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## Abstract

To date, the interpretive paradigm in information systems (IS) research has made important contributions in this field of knowledge, one of them to challenge taken-for-granted assumptions about the purpose and nature of the information systems and their roles in wider social or political contexts. Currently, the internet allows IS practitioners and researchers to gather data and facilitate online discussions, prompting a number of issues to be considered for the future of IS research. This paper identifies and assesses limits and possibilities of interpretive IS research in relation to online ethnography as a form of interpretation which helps us assess existing criteria to develop and evaluate interpretive IS research.

## Introduction

The online world is increasingly becoming part of our lives. “The distinction between ‘real life’ and online is no clear-cut” (Gefter, 2006). Information systems (IS) and technologies make it possible for people to communicate instantly and to respond immediately, to store and manage electronic data and to participate in virtual communities. In particular online technologies have pervaded IS practice, allowing for the creation of innovative information systems which enable new forms of work and participation. This has the potential to enhance if not to transform daily life in organisations. Traditional forms of work are being replaced by those that mediate between many different individuals and organisations at the same time, enabling synchronous or asynchronous communication.

For researchers in information systems, the online world opens up a new lens to look at organisational phenomena and processes across organisations. This world allows people to create and manage data, to process information or to participate in many interest groups, some of which enable researchers and individuals to share and reflect on ideas that stem from their experiences. More specifically, IS researchers can gain access to the interpretations of designers and users about the information systems that they daily use, and thus explore their dynamics and implications in their own environment. Being able to participate “within” the information systems that they research or use can provide more in-depth insights for researchers than face-to-face approaches. Moreover in such environments, virtual forms of organisation emerge where the production of goods, activities, and interactions between staff and customers occur partially or totally online. For these particular forms of organisation the online world might be conceived of as their “real world.”

With the online world, there could be many possibilities for research. However, it is important for IS researchers to ask a number of questions: How and when are researchers to interpret and use

what they come across online? How are they to better assume their roles in online settings? How are they going to use or draw on online participation as a reliable research source? These are all pertinent questions that need prompt answer for the benefit of researchers as well as research participants and for the future of IS as a research field.

In this paper we explore the dynamics of research in the online world with a view to assess and possibly extend the scope of interpretive research in information systems as it has been defined, proposed and popularised in the last few years. Our argument is that online research can greatly contribute to understand what happens in 21st century organisations which make use, in different ways and degrees, of online technologies. However, care needs to be taken about limits and possibilities of what is being interpreted from this type of research. With reference to online ethnography as a form of interpretive IS research we discuss how existing criteria and processes of traditional face-to-face research can be complemented and applied in the online world. In the paper we prefer the terms online and offline instead of "real life" and "virtual" as we believe that online activities are as real and meaningful to people as offline activities.

The paper is organised as follows. First we look at interpretive research and its use in information systems. We then present online ethnography as a form of research which offers possibilities but which also requires interpretive researchers to carefully asses it. We propose to use the criteria of Klein and Myers (1999) which we review for the case of online ethnography. We conclude the paper with our assessment on the usefulness of these criteria.

## Interpretive Research in Information Systems

In the social sciences, interpretive research seems to have been borne out of opposition to positivist research. Traditional, positivist scientists seek to "explain and predict what happens in the world by searching for regularities and causal relationships between its constituent elements" (Burrell and Morgan, 1979). For positivists, the world is external and objective and the observers (i.e. the researchers) are independent (Carson et al., 2001). In line with this, positivist IS researchers believe that organisations "have a structure and reality beyond the actions of their members" and the research has to "discover" this reality by applying precise measures that will uncover the dimensions of reality that interest the researcher (Orlikowski and Baroudi, 1991).

In contrast with the above, interpretive scientists believe that human beings behave according not to causal relationships but socially constructed values. For them "each situation is seen as unique and its meaning is a function of the circumstances and the individuals involved" (Remenyi et al., 1998). In order to understand situations, interpretive researchers immerse themselves in the social world they are studying so as to "hear, see and begin to experience reality as the participant" (Marshall and Rossman, 1989).

As the interpretive paradigm focuses on the meanings that people give to their environment (May, 1997), it allows for multiple subjective interpretations of phenomena. That is, the ones of the subjects of study (firs-level constructs) as well as the IS researchers (second-level constructs, in other words the researchers' constructs of first-level constructs) (Lee and Baskerville, 2003). Thus, interpretive researchers report their interpretations of other people's interpretations (Walsham, 1995). In this process, it is required that the researcher exposes his intuitive, religious, political and philosophical views so as to justify and clarify design decisions and the outcome of the research.

Phenomenology and hermeneutics are important foundations of the IS interpretive paradigm (Klein and Myers, 1999; Myers, 2003). "Phenomenology is the intuition of essences" (Boland, 1985). "An essence is defined as that which is necessary for something to be recognized as that thing" (Hirschheim, 1985). We grasp the essences of people, things and experiences subjectively, through

our intuitions, by inspecting our consciousness and uncovering our assumptions and prejudices. It can be said that it is in this process where meaning is provided to the experience (Hirschheim, 1985). This process of understanding is an hermeneutic problem, "the problem of translation and interpretation of texts" (Boland, 1985) or "text-analogues", e.g., "an organization which the researcher comes to understand through oral or written text" (Myers, 2003). The 'problem' to be researched could also be an online environment that the researcher witnesses by accessing his and other people's interactions and activities through the texts they create in their participations in such an environment.

Those individuals advocating a interpretive stance in IS research argue that organisations, groups and social systems do not exist apart from humans and therefore cannot be studied independently or objectively (Orlikowski and Baroudi, 1991). Indeed, most interpretive IS researchers would agree that information systems are "fundamentally, social rather than technical systems" (Hirschheim, 1985). Phenomena, their essences and texts are now manifesting themselves in diverse ways, many of which are embedded in information systems and online technologies. This has contributed to interpretive research in IS taking many different forms. From studies that conceive of IS systems as 'artifacts' with inscribed properties of the social and organisational world they exist in (Orlikowski, 1992), to those that focus on studying the human processes underlying both organisational and systems transformation as part of wider social and political contexts (Walsham, 1993, 1995), and those that enable identification of meanings supporting the adoption, use or rejection of information systems (Checkland, 1990; Wilson, 1984). All of these studies seem to accept a common idea that there are underlying phenomena that influence and are influenced by processes of information systems design, implementation and use which is necessary to elicit, to 'read' and interpret if not interact with.

To date, the main focus of interpretive IS research has been the 'organisation' as an identifiable phenomenon. Interpretive research is mainly done in "natural settings" with the researcher as the "main data gathering instrument" (Savenye and Robinson, 2001). Examples of interpretive research detail how fieldwork is carried out in the form of in-depth case studies, ethnographies or action research (Klein and Myers, 1999, Walsham, 2006). These and other approaches require the researcher to immerse himself in the phenomena to be studied (Carson et al., 2001). Considerations that should be taken before and during research include the degree of overtness and covertness of researchers, their style of involvement (neutral observer, full action researcher or others), their access to locations (e.g. organisations) and collecting field data (e.g. interviews, recording and transcriptions) (Walsham, 2006). In addition, in interpretive IS research stress is given to ethical issues, such as informed consent, privacy and anonymity of data, which arise from the relationship between the researcher and the subjects of study (Gill and Johnson, 1991). Choices about openness, degree of involvement, methods to be used and ethics depend on what is seen as convenient and appropriate by the researcher, in other words what will allow him to identify and access people's interpretations (Walsham, 2006). Justifications of the researcher's decisions about his/her choices should be made clear during research and after when reporting.

The above features describe a generic type of interpretive IS research. These features have been updated to consider how this type of research can be used in a variety of cultural and political contexts (Walsham, 2006). Regarding its possible use in online settings, Walsham (2006) gives some clues about it. He advocates that researchers should give some sort of 'feedback' to organisations being studied, "even if they are adopting the role of neutral observers" (p.322). He also regards data from emails, websites or chat rooms as 'valuable' to help researchers enrich their interpretations (p.323) and produce 'persuasive' accounts of what they observe. These possibilities can be explored further if we not only consider the online world a source of data but a research setting as such. Doing so can lead us to review what we consider are the salient features of interpretive IS research. In order to explore this possibility we now turn our attention to online

research and online ethnography.

## Online Research and Online Ethnography

Generally speaking, online research is that research carried out through online media, i.e., the web, the internet. Online research can be used to gain access to the online phenomena itself or to other settings whose offline access is very difficult (Langer and Beckman, 2005; Murthy, 2008). Despite its emerging popularity, online research is not a new philosophical paradigm but a new way of doing research by using or accessing new technologies. These new technologies have allowed the creation of spaces, or online settings where people start groups and networks, participate in meaningful ways, exchanging ideas and carrying out activities. To study these environments though, researchers have to consider the implications of using online media, for example in studies of online text-based forums by addressing the effects that the lack of visual and social cues, which "signal the nature of the context" (Jacobson, 1996), has on research.

Online research though, can contribute to modify the nature of participation(s) by researchers. Particularly for interpretive researchers, the online media becomes the "place" where texts reside, texts reflecting the thoughts, interactions or activities of people. This feature of the online world helps positioning research approaches such as ethnography, case study and advocacy in facilitating participation of researchers and their interaction with research participants. This possibility is also compounded by the fact that there is a diversity of tools that people use to communicate online, and which can be accessed by an online researcher.

Currently, the most popular of these tools are second generation web tools or web2.0 such as discussion forums, weblogs and social networking sites (Murthy, 2008). Discussion Forums (or fora) have been around for some time. Chronologically speaking, after email they are the oldest platform for human interaction on the net. They have changed shapes and names many times e.g., mailing lists, Usenet® or discussion boards. However one common characteristic is that they allow two or more people to converse by sending or posting messages onto a public space, or by directing them to everyone else's emails. Other web2.0 tools are blogs and social networking sites. Weblogs or blogs are online journals containing posts written by one or more people. Blogs can reference each other creating a network of blogs, also called Blogosphere. Social Networking sites (i.e. Facebook®) host a variety of communication tools within them. Members of these sites create a set of connections with other members who they call contacts, friends or followers. All these connections form networks of contacts through which social interactions happen, hence the name social networking. In addition, tools such as e-commerce sites and intranets, which contain embedded web2.0, features are also available to the researcher. However access to intranets needs to be granted by the owners. In all these environments there is scope for ethnographers to access, participate and engage with online participants. These tools provide spaces where other people interact and where traces of those interactions are left as historical reminders; these traces can contribute to enhance the quality of research by giving a degree of ownership and further participation to those people being studied (Murthy, 2008).

Figure 1 presents a typology of online research with examples of online research within each quadrant. Several quantitative and qualitative research approaches can take advantage of online tools. However non all of them can be catalogued as online research. The typology shows a few examples which are and are not online ethnographies. Similarly, topics of research can include the online tools and groups themselves but can also be concerned with topics beyond the online world. These are phenomena occurring offline but which are manifested in the online realm.

Examples of research which use online tools (and are not ethnographies) to study the nature of the online world can be found in the work of Greenfield and Subrahmanyam (2003) who study online

discourse via chatroom transcripts. Stefanone and Jang (2008) study the motivations of online bloggers using online surveys. Boyd, Golder and Lotan (2010) use random samples of data from Twitter's public timeline and ask questions to people via Twitter to analyse retweets (sharing messages previously sent by other users). Alternatively research can focus on topics beyond the nature of the online phenomena itself. For example, a study by Chou (2001) about internet addiction uses chat rooms to carry out interviews. In this study researchers are not involved with the subjects in their activities on the internet. Madge and O'Connor (2004) paper is another example that reports the use of web based questionnaires and online synchronous interviews to study new expectant parents (See figure 1 below).

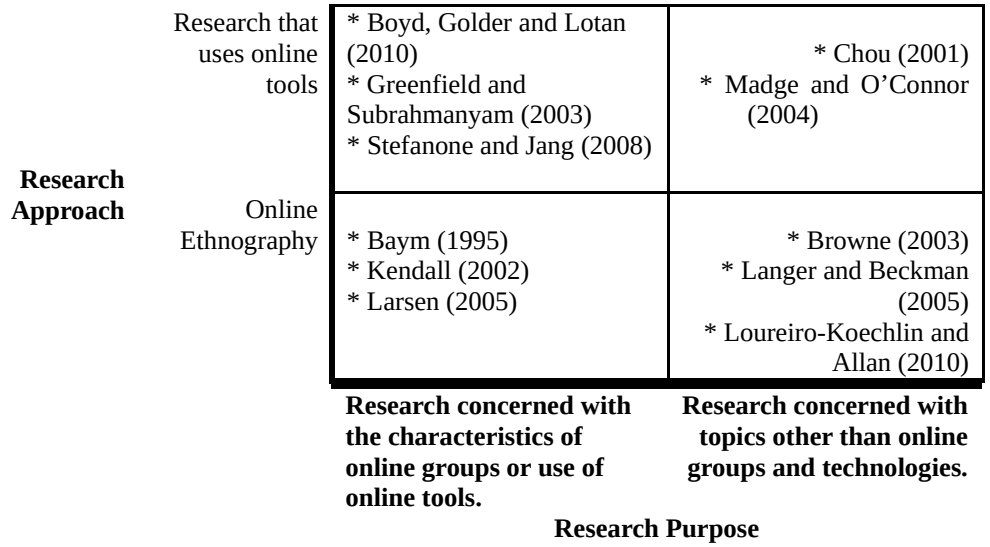


Figure 1 A Typology of Online Research

We now refer to Online ethnography and its features. *Online ethnography* is a form of online research in which the researcher *immerses* himself in online environments with other people. As seen in the above figure, online ethnographers can study the features of and issues emerging in online environments or any other topic. For example Baym (1995) explores the development of solidarity and identity of online groups through the exploration of humour. Kendall (2002) studies the culture and interpersonal connections between the "patrons" of BlueSky, a Multi-user domain (Mud); and Larsen (2005) carries out an ethnography on Arto®, a social networking site for young people. Ethnographies are also useful to study processes beyond social group activities as is the case of Browne (2003) who explores online learning by using "cyber-ethnography" whereas Langer and Beckman (2005) study an online group of people who are to be or have been subjected to cosmetic surgery. In addition, online ethnography can use a combination of online and offline methods. For example, Loureiro-Koechlin and Allan (2010) report on an ethnography study that was partially done face-to-face and partially done online with the aim of exploring e-learning and e-mentoring.

The above examples of online ethnography also show that some its features are inherited from traditional ethnography. These features include, "first hand involvement in the social world [that is] chosen for study" (Marshall and Rossman, 1989, brackets added), e.g., forums, chat rooms, social networks. This means that researchers should consider how to become involved in online settings synchronously or asynchronously. Also, online ethnography requires ethnographers to 'live' or 'work' with the people they are studying, and therefore they need to secure a good setting and with similar or appropriate access possibilities to those of participants and with ways to maintain or continue their online engagements.

Moreover, ethnographers are supposed to gain in-depth understandings to interpret the phenomenon the way the others do (Gill and Johnson, 1991). In the case of online ethnography, this means understanding not only phenomena that could take place online or offline by interpreting different types of texts (conversations, emails, online interviews), but also phenomena that relate to why and how people use these tools, and the effects that they could have. The examples above reported suggest that a variety of methods should be considered before online engagements. They can include combinations of offline and online methods to gather data (conversations, interviews) as well as methods to interpret and validate it.

Finally, ethnographers need to consider the ethics of what they do in relation to asking for permission to be part of online groups, to disclose or hide intentions as well as to reveal to the outside world what happens online.

The following table summarises the above considerations:

| **Feature** | **Examples** |
|---|---|
| Setting | An online forum, a social network, discussion list and weblog, an intranet. |
| Degree of involvement | Participation in online activities as observers, participants or combinations of both, synchronous or asynchronous |
| Access | Same as other participants whenever possible or adequate according to research questions. |
| Methods | Methods should be guided by the research questions and include those to interpret 'texts', to interact with people, or gather feedback (during or after the research). Participation methods (which are data collection methods) include interviews, discussions in forums, online questionnaires, use of blogs or social networking sites (Lobe and Vehovar, 2009; Murthy, 2008). Methods can also include combinations of for instance online conversations with face-to-face interviews and or / triangulations in order to validate the data being obtained. |
| Ethics | Researchers can ask for permission, disclose or hide intentions to participants including those of revealing or hiding what happens in the online setting. A balance between protecting the identity of those being researched when describing what happens, and adopting an appropriate role (covert, overt, unobtrusive) should be sought (Langer and Beckman, 2005). |

Table 2. (IS) Interpretive Ethnography features applied to the online world.

## Assessing Online Ethnography

Online ethnography seems to inherit the features of traditional ethnography to be assessed. This means that it is the researcher who interprets what s/he observes and present both process and outcomes in plausible, authentic and inspiringly critical ways (Golden-Biddle and Locke, 1993). However, with online ethnography the assessment task becomes complex and open given the myriad of possibilities of combining online and offline methods, and with these the different underlying research paradigms that support their use. We need to understand how online ethnography in IS could be assessed from an interpretive angle on research.

In general terms, interpretive research is assessed via a variety of constructs (which are different from the scientific, positivist ones) of which the most used are **reliability, validity and credibility**.

"Checking the reliability is closely related to assuring the quality of field notes and guaranteeing the public access to the process of their production" (Perakyla, 1997). "The validity of research concerns the interpretation of observations" (Perakyla, 1997), in other words, it concerns "whether the researcher has gained full access to knowledge and meanings of respondents" (Remenyi et al., 1998). Credibility of an interpretive research is assessed by the extent to which it was designed in a manner that fully identifies and describes the phenomenon under study and not something else or something fabricated (Remenyi et al., 1998). In online research these three constructs need to be considered in the online activities carried out by the ethnographer. Although different in nature these activities are often undertaken by following the same principles as in offline research. For example, to prove validity, the ethnographer needs to prove that s/he has gained access to relevant online forums and that he has interacted with subjects of study whose knowledge, expertise or personal experience is truthful and relevant for the study. In the online realm this can be a challenge, as in some environments the identity of participants cannot be verified and participants may use nicknames or fake names. In the worst case they can pretend to be someone they are not. The researcher should assess the veracity of online identities and stories being told. This is why total immersion in the online environment is important so as to enable the ethnographer engage with participants and their environments through enough time in order to get to know them.

For the case of interpretive research in information systems, the above criteria (reliability, validity, credibility) have been expanded and detailed by Klein and Myers (1999). These authors design a set of principles which can be used to guide and assess the conduct of interpretive research studies, in particular those which are guided by the phenomenological and hermeneutic perspectives which we have described earlier. The principles are "fundamental ideas" because they are derived from philosophical writings considered as classical contributions to the interpretive perspective (Klein and Myers, 1999). The principles are shown in table 1.

| **1. The Fundamental Principle of the Hermeneutic Circle** |
| --- |
| This principle suggests that all human understanding is achieved by iterating between considering the interdependent meaning of parts and the whole that they form. This principle of human understanding is fundamental to all the other principles. |
| **2. The Principle of Contextualization** |
| Requires critical reflection of the social and historical background of the research setting, so that the intended audience can see how the current situation under investigation emerged. |
| **3. The Principle of Interaction Between the Researchers and the Subjects** |
| Requires critical reflection on how the research materials (or "data") were socially constructed through the interaction between the researchers and participants. |
| **4. The Principle of Abstraction and Generalization** |
| Requires relating the idiographic details revealed by the data interpretation through the application of principles one and two to theoretical, general concepts that describe the nature of human understanding and social action. |
| **5. The Principle of Dialogical Reasoning** |
| Requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings ("the story which the data tell") with subsequent cycles of revision. |
| **6. The Principle of Multiple Interpretations** |
| Requires sensitivity to possible differences in interpretations among the participants as are typically expressed in multiple narratives or stories of the same sequence of events under study. Similar to multiple witness accounts even if all tell it as they saw it. |
| **7. The Principle of Suspicion** |

| |
|---|
| Requires sensitivity to possible "biases" and systematic "distortions" in the narratives collected from the participants. |

Table 1 Seven principles for Interpretive Field Research
Source: Klein and Myers (1999)

These principles can be conceived of as goals to be met regardless of where research is to be carried out (online, offline or both). For example, research can be conducted in different kinds of technology platforms and study a wide variety of people with different backgrounds and interests. As a method of research, online ethnography can help researchers engage in continuously understanding the dynamics of the phenomena under study. With these principles in mind, we now identify some implications of online ethnography to meet the seven (7) principles of interpretive IS research as presented above. Our aim is to contribute to better understand constraints and possibilities that emerge when online ethnography is to be used to investigate phenomena related to the adoption and use of information systems.

*Using Interpretive IS Research Principles for Online Ethnography*

As we see it, online ethnography requires researchers to spend more time in designing how to use online media as part of their research agenda, but less time when it comes to refine and reuse such media to engage and validate their research outputs. An overall interpretation of how the above principles apply to online ethnography suggests that this type of research requires more effort from researchers in producing convincing and plausible interpretations (principles 1 to 5), but possibly less effort in validating and refining them (principles 6 to 7), given that the availability of online data and online participation can be used to substantiate and validate research outputs and with participation of research subjects (Murthy, 2008). We now explain these assertions in more detail.

Principle number one (the hermeneutic circle), relates to the understanding of the whole from the meanings of its parts and their relationships. This understanding is achieved through a series of iterations in which the researcher gradually studies the parts of a phenomenon and uncovers their relationships. In online ethnography this iterative process can be facilitated by the long-lasting nature of most (asynchronous) media. Traces of historical interactions, in form of e-mails (texts) or software products (text-analogue), can be accessed, reviewed and compared by researchers in a hermeneutic fashion. For example, cultural and social nuances of an online group of IS users as observed by the researcher (whole) can be different from the individual understandings that the researcher gathers from them (parts) if asking about their use of a particular system. Individual interactions might provide different views and in fact they might contradict each other. However, put together they reveal a series of relationships which the researcher can then interpret to build *and show* the "whole". A second example is the understanding of an online issue, such as online privacy (whole). The researchers' understanding of this issue can be enhanced by his participation in different forums and social networking sites (parts) (Langer and Beckman, 2005). As the nature of ethnography is the one of "observation" as well, the researcher is free to collect and interpret (historical or current) interactions in which s/he is not a participant. S/he could use a variety of media to support his/her account within an interpretive account (Black, 2006)

To generate a richer picture, the historical contextualisation (principle two) of the meanings that are identified and assembled as a 'whole' as stated above should be done with consideration of interplays between phenomena, for example as manifested online and offline, or as revealed by a series of events which trigger the development of new ideas. A variety of online and offline methods can be employed to enrich contextualisation (Lobe and Vehovar, 2009; Murthy, 2008). Due to the "virtual" distance between the researcher and subjects of study, this contextualisation might prove difficult, in particular if researchers adopt the view of online media as neutral or

completely detached from the offline world (Murthy, 2008). The researcher could ask him/herself what relations his/her online ethnography content has with the offline world (e.g. what happens in a physical organisation), or if there is a wider phenomenon unfolding with a historical, social and cultural background. This kind of check can also help the researcher to ground more firmly his understanding of the characteristics of the online tools involved.

From this perspective a study of a web-based software implementation in an organisation can be seen as a manifestation of organisational change with different ramifications (Walsham, 1993). One of these ramifications involves electronically mediated communication as a new form of relation between individuals. The researcher plays an active part in the construction of meaning by interacting with online participants in different forms. S/he does not simply collect 'raw data' from forums, blogs or social networking sites. The interaction between the researcher and the subjects in order to construct data (principle three) usually requires the building of rapport. The researcher needs to gain acceptance by learning the rules and norms of the online group he is dealing with. However, in the online world the lack of social and visual cues can restrict and delay the building of rapport. A possible way of addressing this distance is the use of video conferencing and similar tools.

Regardless of the style of research adopted (covert/overt) researchers need to discuss the ethical implications of their work prior to, during and after the research has taken place (Langer and Beckman, 2005). For example, an online ethnography of the development of a web portal cannot be simply narrated by describing the evolution of its pages. The researcher needs to engage with the subjects who participate in the development by enquiring about their opinions and reasons for their take on the portals adoption. This can be done by referring to historical communications and by dialoguing. Reflections on the process can be made publicly available.

The process of abstraction of data and the building of theory (principle four) is not different from traditional interpretive research. Klein and Myers (1999) state that the abstractions should be related to the details of the field study. Following this principle, the researcher should be able to explain: 1) In which contexts he has obtained data and 2) How he carried out processes of abstraction and generalization. These are explained as follows:

1) For online ethnographies the researcher needs to explain every relevant aspect of their ethnographies in terms of:

    a) the settings used (online discussions, fora, blog posts);
    b) roles of the researcher in each of these settings;
    c) data gathering methods employed (interviews, observations, participations, discussions, chats);
    d) datasets generated *from* the research (e.g. websites, blogs, wikis)
    e) The contextualisation of all data prior, during and after online ethnography as explained before.

    Explanation about these can help researchers to build transparency in their research and to strengthen the validity, credibility and plausibility of the research.

2) As in interpretive IS research, the processes by which the researcher draws from the above in order to generate theories, concepts or insights needs to be explained and justified. Walsham (1995, 2006) categorises the types of outcomes that interpretive research generates and shows a number of examples that describe both the processes and insights obtained. Another example is presented by Loureiro-Koechlin (2006) who reveals how she performed an iterative content analysis of an online ethnography in order to draw a model to

understand the dynamics of software development. IS researchers need to decide where the emphasis of their theory generation can be as online ethnography can bring insights on communication (offline/online), the use of technology tools, ethical aspects, people's adaptation of technology or similar areas.

Following the same line of argument, the principle of dialogical reasoning (principle five) indicates that the researcher should reveal and challenge his/her preconceptions and be sensitive to potential contradictions between different sources of data, and between the data and established theories. In the case of online ethnography these could also relate to the researcher's previous knowledge of information systems, web 2.0 technologies or online phenomena. Online settings can also be conceived as places where knowledge continuously evolves. As the researcher goes through cycles of hermeneutic iteration his/her acquired knowledge becomes the preconception for next iterations. Preconceptions could be seen –in principle as different from what happens in online interactions as well as those of the offline world. For example, the successful delivery of a software product by a group of software developers might not be due to the adoption of a well proven software development methodology. In a sequence of studies Cockburn (2000), discovered that developers "were successfully able to ignore [methodology experts], and were still delivering software, anyway" (brackets added).

Once the ethnography environment is set, it can help researchers to follow the remaining principles (six and seven). Iterating over same samples of online data, asking online observers to provide their interpretations, comparing and contrasting different online data sources or generating new sources in the public domain can help researchers to produce and generate multiple interpretations of phenomena (principle six) and thus reduce potential of biases or distortions. For example, preconceptions and contradictions can emerge when researchers take part in different online forums to find out more about open source development. Some of these forums would advocate it whereas others would challenge it. Researchers themselves might have their own idea of how this type of software development takes place.

Regarding the principle of suspicion (principle seven) researchers should be aware of some inherent characteristics of the online media. Thorough assessment of this principle is essential to ensure credibility, validity and reliability of online sources. As mentioned earlier, anonymity of participants for example can make it difficult to verify real identities if needed. This can be the case for example of research participants using pseudonyms or nicknames, or claiming to be experts or engineers. Researchers need to use their own knowledge and other sources to verify the veracity of statements. They also need to be careful in managing their online identities in online groups. In doing so, they should make their narratives and accounts consistent and plausible, and therefore they should think of how suspicion is to be related with the previous principles.

**Conclusions**

This paper has reviewed interpretive research in information systems (IS) with a view to ascertain how online research can contribute to IS's further development. The availability of online tools is not to be ignored but embraced to support this type of research. We have explored how one particular form of online research (online ethnography) can be assessed as a form of interpretive IS research by following a number of principles. Our exploration highlights the importance of adequately framing the use of online tools within the research process in order to meet these principles and thus to contribute to better understand phenomena under study.

Overall, it can be said that all the principles of interpretive research in IS apply to online ethnography. However, this requires careful design and management of online data in conjunction with theories and assumptions that researches use from the offline world. This includes an

assessment of the veracity of online and/or any other source of data. In addition, sensible consideration of the role(s) of researchers needs to be developed.

Interpretation of online data can also lead researchers to challenge and enrich existing theories and concepts. The specifics of how the use of these tools in practice can help extend the scope of interpretivism in IS remains an area for further research and we plan to continue validating empirically the relevance of the principles described for online ethnography. We also hope that this paper contributes to a better understanding of online research and encourages interpretive IS researchers to pursue this route.

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