

Crisis response, organizational improvisation and the dispassionate communicative genre during the 2003 French heat wave

□ Résumé

Ce papier examine le rôle joué par les technologies de l'information et de la communication (TIC) lorsque les organisations qui répondent à des crises doivent improviser à l'échelle organisationnelle. La littérature sur le management de la crise et dans le domaine des systèmes d'information ne rend pas compte de toute la complexité du phénomène d'improvisation. Nous proposons donc de mener une étude qualitative rétrospective de la canicule de 2003 en France. En suivant une démarche inductive, nous identifions le genre de communication que nous qualifions de dépassionné, développé par les administratifs autour du fax et de l'email qui a compromis leur participation à l'improvisation organisationnelle.

Mots clefs :

Improvisation organisationnelle, genre de communication, réponse à la crise.

□ Abstract

This paper seeks to understand the role played by Information and Communication Technologies (ICT) in organizational improvisation during crisis response. The crisis management literature and the IS literature do not fully capture the complexity of improvisation and crisis response. Due to the lack of theoretical background in relation to ICT support to crisis improvisation, we conduct a retrospective qualitative analysis of the 2003 French heat wave crisis response. Going back and forth between theory and data, we identify the *dispassionate* communicative genre, developed by the administrative actors around emails and faxes that hindered their participating in organizational improvisation.

Key-words:

Organizational improvisation, communicative genre, crisis response

Anouck Adrot

*Centre de recherche CREPA
– Management & Organisa-
tion- DRM UMR 7085*

*Place du Maréchal Delattre
de Tassigny
75116 Paris Cedex*

Anouck.adrot@gmail.com

1. Introduction

This paper applies the grounded theory method to understand how Information & Communication Technology (ICT) supported the organizational improvisation that took place during the response to the 2003 French heat wave crisis.

In August 2003, the weather in France suddenly became scorching, attaining record temperatures (46 C, e.g. 130 F) for the first time since 1976. August is usually a time for vacation and the population enjoyed the heat during the first few days. But the reality of the heat wave quickly became less glamorous. The number of health complications from the heat rapidly increased; the elderly, especially in urban areas, were not able to combat hyperthermia and 14,802 people died in France between the 4th and the 20th of August. The heat wave was depicted as a natural disaster that provoked an organizational crisis in hospitals (Lalande, Legrain, Valleron, Meyniel and Fourcade, 2003). Not only were health care units overwhelmed with people suffering from heat related illnesses but they also faced unexpected shortages of medical supplies, water, ice, air conditioners and even nurses. Hospital morgues were overcrowded with corpses and many electrical devices overheated and broke down. Moreover, physicians struggled to diagnose and cure hyperthermia because medical knowledge on heat waves was almost nonexistent in France. Finally, the Health Ministry did not finish collecting information related to the number of death. Because of this lack of information, the Health Minister and his advisers did not understand the gravity of the situation and therefore delayed the enacting of emergency guidelines such as the White Plan.

The crisis response revealed several different examples of improvisation. Nurses spontaneously substituted missing perfusion equipment by wall hooks to hang up hydrating solutions. Hospitals were lacking air-conditioned rooms. To cool down several places at one time with small effort, nurses motorized the available air conditioners by placing them on wheels. Firemen and some emergency organizations invented a system of code to differentiate between deaths caused by the heat from those other resulting from other causes. Finally, some administrative actors rented refrigerated vans used to transport food to manage the large quantity of corpses that were overcrowding morgues.

During the 2003 heat wave crisis response, improvisation progressively became organizational but could not grow to the largest scale possible, e.g. all the groups of actors who were involved in the crisis response. For instance, most administrative actors, in spite of having access to crucial resources, failed to participate in the ongoing improvisation even though they extensively used emails. Interestingly enough, many improvisers had face-to-face

meetings and relied on phones rather than emails to interact. Finally, the actors who used technology to coordinate during organizational improvisation represent a very small proportion of the overall quantity of the crisis responders.

This study aims to bring some clarity to this mysterious contrast between ICT use and organizational improvisation. This requires understanding why technology supported, but from some reason, prevented improvisation from fully developing into an organizational form. More specifically, our work addresses the following question:

How do users benefit (or not) from ICT when they interact to improvise collectively in crisis response?

Theories on the fit between technology, tasks and contingency seem to be the most appropriate to analyze this phenomenon. However, a theory building approach is required to fully understand the role that emails and faxes played in the 2003 French heat wave crisis response. Taking this view into account, we apply the grounded theory method to build a theoretical framework. Our analysis reveals that the crisis responders' participation in the ongoing improvisation depended on their communicative genres, e.g. the communication practices and strategies that are widely recognized and applied within a group of actors (Orlikowski and Yates, 1994, Yates and Orlikowski, 1992). We identified among administrative actors a "dispassionate" communicative genre in relation to email and fax use that consisted of protecting oneself from potential criticism stressing one's transparency in electronic communication. By preventing the administrative actors to mention and take part in improvisation, the dispassionate genre burdened the development of organizational improvisation.

The presentation of our research is structured as follows. After a succinct presentation of the concepts of crisis and improvisation, we detail our method. Finally we present a comprehensive view of our findings and discuss their implications.

2. Theoretical background

2.1. Organizational crisis during disasters

Disasters refer to massive material and human damage (Perry and Quarantelli, 2005) that disturbs organizational functioning enough to trigger organizational crises (Pearson and Claire, 1998). This is what happened during the 2003 French heat wave (Lalande, et al., 2003). The temperature elevation was a natural disaster: it favored drought, fires and electricity breakout all over Europe. It also triggered organizational crisis within the French health network by threatening its functioning and primary mission: taking care of citizens (Lalande, et al., 2003).

Organizational crisis is a critical experience that threatens organizations' primary goals and values (Hermann, 1963). Because of important constraints, organizational crisis requires quick and innovative response by improvising (Crossan, 1998). Stakes and costs of a mishandled crisis are not only material but also social (Dynes and Quarantelli, 1976), which causes important stress and emotional pressure (Milburn, Schuler and Watman, 1983 1983, Smart and Vertinsky, 1977).

This means that organizations have to manage both disaster response and potential organizational crises during disasters. They participate in alleviating material and human damage but also cope with unexpected incidents that put them into crisis. For instance, during the 9/11 or Katrina disasters, hospitals, emergency units, and police services struggled to save lives. They also spent time and energy reestablishing the electrical infrastructure that was necessary for the functioning of equipment (Mendonça and Wallace, 2007). During the heat wave, the response network responded to the heat but also needed to manage their own shortages of resources, lack of information and overwhelmed nurses.

Organizations face important complexity and uncertainty while responding to organizational crisis in disasters. Uncertainty refers to the organizations' difficulties to forecast events related to the crisis. Uncertainty requires the organization to be resilient by developing not only anticipatory but also improvisational skills (Rerup, 2001). Complexity stems from the intricate set of interdependent outcomes from the crisis (Milburn, et al., 1983). Improvisation requires organizations to make do with available resources and to be responsive enough to quickly develop new solutions by improvisation.

2.2.Organizational improvisation during crisis response

Improvisation has been frequently associated with critical situations (Ciborra, 1996, Hutchins, 1991, Rerup, 2001) but is not restricted to critical contexts (Ciborra, 1996). Improvisation refers to a creatively acting on the spur of the moment. It implies a limited delay between acting and planning (Moorman and Miner, 1998), which results in a seemingly extemporaneous action (Weick, 1998). Improvisation includes novelty of action, also called bricolage (Cunha, Cunha and Kamoche, 1999) that consists of deviating from established uses of resources.

Improvisation frequently occurs during crisis response due to strong time pressure, complexity and uncertainty (Crossan, Cunha, Vera and Cunha, 2005, Cunha, 2004). Improvising can be more relevant than planning during crisis response because it enables adaptation to the specificities of the situation (Rerup, 2001, Waugh and Streib, 2006). However, improvisation can become difficult to manage since it involves various individuals and groups (Hutchins, 1991). It requires efficient interactions

(Weick, 1998) and the ability to quickly understand one another's actions. Examples of failed improvisation provide evidence of how misguided interactions can lead to misunderstandings of intentions and threaten coordination. The Mann Gulch disaster, analyzed by Weick (1993) and Ciborra (1996), is a vivid illustration of the influence interactions have on coordination when improvisation occurs. As Weick explains (1993), more people could have survived the fire if the demonstration of improvisation had been perceived as a way to escape fire rather than suicide.

“Dodge (one of the survivors) yelled at the crew to drop their tools, and then, to everyone’s astonishment, lit a fire in front of them and ordered them to lie down in the area it had burned. No one did, and they all ran for the ridge” (p. 629).

2.3.Improvisation constituents

Spontaneity is a core but not unique characteristic of improvisation (Crossan, 1998). Spontaneity develops in at least three manners in improvising groups. First of all, improvising individuals have to spontaneously recognize whether predefined procedures are executable. Secondly, improvisers have to develop a mixing and matching of planned procedures (Mendonça, Jefferson and Harrald, 2007). In this study we propose that improvisers have to quickly adjust to coworkers' actions to participate in the ongoing improvisation. We therefore propose that spontaneity during improvisation does not only concern idea generation but coordination as well.

Another essential feature of organizational improvisation is the creative treatment of resources by actors. Improvisers deviate their use of resources from established patterns during crisis response to meet the necessity to urgently complete some tasks whose devoted resources are not at hand (Crossan, et al., 2005, Cunha, et al., 1999). Drawing on available resources rather than seeking the proper ones corresponds to the notion of bricolage, defined by Levi-Strauss (1962). While some authors argue that improvisation does not necessarily lead to the use of bricolage (Baker, 2007), most studies assert that deviation from established use of resources is an important part of improvisation (Moorman and Miner, 1998).

Two main types of mechanisms appear to regulate interactions during organizational improvisation: boundary spanning, expertise leadership, and minimal structures.

The first type, boundary spanning, helps information translation from one community of users to another, as defined by Wenger (1999). Boundary spanning enables a translation of information from one group to another to assure consistent action, thanks to the boundary spanners that can be either individuals, such as victims (Kristensen, Kyng and Palen, 2006), or objects such as a technological tool (Gasson, 2005). For instance, social media and Internet web sites enable crisis responders to

publicly share information with other crisis responders and victims (Lang and Benbunan-Fich, 2010). Different communities or subsystems may have divergent rules or codes for action which, in addition to political tensions, can have a negative impact on the organizational ability to react during crisis (Beamish, 2002). As crisis responses frequently involve groups with specific rules and codes, boundary spanning is crucial to maintaining a common referential composed of information, practices and vocabulary, or a common idea between the individuals involved in the ongoing improvisation of how tasks were performed – also called narration (Brown and Duguid, 1991) and should be pursued (Kapucu, 2006). Furthermore, boundary spanning compels actors to understand that the groups they have to collaborate with have developed different practices and values. Gasson explains that boundary spanners often have to rely on discursive practices to convince groups that their practices are not the best or need to be adjusted, reducing the risk of misunderstandings that can endanger improvisation (2005).

Second, expertise helps to identify which interpretation of reality is legitimate. For example, in high reliability organizations that have to organize instantaneously, new issues for collective action are first addressed to experts (Weick and Sutcliffe, 2001). For this reason, expertise leadership can regulate interactions to coordinate organizational improvisation. Especially in crisis situations, dialogical reasoning, which consists in dialogue and feedback between experts, helps to guide the ongoing searching for ad hoc solutions (Faraj and Xiao, 2006). The emergence of expertise leadership requires that experts can contact and interact with other participants. Expertise leadership can develop thanks to boundary objects. For instance, social media allows discussion between interlocutors to integrate outside intelligence and expertise into the ongoing improvisation (Turoff, Chumer, Van De Walle and Yao, 2004).

Method

Applying a qualitative case study methodology is consistent with our exploratory approach to ICT and crisis improvisation. Despite significant investigation on user's practices around ICT, we know little about how crisis improvisers interact with each other, in particular when they need to use ICT. Qualitative methodology therefore responds to this lack by capturing data "from the inside" through a process of deep attentiveness (Miles & Huberman, 1994). In addition, a case study enables to develop deep observation of the complexity of organizational processes and behaviors that compose a specific phenomenon such as crisis improvisation (Gombault, 2005).

The grounded theory approach, as defined by Corbin and Strauss (Corbin & Strauss, 1990; Orlikowski, 1996; Orlikowski & Hofman, 1997), applies to our case. In fact,

Locke acknowledges at least three conditions for following a grounded theory approach (2001). Among them we retained three main motivations that were further explicated by Sousa and Hendricks (2006). First, there is deficient theoretical guidance: existing theoretical frameworks on ICT and improvisation in crisis response are undeveloped or do not provide satisfying answers to the research question, which signifies the need for theory enrichment. Second, the core concepts of crisis and improvisation are loosely coupled to each other or the connections between concepts are obscure. Third, observing the crisis responders' interactions is necessary to respond to the research question. We therefore applied the grounded theory principles when completing data collection and analysis. In addition, our epistemological posture is depth realist, which allows theory-building from both objective and subjective perspectives (Blaikie, 2007; Mason, 2002). Our data collection covers four main sources: public hearings, retrospective interviews, internal archives and external archives that we selected on the basis of their reliability and their proximity with the research topics. The public hearings consisted of more than 100 hours of public collective interviewing completed in the aftermath of the heat wave by members of two investigation commissions. 13 retrospective interviews were completed with various crisis responders. Internal archives correspond to the documents that the heat wave crisis responders exchanged, ranging from emails to press releases drafts. The external archives gather essays, academic works, reports and newspapers' documentation on the crisis response to the 2003 French heat wave. In this study we coded emails, faxes and public hearings and completed additional analysis of external archives. Given the important amount of data we had to analyze, we had to complete a data reduction by following a theme dictionary (Thiéart, 2007). Such a diversity of data sources is compatible with the grounded theory principles and provides support to data triangulation.

The analysis of the case study started with a full investigation of the actors within the response network. More specifically, Annex A describes the field actors and the administrative actors of the response network. The grounded theory approach aims to build alternate explanations of social phenomena by rigorous coding processes. Following a grounded theory methodology, we identified categories from data. We then transformed them into concepts, which correspond to the abstraction process as defined by Strauss and Corbin (2008). Annex B describes the methodology and coding section details the coding process that contributed to the emergence of the concepts or organizational emptiness, dispassionate communicative genre and fervent communicative genre.

3. Findings

In this section we describe the dispassionate communicative genre features and their effects on organizational improvisation. As a reminder, the *dispassionate* communicative genre was developed in relation to email and fax use.

Orlikowski and Yates' work provide a clear explanation of what a communicative genre is (1994). As those authors explain:

"A genre of organizational communication such as the business letter, shareholders' meetings, or report, is a distinctive type of communication, characterized by a socially recognized and common aspect of form (...). The communicative purpose of a genre is not rooted (...) in a purpose that is collectively constructed, recognized and reinforced within a community" (p.543).

In other words, a communicative genre consists of a repertoire of communicative practices and strategies that are associated with specific social codes and communication media. For instance business letters correspond to specific communication strategies towards shareholders. Similarly to routines, genres develop on the long term. We now detail the features of the dispassionate communicative genre and their effects on the constituents of organizational improvisation.

3.1. Process Narration

Actors primarily reported ongoing processes and data in emails, which restricted opportunities for dialogical reasoning and expertise leadership. Processes were mentioned to introduce what tasks were needed but hardly informed about how these processes could be achieved. For instance, on the 6th of August, one of the Health ministry advisers explained to his counterparts at the DGS his concern about the effect of the heat on citizens' health:

"It would be useful to send a memo to recall basic precautions to care for the youngest and eldest patients. There are plenty of studies about the health related impacts of heat waves (...). I think the CDC (Center for Disease Control in Atlanta) reviewed them. It could result into an emergency message".

The advisers' subordinates then spent three days responding to this initiative. As Patrick Pelloux explains in his essay (2004), they exchanged 60 emails to end up with a final version of the memo. Interaction via email reported major or minor revisions from interlocutors on the document.

Actors also developed a narrative structure that supported coordination by transmitting information about what process was complete. Because actors focused on reporting, opportunities for improvisation were hardly dis-

cussed. For instance, an INVS¹ employee reported the general ideas that emerged from an informal phone interaction with colleagues. He sent his colleagues the following email:

"I called (colleagues) to discuss about what could be done (to investigate the health related impacts of the heat wave).

First of all, we should take into account the feasibility criterion. We therefore should collaborate with organizations that already have an information system and data from previous years

Here is our idea: trying to bring information up to the INVS rather than settling for a specific data collection system".

By mentioning a previously received email, the sender transcribed what was discussed previously to his email, which supported process narration. The email was then forwarded multiple times without any comment or additional idea. Its content was of the strategic level, dealing with feasibility as a generic criterion to make decision on whether the strategy should be implemented. However, the interlocutors did not mention any detail on how to implement the strategy. It is interesting to note that the INVS never implemented its plans for investigation.

Despite the development of a narration, discussion to implement ideas scarcely occurred when crisis responders communicated in a dispassionate genre. Process reporting lessened opportunities for the spontaneous generation of alternative ideas by email and fax users.

3.2. Data Hunting

When objective, data provides a legitimate basis to make decisions. For this reason, email users extensively sent figures and data during crisis response. As a result, administrative actors spent the whole crisis response period to find out the number of deaths rather than discussing about the ongoing improvisation.

Indeed emails including data were systematically transmitted between actors, but with scarce discussion. Moreover they hardly mentioned concrete facts, objects and persons. For instance the following message was initially sent to the INVS and then transferred to seven actors:

"There was a call at 4 pm from the DDASS in Morbihan. Three persons had died at work. As reported by the emergency services, these persons were pretty young. The person called the DGS and was advised to call the INVS. Here is his phone number (...)".

¹ INVS is the national health-watching institute in France (Institut de Veille Sanitaire in French).

First the message was introduced in a forwarded email as follows: “I let you evaluate the situation”, or “FYI”.

Then some interlocutor announced common points and differences between dead persons (such as age, weight, gender) to evaluate whether these deaths were due to infection or not. The objective of these emails was to negate or confirm the interpretation of the situation by the interlocutors with more data. Actors strove to stay as neutral as possible when it came to interpretation and to refer to objective figures. They rarely expressed personal views of the situation or refer to their sensations. In many cases, interlocutors expected each other to make sense of the data, which delayed action and obstacles extemporaneous action (Tyler and Tang, 2003).

As a core feature of the dispassionate communicative genre, data hunting prevented actors from fueling reflection with opinions and emotions, which prevented expertise leadership from emerging.

3.3.Centered communication

Remaining focused on the reporting of administrative processes, administrative actors hardly integrated field actors’ requests for help or action into their process. For instance an ERT contacted one of the DGS employees on the 11th of August. His email vividly depicts his feeling powerless to tackle deaths and suffering:

“Many elderly die in emergency rooms indirectly or directly from hyperthermia. Three persons died in Saint Joseph (hospital) so far. The emergency roomers (ERs), at least ours, are totally flooded with patients. Some of them stay 4 or 5 on the same stretchers in ER. We have to search for more beds and have completely deleted all our scheduled medical interventions. I have never experienced such a situation in 25 years. The situation is really serious”.

His administrative interlocutor reformulated his request as a transmission of information and did not respond to the ERT’s opinion on the criticality of the situation. His response did not include any personal reaction to the description of the suffering and his tone remained neutral. He accounted for forms as management tools to be used in hospitals in generic terms:

“Thank you for the information you transmitted earlier about heat strokes in Saint Joseph and Bichat hospitals. I relayed it internally. The INVS has just settled an emergency data collection process. Please find attached the forms that compose it. All these documents have been sent to hospitals. The person to contact is....”.

The ERT response unveiled statistics issues related to data collection:

“Thanks for your message. We have sent messages everywhere. The problem with data is that they will not re-

flect indirect effects of hyperthermia (...). The situation is desperate here. The government or the DRASS should trigger the White Plan or an Emergency plan very quickly. As I made my promise to your colleague, could you please transfer information?”

With no surprise the administrative interlocutor effectively transmitted the email but no discussion was developed on data collection. It is interesting to note the email response to the ERT who had alerted administrative actors to get resources:

“Thank you for information. Beyond the current investigation we intend to lead a long term investigation on the total mortality – or even morbidity – that will take into account some specific pathologies, such as cardiac, vascular, and respiratory diseases. Our project has to be validated but we hope that an international comparison will be feasible”.

Hunting data led email users to hold on to a functional interpretation of the situation. It led them to elude some practical and logical issues. Furthermore centered communication prevented actors from discussing micro issues and from developing pell-mell interactions that promote spontaneous deviation from established use of resources.

3.4.Protecting from disapprobation

In relation to the dispassionate communicative genre, email media was an instrument to show transparency off. Basing their rationale on risk taking and the traceability of emails, actors used emails as a traceable proof of their responsiveness. However, the intention to enhance one’s reactivity resulted in extensive forwarding but scarce discussion. To protect from disapprobation, email users forwarded their emails to their colleagues, counterparts and those who were likely to evaluate them. This finding is consistent with recent studies on the importance of status in electronic communication (Dabbish, Kraut, Fussell and Kiesler, 2005) and the side effects of electronic communication (Courbon and Tajan, 1997).

In our view, email use illustrated the actors’ intent to prevent criticism. Therefore they avoided mentioning controversial content, which limited discursive exchanges about the widespread bricolage and improvisation practices. Similarly operational actors have been reluctant to use email since they improvised. However tracking interactions is technically permitted by email storage on server information traceability (Ramesh, 1998, Ramesh, Tiwana and Mohan, 2002). As highlighted by Car and Sheikh (2004):

“The written record of email consultations enables close monitoring and evaluation of appropriateness and safety. Whereas face to face and telephone consultations are rarely recorded verbatim (typically being documented

with only a few key words), email provides direct evidence of patient-doctor conversation” (p.441).

Traceability is also enacted by email users (Boukef, 2005, Ducheneaut and Bellotti, 2001, Kalika, Boukef Charki and Isaac, 2007). As a conclusion, we posit that search for protection from potential hierarchical disapprobation led email users to avoid mentioning controversial aspects

of the situations or specific issues. In addition they remained on a general stance and directed their messages towards status rather than persons. As a result, experts were hardly mobilized because not among email recipients, which burdened expertise leadership. Figure 1 represents the impact of the dispassionate communicative genre on the organizational improvisation constituents.

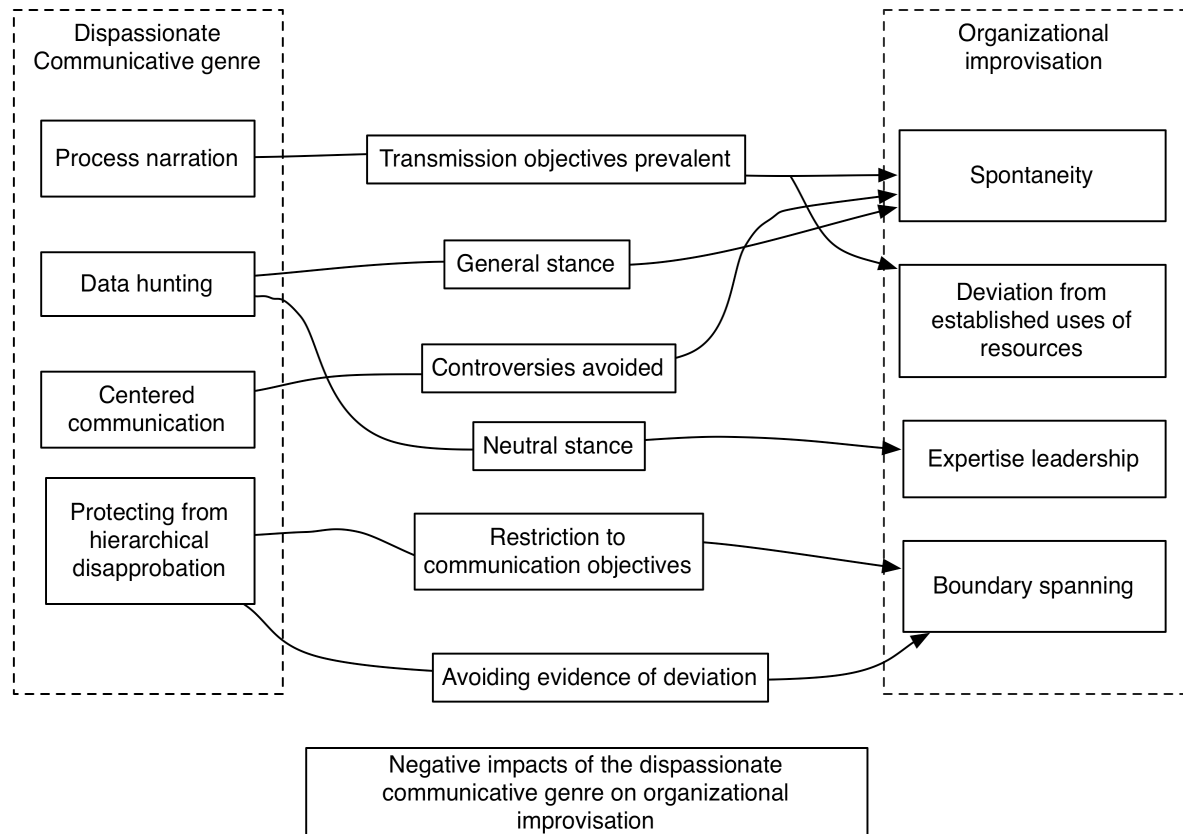


Figure 1. The impact of the dispassionate communicative genre on organizational improvisation

3.5. Moving on from the dispassionate communicative genre

Some administrative actors participated in organizational improvisation during crisis response in diverse manners. Simultaneously these actors developed new communication practices and strategies in relation to fax use. More specifically, they involved themselves personally in messages by expressing their emotions and opinions in favor of improvisation, which promoted deviation from established uses of resources. Moving the dispassionate communicative genre, they promoted the settling of a common emotion, therefore supporting boundary spanning.

For instance, one of the AP-HP directors spontaneously sent a fax on the 8th of August to transmit guidelines to hospitals. These directions mentioned the need to alleviate the workload of emergency units, by sending back homes the patients whose health state was satisfactorily and canceling previously planned surgery operations.

Given the similarities between these guidelines and the ones defined in the emergency plan called the “White Plan”, the AP-HP directors unofficially enacted the White Plan in hospitals on the 8th. By enacting an emergency plan without asking permission to the prefectures or to the Health Ministry, the AP-HP directors deviated from the rules that health care and civil protection organizations usually abide by. The AP-HP co-director, who was the author of this fax, wrote a personal comment next to the guidelines. In this comment, he expressed his concern and his being aware that hospitals are facing problems:

“The situation is very alarming. I insistently ask everyone to take all the necessary initiatives as soon as you get this message. I am aware that the situation is complicated”.

This fax message differed from the ones previously sent in that it did not correspond to the dispassionate communicative genre. Similarly, the DHOS director sent a fax on the 12th of August to recommend that hospitals feel free to “consider every opportunity to increase beds capaci-

ties, even by collaborating with funeral homes”. In other words, the DHOS director gave permission to hospital directors to improvise ad hoc solutions to manage corpses.

The DHOS director spontaneously joined the following request to the hospitals’ director in his message, radically diverging from the dispassionate communicative genre:

“The medical teams as well as all the hospitals personnel have been assailed with requests. We are currently experiencing an extraordinary situation. In such conditions, the hospitals’ personnel have been demonstrating the best of our values: professionalism, availability, solidarity. They are the pride of our hospitals and of our health care system. I ask you to transmit my congratulations and my thanks”.

Our analysis of these two messages suggests that some administrative actors managed to participate into organizational improvisation. Thus, they used faxes to communicate and moved from the usual dispassionate communicative genre to interact with improvisers. Interestingly, they could improvise over the dispassionate communicative genre by using pens, writing the additional messages by hand. This finding suggests that the materiality involved into fax communication facilitated the transformation of the dispassionate communicative genre into a more fervent way of interacting.

4. Conclusion

This paper addresses the need to understand what makes technology a potential obstacle to organizational improvisation. To respond to the research question of this paper entitled *How do users benefit (or not) from ICT when they interact to improvise collectively in crisis response*, we follow the grounded theory method to propose that the communicative genres developed around ICT tools impact the users’ benefit from ICT in organizations that need to improvise during crisis response. By doing so, we provide an integrative explanation of the influence of technology on crisis improvisation.

Our analysis unveils that the *dispassionate* communicative genres developed by the administrative actors of the crisis response network hindered the interactions that composed organizational improvisation. The way users appropriated emails and faxes prevented them from creating a space for the expression of emotions, disorders and creativity. However, some administrative actors managed to participate into improvisation. When they did, they gave permission and guidelines to improvise through faxes. To do so, they adapted their communication practices, moving from the dispassionate communicative genre to interact with improvisers. Table 2 compares ICT use, communicative genres and in organizational improvisation during the 2003 French heat wave.

ICT tools	Communicative genre	Participation in organizational improvisation
Emails	Strictly dispassionate	None
Faxes	Dispassionate. However, fax senders embrace improvisers’ experience and involve their opinions rather than staying neutral	They provided permissions and guidelines to improvise

Table 2. ICT tools, communicative genre, participation in organizational improvisation

In sum, the contribution of our work is twofold. First, our study enriches the literature on ICT and crisis response. Our work reveals that ICT tools such as emails, phones and faxes can have different influences on organizational improvisation during crisis response. We explain these differences by the fact that crisis responders developed diverse communicative genres that existed in relation to these tools.

Our findings are consistent with recent academic concern about organizations’ reflexivity in relation to ICT use. The 2003 French heat wave illustrates the risk of transforming our means of communication as cold and formal channels, where unexpected news or data remain out of the frame. Likewise some authors stress that electronic communication mismanagement is likely to burden organization’s processes (Isaac, Campoy and Kalika, 2007, Kalika, *et al.*, 2007, Tran, 2010).

However, it is important to note that this study does not question the appropriateness of email in crisis response. Examples of efficient use of emails in crisis response are abundant in the literature (Jefferson, 2006, Marincioni, 2007). Rather, we highlight the need to manage our means of communication to enable interactions when a crisis occurs. In particular, we suggest the need to create virtual spaces where users feel free to provide new ideas. Interestingly enough, some improvisers managed to adapt their communicative genres around email and faxes by using material objects on the spur of the moment. We therefore propose that future research further investigate the role of technology materiality in improvisation.

Second, our study confirms the importance of interactions and communicative genres when crisis responders have to improvise as suggested by multiple authors such as Weick (1993), Ciborra (1996) and Kapucu (2006). Our work goes further: it enriches knowledge on the interactive side of improvisation by showing how interactions can conduct groups of actors within an organization to

stay away from improvisation in spite of having great the potential ability to facilitate it.

References

- Baker, T. (2007) "Resources in play: Bricolage in the Toy Store (y)". *Journal of Business Venturing* 22(5), pp 694-711.
- Beamish, T. D. (2002) *Silent Spill*. The MIT Press.
- Brown, J. S. and Duguid, P. (1991) "Organizational learning and communities-of-practice: Toward a unified view of working, learning, and innovation". *Organization Science* 2(1), pp 40-57.
- Car, J. and Sheikh, A. (2004) "Email consultations in health care: 2--acceptability and safe application". *Bmj* 329(7463), pp 439-442.
- Ciborra, C. (1996) "Improvisation and Information Technology Proceedings in Organizations", ICIS
- Ciborra, C. (1996) *The Labyrinths of information: challenging the wisdom of systems*. Oxford University Press, Oxford.
- Comfort, L., Dunn, M., Johnson, D., Skertich, R. and Zagorecki, A. (2004) "Coordination in complex systems: increasing efficiency in disaster mitigation and response". *International Journal of Emergency Management* 2(1-2), pp 62-80.
- Corbin, J. M. and Strauss, A. (1990) "Grounded theory research: Procedures, canons, and evaluative criteria". *Qualitative Sociology* 13(1), pp 3-21.
- Courbon, J.-C. and Tajan, S. (1997) *Groupware et Intranet*. InterEditions.
- Crossan, M., Cunha, M. P. E., Vera, D. and Cunha, J. (2005) "Time and Organizational Improvisation". *Academy of Management Review* 30(1), pp 129-145.
- Crossan, M. M. (1998) "Improvisation in action". *Organization Science* 9(5), pp 593-599.
- Cunha, M. P., Cunha, J. V. and Kamoche, K. (1999) "Organizational Improvisation: What, When, How and Why". *International Journal of Management Reviews* 1(3), pp 299-341.
- Ducheneaut, N. and Bellotti, V. (2001) "E-mail as habitat: an exploration of embedded personal information management". *interactions* 8(5), pp 30-38.
- Faraj, S. and Xiao, Y. (2006) "Coordination in Fast-Response Organizations". *Management science* 52(8), pp 1155-1169.
- Gasson, S. (2005) "Boundary-Spanning Knowledge-Sharing In E-Collaboration", *System Sciences*, 2005. HICSS '05. Proceedings of the 38th Annual Hawaii International Conference on, pp 245b-245b,
- Hermann, C. F. (1963) "Some Consequences of Crisis Which Limit the Viability of Organizations". *Administrative Science Quarterly* 8(1), pp 61-82.
- Hutchins, E. (1991) "Organizing work by adaptation". *Organization Science* 2(1), pp 14-39.
- Isaac, H., Campoy, E. and Kalika, M. (2007) "Surcharge informationnelle, urgence et TIC. L'effet temporel des technologies de l'information. (French)". *Revue Management et Avenir* (13), pp 149-168.
- Jefferson, T. (2006) "Using the Internet to communicate during a crisis". *VINE: The journal of information and knowledge management systems* 36(2), pp 139-142.
- Kalika, M., Boukef Charki, N. and Isaac, H. (2007) "La théorie du millefeuille et l'usage des TIC dans l'entreprise". *Revue française de gestion* 172, pp 117-129.
- Kapucu, N. (2006) "Interagency Communication Networks During Emergencies: Boundary Spanners in Multiagency Coordination". *American Review of Public Administration* 36(2), pp 207-225.
- Kristensen, M., Kyng, M. and Palen, L. (2006) "Participatory Design in Emergency Medical Service: Designing for Future Practice", *CHI 2006 Proceedings*, Montréal, Québec, Canada,
- Lang, G. and Benbunan-Fich, R. (2010) "The Use of Social media in Disaster Situations: Framework and Cases". *International Journal of Information Systems for Crisis Response and Management* 2(1), pp 11-23.
- Lévi-Strauss, C. (1962) *La pensée sauvage*. Plon, Paris.
- Marincioni, F. (2007) "Information technologies and the sharing of disaster knowledge: the critical role of professional culture". *Disasters* 31(4), pp 459-476.
- Mendonça, D., Jefferson, T. and Harrald, J. (2007) "Collaborative adhocracies and mix-and-match technologies in emergency management - Using the emergent interoperability approach to address unanticipated contingencies during emergency response". *Communications of the ACM* 50(3), pp 45-49.
- Mendonça, D. J. and Wallace, W. A. (2007) "A cognitive model of improvisation in emergency management". *Ieee Transactions on Systems Man and Cybernetics Part a-Systems and Humans* 37(4), pp 547-561.
- Milburn, T. W., Schuler, R. S. and Watman, K. H. (1983) "Organizational Crisis. Part I: Definition and Conceptualization". *Human Relations* 36(12), pp 1141-1160.
- Moorman, C. and Miner, A. S. (1998) "The convergence of planning and execution: Improvisation in new product development". *Journal of Marketing* 62(3), pp 1-20.
- Moorman, C. and Miner, A. S. (1998) "Organizational improvisation and organizational memory". *Academy of Management Review* 23(4), pp 698-723.
- Orlikowski, W. J. and Yates, J. (1994) "Genre Repertoire: The Structuring of Communicative Practices in

- Organizations". *Administrative Science Quarterly* 39(4), pp 541-574.
- Pearson, C. M. and Claire, J. A. (1998) "Reframing crisis management". *The Academy of Management Review* 23(1), pp 59-76.
- Pelloux, P. (2004) *L'urgentiste*. Fayard.
- Perry, R. W. and Quarantelli, E. L. (2005) *What is a Disaster?: New Answers To Old Questions*. Xlibris Corporation.
- Ramesh, B. (1998) "Factors influencing requirements traceability practice". *Commun. ACM* 41(12), pp 37-44.
- Ramesh, B., Tiwana, A. and Mohan, K. (2002) Supporting Information Product and Service Families with Traceability. *Software Product-Family Engineering*, pp 281-302.
- Rerup, C. (2001) "'Houston, we have a problem': Anticipation and Improvisation as sources of organizational resilience". *Comportamento organizacional e gestao* 7(1), pp 27-44.
- Smart, C. and Vertinsky, I. (1977) "Designs for crisis decision units". *Administrative Science Quarterly* 22(4), pp 640-657.
- Strauss, A. L. and Corbin, J. (2008) *Basics of qualitative research: techniques and procedures for developing grounded theory*. Sage publications, Thousand Oaks.
- Thiétart, R.-A. (2007) *Méthodes de recherche en management* Dunod, Paris.
- Tran, S. (2010) "Quand les TIC réussissent trop bien dans les organisations: le cas du courrier électronique chez les managers". *Management & Avenir* 34(4), pp 200-215.
- Turoff, M., Chumer, M., Van de Walle, B. and Yao, X. (2004) "The Design of a Dynamic Emergency Response Management Information System". *Journal of Information Technology Theory and Application* 5(4), pp 1-35.
- Waugh, W. L. and Streib, G. (2006) "Collaboration and Leadership for Effective Emergency Management". *Public Administration Review* 66, pp 131-140.
- Weick, E. and Sutcliffe, K. M. (2001) *Managing the Unexpected: Assuring High Performance in an Age of Complexity*. University of Michigan Business School.
- Weick, K. E. (1993) "The Collapse of Sensemaking in Organizations - the Mann Gulch Disaster". *Administrative Science Quarterly* 38(4), pp 628-652.
- Weick, K. E. (1998) "Improvisation as a mindset for organizational analysis". *Organization Science* 9(5), pp 543-555.
- Wenger, E. (1999) *Communities of practice: learning, meaning, and identity*. Cambridge University Press., Cambridge.
- Yates, J. and Orlikowski, W. J. (1992) "Genres of Organizational Communication: A Structural Approach to Studying Communication and Media". *The Academy of Management Review* 17(2), pp 299-326.