# Is Communication Separable From Information?

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**Abstract**

The aim of this paper is to present the French approach to Information and Communication, and to sketch out some arguments pro and con for their amalgamation into a unique scientific body. Since its creation in 1975, the French academic field of Information-Communication has proved several advantages in the development of a new scientific corpus, but also some drawbacks. These are going to be reviewed and the question will be posed on the opportunity to generalize that model or to abandon it.

The research concludes that a dichotomy between information and communication is certainly not representative of the French field of information and communication; it would rather be a continuum or a multi-polar space. Furthermore it is suspected that Anglo-Saxon separation of information science from communication science is not clear either. International comparison and research program in information – communication are advocated.

**Key Words**

Information, Communication, Epistemology, Constructivism, Positivism, French University System, Education, Publications

# *IS COMMUNICATION SEPARABLE FROM INFORMATION?*

## INTRODUCTION

In most countries, Communication Studies are distinguished from Information Studies. In Europe, the respective situation of those two fields as separated is less clearly established. France, which is known on the world scene for its "exceptions", whether cultural, medical, economic, market, etc. carries on another exception: the merger of information and communication studies into one unique academic field denominated *Sciences de l'information et de la communication*, (in short, *Sic*), i.e. *Communication and Information Sciences*. That is much less mediated than other forms of French singularities, but, in a European perspective, it is interesting to explicit the rationale and questions raised by that scientific and organizational approach. It is important at the present time of unification of the European diplomas (License, Master, Doctorate, or LMD) to exchange on that issue with other academics.

The rationale of this presentation is multiple. First it is to explain our European partners some features of the French exception in Information and Communication science. Second it is to question whether this unification is the result of a mere administrative process in the French research policy or has some epistemological foundations. Then it is to confront a historical and epistemological viewpoint with some empirical data about how doctoral dissertations in French *Sciences de l'information et de la communication* can be classified on a bipolar axis, i.e. information vs. communication. Accordingly, this paper is divided in two parts; the one dedicated to a general reflection about the opportunity to dissociate information from communication studies, and the second to examine a corpus of 862 dissertations with respect to their positioning in information or in communication.

## COMMUNICATION SCIENCE OR INFORMATION SCIENCE, A RECENT FIELD OF STUDIES

### A conflict of paradigms

Communication science and information science, whether united or not, are newly established fields as compared to other social sciences like sociology or psychology for example. At the time they were established, in the second half of the XX century, new paradigms for scientific research were emerging to overcome some of the main drawbacks of the model that has guided science for two centuries, i.e. the rationalist, positivist model. Amidst a stream of new insights into epistemology, from Bachelard (1971), to Von Bertalanffy (1968) and Watzlawick (1988), it is Piaget who introduced the concept of "constructivism" in 1970 (Von Glasersfeld in Pitasi, 2001). Thus, since the beginning, epistemologies of Information science and Communication science were in the midst of disputes between tenants of positivism and of constructivism. The argument was not only due to the conflict between two paradigms but also due to the fact that these new "sciences" were focusing on objects stemming from professional and social practices (Le Moigne, 2001, 2002). The positivist attitude had been quite relevant to study natural objects like a piece of iron clearly outside the world of the researcher. That is the "hard science". However some doubts about this ontological statute of the object rose after the development of Einstein's theories of relativity, followed by Planck's theory of quanta and Heisenberg's theory of uncertainty. Furthermore is it true when you contemplate an object, such as an interaction between persons, whose existence itself depends on the way you record it and you interpret it. This is the characteristic of "soft science". The temptation was great, and still is, to split the complex phenomenon of interpersonal interaction in order to reduce it either to hard science or to soft science. We set forth the

hypothesis that several countries or cultural areas have performed the separation by attributing the soft side of interpersonal interaction to communication sciences and the hard side to information sciences, since it is not unreasonable to consider a bit of information or a book in a library as an object per se.

## The organizational structure of public research in France and the founding of Sciences de l'information et de la communication (*Sic*)

Curiously enough we could have expected that the French attachment for rationalism and positivism would have produced an academic organization of Sciences of information and Sciences of communication alongside the line of separation between hard sciences and soft sciences. The contrary has happened, but with hot disputes and continuous contradictions. To understand this situation we are going to brush a broad picture of the process of producing research structures in the French national system of research and university teaching.

The French higher education system is centralized and nationwide. It depends on the Ministry of Education, generally associated with a High Secretary of Research, one of the most populous organizations in the world. A number of large public research centres are also under its supervision, among them the Cnrs (Centre national de la recherche scientifique), Cea (Commissariat à l'énergie atomique), Inria (Institut national de la recherche en informatique et en automatique), Inra (Institut national de la recherche agronomique), etc. Scientific disciplines are catalogued jointly by the Cnrs with respect to research and by the Directorate of Higher Education with respect to teaching. The latter rests on a partly elected council to enforce academic programs and recruitment of professors. This council named Cnu (Conseil national des universities) is subdivided into almost a hundred of so-called "scientific sections and sub-sections". To summarize abruptly, we can say that a scientific discipline is recognized in France when it has been established as a section of the Cnu. For example, the new discipline of *Sciences de l'information et de la communication* (*Sic*) has been given the number 71 by decree dating back to 1975.

The process of being recognized by the Cnu may take several decades. It is both a matter of defining the object, having it recognized by influent members of the scientific community, and of lobbying in the ministry. At present, the *Sciences de l'information et de la communication* are not yet unanimously recognized by everybody, for instance by specialists of computer science. Yet *Sic* are largely spread in universities with 607 full professors and assistant professors in 2003 (http://cnu71.free.fr), dozens of thousands of students in their major, 862 published doctoral dissertations from 1975 to 2004. Hence we can set forth the affirmation that *Sciences de l'information et de la communication* are existing and even quite well off with the highest growth rate since when they have been established as one the sections of the Cnu.

Whether a "section of Cnu" is a "discipline" is another question of epistemological nature. It is related to the facts that a) Cnu is concerned with research, teaching and the general organisation of French university system, and b) *Sciences de l'information et de la communication* define themselves as an inter discipline. "What would shape a discipline out of an inter discipline?" is a paradoxical question which has not been solved yet. That situation is probably, and paradoxically too, one of the weaknesses and one of the strengths of that French view we are tempting to characterise. And, as we are going to note it hereafter, one consequence of that situation is the difficulty to evaluate the production of knowledge through the bibliometric analysis of published articles since there is no systematic referencing of

specifically labelled "*Sic*" papers or reviews. In section II, we are going to limit to doctoral dissertations our analysis of publications.

The first steps of the 71° section (*Sic*) have been marked by hard arguments between several currents of thinking coming from different approaches rooted in the different backgrounds that the persons who joined the new section were carrying, for example sociology, history, media, law, computer science, library science, management science, etc. These disciplinary crossings have a plurality of study objects and methodologies as a corollary (Mattelart, 1997, Miège, 1995). From this point of view, the history of *Sic* since the seventies has undergone a phase of institutionalisation in the twin aspects of teaching and research: teaching with the establishment of new professional curricula in Technological Institutes (Iut) first, in Licence and Master programs later in the eighties (Bernard, 2002); and research by the creation of research laboratories (Meyriat, Miège, 2002) whose main concern was the search for an institutional legitimacy which passes through establishing scientific and social standards. As Boure stated it in 2002, and which is still current, "a historical research program would consist in examining, field after field, how researchers in *Sic*, starting from facts located within a specific space-time framework, a socio-institutional framework and socio-intellectual determinations, muddled through, arranged, and built up information and communication objects and problems. It would thus make scientific exchanges more possible (transfers, dialogues, inter-science confrontation, development of common references, etc.) which in turn would allow the process of becoming a science to be gradually and dynamically constructed on inter disciplinary basis previously recognized by University". (Boure, 2002)

## The correspondence between French and Anglo-Saxon areas of *Sic*

As a first approach to comparison between French and Anglo-Saxon approaches to the field of Information - Communication, we have investigated the Anglo-Saxon terminology in an international index. The following table quotes reviews that come under the fields of Information and Communication and were selected among the first 35 reviews of the *Journal Citation Report - Social Science* (JCR-SS - 2004) for the fields "communication" and "information science & library science" (sorted by Impact Factor for each field). 15 reviews per field were selected following the list ordered by Impact Factor. If this partition doesn't qualify exactly our French *Sic*, it yet makes it possible to better determine the extent to which the French fields are consistent with an internationally known reference frame. However this reference frame is limited because, on the one hand, it would deserve to be supplemented by other reviews which do not appear in Jcr-ss and, on the other hand, it is limited to the Anglo-Saxon reviews.

| COMMUNICATION | INFORMATION SCIENCE & LIBRARY SCIENCE |
|---|---|
| 1. HUMAN COMMUNICATION RESEARCH | 1. ANNUAL REVIEW OF INFORMATION SCIENCE AND TECHNOLOGY |
| 2. MEDIA PSYCHOLOGY | 2. INFORMATION SYSTEMS RESEARCH |
| 3. COMMUNICATION THEORY | 3. LIBRARY AND INFORMATION SCIENCE |
| 4. COMMUNICATION MONOGRAPHS | 4. JOURNAL OF THE AMERICAN SOCIETY FOR INFORMATION SCIENCE AND TECHNOLOGY |
| 5. JOURNAL OF COMMUNICATION | 5. JOURNAL OF DOCUMENTATION |
| 6. PUBLIC CULTURE | 6. INFORMATION PROCESSING & MANAGEMENT |
| 7. COMMUNICATION RESEARCH | 7. JOURNAL OF MANAGEMENT INFORMATION SYSTEMS |
| 8. CRITICAL STUDIES IN MEDIA COMMUNICATION | 8. JOURNAL OF ACADEMIC LIBRARIANSHIP |
| 9. CONVERGENCE: The International Journal of Research into New Media Technologies | |
| 10. EUROPEAN JOURNAL OF COMMUNICATION | |

| | |
|---|---|
| 11. GLOBAL MEDIA AND COMMUNICATION | 9. JOURNAL OF INFORMATION SCIENCE |
| 12. NEW MEDIA & SOCIETY | 10. LIBRARY QUARTERLY |
| 13. JOURNAL OF APPLIED COMMUNICATION RESEARCH | 11. INFORMATION SOCIETY |
| 14. TECHNICAL COMMUNICATION | 12. SCIENTOMETRICS |
| 15. JOURNALISM & MASS COMMUNICATION QUARTERLY | 13. SOCIAL SCIENCE COMPUTER REVIEW |
| | 14. JOURNAL OF LIBRARIANSHIP AND INFORMATION SCIENCE |
| | 15. KNOWLEDGE ORGANIZATION |

**Table 1: A listing of the 15 major Anglo-Saxon publications in the two fields of communication and information**

At bird's eye, Table 1 indicates the existence of a parentage between the French and Anglo-Saxon research programs since the titles of major Anglo-Saxon publications are corresponding to French sub-domains of *Sic* (but not one to one). However, independently of these correspondences, rare are the French authors in these reviews, rare are the bilateral research programs, rare "the materialisation of these parentages between researchers, currents of thought, disciplines, and authorities" (Boure, 2002). The question is whether this reciprocal lack of interest between the two cultures is due to a general cultural gap, or to a feeling of discrepancy between research objects here and abroad. To date, it is not possible to answer. Let's just notice that, contrary to other fields where French scientists are publishing in English (say "hard" sciences…), it seems that the French researchers in *Sic* are hardly worried of the international size of their research. This can be clearly observed in the low number of Anglo-Saxon bibliographical references (in dissertations for example) and of publication in international scientific reviews.

Thus, the question of the singleness or at least the historical bonds between information science and communication science (in particular how they have, or not, acquired an autonomy one with respect to the other) in France vs. Anglo-Saxon countries still appears conjectural.

## The boundaries of *Sic*

Information and communication innerve the whole spectrum of human activities, and even in a broader approach, all *living* activities. "It is impossible not to communicate" Watzlawick said. An extensive application of this view would have conducted the newly established *Sic* to incorporate several other scientific fields, or at least some parts of them, such as Law, sociology, psychology, cognitive sciences, education science, history, computer science, management science, business or political science. As ever, building a scientific territory implies "to build borders which its nationals protect more or less and which they often agree to saying that interfaces deserve to be more deeply prospected. But, in any case, *Sic* can be praised, in spite of the imperfection of their objects and their problems, to have always sought to be different from the other disciplines by the extreme attention paid to their central objects, the information and the communication "(Boure, 2002). An imperialistic approach was clearly not defendable and, in 1995, the Cnu has issued a directive fixing the boundaries of *Sic* studies with the connected fields. This directive has been updated in 2004 (http://cnu71.free.fr) and stipulates:

*"The 71e Section considers in its field of competence research on varied objects, even heterogeneous, so long as human dimension, the social significances, representations, the forms of writings and appropriation or the strategies of the actors are in the centre of the problems. Consequently, they are not the objects, nor even the materials of research or the*

*grounds observed which are enough to determine whether they are relevant with the section. Thus, as an indication, […] research is admissible relating to objects such as: competitive intelligence, territorial intelligence, collective intelligence, medical information, geographical information, automatic treatment of the language, lexicography, info metrics, on line services (e-learning, e-business, e-governance...), man-machine interface, semantic Web, data processing, data base, cinema, audio-visual, spectacles, arts, literary productions, edition and publishing, design... museums, libraries, other cultural institutions..."*

Interesting enough is the fact that at the same time in the Usa, Watzlawick (1988, p 199) noted: "human communication should incorporate various disciplines hitherto considered separated or not considered at all". But this kind of cataloguing, whatever the help it provides for young scientists to orientate their research and their career, does not provide epistemological foundation for a unified field of information – communication. The question is: are there epistemological foundations for a unified field? We are going now to review a more global approach to that question.

## Are information and communication "research programs" liable to differentiation?

We use the concept of "research program" as a less ambitious and more practical formulation than "paradigm" to name a "typical descriptive unit of great scientific achievements" in the sense of Lakatos (1978) quoted by Gastil (1994). As we have noted earlier, the tendency in various countries, esp. the Anglo-Saxons, is to root information science in the positive, rational research program of "hard" science and communication science in the constructivist research program of "soft" science as demonstrated by Gastil (1994). Unfortunately this is not that simple. Table 1 for instance indicates that reviews in "Information science" are not so "hard". The Shannon model of communication is no longer usable. If information arises in the instrumental world of electronics and tele-communication, it ends up in a fleshy and emotional brain whose behaviour cannot be reduced to equations.

However, when dealing with epistemological contributions of researchers whom we explored, positivism and constructivism tend to clash, to be opposed permanently: "this division thus gives to each design a character of exclusiveness; one is supposed to subscribe to the law of causality or to the principle of finality, with the absolute obligation to reject the other "(Riedl, 1988, p.98). It would seem whereas a third way is possible, an articulation of these two epistemologies in a specific research program, an intuition which is supported by our review of practices that tends to contradict speculative dissertations.

Our reasoning is based on the perspective of an articulation of positivist and constructivist epistemologies (Duvernay, 2004). If a constructivist posture is privileged in communication, we think that it somehow and everywhere remains a *pre positivist framework*; in the sense that we do not construct from "nothing" and that certain human characteristics are innate. *"One can speak about facts to which a theory refer, and to which it is supposed to correspond, without using the concepts of the theory itself. The facts are not accessible for us, and one cannot speak about, without reference to a theory "* (Chalmers, 1987, p.245). Even for Morin, defender of a complex thinking, far from the Cartesian reductionism, the positivist simplifying thought has not to be eradicated as such. The simplifying modes of thought are integrated in the complex approach, but the observed object is not reduced to this simplification "*which takes itself for the reflection of what is real in reality*" (Morin, 1990, p.11). And through the way that it opens to us, Edgar Morin, however listed among the constructivists, also postulates that whatever man builds (and which also builds him in return)

through his education, its social interactions, its culture, its language, on which it depends, it remains nevertheless also dependent on not constructed factors, of the order of biology and genetics, such as a "brain, itself product of a genetic program, and the genes on which we also depend." (Morin, 1990, p.89). Besides that, it is interesting to note that a number of authors descending of a constructivist lineage, arrive to feel in their reasoning the need to articulate constructivist and positivist epistemologies. "The relation of correspondence between the two types of interpretation appears clearly when one considers the hierarchy of the layers which make the structure of the world. There is not any doubt that elementary particles constitute atoms which form molecules, bio molecules, cells, tissues and organs which, in their turn, compose of individuals, societies and cultures particular to each type of society "(Riedl, 1988, p.98-99). In the final analysis, it appears relatively obvious that an epistemological posture purely constructivist would be intolerable. We do not build "from nothing", we said it, but well in pre-frameworks of some sorts, cognitive, anthropological, even biological and physiological. And these pre-frameworks force us and limit us in our reasoning and our communication aptitudes. Another famous constructivist, biologist and a figure recognized in the scientific field of the artificial intelligence, Francisco Varela (1988, p.341) insists: *"First of all, we cannot leave the field defined by our body and our nervous system. There exists for us only one world: that of which we make the experiment by these physiological processes that make us such as we are. We are in a cognitive system, and we cannot get out, nor choose where it starts and how it functions ".*

Although stated differently Gastil (1994) arrive at a similar conclusion in its "Appraisal and Revision of the constructivist Research Program". Constructivism is not condemned per se albeit its shortcomings. It should be revised within the framework of its core research program, specifically in its "protective belt", i.e. mainly its operative processes and some side theories. "*Constructivism will maintain its prominence in the field of communication until it is either replaced or abandoned. Critics who argue that constructivism has become a hopelessly degenerating program are charged with the task of replacing it with an alternative research program capable of explaining constructivists research findings*" (ibid. p 98). Unfortunately, Gastil does not speak of any research program for Information science or its associated fields. We have to go further into our drill for a common research program.

## On a unique concept of information- communication

One realizes intuitively the fuzziness of the border between what one names communication and information, while feeling that there is a difference between the two. The epistemological pirouette consists in (a) declaring these terms are polysemic - an evidence considering their extensive usage- and (b) studying them separately, each one according to the rationalist principles and to the restricted point of view of the researcher; that of the individual, the cell, the organization, the technology, etc. To advance in our reflection, we will pose that information and communication in their various meanings are the *dual* facets of a unique object that, to follow a popular use in France, we will name "*inforcom*".

## An analogy with quantum theory and the wave/particle duality

The recognition of double properties, either contradictory, or complementary, is as old as the human traces of thought. And it is symptomatic that the majority of the religions and much of philosophical movements put much energy to fight the concept of duality. In the world of epistemology, the question of the duality impregnates the scientific debates since the age of

the Renaissance, with in particular the debates on the opposition matter vs. energy, then on wave vs. particle. The debate in physics seems relatively currently stabilized since the universal recognition of the laws of theoretical physics and quantum mechanics (Congress of Solvay, 1927). The great stages sketchily are: Planck (quantum of energy, 1900), Einstein (quantum of light, 1905), Bohr (atomic quantum, 1919), De Broglie (matter wave, 1923), Heisenberg (measurement and determinism, 1925). But new debates reappear in a perpetual way. To introduce this essay, we will be satisfied with the intuition of Broglie (1924) which led him to his unifying theory: "I was convinced that the dualism of the waves and the particles, discovered by Einstein in its quantum theory of light, was absolutely general and extended to all physical nature." But the mental also is questioned. In parallel, the philosophers wonder about dualism body vs. spirit. We will stop with Bergson, contemporary of the immense scientists of the quantum adventure, who, in *Matière et Mémoire* (1939), tried to solve the oppositions between dual concepts such as body and soul, brain and conscience, extension and un-extension, quantitative and qualitative.

The inforcom is an instantiation or actualisation - i.e. the performance- of a relation between two entities - people, living organisms, organizations. It results in, on the one hand, a flow of *grains of information* - commonly called data and, on the other hand AND simultaneously, a flow of *waves of communication*.

*One will pose that the inforcom is a quantum of interaction between two agents.*

The particle, or grain, and the wave-like dual dimensions of the *inforcom* will make it possible to classify a certain number of concepts usually evoked in *Sic*. We will arrange them under the terms of “grain and wave".

### THE GRANULAR DIMENSION OF THE *INFORCOM*

Essentially all that is numerical, digital or digitisable, quantifiable, rational or rationalisable: bit, data, sign, symbol (graphic), figure, alphanumeric, text, image, colour in the spectrum, sound represented by its height, its pitch, its duration, its rhythmic...

### THE WAVE-LIKE DIMENSION OF THE *INFORCOM*

All that is physically impalpable, in the order of the intuitive and of the feelings: the nonverbal not codified communication, speech also in what it conveys in the meaning of Breton (2003), the inflection of the voice, the ambiguity, the inaccuracy generating creativity, the charisma, the radiation, the vibration, the ritual, the imaginary, the feeling of time, of space, aesthetics (Caune, 1997), the implicit (Goffman, 1974), the empathy (Berthoz & Al. 2004), the clandestine, or the ruse (de Certeau, 1980), etc.

### CONSEQUENCES

The use of the analogies in the scientific reasoning is at the same time powerful and risky. We took the risk because the question of the nature of information as compared to the communication is still largely in debate. Any attempt to highlight it appears a priori justified. We see several advantages with a unified conceptualisation of information communication. One of them is in the realm of pedagogy. If one takes a modern course on quantum mechanics, one can operate a startling transposition in the field of information communication by following the change of viewpoint that it imposes to us as compared to traditional mechanics. Here in Table 2 is the reasoning extracted from a modern course of physics (http://villemin.gerard.free.fr/Scienmod/Quantiqu.htm) whose synopsis could be used as a metaphor in a class of information *and* communication.

| | |
|---|---|
| Quanta? | Theory formulated by Planck in 1900 perceived like subversive at that time |
| Planck 1900 | Max Planck proves that energy exchanges between the matter and the radiation are carried out not in a regular way |
| | But by packages, discontinuous quantities |
| | From where the name of quantum given to each one of these packages |
| Einstein 1905 | Albert Einstein shows in his turn that the light, that one firmly believed to be a wave |
| | Is made of grains of energy which one will later call the photons |
| | Quantum physics has just been born |
| Electron? | No longer a kind of planet that turns around a star, the nucleus of the atom |
| | It does not follow a precise way |
| | But a series of possible trajectories |
| | It is not any more one object. It is a cloud |
| | It is invisible and imperceptible |
| | It is a wave, a package of wave |
| | It is a field which can exist even if the particle is not there, even if it is not materialized |
| | It is a kind of thing that influences the medium, that impregnates it, that gives it a total intrinsic property |
| Consequences | Isn't it puzzling? Doesn't go further than what you fancied? |
| Chance? | The world is no longer well-ordered, deterministic |
| | It is uncertain, governed by chance |
| | The outcome is no longer the result of a precise cause, it is randomized |
| | Reality is fading for ever: a particle can appear, disappear, change its course |
| | A measurement taken on a particle may influence another particle, immediately, without delay, at any distance |
| Invading? | In the new mechanics, any point in the system is anywhere in a space that is set at its disposal |
| Uncertain? | One cannot determine with precision both the position and the speed of a particle |
| | One can't even measure them simultaneously |
| | Whatever the precision of the measurement system |
| | The world of the electron escapes any measurement and henceforth prediction |
| | One has to rely on statistics and probabilities |
| | One only knows that the particle has a chance to be somewhere |
| Paradoxical? | The theory is able to give some certainty: it's a sort of statistical determinism |
| | And the model is extraordinarily powerful, with great precision |
| Tricky? | What happens in the quantum world depends on the way that it is observed |
| | A phenomenon can't be isolated from it measurement |
| | **Reality is created by the observer** |

**Table 2: A synopsis of presentation of the quantum theory that could be transposed to information communication theory**

Think of replacing the word "quantum" by "inforcom". This would be a starting point for a research program in information – communication. If one approached information - communication with such mental representations, what simplistic blunders one would avoid!

A second advantage is that our quantum of relation, the inforcom, does not bring a new structuring of the complexity of the phenomenon by a increasingly refining the models, but by unifying theoretical approach of the existing models. This attempt only touched on the subject. Meanwhile it is necessary to be well reminded, "Comparison is not reason". What physics teaches us about duality clarifies our discourse; it does not demonstrate it. Moreover further research is necessary to define the equivalent of a " wave-like function " of information - communication, and its application to reality.

## A PRAGMATIC APPROACH TO THE CONTINUUM OF INFORMATION COMMUNICATION IN FRENCH RESEARCH

### The experimental device

Our objective, in this work, is to show that the discipline of information and communication sciences in France is not reducible to the juxtaposition of two sub disciplines which would be on the one hand information science and communication science on the other. There are certainly purists' researches that are completely attached to the information science or communication science, but there are also works that combine these two approaches. It is in this melting pot that rests all the originality of the French approach to *Sic*.

Our analysis relies upon a corpus of doctoral dissertations in information and communication sciences. This corpus should cover very correctly the state of the dissertations deposited in France in this discipline. We chose to focus on doctoral dissertations for two reasons:

- The dissertations characterize well the state of the search for a field

- There is a public database of the accessible dissertations and having a disciplinary index making it possible to quickly constitute a corpus in Information and communication sciences.

The selected corpus is thus the whole set of dissertations defended from 1974 to 2005 with information or communication as key words in the index field ( because of the time between the defence of the thesis and its integration in the database, the number of dissertations present in the database for year 2005 is not relevant and comparable to the production of the other years). A corpus of 862 dissertations thus could be downloaded.

Each index note displays a certain number of data structured around the main following fields:

- name of the candidate
- title of the dissertation
- name of the supervising professor
- date of defence
- university of defence
- abstract in French and/or English
- key word descriptors of the thesis
-...

All these fields are not available for all the dissertations but it is observed that the index notes recently seized in the database are often complete. Our work was particularly centred on the key word field. The key word field corresponds to a list of key words chosen by the candidate

to describe his thesis and corresponding with an entry to the *Rameau* thesaurus (a French thesaurus for academics library, i.e. Bibliothèque Nationale de France and University libraries). These key words are thus not in free text but correspond to words of a thesaurus. We privileged the key words appearing at least three times in the corpus of the 862 dissertations. There are 122 of those key words. One, several or none of those key words describes any and each dissertation. The space of the key words is thus a multidimensional space, the distance between two key words depends on the privileged association of these key words in the corpus of the dissertations. We first chose to carry out a factorial analysis of correspondences.

## A factorial analysis of correspondences

This technique of analysis of data consists in projecting the group of dots of the key words on two axes while seeking to restore the maximum of information from the corpus. The result is sketched in Figure 1

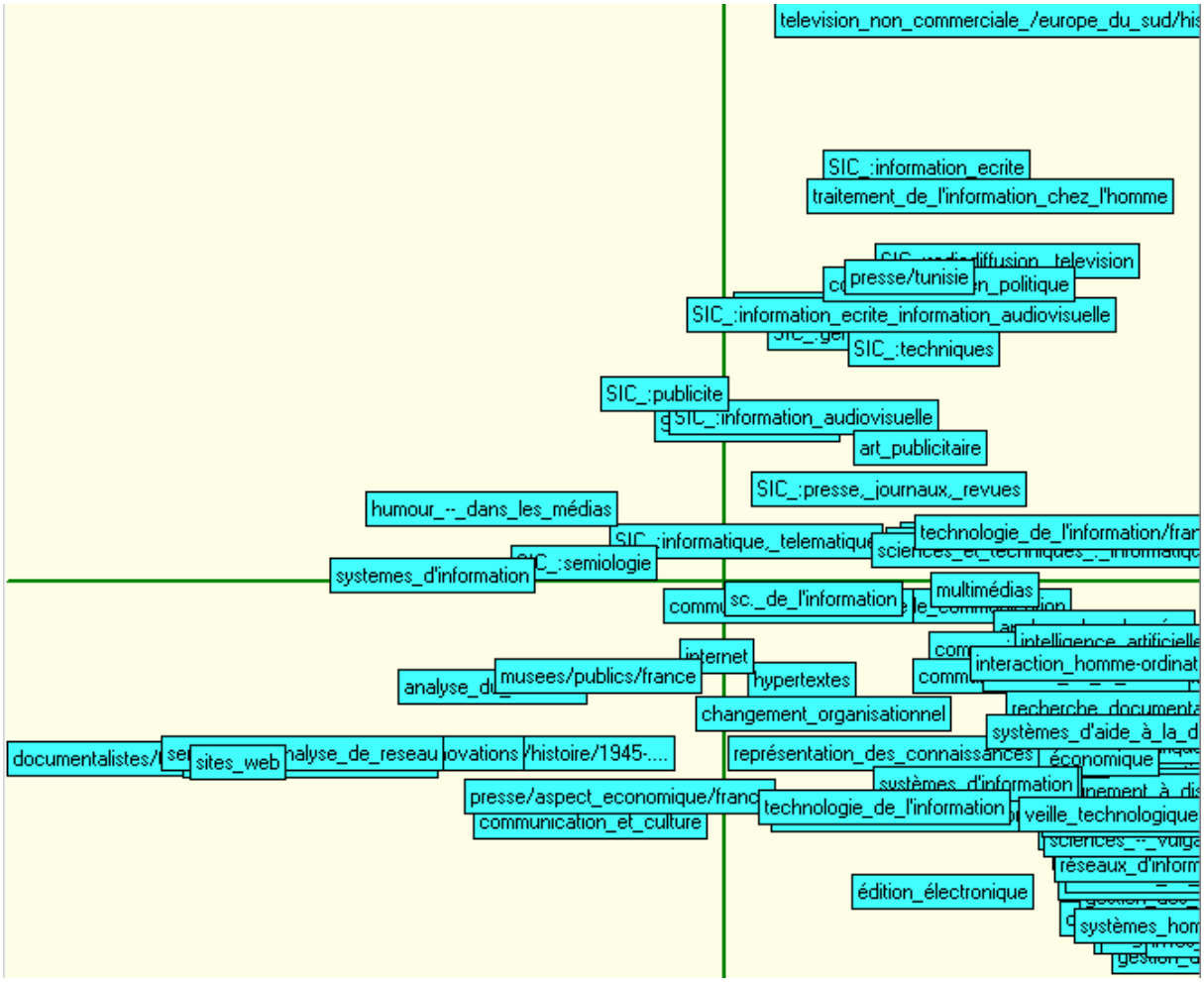


**Figure 1: The first two axes of the factorial analysis of correspondences demonstrate the impossibility to dichotomise the corpus of dissertations**

INTERPRETATION

The Figure 1 yields 31% of all the information contained in the corpus, respectively 16% for X-coordinate axis and 15% for Y-coordinate axis and does not show any evidence of separation between two supposed types of dissertations.

That is already an interesting intermediate result. Reasoning by absurdity, let's assume that communication and information sciences were reducible to a dichotomy in which one would observe either dissertations in pure information or dissertations in pure communication; then, when one would project the group of dots of the key words descriptors of each dissertation on a factorial analysis of correspondences one would obtain an axis 1 which would have a high eigenvalue implying that this axis is discriminating. This is not the case here. The study of these first two eigenvalues thus leads us to the fact that there are other dimensions to take into account beyond the distinction information/communication.

## Network analysis

What are the other relevant dimensions? Network analysis (Figure 2) gives us a part of the answer. Each box, in the following network, represents a keyword and a tie between two boxes means that the two key words are defined as description keywords in at least 4 dissertations. (As the complete network was unreadable we made a filter on it. We only selected the associations between key words that are associated within 4 dissertations at least). Doing such limitation, we are not considering all the information but only 66% of the total information of the corpus. This is sufficient for the present purpose, although it may show some irregularities that do not alter our reasoning.

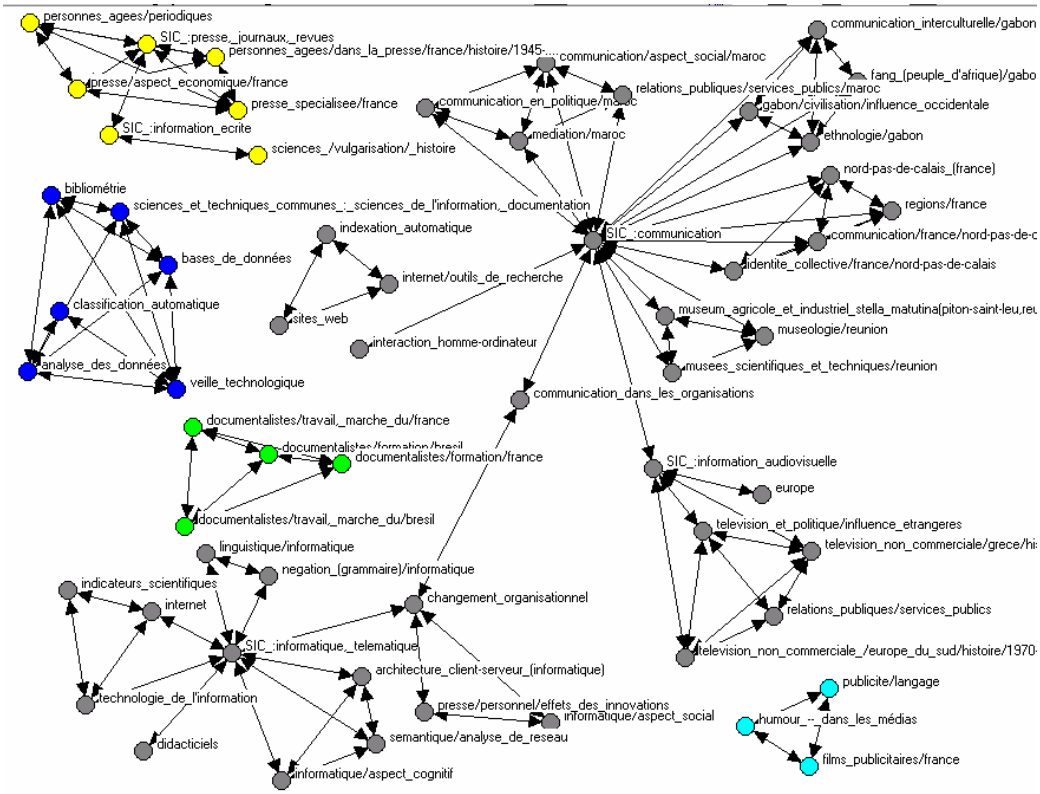

**Figure 2: The simplified network analysis provides a representation of associations between key words of the corpus**

INTERPRETATION

The network shows that the continuum is not the more relevant way to characterize these data. We can distinguish several subgroups in the network suggesting different sub disciplines inside information and communication sciences. Some keywords have a special function of *connectors* between components of the graph that could be separated if these intermediary terms did not exist. Key words like "communication dans les organisations" are like isthmuses between two subgroups.

We conclude that the dichotomy between information and communication is not an efficient way to describe the reality of information and communication sciences in France. Far from this dichotomy, we can observe a multi polarity in the whole set of communication and/or information approaches.

## Application of the *Inforcom* concept

AT THE STUDENT LEVEL

For each dissertation, one is able to know the number of key words specifically attached to the information science which one finds in the abstract. One is able to know in the same manner the number of terms attached to communication science in the abstract. This work has been done manually giving the list of the keywords to two experts in the domain of information and communication sciences. Each expert has to ascribe whether the keyword was an informational or a communicational one. Only those keywords that were associated in the same field by the two experts in a non-ambiguous manner were considered in the rest of the analysis. From that classification, one deducts a percentage [$Z_{inforcom}$] of information key words vs. communication keywords.

$Z_{inforcom}$ = Number of information key words of a dissertation/(Number of information key words of the dissertation + Number of communication key words of the dissertation)

On the basis of this $Z_{inforcom}$ criterion, we are going to rank dissertations from the highest to the lowest. The higher the $Z_{inforcom}$, the more "infomationist" the dissertation.

Statistics relating to the 429 dissertations having an abstract and retained in the sample are presented Table 3.

| Value of $Z_{inforcom}$ | Number of dissertations in % |
|---|---|
| 100% | 11,65% |
| 0% | 26,57% |

a) With respect to the extremes (0-100%)

| Value of $Z_{inforcom}$ | Number of dissertations in % |
|---|---|
| >75% | 24,24% |
| < 25% | 46,85% |

b) With respect to the quartiles (25-75 %)

**Table 3: Breakdown of the dissertations by their level of "informationism", i.e. Z inforcom**

INTERPRETATION

Table 3 expresses the fact that in the abstract of more than 11% of dissertations, one finds only words that we defined as attached to information science. On the other hand, one finds more than 26% of the dissertations whose abstract comprises only words recorded as belonging to the field of communication science. Let's pose that if more than 75% of the descriptors belong to a category then the dissertation is attached to this category. According to this criterion, one finds 24.24% of dissertations attached to information science and 46.85% that are attached to communication science. This also means that 28.91% of the cases are out of that dichotomy. One deals with work which is somewhere outside the poles and which may be hypothesised as on a bi-dimensional continuum.

AT THE RESEARCH DIRECTOR LEVEL

On the basis of that classification, we have attempted to rise up to the level of the research directors. The latter have been supervising several students present in the database. It is interesting –and not intuitively surprising- to note that research directors often have a particular sensitivity towards information or communication which leads them to frame dissertations in a particular direction. From the list of the dissertations supervised by each director, it is thus possible of infer a ratio called [$Z^{director}_{inforcom}$] which characterizes the information/communication sensibility of the director:

$Z^{director}_{inforcom}$ = number of information-like key words/( number of information-like key words + number of communication-like key words)

Figure 3 hereafter shows for each professor its [$Z^{director}_{inforcom}$] ranked from 0 to 100, i.e. from the least to the most "informationist" according to the key words of the doctoral dissertations they supervised.

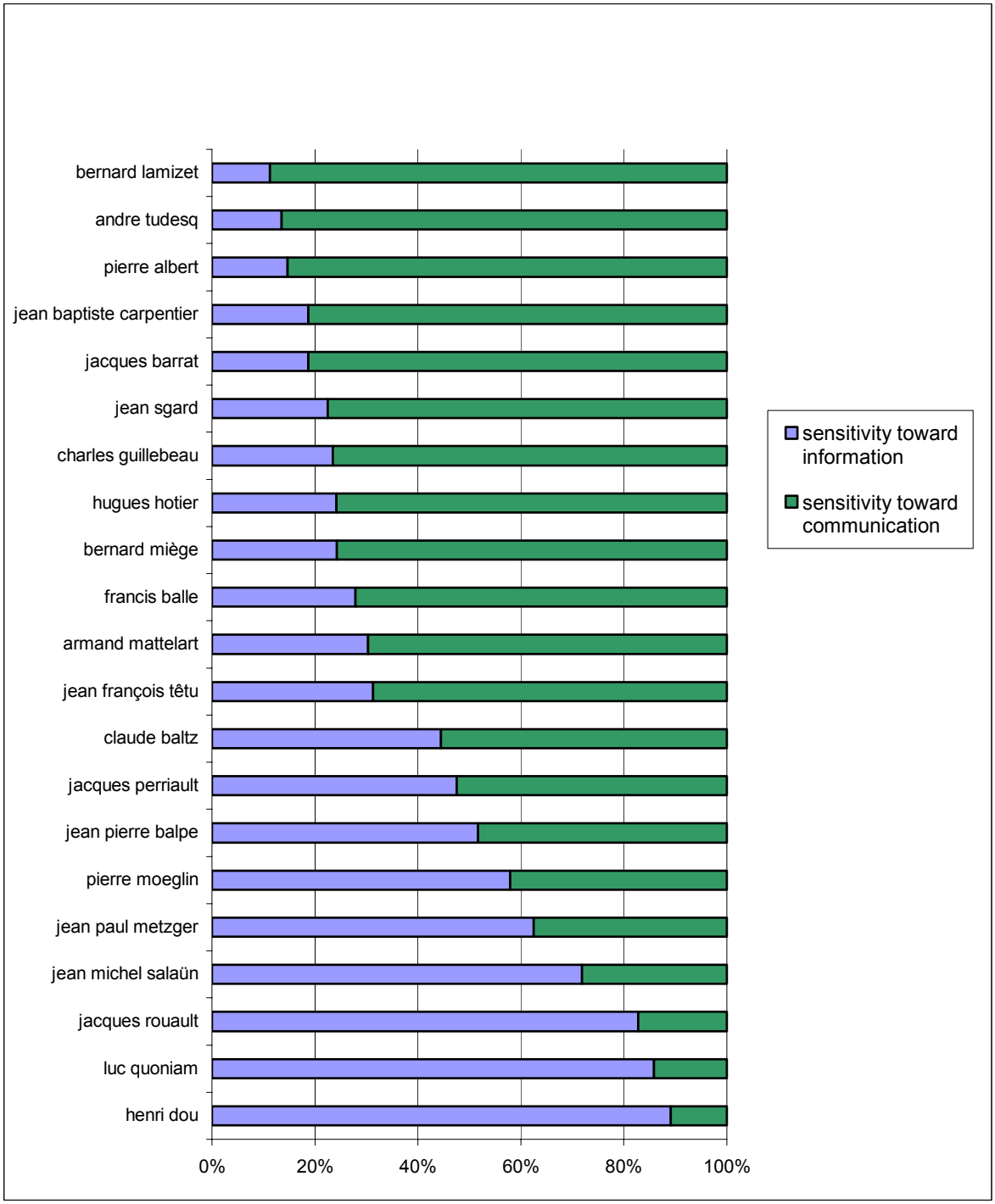


**Figure 3: A distribution of [Z director inforcom ] characterizing the information/communication sensibility of French research directors after the dissertations they supervised**

INTERPRETATION

In this figure, we retained only the 20 directors having the larger numbers of dissertations defended in the discipline during 1975-2005. This figure illustrates the previous observations. We can note that, except directors who are purely informationist or communicationist, most of them have participated in dissertations classified in both information and communication fields

## Critics and appraisal of this experiment

Having started our reflection with a top-down approach of the hypothesised separability of information from communication, we wanted to test the feasibility of a bottom up research plan to examine how the field was structured in that respect. It seems pretty clear from this experiment that dissertations and research directors in France are spanning along a continuum from mere information to mere communication, or at least are in a multi-polar space, not a bi-polar one. One could conclude that, at least, there is no proof that the French posture does not reflect a deep phenomenon of inclusion of information and communication into a unique scientific corpus.

We however keep very prudent in our judgment because our experiment clearly displays some shortcomings. First, having studied dissertations only in the field of an established domain (the French *Sic*) we may arrive at a tautology: dissertations are positioned on a continuum because the research program is a continuum. From that point of view it would be interesting to explore other fields with that kind of methodology. It could be made in France with the doctoral researches in related sciences (Law, sociology, psychology, cognitive sciences, education science, history, computer science, management science, business or political science) and in other areas of the world according to their specificities. Second the time span may be too short to infer a general significance.

But the real result of that experiment is that it indicates a direction for research and the absolute necessity of international, intercultural comparisons.

## CONCLUSION

Finally, our underlying research question was, in mundane terms: is the French experience of a unified research program in information- communication a bureaucratic and socio- political fantasy or a real scientific achievement?

Our answer to date is that it is a valuable attempt that has not yet produced all its potentialities.

Before the epistemological situation of information communication becomes clearer, some consequences can be drawn. First, it exists little probability that the French doctrine of a unique scientific field will change in the near future. Our findings in terms of denomination of Anglo-Saxon reviews reinforce the impression that information is not so much separated outside France that it could be first assumed. It may even be said that in many circles, in France and abroad, the regrouping of several associated existing fields could merge soon in a broader concept of inter-discipline. Second the dissonance between French approaches and Anglo-Saxon ones has to be blended once again and given attention accordingly. Such undertakings like « social informatics » (http://www.dlib.org/dlib/january99/kling/01kling.html) indicate the direction for a merging.

But the present situation impacts on research programs, European scientific development, exchange of teachers and students, unification of European diplomas (in the schema of License, Master, Doctorate) and the visibility our sciences in a world that is more and more driven by simplistic and short sighted slogans. Better knowing ourselves is a first step towards that horizon. The second is to undertake practical cooperation at European level.

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