

Understanding the Identity Concept in the Context of Digital Social Environments¹

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Abstract

The Internet is increasingly being employed as a means to facilitate the social process of human communities, and in particular a large variety of categories environments and mechanisms (such as Email, forums, blogs, wikis, reputation systems, MMORPG, etc.) are now available to mediate people interaction. This paper analyses the concept of identity in the context of the different categories of digital social environments, and for each of them identifies some of the identity issues and illustrate them with an example. It emphasis in this context the importance of the social identity (an abstracted identity representing how people are perceived by others, and which includes concepts such as reputation, behavioral transparency) and indicates the implications of social mechanisms and its role for the management of identity.

1 Introduction

The Internet is increasingly becoming more alive and more social, moving away from the idea of Internet as only a gigantic encyclopedia or a massive shop, and in which the interactions only happen with machines. People today not only use the Internet more and more to interact others people, but they use it to socialize, to generate some lasting relationships, and even to develop a “real” social virtual life (in online forums, chats, massively multi-player online games, etc.) In this context, the online identity that people develop represents a critical element of the activities taking place in these virtual spaces. This digital identity - that represents how they are perceived in the online environment -, has a direct impact in enabling or preventing the social interaction, and on the nature of the interaction (for instance you do not interact the same way with someone that you know and you trust

than with someone for whom you have no information at all). This online identity can be explicit, and managed by some forms of identity management systems, or can be more abstract and diffuse. In the latter case, it includes the social identity that people develop on line, and that exists in the form of the reputation that they acquire (in forum, blogs, etc.), or the network of relationships that they build (in “friends” specified in their blogs, in the Instant messaging buddy list, etc.).

Importantly, and contrary to the off-line world, the trace of this “implicit identity” can be recorded in the digital space, be accessible to human agents, or mined and exploited by automatic mechanisms. This does not happen without posing a series of issues (trust, privacy, identity thief, etc.), in particular when you know that part of this digital life is becoming more prominent in people’s lives, or that the frontier between digital life and real life is becoming blurred.

The objective of this document is to present an overview of digital social environments from the viewpoint of the subject of identity. Its aim is to raise awareness on the diversity and richness of these environments, and on the different identity issues that may occur in these environments.

The first part of this document consists in a general presentation and analysis according to an “identity” perspective of the concept of identity in the context of digital social environments. This document then presents the main categories of digital social environments, and illustrates each of them with a case or story presenting a particular issue. It then concludes by providing some directions of future thinking about online digital identity, and in particular the blurring of online and off-line words, the phenomenon of convergence (identity considered more holistically in the future), and the articulation between formal and informal identity.

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2 Identity issues of Digital Social Environments

2.1 Introducing the identity issues of Digital Social Environments

The increase of the social dimension on the Internet

As the Internet is becoming more mature and is being adopted by a larger (and in particularly less technophile) portion of the population, its usage is becoming less centred on information, and more oriented towards the mediation of the social process. More concretely, people are increasingly using the Internet to engage in activities that include a strong social dimension such as: the participation in communities of interest (intervening in online forums and other virtual community spaces), the expression of their opinions, visions, and description of their lives etc. via personal journals that are made available to others (the “blogging phenomenon” (Kumar et al. 2004)), the exchange of opinions and the building of reputation (examples include reputation systems’ mechanisms found in eBay), the participation in online games or virtual worlds in which the players intervene as avatars, or the use of matching systems (dating systems, social networks) which are used to help the establishment of relationships with other people and to exploit them. If the social dimension of the Internet is not new (emails and newsgroups have supported the social process for years), it is however changing in nature since it is now becoming accessible to the “non-geek” population, is more deeply supported (they are no longer seen only as “side products”, and for instance social network systems aim at explicitly supporting them), and is experiencing a major revival after the new evolution of the World Wide Web as a less information-centric and a more service-oriented system (see for instance (Fox et al., 2005) for some predictions about the evolution of the Internet).

The importance of Identity in Digital Social Environments (DSEs)

In the context of these “socially enhanced” spaces, the online identities that people construct and develop represent critical elements: The quality of these identities (representing the images of themselves that they project in these environments and therefore how they are perceived) has direct implications on the value obtained from these spaces and the quality of the interaction. Obviously, people do not interact the same way with people that they know and trust (even if they have never met them in real life) than with perfect strangers. These identities are complex, since they

include both the explicit personal identities (real or faked) that are managed via digital identity management systems or declared by people by filing a user profile, as well as the implicit social identities that people develop through their behaviours (postings, conversations, actions) and that are often recorded and made persistent in digital systems. This later “social identity”, sometimes summarized as “you are who your network is”, possesses a particular significance in the digital worlds, since contrary to the off-line world, it is explicitly represented (people’s relationships are for instance captured in social network services software, behavioural traces are present in log files, etc.), and can therefore be exploited for instance in reputation systems to help in the forming (via social translucence mechanisms) of online reputations (one major component of social identity), and in some cases be mined and subject to profiling operations for automated utilizations.

Identity issues in DSEs

Online identities in these social enhanced spaces are raising many identity issues (reliability of the information, pseudonymity, privacy, identity thief, etc.), and therefore represent a very useful playground/laboratory for the analysis of identity issues in general, and abstracted identity (informal identities that can be extracted from data) issues in particular.

For instance, in many cases in these spaces it is difficult to check the validity of the information declared by a user, and therefore to trust the validity of the “displayed” identity (for instance people do not hesitate to change gender in online forums or online games). This is particularly true in the case of virtual worlds (gaming, virtual communities, virtual dating, etc) that people use for the purpose of changing for and experimenting temporarily with a more desirable life than the one they have in the real world (in other words, the value that people get from these worlds is exactly in the possibility to “pretend” to be someone else). For instance, a fantasy world will give an insignificant employee in the real world the opportunity to become a renowned knight (Steinkuehler, 2004), a blog will provide a professor the possibility to become a rock and cultural critic (Nardi et al., 2004), and a dating system will permit an introvert to overcome his/her shyness in an online world and to engage in some relationships with individuals of the opposite gender.

On the other hand, and at the same time, people may not be fooled by other people’s “declared identity”, when they can observe the behaviours of these people in these environments: there is a limit to what

individuals can pretend to be and they can be betrayed by their behaviour. For instance (Berman and Bruckman, 2001) have conducted some research on the different way in which men and woman behave online, or if people's communication patterns can help to determine information about age, race, or national origin. In the famous musical comedy "My Fair Lady", based on the play "Pygmalion" by George Bernard Shaw, Prof. Henry Higgins, a renowned linguist, demonstrates his ability to determine the social and geographical origin of people just by analysing the way they talk. If this story is imaginary, the idea of the stickiness of social attributes (the way in which people talk in this case) is not, both in sociology (with for instance the work of Pierre Bourdieu in social capital, (Bourdieu, 1980)), and in people's beliefs.

Another element, pseudonymity, is extensively used in virtual digital environments, even for conducting the more serious or critical activities. For instance online gamers (but also people participating in online forums) typically choose names that help them better to live a fantasy. eBay vendors and buyers (eBay is an electronic marketplace providing reputation mechanisms) conduct their businesses using pseudonyms, and activists hide their real identity to protect themselves from retaliation when creating and posting in a blog (personal online journal used to express opinions).

In addition, the complexity and persistence of digital traces make it difficult for users to control sufficiently the disclosure of this information to third parties (for instance some people have been fired for posting information on their blog that they wrongly assumed to be a private space), and raise concerns related to privacy. Finally, spoofed/forged emails have been used in several cases to damage people's reputation (using spoof email of hatred messages).

Are DSEs identity issues really important?

It is of course legitimate to question the importance of these identities that develop in digital social environments and in particular the abstracted one (the social identity): after all, these virtual worlds are not real, and the consequences can only be minor, and in no way similar in identity to the issues that occur in the real world (identity thief, money laundering, and credit card forgery)! This would be forgetting that these digital social environments are gaining an increasing importance in people's lives. For instance (Stafford and Gonier, 2004) in a study of AOL users' population report that socialisation is now recognised as a significant factor for using the Internet, and a Pew Internet & American Life Project report ((Rainie, 2005) indicates that end 2004, 7% of the 120 million

U.S. adults who use the Internet say they have created a blog, and 27% of Internet users say they read blogs. We can also add that the ruining of an online reputation can be disastrous in real life (when it happens for an eBay vendor or for a politician) and that the frontier between these worlds and the real world is progressively blurring (for instance a project such as I-Neighbour helps to strengthen local bonds and social interaction by vitalizing real local communities, blended learning combining the online and off-line learning is increasingly attracting attention about the future of learning, etc.). Besides, the support of more informal mechanisms in identity management systems, such as the one found in reputation systems like eBay, is making people's activity more visible and accountable, and can in some cases provide more flexibility in managing certain identity and identification aspects than more formal ones which often rely only on one time authentication that can give a false feeling of security.

Better understanding the DSEs, their variety, and their identity issues

The objective of this paper is to contribute to the clarification of identity issues in digital social environments. Practically it consists in presenting and analysing, according to an "identity" perspective, the main categories of digital social environments, and in illustrating with cases or stories the identity issues that can be found in these environments. This paper does not pretend, however, to make an exhaustive inventory of all the possible issues, but rather to raise the awareness of the reader about the richness and the diversity of the identity concept in these environments.

2.2 Defining DSEs

Internet as a mediator of social activity

People, when using the Internet (in working, shopping, playing), are increasingly dealing with other humans rather than only information or machines.

Indeed, as the Internet matures and is adopted by a larger portion of the population (of people who are not necessarily technophile and who are definitely more interested in the "human and social life"), its role as a tool for mediating human interaction is becoming more prominent. People are participating in the digital forums of communities of interests, are "chatting" with friends using Instant-messaging tools, or are having a new life playing in the massively multi-player online games. Interestingly, even the more traditional information perspective (Internet as a big information repository) is becoming extended with social aspects

helping to better manage this information: For instance opinion and social translucence mechanisms (Erickson et al., 2002) are used in electronic marketplaces such as eBay to facilitate the evaluation of the quality and the relevance of product information, and coordination mechanisms are used for instance in Wikipedia to facilitate the collaborative construction of an online encyclopaedia.

This usage of the Internet for supporting people’s communication is not new, and was actually relatively important before the advent of the Web, with systems such as email, chat systems (IRC), newsgroups and other forums. However, with the maturing of the Internet (with reliable high speed infrastructures - more than 50 percent of the total U.S. Internet population access the Internet via broadband (Hu, 2004) -), its democratisation (making it very affordable to all the classes of the population), and its ease of use (new tools like blogging do not require you to be a technical expert), we can observe a radical transformation of the demographics of the user population, and consequently of the usage: a significant portion of the population (in the most advanced country) is now integrating the Internet directly as part of their life (to get informed, to communicate with others, to shop, to learn), and in some cases (for instance with the case of massively multi-user online games) creating totally new life territories in which they can develop a life having a strong social dimension.

What are digital social environments (DSE)

In this paper, we define Digital Social Environments (DSE) as the category of Online Environments that provide some form of support to the social process. This definition therefore covers all the digital environments that we have mentioned in the previous chapter. This definition is rather broad, and includes a variety of systems ranging from very explicit and centralized community systems directly supporting people’s interactions (such as virtual community platforms or forums), to some more decentralized communication systems that are supporting a more peer-to-peer mode of interaction and that are directly controlled by their users (for instance email, Instant messaging systems, blogs). DSE also include environments that do not directly support people’s interactions themselves, but provide some services of intermediation. In a similar way these services can be centralized (for instance a system like eBay which provides some matching services between vendors and buyers, and implement a series of reputation mechanisms), or decentralized (such as in the case of online social networking systems like LinkedIn in which people manage individually their

social network, or peer-to-peer networks that are used to directly exchange digital items).

	communication & Interaction	Intermediation
Centralized	Virtual community systems, Forums, Wiki, MMOG, CMS, etc.	Marketplaces (reputation and recommender systems), ...
Decentralized	Blogs, Instant messaging, email, etc.	Online social networking, peer-to-peer networks, etc.

Figure 1: DSEs centralization / interaction

“Table 1: DSEs centralization / interaction” summarizes this categorization of DSEs according to their centralized or decentralized nature, and on their main role (support for the interaction or intermediation), although in reality the frontier is not always very strict, and that we see some movement of convergence and merging of these systems into more holistic ones (for instance Bill Gates in (Kanellos, 2005) suggests for the future the integration of everything – social networking, blogging, instance messaging, etc.- into a single system).

3 Illustrating the Identity Issues in Digital Social Environments

In this section, we are going to provide a more concrete overview of the different categories of the digital social environments, and for each of them, we will give an example, case or scenario illustrating a particular issue.

3.1 Electronic mail

Description and identity issues

Email communication represents one of the most important tools used on the Internet (Stafford and Gonier, 2004), and one of the oldest. Electronic mail represents the principle means for people on the Internet to communicate directly and asynchronously with one another, which consists in the transmission of a message to a given electronic destination of the receiver.

The Identity in email systems is essentially managed via the email addresses (identifier@domain) that people utilize to communicate with one another. Practically, people’s authentication is done by the “sender” attribute in the email. Privacy is protected by the non-disclosure of this email to third parties (which

may be difficult because this information may be transmitted from a party that was originally trusted). Some information can be inferred from the domain of the email address (this domain sometimes represents the name of the organization to which the user is affiliated, such as a company or a university). Electronic mail is sufficiently well known to have to further describe it in this document.

The management of this email is therefore extremely primitive, and includes many flaws, resulting in many identity issues and problems. First, an email address associated with an organization does not usually provide any indication related to the level of the affiliation (we can however mention the exception of the email addresses issued for alumni of big universities, which indicate the affiliation of the person). Second, the email address can very easily be forged (and appear to originate from an entity or a location different from the actual source) with the objective of misleading the reader about the origin of its initiator. This forging, also called spoofing, has been used in some cases to harm the reputation of individuals or organizations by making them “say” things considered as inappropriate. Spoofing is also frequently used by spammers to force some of the protection of basic email filtering. This spoofing is also used in phishing activities (pretending to be a trustful organization) aiming at “extorting” credit card information. Third, email can be borrowed and used without the knowledge of its owner. In the latter case, this could mean of course the theft of the user’s account, but much more often originates from some virus activities (such as the Melissa Virus that was spread by sending itself via email on behalf of the user’s email account, but without his knowledge). Fourth, we can mention the problem of the “calamity” spamming, which outrageously uses people’s email addresses totally against their will. Finally, we can indicate some serious privacy issues that have appeared with the major Internet player Yahoo, which in exchange for a free massive mailbox, ask the right to mine the content of the emails in order to display automatic advertisements based on the text of e-mail messages (McCullagh, 2004).

To conclude, email represents very insecure systems related to the management of identity. On the positive side, people happen to know about it and are able to live with it, even if some advanced cases of phishing continue to lure the more naïve users, and if the exploitation of email systems by viruses or spamming companies continues to represent a major problem.

A short case of email identity forging, and the consequences for a person’s reputation

In October 1994, someone broke into the computer account of Grady Blount, a professor of environmental science at Texas A&M University, and sent out racist email to more than 20,000 people on the Internet. The message brought death threats and other harsh responses from nearly 500 users and seriously harmed the reputation of this professor, and threatened his career (Blount, said that even his research grants were put in jeopardy as a result of the incident).

This case underlines the risks of identity forging in the “e-mail virtual space”, resulting in very real consequences in the off-line world.

3.2 Virtual Community Environments

Description and identity issues

Virtual community environments include all the systems, such as forums or bulletin boards, that provide explicitly shared dedicated spaces for supporting the discussions of communities or groups of people. The communication in these spaces can be asynchronous (bulletin board) or real-time synchronous (chatrooms). People interact mainly with others by posting messages in (public or restricted) share spaces, but can also sometimes communicate directly and more privately with one another. The control of what can be posted in the public spaces (specified in an explicit or implicit code of conduct) can be enforced by a moderator or by some social regulation mechanisms (typically social pressure).

The management of Identity in virtual community systems covers a variety of aspects. First, the participants in these environments are usually registered as members (they login to these systems to be authenticated), and are visible in these environments via a pseudonym that they have chosen. They can also if they decide display other characteristics described in a user profile, such as age, interest, and other information that can be relevant to the purpose of this community (for instance a community of technophiles will typically display the technological hardware configuration of its users). More interestingly, these systems may also display other characteristics such as the “social status” (e.g. wizard), the position (e.g. moderator) the level of experience (newbie, experienced) or the level of activity of the members, helping the others to make an assessment of their seriousness. It is not uncommon that this latter information to be used to enforce social control (a newbie will for instance be reminded his/her little experience, and be denied some actions).

However, one of the most important identity dimension that people use is the social identity (reputation, etc.) that they develop in these environment, and that reflect their behaviour and attitudes and that can be observed in their postings in the public spaces, as well as in the social relationships they have established with others.

The identity issues that can be found in such environments are mainly the social issues that can be found in the real world, and that are sometimes magnified in these digital spaces, because of some feeling of impunity perceived by some of the new members (older members usually are much more careful to behave well in order to maintain a reputation that is so important to maximize the value that they get from these spaces such as help, recognition or fun) and the perceived easiness of communication. Practically, one of the nuisances in these environments called trolling consists in trying to destroy the good disposition in these communities by surreptitiously creating disorder and frustration (trolling attempts to provoke outraged responses from other forum users) among people who have a feeling of impunity for their action because of some level of anonymity (they use weak pseudonyms with little reputation attached). Another problem is related to identity phishing such as in the case of switching of gender (women for instance receive more attention and are usually better supported in forums, but people may also switch in order to experiment with a new identity (Berman and Bruckman, 2001)).

Virtual community environments also raise a question of privacy: the traces that people leave in the shared spaces are accessible for automatic monitoring and analysis. For instance, some research experiments funded by intelligent agencies have been conducted to spy on the activities of chatrooms (McCullagh, 2004b). We can easily imagine that the mining of forum can also easily be achieved, for instance to identify deviant behaviours! Finally, on a different level, we can mention the use of social psychological theories taking advantage of identity information, to manipulate the people “inhabiting” these communities (for instance (Beenen et al., 2004) investigate strategies to be activated to motivate the contributions to online communities, but we can easily imagine other manipulations aiming at far less acceptable objectives).

A practical illustration: The Strange Case of the Electronic Lover

This case (Van Gelder, 1991) tells the story of Joan Sue Green, “...a New York neuropsychologist in her late twenties, who had been severely disfigured in a car

accident that was caused by a drunk driver.” The accident killed Joan’s boyfriend and left her mute and confined to a wheelchair. But, through the use of her computer and the participation in a BBS (Bulletin Board System), Joan was able to befriend many users and let her bubbly personality shine.

The reality proved to be different: Joan was not a disabled person, ... and Joan was not a “She”!

This case illustrates the particular issues and the seriousness of “social phishing”: the person of this real story was for instance able to extract very intimate information from discussion in the online system. We can very well imagine even more serious problems in the case of sexual maniacs accessing spaces frequented by children, and putting them at risk.

3.3 Blogs

Description and identity issues

Blogging represents the last avatar or “phenomenon” of the “Internet revolution”, and is developing at a tremendous rate (Kumar et Al, 2004). Blogs are online journals that are commonly used to chronicle the lives and opinions of their authors. Blogging provides the possibility for people to develop a personal identity that they are able to project in a social space (the bloggosphere) and to enter into interaction with their audience (visitors are invited to comment the blog postings of the owner of the blog). Blogs are also often interdependent: people frequently quote postings from other blogs and some mechanisms are provided to support this cross-referencing between blogs (for instance the *trackback* is used to notify automatically to another blog that it is being referenced). Besides, blogs often reference explicitly other blogs (acquaintances), creating some networks of blogs.

The management of Identity in blogs should appear to be quite simple, since these blogs are totally controlled by their owners, and are associated to the private sphere (at least for the personal blogs). The reality, however, is more complex. First, in a blog a user can reveal a great deal about himself/herself without fully perceiving the extent of this provision of information (blogging systems are very easy to use technically and posting is often impulsive, and besides the perception of the audience is not very elaborated). One of the main problems with blogging is the lack of clear separation between the private sphere and the public sphere and the risks of information leaking that can happen (for instance (Suitt, 2003) discusses a Harvard Business Review case related to personal blogging in a work context and its implications). Another issue is

related to the trust that can be attached to the bloggers and which is connected to the image (identity) that the bloggers project in the online world. Indeed, as the bloggers are posting some significant information that is impacting the “information sphere” (many bloggers improvise as apprentice journalists and publish information that is propagated), it is important for the reader to assess the reliability of the “editor”, and therefore know better his/her identity (the risk being that the reader is misled by unverified information, or is manipulated by fanatical groups).

If the control and regulation of blogging appears to be individual and social (social pressure), we can mention some tentative orientation towards more central control originating with the phenomenon of convergence of identity management in the different electronic media. For instance, Microsoft is working on a global identity management approach (with the same account encompassing email, instant messaging, blogging and online gaming), and its latest blogging system MSN space, is now controlled and subject to automated censorship (MSN is considered to be liable for the content posted on the spaces no longer seen as totally private).

A Case: being fired after posting on a blog.

“If you've got a blog and a job, beware. The two sometimes don't go together, as many ex-workers are finding out”. (Metz, 2004) reports several cases of problems that have occurred for people who posted on a personal blog, and who had some problem with their work. Concretely, a flight attendant in Texas, a temporary employee in Washington and a web designer in Utah were all fired for posting content on their blogs that their companies disapproved of. A similar story also happened recently in the UK, where an employee was fired because of what he posted on his blog (Barkham, 2005).

This case exemplifies the increasing difficulty of separating the private sphere from the working sphere in the Information Society (privacy issues), and with very concrete and real offline consequences.

3.4 Wiki

Description and identity issues

A Wiki or WikiWikiWeb is a website (or other hypertext document collection) that allows users to collectively write documents using a web browser and a simple mark-up language for formatting these documents. One of the defining characteristics of wiki technology is the extreme easiness with which pages can be created, hyperlinked with one another and

updated (wiki comes from the Hawaiian term for "quick" or "super-fast"). Generally, there is no prior review before modifications are accepted, and most wikis are open to the general public - or at least anyone who has access to the wiki server. The most significant example of a wiki is Wikipedia², a free web-based encyclopedia authored by hundreds of individuals. Wikis implement perfectly one of the original ideas of the Internet culture related to its altruistic nature.

The management of identity in wiki systems is currently rather unsophisticated (people usually only need to register under a pseudonym, but they can sometimes remain anonymous, and then can immediately contribute), although we can mention different categories of problems such as: the reliability of the information posted, problems of plagiarism and of vandalism. Social control (including the emergence of roles such as librarians), as well as some mechanisms of content versioning, and IP blocking are used ways to address these problems. We can however imagine, as wikis are adopted by populations driven by less altruistic goals, that more formal identity and identification mechanisms need to be employed.

A case of Vandalism in a Wiki

Wikipedia is experiencing some vandalism in its site (and as an answer is blocking the vandals). For instance a self-styled god named Sollog who is unhappy with the Wikipedia article on his object of worship, is repeatedly posting articles that include God, Jesus, the Devil, Jim Wales, George W. Bush, Britney Spears, Nostradamus, Adolf Hitler, Einstein, Sollog, Wikipedia, in articles linked on the main page. This category of behaviour raises again the issue of control, of censorship and of liability, in this category of online systems in which the management of identity is usually relatively weak.

3.5 Instance Messaging (IM)

Description and identity issues

Instant messaging (IM) are real time communication systems that allow an individual to communicate immediately in real time with another user (other usages include the creation of temporary private chatrooms supporting the instant communication of groups of individuals). Examples of Instant messaging systems include Yahoo! messenger, Windows messenger, AOL instant messenger or Exodus (used in the open source community). IM systems represent an important communication tool that is used by millions

² Wikipedia (<http://www.wikipedia.org/>)

of Internet users ((Shiu and Lenhart, 2004) indicate that 53 million adults trade instant messages and 24% of them swap IMs more frequently than email).

The management of identity in IM systems is rather sophisticated. The management of identity in IM systems comprises an in-depth user profile describing the characteristics of this user (age, location, picture, interest, etc.) and well as a list of contacts (buddy list referencing the instant messaging acquaintances of this user). Users are also able in an interaction to use some visual tags (emoticons) to indicate mood or emotion (which can help the establishment of confidence). An interesting concept supported by IM systems is the management of presence. Practically users are able to indicate to others (and reversely receive indication from others) about their online status: if they are online or offline, busy or available for interaction, or invisible (the users are in control of the indication of their online presence).

One of the main identity issues with IM is the invasion of privacy (Saunders, 2002)). In a study (Patil and Kobsa, 2004) have identified three privacy concerns: Privacy from Non-contacts (i.e. people who are not part of the contact list), privacy regarding availability (busy/available, at home/at work, etc.) and privacy regarding content (which has to do with the sensitivity of the content of the IM conversations). The privacy regarding the content also relates to the saving of conversations and their divulgation to a third party without the consent and knowledge of one of the parties (therefore a user may have to be liable for private talks happening in an informal chitchat).

Finally it is useful to remind ourselves of the importance of the role that the IM identity should play in the future in the idea of convergence of different online systems (IM, blog, forum, etc.) into a single system for which the big players of the Internet (Yahoo, Microsoft, Google, AOL, etc.) are showing a strong interest.

Digging in IM logs for evidence in a case of law

In September 2003, in the context of an investigation of security fraud, state and federal prosecutors for the first time searched IM records of licensed brokers and dealers (Smith, 2003). It seems that the investigators were able find evidence in the IM traces of a former Bank of America broker which were related to the execution of after-hours mutual fund trades.

This case illustrates concretely the possibility of observability of online chatting activities and the risks of privacy invasion (for the good cause in this case, since it was used for helping to fight crime).

3.6 Online Social Networking (OSN)

Description and identity issues

Online social networking services (OSN) represented the latest avatar of the “Internet revolution” (Braunschweig, 2003) ... before the blogging phenomenon took over this “title”. Socialware are services that are helping individuals to manage and develop their social relationships. Social capital represents indeed a critical element of individual performance in the knowledge economy characterized by less institutional stability and fewer reliable corporate resources (Nardi, 2000) and in which the individual has to behave more autonomously. OSN intervene in a number of domains (Li, 2004; Leonard, 2004): friendship (with friendster.com), business relationships (with LinkedIn, Ryze), jobs (Borzo, 2004), community of interest (Orkut, Tribe), etc. To some extent, we can consider that online dating services belong also to the category of OSN.

Practically, OSN are matching and intermediation services based on two elements: (1) the definition of a user profile in which people can specify their interests and affiliations (people can have this affiliation “confirmed” or endorsed by other members of the network); (2) the explicit specification of a social network of acquaintance that is built via a series of invitations to join the social network by other members of the network. It is important to note that a member is not obliged to accept this relationship, and therefore that a relationship is always the result of an acceptance by both parties (the one that has initiated the relationship, and the one that has accepted the relationship to be established). Different services, exploiting this information and in particular the network, are then possible such as: searching for people (the results are displayed according to social proximity); intermediation (invitations can be relayed via this network from one member to another). In addition, the members have also some control on the visibility of their network for others. For instance some members can decide to make visible their social networks only to their direct acquaintances.

If the online social network represents a fascinating field of practical application of some important social theories, and in particular the theory of the Small World or the Six degrees of separation by which on average the distance in social networks between complete strangers is less than six (Watts, 1999) or the theory related to the power of weak ties (Granovetter, 1973), it is not totally exempt of critics. For instance some people have raised the question of the quality of the networks that are being constructed using OSN.

Indeed we can imagine that no serious person (and in particular businessmen, salespersons or top executives) will enter in an electronic system some information that he/she really considers as critical. Besides, some interesting behaviours have been observed such as contest for creating the biggest networks in such systems (Leonard, 2004). Other voices have indicated the nuisances that have appeared in these systems from people who are trying to construct their social identity and who do not hesitate to contact perfect strangers (Kahney, 2004; Leonard, 2004).

Still, the concrete representation of this social identity (social networking) which in the real world was always implicit provides a very interesting possibility opened by online environments that is worth a further investigation from the identity specialists. People are human and are “social animals”, and therefore representing and managing digitally the human and social dimensions is important, and can possibly open many opportunities that make use of these categories of identity to offer services that have the maximum impact and benefit for the end user.

Multiple OSN for multiple identities

“I soon found myself behaving in different ways on different networks. On Friendster, I looked for people to date. On Tribe.net, I joined tribes and participated in discussions. On LinkedIn, a business-oriented service, I didn't do much of anything at all. On Orkut, I went friend-crazy. Orkut was where “my” people were hanging out, the geeks and techies and online journalists”. Leonard Andrew.

This example (Leonard, 2004) just illustrates the usage of OSN for an experienced “netizen”, and underscores the strategy adopted for organizing his “online social network life” that isolates different life spheres (dating, discussion, business, friendship).

3.7 Reputation systems

Description and identity issues

Electronic commerce is no longer only seen as a very “efficient” procurement system optimizing the matching between the demand and the offer as well as the supply chain, but also as a space where the different actors (both vendors and buyers) can interact with one another. For instance, before engaging into a business transaction, customers will use the Internet to collect opinions from other customers that will help them to decide what product to buy and which vendor to choose. Electronic commerce also comprises the establishment of closer relationships between the vendors and the customers, and in particular more

direct interaction: for instance the creation of a blog for commerce will allow a vendor to communicate information to its prospective clients, but also to engage in an interaction with them. Finally, electronic commerce also includes the reputation systems, popularised by eBay, and which represent electronic marketplaces enhanced with mechanisms supporting the establishment of reputation.

Practically, reputation systems are based on the gathering of comments from buyers and sellers about each other after each transaction, and about making this information visible to the whole community (Resnick et al., 2000). In a reputation system, a new prospective buyer for a product can get access to the whole history of the transaction of the vendor of the product, as well as all the comments that this vendor got from the previous buyers. Obviously bad opinions on previous transactions or the absence of opinions (in the case of a new vendor) will raise suspicion about the seriousness of the vendor, and will seriously reduce the willingness of clients to engage in a transaction. In a similar way, a vendor has the possibility to check the reliability of a client interested by his items, and to decide to refuse to proceed with the transaction. In the latter case, indicators of unreliability of the client include the online age of this customer, the number of transactions that this customer has engaged in in the past, and the opinion that this client gave to other vendors or received from them.

It is very clear that one of the main functions offered by reputation systems is the support for the establishment of an explicit online reputation of the different actors (vendors and clients) involved in an electronic marketplace. This reputation can be considered as an attribute attached to the identity of this actor, and more particularly to its social identity.

The management of this “social identity” is working very well if we observe the success of the company that first implemented the concept (eBay), and its introduction in numerous marketplaces. It requires indeed a minimum of effort and control from the operator of the marketplace infrastructure since it relies on the concept of transparency, and on the contribution of the different actors for establishing the opinions. Interestingly, vendors are strongly encouraged to invite their customer to provide feedback, since it represents for them a main manner to raise their reputation in the marketplace and therefore to increase their profit. Indeed, a good reputation is important not only to attract more customers, but also to justify higher prices (for instance in an experiment on selling postcards (Resnick et al., 2002) has determined that the difference in buyers' willingness-to-pay between reputable vendors was 8.1% of the selling price).

Still, reputation systems (that can also be applied outside the field of the electronic commerce) are not without raising a number of issues and are at the origin of several problems. The first problem is related to the subjective nature of rating and the cultural biases: people are different (some people are harsher than others) and have different cultural values. The risk exists therefore that the constructed social identity does not reflect accurately the reality. Besides, inconsiderate social transparency can in some cases have a negative effect of reinforcing conformance in (virtual) society, “punishing” deviance, and encouraging segregation. The second problem is related to reputation manipulation. For instance (Dellarocas, 2000) indicates that the rating of sellers can be unfair (intentionally false) in order to artificially raise the reputation of a vendor (as would be the case when a vendor creates false transactions just to increase his/her reputation), or decrease it (as conspiring buyers or competitors would do). In his paper, however, (Dellarocas, 2000) indicates some mechanisms to use to fight against this identity falsification. Finally, we can also raise some ethical issues: how far can social identity be managed and processed by automatic mechanisms that can impose important pressure on individuals (for instance, in the case of the eLance marketplace, in which the goods that are traded are small consulting missions). Note: Reputation systems such as eBay are sometime associated with auctioning. Mechanisms of bidding are therefore used to establish the price of the goods in this market. It is interesting to mention here the Shilling fraud, an illegal practice in which sellers bid on their own items or persuade friends or associates to do so in order to drive up the price (Brunker, 2000), and that is made easier on the Internet because of the current weaker level of electronic identities.

Fraud at eBay

Should knowing about the seriousness of a vendor from the aggregated feedback of many participants in a marketplace provide a strong sense of security, or not? This article (Warner, 2003) suggests that people should think twice before trusting too much an identity reflected by a reputation system. Jay Nelson was able to extract \$200,000 on eBay, before being caught and his real identity revealed. Jay Nelson had an excellent reputation on eBay however. It just happened that Nelson managed to use several strategies to boost his eBay reputation, such as: multiple user IDs (that he used to generously give himself rave reviews), but also initially selling computers legitimately to create the illusion of authenticity. By the time negative feedback

started rolling in from his subsequent fake auctions, Nelson was on to a new identity.

The fact that eBay was able to put in place some mechanisms reducing the possibilities of “scammers” and that Jay Nelson was finally arrested, should not prevent us being careful about the limit of these online identities, even if they appear to be the result of the feedback of a multitude of honest people.

3.8 Other DSEs (MMORPG, peer-to-peer network, etc.)

Description and identity issues

Several other DSEs can be mentioned in this paper and can raise very interesting Identity issues. For instance, the domain of entertainment MMORPG (Massively Multiplayer Online Role Playing Games) has opened a whole new space of digital Universes in which participants are able to live lives (and create identities) that were only present in their wildest dreams in the past, or in fairy tale books. Peer-to-peer networks (Kazza, Napsters and the likes), that are used to mediate the exchange of digital media, represent another category of DSEs. Peer-to-peer networks strongly rely for their functioning on the indicators of the level of contribution of the participant (amount of digital media that they make available to the community) and therefore on some form of identity (even if the pseudonyms employed are very much protecting the anonymity). More concretely, the more digital media a given user will contribute, the more this user will be granted bandwidth resource. This same indicator is also employed by music companies to determine the level of piracy of this user and can be used as evidence in a prosecution.

As already indicated previously, it would be wrong to underestimate the importance of these digital spaces in which people dedicate an increasing amount of their time. To detractors that refute the value of these activities and their importance, we will answer that they are really becoming a “real” part of people’s lives (Fattah and Paul, 2002), and in the particular case of gaming, we will provide this quote: “isn’t the distinction between game and life not arbitrary?” (Steinkuehler, 2004).

Griefing in Online games

“As online-game companies court new and wider audiences, many are running into an old problem: “griefers,” a small but seemingly irradicable set of players who want nothing more than to murder, loot and otherwise frustrate the heck out of everyone else. An increasing number of game companies are fighting

griefer damage using a combination of technology, sociology and psychology”.

David Becker (2004)

This example raises the question of the consequences of weak identities in the Online Gaming environment, and indicates some direction for addressing the associated problems.

Cheating in Online games

“A small but fractious minority in online gaming circles, cheaters can suck the fun out of a game by introducing homemade characters with unauthorized powers, making it impossible for opponents to win or even survive. They can also quickly pollute the social atmosphere critical to many games”.

David Becker (2002b)

This example indicates some technical “hacking” in Online Gaming that allows some individuals to acquire unfair capabilities.

Selling an “Identity” of online games

“Like most RPGs, players can swap items within the game using the game's virtual currency. But many players prefer to get real money, selling items and characters on auction sites such as eBay or specialty barter sites, including CamelotExchange. A search of eBay showed more than 150 DAOC items available Thursday, including online accounts with several highly developed characters selling for \$300 or more”.

David Becker (2002)

This example illustrates the transferability and the trading of identity in an online world.

4 Conclusion

The conceptualization of identity in DSEs (Digital Social Environments) that we have presented in this paper relies to a large extent on a more informal and abstracted perspective of identity than the concept of identity manipulated by the information system or security specialists. Whereas in the last case the identity is managed principally with people representations (as a set of attributes and characteristics that can be stored for instance in an identity card) and their authentication (usually happening once at the beginning of a session), the management of identity in social environments is more diffused, and in particular its control is not granted to a central authority but based on the idea of providing transparency about the behaviours and the actions of

people, and is socially regulated (for instance with social pressure).

Still, a closer look indicates that the two worlds (formal and informal perspective) are not totally alien but are on the contrary complementary, and are subject to cohabit more and more in the future, in particular as the identity issues in the Information Society are addressed more holistically. Indeed, as the frontier between the physical and the digital worlds is becoming blurred (this is best illustrated by the advent of ambient intelligent environments) and is converging, as this new world is becoming very complex and difficult to manage by traditional methods (via explicit identity and identifier, and one time authentication), and as the Information Society is becoming interested in supporting more widely human aspects (privacy, social dimension, etc.), new methods (in particular more flexible and more robust) will need to be activated to manage the identity in our societies.

Social mechanisms (reputation, social control, etc.) represent an effective means of regulation for complex systems, and should be considered (at least for a partial use) in every identity management solution. In particular, social engineering approaches to systems that include an important human component (including management of risk associated with inevitable human errors and biases), a category to which identity management systems belong to, are often more effective and more robust approaches than the technical engineering approach alone. This paper has also indicated that the use of social mechanisms also has its limits, and that the management of identity in DSEs could benefit from the work of the more formal management of identity.

In conclusion, we can consider as suggested in (Jordan, Hauser, and Foster, 2003), that the two approaches are complementary and should be combined in order to implement systems that are more flexible, more robust (in particular concerning human error) and more reliable, for designing the next generation of Internet systems that will be more socially aware, and more humanly friendly than they are today.

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