From IS to Organisation: Analysing the Uses of a Collaborative IS in a High-tech SME

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Abstract. Researchers and practitioners generally observe a disparity in organisations between the actual uses of HRIS and what was expected of them prior to implementation [1]. In order to investigate this phenomenon, [7] develops a coherent and structured conceptual framework that can be used to analyse the reasons why actors develop such different uses for a given technology. While our paper uses her theoretical propositions as a framework for analysing uses, it seeks to extend her approach by means of a theoretical framework that can be used to understand the spirit of the technology and interactions between individuals and artefacts. Following an outline of these various concepts (2.), a case study of the uses of a collaborative IS in a high-tech SME (3.) will serve as a basis for an initial test of this analytical framework (4.) and discussing the contributions it makes (5.).

1 Introduction

Since the end of the 1990's, HRISs have crossed the borders of the HR department and have began to impact the wider organization: senior management, line managers and even employees [5]. HRISs are complex social objects which are the outcome of the embedding of computer systems into an organization. The development of those systems articulates two communities particularly different: a community of users and a community of providers. Users are the people how are supposed to use HRIS and providers are the systems engineers whose expertise is in designing, developing, implementing and maintaining the information systems that the users use.

Researchers and practitioners generally observe a disparity in organisations between the actual uses of IS and what was expected of them prior to implementation [1]. In order to investigate this phenomenon, Orlikowski [7] develops a coherent and structured conceptual framework that can be used to analyse the reasons why actors develop such different uses for a given technology. While our paper uses her theoretical propositions as a framework for analysing uses, it seeks to extend her approach in two aspects.

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Firstly, although she acknowledges the tangible dimension of technology ('technology as artifact'), Orlikowski [7] does not really bring it to bear in her analysis of uses. In order better to analyse the place that this artefact might play in the construction of uses, we will incorporate into her framework the concept of the 'spirit of technology' [3]. Secondly, it also seems to us necessary to incorporate explicitly into her analytical framework the existence of other instruments that might influence the uses of the IS under investigation, as highlighted in the distributed cognition approach.

Following an outline of these various concepts (2.), a case study of the uses of a collaborative IS in a high-tech small and medium enterprise (SME) (3.) will serve as a basis for an initial test of this analytical framework (4.) and for discussing the contributions it makes (5.).

2 Construction of a Theoretical Framework for Analysing the Disparities between the Uses Expected by the Designers and the Actual Uses of a HRIS

Orlikowski [7] takes the view that, when a technology is mobilised in a context of recurrent social interactions, it becomes a 'technology-in-practice' and constitutes an intangible form that plays a part in human actions (the repeated social interactions) through the facilities, norms and interpretive schemes that it helps to construct. Thus every type of use to which a technology is put shapes specific facilities, norms and interpretive schemes that change the nature and content of the repeated social relations that individuals develop in their work, their teams or their companies.

Orlikowski is aware that, beside the 'technology-in-practice', there is a formal aspect of technology (its functionalities, for example). She even conceptualises it by advancing the notion of 'technology as artifact' ([7] p.408). Nevertheless, she does not bring this aspect into play directly in her analysis of uses. Even though uses can never be deduced mechanically from the notion of 'technology as artifact' [9], it seems to us that it does, nevertheless, play a role in the uses that are made of a technology. It is for this reason that we extend Orlikowski's analytical framework by adding to it the notion of the 'spirit of the technology' [3], which seeks directly to analyse how a technology has been constructed by its designers and how its principal features influence the uses developed with it.

More specifically, the 'spirit' of the technology denotes general intention, goals and values that underpin the technology. It reflects the official line of conduct to be adopted by users and the purposes assigned to it. Thus our aim is to reincorporate into our theoretical framework this aspect of technology (technology as artefact), which is mentioned but not used by Orlikowski [7] in her analysis of actual uses. It seems to us necessary to retain this concept, since certain uses can be readily explained by what the designers incorporated into the technology during the development process.

Similarly, it seems to us that Orlikowski's formulation of uses [7] does not make it possible to take account of all the lessons that can be derived from studies based on the distributed cognition approach ([6]; [4]). While we are seeking to extend Orlikowski's approach in a fairly simple way, it seems to us important to stress that the uses are also constructed by the way in which this new application is integrated into pre-existing applications and work practices.

Distributed cognition theory is, after all, concerned with the structure of knowledge, with its transformation and its propagation by means of artefacts in a context characterised by interaction (processes of cooperation and collaboration) among individuals whose cognitive development is regarded not as an isolated event but as taking place within a system in which both individuals and the artefacts they use are participants. Distributed cognition theory emphasises the role played by the objects present in the environment. These objects cannot be regarded as mere peripheral aids to cognition. Rather, they constitute a form of external representation, which, together with internal representations, plays a role in establishing the representational system of a distributed cognitive task [8]. From this point of view, the distributed cognitive approach seems to us a vital element of any attempt to understand uses.

3 Methodology and Case

The investigation conducted here is strictly exploratory. The phenomena under investigation are not well known and their boundaries are ill defined. For these reasons, the case study seems to be the most appropriate research method [11].

The case study was carried out in a software and computer services company that produces and markets several software packages (registry/public records office management, mail digitisation and management, document classification). In 2006, the company's turnover was 4.5 million euros and it employed a total of 48 people. The workforce is distributed among 6 departments: digitisation software (10 people), electronic data Interchange (EDI) software (7 people), customer support (10 people), implementers (8 people), sales (10 people), administration (3 people).

In the autumn of 2007, this SME began to use the 'think together®' software package, the purpose of which, according to its designers, is to *'facilitate and accelerate decision-making in organisations'*. In order to understand the 'spirit' of this technology, we conducted three interviews with the designers of the software. We also interviewed the SME's managing director. He told us that this software package was intended in the first instance for use in the Electronic Data Interchange software department. Accordingly, we interviewed more than half the members of this department (4 out of 7). In order to extend the scope of our analysis, we also interviewed the head of the customer support department.

4 Results: Spirit of the Technology, Uses and Environments

We draw here on the theoretical framework outlined above in order to analyse the social structures enacted by the technology's designers, to characterise the uses of this software and to consider them in relation to the social, instrumental and cultural environment in which they were produced.

In order to remain true to the approach developed by Orlikowski, we are going systematically to characterise the uses these different actors make of the software in terms of the 'interpretive schemes', 'norms' and 'facilities' that structure those uses. We are going to see that the disparity between expected and actual uses can be understood in terms of the disparity between the way in which the designers (41.), end users (42.) and purchase initiator (43.) represent these uses to themselves.

4.1 A Spirit of the Technology Shaped by the Notion of 'Organisational Transparency'

During the interviews with the two designers of 'think together®', we noted that they had a very precise idea of what seemed to them to constitute an appropriate use for their software. From their perspective, the software is intended to enable users to make 'good' decisions. For example, one of them stated: '*The idea of* ['think together®'] *emerged in the wake of a problem we were experiencing at X* [his previous employer], *namely a failure to take our opinions* [as software developers] *into account, the lack of recognition for what each of us contributed to the organisation. People were raising problems but the line manager was not taking any notice and we were coming up against a wall ... what's more, it was us who then had to repair the damage!'*.

This representation that they constructed of the appropriate use for their software is based on precise and coherent hypotheses as to what constitutes a good decision-making process in a company. From their point of view, such a process is constructed firstly by '*soliciting the opinion of the greatest number of people in the decision-making process'*. Thus this first interpretive scheme that they incorporated into their technology reflects the notion that increasing the number of opinions increases creativity and ensures that the entire range of views that exist within the organisation will have been canvassed. From their perspective, secondly, a good decision is constructed if those involved managed to '*bring all these different opinions to a point of convergence'*. Thus the second interpretive scheme they incorporated into their technology reflects the need to bring this 'seething mass' of different ideas to a point of convergence in order rapidly to produce a mutually acceptable solution that can serve as a basis for decision-making.

These interpretive schemes (diversity of opinions, need for convergence) are reflected in their representation of the appropriate use by behavioural norms, which, in turn, structure the software package. For example, the idea that a good decision arises out of a clash between very diverse arguments led the designers to structure the

interactions between discussants in a very precise way. An employee puts forwards a topic for discussion[1]. He or she can choose the individuals to be invited to take part in this discussion[2]. The members of the discussion group receive an e-mail in which the initiator of the discussion outlines his or her point of view. They can respond to each of the arguments advanced by clicking on four different buttons: support: to put forward an argument that tends in the same direction as the one being advanced; modify – to advance an argument that opposes the one being put forward; reply – to put forward an argument that responds to a question raised by the initiator in the course of his or her argument; propose – to advance an argument that opens up a new topic for discussion (thus not connected with the initial discussion).

The various options contained within this behavioural norm are given concrete expression in the software in the interface that the designers call the '*cartography'*, which takes the following form:

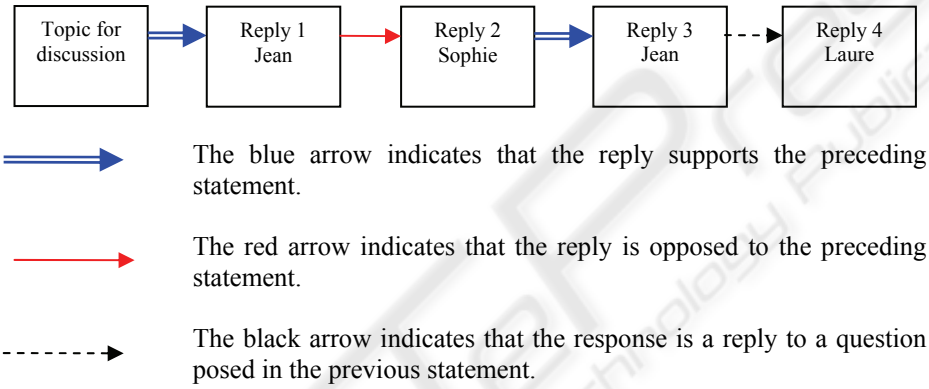
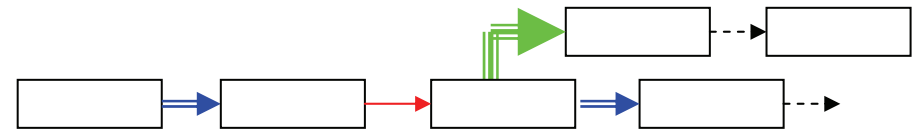


Fig. 1. Example of the formalisation of the discussion in the 'cartography'.

The colours of the arrows indicate the way in which the discussion has progressed. The designers also put in place a fairly sophisticated system of indicators that show the percentage of people who have declared themselves for or against a particular argument, etc. The aim of the software is also to reach a final agreement rather than engaging in a discussion simply goes on and on. Thus from the designers' point of view, the example depicted below would constitute a failure for their software.

[11] Potentially, all employees, regardless of their position in the hierarchy, have the right to initiate a new discussion.

[2] The list submitted to him or her by default includes all employees; the initiator chooses those to be included in the discussion.



The green arrow indicates that the reply proposes a new topic for discussion.

The other colour codes have the same meaning as those given in Figure 1 above.

Fig. 2. Example of the formalisation of a 'divergent' discussion in the 'cartography'.

The facilities the software package provides reflect the behavioural norms and interpretive schemes assumed by the designers: in order to take a good decision, it is necessary to consult as many people as possible. However, this has a major disadvantage: it is difficult to make a discussion in which many actors have been involved to converge towards a single solution. Consequently, the software has to be equipped with facilities that help the leader of the discussion precisely to 'plot' the arguments advanced by all involved in order to reach a final consensus.

4.2 A Use that Respects this Spirit while Linking Up with other Instruments

The interviews conducted in this firm that uses 'think together®' revealed that certain uses do indeed seem to be of the type that the designers expected.

Thus one developer stated: '*We'd been holding meeting after meeting for four months in an attempt to solve a problem, namely how to link our 'mail' product* [which digitises incoming mail] *and our 'document' product* [which automatically classifies documents]. *Customers had been asking us for months to link the two together and we couldn't decide on how to do it. I gathered all the e-mails we had exchanged and fed them all into* ['think together®']. *That was Friday* (…) *This created a stir, with everybody giving their opinion… The Wednesday afterwards, we had a meeting and we came out of it with a firm decision. We really unblocked the situation thanks to* ['think together®'].'

This example shows that the structure of the 'good decision' that the designers incorporated into the software may sometimes reflect the decision-making process in an organisation. In this case, the actual use may be reasonably faithful to the spirit of the technology incorporated into the software by the designers.

Nevertheless, this diagnosis has to be qualified on two counts. Firstly, the developer's statements quoted above show that, in order to analyse in detail the use he made of 'think together®', account has to be taken of the uses he made of the other coordination instruments that exist in this organisation (e-mail, meetings, probably also telephone and face-to-face discussions). After all, although 'think together®'

demonstrated its relevance in this case, these additional instruments considerably reduce the likelihood that this new software package will be used on a regular basis in this organisation. After all, discussions, e-mails and meetings seem to be the instruments most favoured by the actors in this organisation. Thus it would only be in cases in which these instruments have failed that this user would turn to 'think together®'. This competition between the various instruments undoubtedly explains some of the under-use of collaborative software in organisations. They are not much used because other instruments that pre-existed them are used instead and are already distributing cognition.

Secondly, it should be noted that the final decision was not taken in 'think together®' itself. The software was used to bring out the various opinions (which certainly accords with the spirit incorporated into the technology by the designers), but the final decision was taken during a meeting (and not by means of the software, as the designers planned). This qualification is important, since it led this developer – for whom the software had, nevertheless, been extremely useful – to declare that '*the interface is not clear. In fact, there's no real need for those arrows between the arguments, for the different colours and all that… It would be better if the arguments were divided into those that favour one solution and those that favour a different one… That would make it possible to summarise the arguments more rapidly in order to start the ball rolling at the subsequent meeting…'*.

This criticism seems to us interesting because it is not targeted simply at the interface as it was designed. This user's dissatisfaction also stems from the fact that the interface was designed for a particular use (decision-making in 'think together®') that presupposed certain behavioural norms (bringing the arguments to a point of convergence by clearly delineating their sequencing) supported by certain functionalities (the *'cartography'*). This is at odds with the use this actor made of the interface (taking the decision during a meeting), which involves different interpretive schemes (revealing opinions without seeking to achieve convergence within the software), different behavioural norms (identification of participants' overall position and not the detail of each of their arguments) and thus different functionalities (establishing broad groups of related opinions and not outlining the sequence of arguments).

Even when the use accords fairly closely with the spirit of the technology, analysis shows that competition from other instruments and the user's organisational choices (taking the decision in a meeting and not by means of the software) explain part of the observed disparity between the expected use of the software and the use to which it is actually put.

The case of the customer support manager also shows that the actual use may diverge considerably from the use expected by the designers. She wanted to use the software as a tool for collecting and pooling all the solutions already developed in order to respond to the complex questions put by customers (FAQ). However, the use she expected to make of it had little to do with the spirit the designers incorporated into the technology. This other example is interesting because it provides another explanation for the disparity between the expected and the actual uses of this

collaborative software. While being presumptively strongly in favour of this new software, this user viewed it from the perspective of what was creating problems for her in her work. The fact that the software had not been designed to solve this type of problem played no part in her logic: she evaluated the software's usefulness or uselessness simply in terms of the use to which she wanted to put it.

4.3 The Purchase Initiator: A Singular User

Since it occupies a unique position, it seems to us important to analyse one final type of use, namely the one represented to himself by the 'purchase initiator' of this software.

We use the term 'purchase initiator' to denote the person who takes the decision to purchase this software and hence to implement it within the organisation. In general, he or she is not an end user (such as those described above). In the case we studied, the person in question was the company's managing director. Like the company's other employees, he too has the 'right' to initiate discussions in 'think together®' (which he has done, incidentally). His discourse is interesting, however, because unlike the previous users he does not seem solely interested in the instrument's technical effectiveness. Whereas the other users judged 'think together®' in terms of its capacity to solve problems arising out of FAQs or to unblock a jammed decision-making process, the purchase initiator judges it in terms of its ability to change the organisation of which he is the head.

After all, when asked: '*Could you tell us why you decided to implement* ['think together®'] *in your company?',* he replied: '*it's a rather complicated story… The Electronic Data Interchange team, which is where I wanted to use it, had not had a manager for a long time.. We had a person, who was supposed to be the manager, but in fact he concerned himself only with the technical side of things, he wasn't the one who did everything that was pure management… When he left for health reasons, we replaced him but things turned out very badly… In terms of interpersonal relations, the new manager was a complete failure… We had to let him go and since then I've been in charge of this team… But I've got too many things to do and I can't devote enough time to them. What's more, on the technical level, I'm not knowledgeable enough about what they're doing. Everything changes too quickly. There's someone in the team, X, who you're going to meet, that I would like to promote to manager. I think he has the strength of character and the abilities, but he has to mature gradually… To my way of thinking, the use of* ['think together®'] *could help him take on this new role'.*

The statements of this 'purchase initiator' recall a situation already encountered in other organisations [2]. Like other users, purchase initiators position their uses of an instrument relative to the problems they encounter in their work. For this MD, the aim is to identify a manager for his Electronic Data Interchange software group and to get him accepted by the team. This manager's principal role is to foster professional cooperation within the team (its community of practice aspect) and functional coordination with the other departments when decisions have to be taken collectively.

The MD is using [‘think together®’] in the hope of being able to provide the future manager with a tool to help in carrying out his duties as well as legitimation for his managerial role.

This use accords fairly well with the initial spirit of the technology (organising exchanges of ideas with this software equates to a standard managerial activity). It is reinforced by the converging use of other available coordination tools (for example, this same X has been entrusted by the MD with leading the ‘*Friday*’ team meetings and his work means he is positioned at the interface between the EDI group and the other departments in the company). However, the purchase initiator does not evaluate the software’s contributions solely in relation to the decisions it helps to make (which is officially why it was purchased and developed) but primarily in terms of its ability to bring about organisational change. Now the designers developed this software around the notion of ‘organisational transparency’, which can be practised in various formal hierarchical organisations, in so far as they can maintain such transparency. In this case, this ‘transparency’ was being sought by the purchase initiator in order to legitimate a particular choice of hierarchical organisation. Thus these issues of organisational change (which are not explicitly included in the designers’ offer) emerge as an important factor in the disparity between the uses anticipated by the purchase initiator and the actual uses to which the software is put by the other users.

5 Discussion

Three conclusions can be drawn from these initial results derived from the theoretical framework outlined above:

Firstly, in line with the studies by De Sanctis and Poole [3], our case study shows that the developers of the software designed it with a clear idea in their heads of the type of use to which it should be put, a use inferred from the social structures they were enacting. The functionalities they built into their software show how they incorporated their representation into the software itself. Thus, like Orlikowski [7], we maintain that the social structures are not embedded in the technology. Nevertheless, these structures enacted by the software designers may influence future uses and must therefore be included in the analysis. Consequently, we have put forward in this article some proposals concerning the status that a technological artifact might have in an analysis of use such as that proposed by Orlikowski.

Secondly, the actual uses that the employees in this company have made of the software may or may not accord with the spirit of the technology. This is in line with Orlikowski’s findings [7], which show that, in developing a technology, designers construct a vision of the world and then retranscribe it in the form of technological properties and that, when users engage recursively with the technology, they develop a technology-in-practice that may diverge considerably from the developers’ intentions. If they are to be correctly analysed, however, these intentions must be repositioned relative to the groups and instruments already in existence in the organisation, as advocated by the distributed cognition school.

Finally, our results lead us to highlight the role of a particular actor, namely the person who introduced the software into the organisation and whom we have

described as the purchase initiator. We have shown that the use of this software that he wanted to see implemented is not confined to improving existing decision-making processes but extends to an expectation of change in the organisation itself (towards greater interdepartmental cooperation). Since this actor expresses most accurately in his actions the actual uses to which this new software is put, this might cause him to minimise the actual contributions made by the software, even if they are fairly consistent with the original motivation behind the software, as soon as those uses fail to bring about the organisational changes he is seeking.

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