.

Figure 11.10: Post on the Professional Weblog "resource shelf".

Professional blogs (for an example, see Figure 11.10) play a role that is not to be underestimated in the communication of the respective communities, as Bar-Ilan (2005, 305) observed:

'Professional' blogs are excellent sources of secondary and tertiary information. Most information (...) can be easily found elsewhere, but these blogs concentrate and filter it, and they can be viewed as one-stop information kiosks or information hubs. The postings are mainly on information appearing in other weblogs, news items and press releases. Often, in addition to pointing to information sources, the bloggers provide commentary and express their opinion on the issues at hand.

Within the blogosphere, the information contained in the posts is deemed pretty much uniformly credible–even more so than other sources, such as newspapers, television and radio (Johnson & Kaye, 2004). The blogosphere's evaluation with regard to the individual's participation in society (as required by Critical Theory, for instance) is divided. Jürgen Habermas, as the main advocate of Critical Theory, gives the blogosphere a negative assessment, as he regards weblogs to play "a parasitical role of online communication" (Habermas, 2006, 423), which contrib-

utes to the fragmentation of the public sphere. Fuchs (2008, 134) makes out dangers in blogs run by companies and political institutions:

This shows that Web 2.0 can be incorporated into big politics (as well as big business) that can result in a destruction of its participatory potentials. In such cases, Web 2.0 is colonized in the Habermasian sense of the word by power and money.

Kline and Burstein (2005, XIV), on the other hand, bank on the "participatory potential" of weblogs, as blogging can move others to participate: "to restoring the lost voice of the ordinary citizen in our culture".



Figure 11.11: Homepage on Twitter with Current Tweets.

11.4.3 Microblogging

A variant form of blogging is **microblogging**, represented most prominently by **Twitter**. Every registered prosumer is able to send messages ("tweets") (restricted to 140 characters) from his computer or cell phone. One can "follow" other users (thus becoming their "follower") and is shown their tweets. If a user wants to send a message to a certain recipient in person, ha can also do so (via @user) (the public can see these tweets too, though). (Purely private tweets are sent as "direct messages") The ratio of personal @-tweets is around 25% of all posts (Huberman,

Romero, & Wu, 2009). Occasionally, there are efforts toward establishing a controlled vocabulary. In order to always give a concept (let us say a conference or a product) the same name, "hashtags" are used (as in Figure 11.11 #Scopus). The counterpart to the forwarding of e-mails is called "retweeting" on Twitter (Boyd, Golder, & Lotan, 2010).

Twitter's advantage is the shortness of posts, which means a very low effort is required on the part of both the author and his followers (Zhao & Rosson, 2009). However, one can always incorporate a link into one's tweet. "The ability to include links in a post means that richer content is only a click away" (Martens, 2010, 149). The flexible content is regarded as another advantage, as all that is required (apart from laptop and cell phone) is an internet connection. The use of mobile end devices makes Twitter a very fast medium of information distribution.

As searches on Twitter itself are suboptimal, and less than the entire database is made available for research, one has to take recourse to search engines (such as Bing or Google), which process both the current tweets as well as Twitter's entire public archive. The contents of Twitter are also saved by the Library of Congress.

The four classes of blogs can also be detected in microblogging. Mainka (2010) demonstrates this for microblogs run by companies and political parties, which means that here, too, there is a partial kind of "colonization" of Web 2.0 with the aid of money and power. Professional microblogs, for example, can be observed in scientific conferences (Letierce et al., 2010). From time to time, there are two discussions during and after lectures, one taking place in the room, the other on Twitter. Statements regarded as important are distributed in real time, lecture's full text in the proceedings, and there is the occasional lunch or dinner date.

Twitter, too, is a medium of social networking in the broader sense. The precise statements on followers and followees make it relatively easy to create graphs of communities via network analysis, which emphasize the role of the individual prosumers very clearly. Java et al. (2007) work with the algorithms on hubs and authorities known in information retrieval to determine the status of a single agent (Kleinberg, 1999; see Stock, 2007, 375-382); an alternative is Google's PageRank (Stock, 2007, 382-386). The basis of Java et al.'s calculations are the number of followers (to determine the degree of authority) as well as the number of followers (to determine the duble. As in the Kleinberg algorithm, analog calculations are performed for followers and followees. For an authority, it is thus not only of importance how many users follow them, but also *who* follows (a follower with, say, 1,000 followers of his own is thus more important than one with only 10).

11.5 Social Networks

Social networks in the narrow definition serve the user's self-representation on personal sites, the nurturing of social relationships as well as other (partly collabo-

rative) activities (such as games). Boyd and Ellison (2007) define the term as follows:

We define social network sites as web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their lists of connections and those made by others within the system.

We will distinguish general social networks from interest-led networks. In general networks, there are country-specific platforms (e.g. VKontakte in Russia or studiVZ in Germany), but international domination–even at the cost of the national versions–has been achieved by Facebook. For interest-led communities, MySpace music is a very prevalent service.

11.5.1 General Social Networks

On **Facebook**, prosumers create a site about themselves, which can be accessed either by all or only by "friends". A friend relationship in this sense is always mutual, which means that requests must be explicitly accepted. In addition to the personal sites, one can also create sites of which users become "fans" (see Figure 11.12). The fan relationship is one-sided; it does not have to be confirmed. Facebook allows the posting of messages to a user's "wall", the uploading of photos or video clips and the commenting of friends' activities. On the sites of one's friends, one can find a complete list of their respective friends and a highlighted subset of mutual friends. There are various applications, particularly games (Rao, 2008), such as Farmville. The majority of users visits "their" social network once or several times a day (Khveshchanka & Suter, 2010, 74).

Motives for participating in general social networks include the nurturing of social contacts and simply the fact that they are fun to use. There are users "who are looking for fun and pleasure while 'hanging around' on the WWW" (Hart et al., 2008, 474). Social contacts are established in independence of geographical constraints. This also has repercussions in the non-digital world, as Ellison, Steinfield and Lampe (2007) report:

The strong linkage between Facebook use and high school connections suggests how SNSs (Social Network Services, A/N) help maintain relations as people move from one offline community to another. It may facilitate the same when students graduate from college, with alumni keeping their school email address and using Facebook to stay in touch with the college community. Such connections could have strong payoffs in terms of jobs, internships, and other opportunities.

Informationswissenschaft Heinrich Heine Uni Düsseldorf Düsseldorfer Studenten der Informationswissenschaft halten auf Hawaii Fachvorträge

Zum 43. Mal fand im Januar 2010 die renommierte Hawaii International Conference on System Sciences statt. Sie gilt als ein Mega-Event bei Informationsspezialisten. Diesmal trafen sich rund 800 Wissenschaftler aus über 30 Ländern zum Erfah... Mehr anzeigen



15:26 · Kommentieren · Gefällt mir · Teilen

🖒 Nils Werner, Katrin Weller und Kochanek Rafael gefällt das.

Schreibe einen Kommentar ...



Figure 11.12: Extract from the Fansite of the University of Düsseldorf's Department of Information Science on Facebook.

What circumstances would move users to switch social networks? On the pull side, the influence of peer groups dominates; a significant push factor is represented by dissatisfaction with usage conditions (Zengyan, Yinping, & Lim, 2009). Users stay faithful to Facebook if they are happy, with this happiness depending on their expectations being exceeded by the platform (i.e. if there is positive disconfirmation). Shi et al. (2010) were able to determine stay factors:

The findings suggest that the positive disconfirmations of maintaining offline contacts, information seeking and entertainment all significantly affect users' continuance intention to use Facebook which are mediated by their satisfaction with Facebook.

Regarded as a problem is the lack of **privacy**-the publishing of private and rather confidential personal statements. Young users in particular, and those who seek a relationship, tend to put highly sensitive and potentially stigmatizing information (such as their sexual orientation or religious beliefs) on Facebook (Nosko, Wood, & Molema, 2010). In contrast with German studiVZ users, American Facebook users are more aware that any published personal information can be misinterpreted or otherwise used to the publisher's disadvantage (Krasnova & Veltri, 2010, 5). However, this does not prevent them from revealing more information than their German counterparts (Krasnova & Veltri, 2010, 9). In a detailed analysis of the publication of private data on social networks, Khveshchanka and Suter (2010, 74) found out that American users show their photos on their site in 92% of cases, whereas the figures for Russian and German users are 72% and 53%, respectively.

Facebook has functions that are also offered by other Web 2.0 services: the user can upload photos or videos and communicate with others. We thus have a case of competition between the platforms of social software.

11.5.2 Interest-Led Networks

There are further social networks, which mainly cater to their users' common interests. Thus there is Xing for business contacts or **MySpace** for music. Prosumers occasionally use different networks for different purposes, e.g. Xing for professional interests, Facebook to communicate with friends and MySpace to promote their band.

In the case of MySpace Music, Rossi and Teli (2009) speak of a "virtual scene" instead of an online community. MySpace Music is used by both established artists and unknown (so far) bands. Smaller bands (Figure 11.13) benefit from the fact that songs can be uploaded without an accompanying video. On the profile pages, there are statements about the artists, music titles can be played back (with or without a video), there are blogs and notes on upcoming gigs. Friendships areas on Facebook–bilateral. "Top Friends" are a handpicked amount of (up to) 40 people, whose names are displayed ("normal" friends are not listed). For musicians, there are advantages to participating in MySpace (Antin & Earp, 2010, 954):

Participating in MySpace Music has the potential to convey a variety of benefits on musicians. Musicians are likely to use MySpace Music to explore musical styles, to find new music and collaborators, to organize gigs, and form communities around musical genres or geographic locations.

For top artists, a correlation can be detected between their number of friends on MySpace Music and their CD sales and profits (Dhar & Chang, 2009).



Figure 11.13: Profile Page of the Independent Düsseldorf Rock Band NFO on MySpace.

11.6 Conclusion

Only available in the printed version.

11.7 Bibliography

- Anger, E. (2002). Brockhaus multimedia 2000 Premium auf CD-ROM und DVD. Rösch, H. (ed.), Enzyklopädie im Wandel. Schmuckstück der Bücherwand, rotierende Scheibe oder Netzangebot (pp. 36-65). Köln: FH Köln. (Kölner Arbeitspapiere zur Bibliotheks- und Informationswissenschaft; 32).
- Antin, J., & Earp, M. (2010). With a little help of from my friends. Self-interested and prosocial behavior on MySpace Music. Journal of the American Society for Information Science and Technology, 61(5), 952-963.
- Bar-Ilan, J. (2005). Information hub blogs. Journal of Information Science 31(4), 297-307.
- Boyd, D., & Ellison, N.B. (2007). Social network sites. Definition, history, and scholarship. Journal of Computer-Mediated Communication, 13(1), art. 11.
- Boyd, D., Golder, S., & Lotan, G. (2010). Tweet, tweet, retweet. Conversational aspects on retweeting on Twitter. Proceedings of the 43rd Hawaii International Conference on System Sciences. Washington, DC: IEEE Computer Society Press.
- Cha, M., Kwak, H., Rodriguez, P., Ahn, Y.Y., & Moon, S. (2007). I tube, you tube, everybody tubes. Analyzing the world's largest user generated content video system. Proceedings of the 7th ACM SIGCOMM Conference on Internet Measurement (pp. 1-14). New York, NY: ACM.
- Cox, A.M. (2008). Flickr. A case study of Web2.0. Aslib Proceedings 60(5), 493-516.
- Crandall, D., Backstrom, L., Huttenlocher, D., & Kleinberg, J. (2009). Mapping the world's photos. Proceedings of the 18th International Conference on World Wide Web (pp. 761-770). New York, NY: ACM.
- Denning, P., Horning, J., Parnas, D., & Weinstein, L. (2005). Wikipedia risks. Communications of the ACM, 48(12), 152.
- Dhar, V., & Chang, E.A. (2009). Does chatter matter? The impact of usergenerated content on music sales. Journal of Interactive Marketing, 23(4), 300-307.
- Ellison, N.B., Steinfield, C., & Lampe, C. (2007). The benefits of Facebook "Friends". Social capital and college students' use of online social network sites. Journal of Computer-Mediated Communication, 12(4), art. 1.
- Emamy, K., & Cameron, R. (2007). Citeulike. A researcher's social bookmarking service. Ariadne 51.
- Fuchs, C. (2008). Internet and Society. Social Theory in the Information Age. New York, NY: Routledge.
- Giles, J. (2005). Internet encyclopaedias go head to head. Nature, 438, 900-901.
- Gill, P., Arlitt, M., Li, Z., & Mahanti, A. (2007). YouTube traffic characterization. A view from the edge. Proceedings of the 7th ACM SIGCOMM Conference on Internet Measurement (pp. 15-28). New York, NY: ACM.

- Grange, C., & Benbasat, I. (2010). Online social shopping: The functions and symbols of design artefacts. Proceedings of the 43rd Hawaii International Conference on System Sciences. Washington, DC: IEEE Computer Society Press.
- Habermas, J. (2006). Political communication in media society. Does democracy still enjoy an epistemic dimension? The impact of normative theory on empirical research. Communication Theory, 16, 411-426.
- Haider, J., & Sundin, O. (2010). Beyond the legacy of the Enlightenment? Online encyclopaedias as digital heterotopias. First Monday, 15(1).
- Hammond, T., Hannay, T., Lund, B., & Scott, J. (2005). Social bookmarking tools (I). A general review. D-Lib Magazine, 11(4).
- Hammwöhner, R. (2007). Qualitätsaspekte der Wikipedia. kommunikation@gesellschaft, 8, Beitrag 3.
- Hart, J., Ridley, C., Taher, F., Sas, C., & Dix, A. (2008). Exploring the Facebook experience. A new approach to usability. Proceedings of the 5th Nordic Conference on Human-Computer-Interaction: Building Bridges (pp. 471-474). New York, NY: ACM.
- Haupt, J. (2009). Last.fm. People-powered online radio. Music Reference Services Quarterly, 12, 23-24.
- Herring, S.C., Scheidt, L.A., Bonus, S., & Wright, E. (2004). Bridging the gap. A genre analysis of weblogs. Proceedings of the 37th Hawaii International Conference on System Sciences. Washington, DC: IEEE Computer Society.
- Heymann, P., Koutrika, G., & Garcia-Molina, H. (2008). Can social bookmarking improve Web search? Proceedings of the International Conference on Web Search and Web Data Mining (pp. 195-206). New York, NY: ACM.
- Hotho, A., Jäschke, R., Schmitz, C., & Stumme, G. (2006). Bibsonomy. A social bookmark and publication sharing system. Proceedings of the Conceptual Structure Tool Interoperability Workshop at the 14th International Conference on Conceptual Structures (pp. 87-102).
- Huberman, B.A., Romero, D.M., & Wu, F. (2009). Social networks that matter. Twitter under the microscope. First Monday, 14(1).
- Java, A., Finin, T., Song, X., & Tseng, B. (2007). Why we twitter. Understanding microblogging usage and communities. Proceedings of the 9th WebKDD and 1st SNA-KDD Workshop on Web Mining and Social Network Analysis (pp. 56-65). New York, NY: ACM.
- Johnson, T.J., & Kaye, B.K. (2004). Wag the blog. How reliance on traditional media and the Internet influence credibility perceptions of weblogs among blog users. Journalism & Mass Communication Quarterly, 81(3), 622-642.
- Khveshchanka, S., & Suter, L. (2010). Vergleichende Analyse von profilbasierten sozialen Netzwerken aus Russland (Vkontakte), Deutschland (StudiVZ) und den USA (Facebook). Information–Wissenschaft und Praxis, 61(2), 71-76.
- Kleinberg, J. (1999). Authoritative sources in a hyperlinked environment. Journal of the ACM 46(5), 604-632.
- Kline, D., & Burstein, D. (2005). Blog! How the Newest Media Revolution is Changing Politics, Business and Culture. New York, NY: CDS Books.

- Krasnova, H., & Veltri, N.F. (2010). Privacy calculus on social networking sites: Explorative evidence from Germany and USA. Proceedings of the 43rd Hawaii International Conference on System Sciences. Washington, DC: IEEE Computer Society Press.
- Kruitbosch, G., & Nack, F. (2008). Broadcast yourself on YouTube–really? Proceedings of the 3rd ACM International Workshop on Human-Centered Computing (pp. 7-10). New York, NY: ACM.
- Lange, P.G. (2007). Publicly private and privately public. Social networking on YouTube. Journal of Computer-Mediated Communication, 13(1), art. 18.
- Letierce, J., Passant, A., Decker, S., & Breslin, J.G. (2010). Understanding how Twitter is used to spread scientific messages. Proceedings of the Web Science Conference 2010, April 26-27, 2010, Raleigh, NC, USA.
- Lewandowski, D., & Maaß, M., eds. (2008). Web-2.0-Dienste als Ergänzung zu algorithmischen Suchmaschinen. Berlin: Logos.
- Lim, S. (2009). How and why do college students use Wikipedia? Journal of the American Society for Information Science and Technology, 60(11), 2189-2202.
- Liu, W., & Wu, L. (2009). 2collab. Journal of the Medical Library Association, 97(3), 233-234.
- Lund, B., Hammond, T., Flack, M., & Hannay, T. (2005). Social bookmarking tools (II). A case study–*Connotea*. D-Lib Magazine, 11(4).
- Luyt, B., & Tan, D. (2010). Improving Wikipedia's credibility. References and citations in a sample of history articles. Journal of the American Society for Information Science and Technology, 61(4), 715-722.
- Mainka, A. (2010). Twitter: "Gezwitscher" oder gezielte Informationsvermittlung? Information–Wissenschaft und Praxis, 61(2), 77-82.
- Martens, E. (2010). Twitter for Scientists. ACS Chemical Biology, 5(2), 149.
- Nardi, B.M., Schiano, D.J., Gumbrecht, M., & Swartz, L. (2004). Why we blog. Communications of the ACM, 47(12), 41-46.
- Nielsen, J. (2006). Participation Inequality. Encouraging More Users to Contribute. (Online).
- Nosko, A., Wood, E., & Molema, S. (2010). All about me. Disclosure in online social networking profiles. The Case of FACEBOOK. Computers in Human Behavior, 26, 406-418.
- O'Reilly, T. (2005). What is Web 2.0? (Online).
- O'Reilly, T., & Battelle, J. (2009). Web Squared: Web 2.0 Five Years on. (Online).
- Peters, I. (2009). Folksonomies. Indexing and Retrieval in Web 2.0. Berlin: De Gruyter Saur. (Knowledge & Information. Studies in Information Science).
- Peters, I., & Stock, W.G. (2010). "Power Tags" in Information Retrieval. Library Hi Tech, 28(1), 81-93.
- Prainsack, B., & Wolinsky, H. (2010). Direct-to-consumer genome testing: Opportunities for pharmacogenomics research? Pharmacogenomics, 11(5), 651-655.
- Rao, V. (2008). Facebook applications and playful mood. The construction of Facebook as a "Third Place". Proceedings of the 12th International Conference on

Entertainment and Media in the Ubiquitous Era (pp. 8-12). New York, NY: ACM.

- Reher, S., & Haustein, S. (2010). Social bookmarking in STM. Putting services to the acid test. Online, 34(6), 34-42.
- Rheingold, H. (1993). The Virtual Community. Homesteading on the Electronic Frontier. Reading, MA: Addison-Wesley.
- Rossi, C., & Teli, M. (2009). Music collectivities and MySpace: Towards digital collectives. Proceedings of the 42nd Hawaii International Conference on System Sciences. Washington, DC: IEEE Computer Society Press.
- Rotman, D., Golbeck, J., & Preece, J. (2009). The community is where the rapport is. On sense and structure in the YouTube community. Proceedings of the 4th International Conference on Communities and Technologies (pp. 41-50). New York, NY: ACM.
- Shi, N., Lee, M.K.O., Cheung, C.M.K., & Chen, H. (2010). The continuance of online social networks. How to keep people using Facebook? Proceedings of the 43rd Hawaii International Conference on System Sciences. Washington, DC: IEEE Computer Society Press.
- Smith, D.A., & Lieberman, H. (2010). The why UI. Using goal networks to improve user interfaces (pp. 377-380). Proceedings of the 14th International Conference on Intelligent User Interfaces. New York, NY: ACM.
- Spyns, P., de Moor, A., Vandenbussche, J., & Meersman, R. (2006). From folksonomies to ontologies. How the twain meet. Lecture Notes in Computer Science, 4275, 738-755.
- Stock, W.G. (2007). Information Retrieval. Informationen suchen und finden. München; Wien: Oldenbourg.
- Stvilia, B., Twidale, M.B., Smith, L.C., & Gasser, L. (2008). Information quality work organization in Wikipedia. Journal of the American Society for Information Science and Technology, 59(6), 983-1001.
- Surowiecki, J. (2005). The Wisdom of Crowds. Why the Many are Smarter than the Few and How Collective Wisdom Shapes Business, Economics, Societies, and Nations. New York, NY: Anchor Books.
- Talbot, D. (2010). Can Twitter make money? Technology Review 113(2), 52-57.
- Tönnies, F. (1887). Gemeinschaft und Gesellschaft. Leipzig: Fues.
- Toffler, A. (1980). The Third Wave. New York, NY: Morrow.
- Trkulja, V. (2010). Die Digitale Kluft. Bosnien-Herzegowina auf dem Weg in die Informationsgesellschaft. Wiesbaden: VS Verlag f
 ür Sozialwissenschaften / Springer Fachmedien.
- Van Zwol, R. (2007). Flickr. Who is looking? Proceedings of the IEEE/WIC/ACM International Conference on Web Intelligence (pp. 184-190). Washington, DC: IEEE Computer Society.
- Vander Wal, T. (2008). Welcome to the matrix! Gaiser, B., Hampel, T., & Panke, S. (eds.), Good Tags–Bad Tags. Social Tagging in der Wissensorganisation (pp. 7-9). Münster: Waxmann.
- Weller, K., Dornstädter, R., Freimanis, R., Klein, R.N., & Perez, M. (2010). Social software in academia: Three studies on users' acceptance of Web 2.0 ser-

vices. Proceedings of the Web Science Conference, April 26-27, 2010, Raleigh, NC, USA.

- Westcott, J., Chappell, A., & Lebel, C. (2009). LibraryThing for libraries at Claremont. Library Hi Tech, 27(1), 78-81.
- Zengyan, C., Yinping, Y., & Lim, J. (2009). Cyber migration. An empirical investigation on factors that affect users' switch intentions in social networking sites. Proceedings of the 42nd Hawaii International Conference on System Sciences. Washington, DC: IEEE Computer Society Press.
- Zhao, D., & Rosson, M.B. (2009). How and why people twitter. The role that micro-blogging plays in informal communication at work. Proceedings of the ACM 2009 International Conference on Supporting Group Work (pp. 243-252). New York, NY: ACM.