DR 08016

Letters and Scientific Communities

Anca Metiu
Anne-Laure Fayard

octobre 2008

ESSEC
CENTRE
DE RECHERCHE

- DR 08016 -

Letters and Scientific Communities

Anca Metiu and Anne-Laure Fayard***

Octobre 2008

[*] Professor, ESSEC Business School, metiu@essec.fr
[**] Polytechnic Institute of New York University Brooklyn, alfayard@poly.edu

Letters and Scientific Communities

Abstract:

We enter the debate about the possibility of collaboration and of rich exchanges among physically distant individuals by offering a literacy perspective on communication to show how the dimensions of writing enable the development of scientific communities. We illustrate this perspective with an analysis of the correspondences of one philosopher and one scientist – Descartes and Emilie du Chatelet, as well as with a description of one of the most prominent communities of scientists and philosophers in Europe, the Republic of Letters. Our findings show that writing is essential for the expression and exchange of ideas, abstractions, complex thoughts, demonstrations, arguments – in sum, for the entire scientific enterprise. We discuss the implications of the literacy perspective and of our findings for the current understanding of online intellectual communities.

Keywords: Orality and Literacy; Scientific Communities; Online Communities; Letters; Organizational Communication.

Résumé :

Nous suggérons que la théorie de la literacy est une perspective pertinente pour comprendre la coopération et les riches échanges entre des individus situés dans des géographies différentes et pour montrer comment les caractéristiques de l'écrit permettent le développement des communautés scientifiques dispersées. Nous illustrons cette perspective en analysant les correspondances d'un philosophe et d'une scientifique, René Descartes et Emilie du Châtelet, ainsi qu'en décrivant une des plus prestigieuses communautés de scientifiques et de philosophes d'Europe, La République des Lettres. Nous montrons que l'écrit est essentiel pour l'expression et l'échange d'idées, de concepts, de démonstrations, et d'arguments – en bref, pour l'ensemble de l'entreprise scientifique. Nous discutons les implications de notre théorie pour mieux comprendre les communautés scientifiques virtuelles actuelles.

Mots-clés : Oralité et lecture ; communautés scientifiques ; communautés virtuelles ; lettres ; communication organisationnelle.

JEL Classification : Z13

Introduction

The idea that writing is at the center of the scientific enterprise is intuitive and well-accepted (Latour and Woolgar, 1986). Indeed, communities of scientists and intellectuals emerged at the same time as the rise of the great systems of writing (Collins, 1998). For the most part of their existence, these intellectual communities have communicated via writing and especially through letters. For example, Darwin mailed more than 7,500 letters, and responded to 32 percent of the roughly 6,530 letters he received; also, Einstein sent more than 14,500 letters, received more than 16,200, and responded to only a quarter of them (Oliveira and Barabas, 2005).

In light of this idea, the current debates surrounding the possibility of collaboration and of exchange of complex, subtle ideas across distance seem surprising. While some praise communities for bringing together individuals regardless of their physical location, and providing support to people who otherwise wouldn't have had access to a group interested in similar things, thus arguing that online communities are *real* communities (Rheingold, 1993), still others consider online communities as less real, less strong in terms of human bonds than traditional, face-to-face communities (Stoll, 1995, Kraut et al., 1998, Nie et al., 2002).

We enter these debates by offering a literacy perspective on communication to show how the dimensions of writing enable the communication of complex ideas, as well as the building of real, though dispersed, communities. We illustrate this perspective with an analysis of the correspondences of one philosopher and one scientist – Descartes and Emilie du Chatelet, as well as with a description of one of the most prominent communities of scientists and philosophers in Europe, the Republic of Letters.

Our paper aims to make three contributions to the understanding of the role of

writing in the development and flourishing of scientific communities. First, it offers an explanation that is focused on the modality of communication – written vs. oral – as opposed to prevailing theories that focus on the medium of communication. Second, our work shows that strong relational communities can be build via writing. Furthermore, we show that dimensions of communities, at least in the case of scientific communities, are *better* accomplished in writing. Thus, our theory and findings also allows us to offer an explanation for the current success of online intellectual communities.

Scientific communities

In many ways, scientific communities epitomize the relational communities that stand in contrast with traditional, geography-based groups. As Durkheim (1964) remarked, in modern society communities form rather around interests and skills rather than around location. Relational communities form even when people interact in a non-regular fashion, and even may never meet (Gusfield, 1975). Members of scientific communities develop a sense of common affiliation based on their face-to-face and especially written interactions. According to McMillan and Chavis, communities "offer members positive ways to interact, important events to share and ways to resolve them positively, opportunities so honor members, opportunities to invest in the community, and opportunities to experience a spiritual bond among members" (McMillan and Chavis, 1986:14).

McMillan and Chavis (1986) have identified four main dimensions of relational communities. We quote their definition and elements:

> "The first element is *membership.* Membership is the feeling of belonging or of sharing a sense of personal relatedness. The second element is *influence*, a sense of mattering, of making a difference to a group and of the group mattering to its members. The third element is reinforcement: *integration and*

> *fulfillment of needs.* This is the feeling that members' needs will be met by the resources received through their membership in the group. The last element is *shared emotional connection,* the commitment and belief that members have shared and will share history, common places, time together, and similar experiences. This is the feeling one sees in farmers' faces as they talk about their home place, their land, and their families; it is the sense of family that Jews feel when they read *The Source* by James Michener (1965). In a sentence, the definition we propose is as follows: Sense of community is a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members' needs will be met through their commitment to be together (McMillan, 1976). (McMillan and Chavis, 1986: 9).

Scientific communities share these four characteristics. They are relational communities because the intense exchanges among their members create a sense of membership and of shared activity. They are also geared towards achieving influence over particular knowledge domains, as well as the fulfillment of members' needs for the advancement of knowledge. As occupational communities, scientific communities they are held together by the similarity in the nature of the work its members do, by the type of identity they draw from this work, as well as by the values and norms according to which they do this work (van Maanen and Barley, 1984). What is important is that members consider the community they belong to as a reference group, and act, more often than not, according to its norms (Van Maanen and Barley, 1984).

The norms of these communities are quite particular. For Merton (1968), science is organized according to an idealized model that strives to attain the Weberian ideal of meritocracy. To this end, these communities have been able to narrow enough the criteria for status achievement. The Mertonian "normative structure of science" defines a number of ideal norms and values which were legitimized by the scientific community. They are held to be binding and scientists are emotionally as well as rationally committed to them-they have moral force. The four sets of institutional imperatives that together constitute the scientific ethos are

universalism, communism, organized skepticism, and disinterestedness (Merton, 1968). Scientific communities are universal, hence dispersed, or virtual. In this sense, scientific communities are very much imagined communities (Anderson, 1991) whose members rarely, if ever see each other. While members of these communities try to meet face-to-face, their main interactions take place via writing.

Scientific communities and writing

Writing – in the form of journal articles, books, conference papers, and letters (and, more recently, emails) is a key activity of scientists. Furthermore, in spite of widely held views about the superiority of face-to-face communication in relaying complex information (Daft and Lengel, 1984, 1986), writing can be a very effective communication modality. In fact, writing can even be the preferred communication modality among scientists.

The history of artificial intelligence offers such an example (McCorduck, 1979). McCorduck quotes Alan Newell as saying, about a time when himself, Herbert Simon, and Cliff Shaw worked closely while being physically far away from each other: “It’s probably the case that the whole scientific enterprise with the three of us would never have worked out if we were all sitting in one place. Cliff found this way of working, with me located miles away, to be just about the right level of controlled interaction for him to flower. And so I operated both by letter and by telephone – by two and three hour-long conversations a week through this whole period – so in fact the three of use never got together, almost.” (McCorduck, 1979: 144). As this example shows, writing can be the preferred modality of communication as it allows the right amount of individual reflection. The quote also suggests that not only

interaction, but also distance ("controlled interaction") is needed for ideas to develop and flourish.

This example is by no means unique. The collaboration between Einstein and Cartan was similar in this respect, the two physicists exchanging numerous letters and meeting in person from time to time. More recently, scientific collaborations relying primarily on the writing modality have been flourishing. Thus, the open source software communities have been able to develop complex products such as Linux and Apache almost exclusively via emails and forum exchanges (Kogut & Metiu, 2001; Moon & Sproull, 2002; von Hippel & van Krogh, 2003). Also, some types of experimental biology (e.g., the Human Genome Project) are conducted successfully across distance: several labs working on distinct parts of the problem, with one lab generating an intermediate product (such as a cell line), and then sending it to another lab for further work (Walsh & Bayma, 1996). Also, the cognitive science community also relies successfully on writing (Schunn, Crowley, and Okada, 2001). In all these examples, while effort and expense was needed to overcome distance (Schunn et al., 2001), writing also had positive consequences for collaboration.

All these examples suggest that distant collaborations via writing – letters, email – can be more productive than face-to-face collaborations. The examples though raise the challenge of explaining their success in spite of the supposed limitations of the media – letters, emails – used by their members. Indeed, current theories of organizational communication, which tend to consider writing an impoverished medium, have trouble explaining these cases. These theories tend to focus on the technology, namely on the features of the various communication media that facilitate or – most often than not – impede the effective exchanges of ideas and the building of a community.

According to prevailing theories of organizational communication, the advantage of the new communication technologies – mostly writing-based – is that they reach more people and are retrievable. The negative side seems difficult to surmount though; most researchers argue that the absence of face-to-face communication is not conducive to the development of human bonds. Indeed, computer-mediated communication has been held to be a poor medium for the transmission of complex information when compared to the 'richer' face-to-face communication that uses rich, contextual, multi-layered via an array of verbal and non-verbal cues (Daft and Lengel, 1984, 1986; Short, Williams, & Christie, 1976). Computer-mediated communication was also found to be impersonal and destroying "real" communities primarily because the written medium did not have the spontaneity of face-to-face interactions, that it didn't allow the expression of emotions, that it didn't convey the contextual information that would allow the reader to interpret its content.

Clearly, a focus on technology, on the media of communication is not sufficient, as it is unable to explain the flourishing of scientific communities such as the Republic of Letters in the 17th century in Europe, or the globally-dispersed open source software communities. Thus, because the features of technology cannot satisfactorily explain the success of these communities, we need to switch our attention to a deeper level, that of the modality of writing. A focus on the underlying modality of writing – as contrasted with the oral, face-to-face modality – may give us a more deeply grounded explanation for the existence and success of dispersed scientific communities.

To put it simply, writing is intimately linked to scientific and, more generally, intellectual endeavors. Writing is crucial to the scientists and philosophers that were

part of the Republic of Letters, and the members of the cognitive science community. Individual or small group scientists had to keep track of their experiments and to write down the results of their experiments in order to reflect on them and to compare them with other results; they had to communicate them, via writing their results to faraway colleagues who, in their turn, would write back with comments and criticisms. Even when writing for one self, writing helps clarify one's thoughts and organize them, especially as one tries different solution to a particular problem.

The importance of writing to the development of science is such that Collins (1998) has argued that intellectual communities arose historically at the same time as public systems of writing. "What is needed is a social arrangement for writing texts of some length and distributing them to readers at a distance, an autonomous network of intellectual communication. As Goody and Watt (1968), Havelock (1982), and others have pointed out, writing enables one to transcend the immediate present; it is a gateway to abstraction and generality." (27).

Letters as the means of communication among distant scientists

Since the invention of writing until the invention of the telephone (around 140 years ago), whenever people could not communicate face-to-face (and even when they were proximate), they – including scientists – communicated via letters.
Especially for scientists, letters were an essential means for communication and for the further development of their ideas (Bazerman 1988).

Letters played a crucial role in the formation of communities of scientists and philosophers at a time when there were no institutions (such as journals) for the dissemination of knowledge (Collins, 1998). Never was the centrality of letters in the development and maintenance of scientific communities more important than in the

17th and 18th centuries in Europe, when The Republic of Letters flourished. The term Republic of Letters designates the networks of philosophers and scientists who, starting with the 2nd half of the 16th century until the end of the 17th century, communicated their ideas mostly via letters, using a intricate system of intermediaries. It is important to note also that intellectuals communicated a lot via writing even when they were collocated, such that when they met face-to-face, these intellectuals may not communicate anything new to one another, the ideas are in their books and letters.

The letters exchanged within this community were important both for the development of their members' ideas and works, as well as for the creation of institutions. Thus, it has been shown that because at the time of Descartes there were no societies, no newspapers or journals, his letters were even more important in the clarification, discussion and diffusion of ideas (Beyssade and Beyssade, 1989).

Furthermore, letters exchanged by the members of The Republic of Letters represented the foundation for the creation of journals of learned societies. For example, the earliest issues of the journal *Philosophical Transactions of the Royal Society* were largely a summary of the correspondence of Oldenburg (the secretary of the Royal Society) (Bazerman, 1988).

The Mersenne network

In this section, we will focus on the Mersenne network of correspondents. Mersenne was considered by Thomas Hobbes as "the axis around which planets were revolving" on the basis of the impressive correspondence he conducted with the main

intellectuals of his epoch – the Enlightenment.[1] Mersenne (1588-1648) was a Jesuit priest who lived most of his life in his Parisian monastery, apart from 4 short study journeys (1629-1630 to Holland, 1639 to the east of France, 1644-1645 to Provence and Italy, and 1646-1647 to the West and South-West of France).

Mersenne was a scholar, and his 17 volume Correspondence (published between 1932 and 1988) reveals the immense range of his correspondents. The 1135 letters contain 330 written by Mersenne and 805 received by him from about 100 correspondents. While almost half of the letters he received came from France, his other correspondents were scattered all over Europe. He maintained an important correspondence with Constantin Huygens (Holland), with theologian Andre Rivet (Holland), with the mathematician Evangelista Torricelli (Italy), with the German Theodore Haak who had sought refuge in England. Table 1 lists the correspondents who wrote to Mersenne at least 10 letters, and Table 2 lists the individuals to whom Mersenne wrote at least 10 letters.

Table 1. Letters to Mersenne (correspondants who wrote at least 10 letters)

Jean-Baptiste Baliani	21
Claude Bredeau	27
Robert Cornier	15
Rene Descartes	145
Theodore Deschamps	30
Jean-Baptiste Doni	24
Pierre de Fermat	37
Jean-Baptiste van Helmont	14
Constantin Huygens	21
Nicolas-Claude Fabri de Peiresc	27
Gabriel Thibaut	14
Evangelista Torricelli	11
Christophe Villiers	49

[1] The data presented in this section draws on Hans Bots' chapter "Martin Mersenne, 'Secretaire General' de la Republique des Lettres (1620-1648) in the book edited by Berkvens-Stevelink, Bots, & Haseler *Les grands intermediaries culturels de la Republique des Lettres. Etudes de reseaux de correspondences du XVIeme au XVIIIeme siecles*, Honore Champion, Paris 2005.

Table 2. Letters by Mersenne (correspondents to whom he wrote at least 10 letters).

Johan Buxtorf	10
Theodore Haack	19
Johann Hevelius	10
Constantin Huygens	11
Nicolas-Claude Fabri de Peiresc	31
Andre Rivet	77
Samuel Sorbiere	10
Evangelista Torricelli	19

Figures 1, 2 and 3 portray the geographical expanse of Mersenne's correspondents. Over 60% of letters were written by mathematicians, medical doctors, astronomers, physicists, and philosophers. A very small number of Mersenne's letters have been conserved. The correspondent with whom Mersenne seems to have exchanged most letters was Descartes, who wrote 145 letters, while only 5 letters of Mersenne to Descartes have been found. Mersenne's main contribution to his epoch was to vulgarize the new philosophy (especially the ideas of Descartes and Galileo) to his contemporaries. From the beginning, he wanted to make their work accessible to the larger public. He also thought that the advancement of science required collective work. This goal, he thought, was to create an academy of scientists much larger than the small circle of friends who were passionate about mathematics. In a letter to Peiresc from July 15, 1635 he expresses this idea: "I would like to have such a peace that we could build an Academy, not just in one city as is the case here and there, but if not of all Europe, at least of the entire France, which would communicate by letters, which will be better than the talks where one gets often too excited in disputing the proposed opinions …"

In the pursuit of this goal, from the 1620's, Mersenne sought a community of scholars where the political, religious, and scientific differences didn't matter. In 1635 he becomes the initiator of *Academia Parisiensis* which brought together the scholars such as Blaise Pascal and his father Etienne, the mathematicians Claude

Mydorge, Claude Hardy, Gilles Personne de Roberval and Pierre Fermat. This academy was informal and without a clear statut.

Mersenne's network of correspondents formed the basis on which both the French Academy of Sciences and the English Royal Academy were formed in 1660. In this way, Mersenne's 'republic of letters' provided the organizational hub for many generations of modern Western philosophy (Collins, 1998: 5).

The Mersenne network of correspondents reveals the importance of letters in the building and sustaining of an intellectual community that transcended face-to-face contexts. In a harsh intellectual environment – Europe's rulers were largely despots – these correspondence networks provided a vehicle for creating and maintaining an international community and evaded the more obvious effects of surveillance and censorship. At the same time, they succeeded – largely through the work of such great intermediaries such as Mersenne and Peiresc (see Figure 4 for a portrayal of the geographical expanse of the de Peiresc correspondents) – to focus on science, and to feel they were members of the same community.

Begun as a network of private correspondence, the Republic of Letters expanded greatly, as it evolved into a network that spanned Europe and involved thousands of individuals. This republic of letters was, in a very literal sense, formed on the basis of the letters exchanged among their members, often through the intermediary of strong nodes such as Mersenne. Although it was focused heavily on Paris and the provinces, Mersenne's network dominated the second quarter of the seventeenth century. Its importance was in cutting across national and religious boundaries that traditionally divided France, Belgium, England, Germany, Holland, and Italy. There were others as well, the Dupuy brothers whose network was more literary, or Nicolas- Claude Fabri de Peiresc (1580-1637) who left between 10,000-

14,000 scholarly letters and who gained international reputation while living in the South of France.[2]

The Republic of Letters as a relational community

The amount of activity in the Republic of Letters, the achievements of its members, its influence over the development of European science are impressive. The Republic of Letters was a real relational community (McMillan and Chavis, 1986). Thus, the first and fourth dimensions – membership and shared shared emotional connectivity – are amply illustrated by the Republic of Lettters. The philosophers and scientists who were corresponding felt they were belonging to the same community, regardless of geographical distance and social distinctions. Thus, Erasmus (1469-1536) considered himself stateless, a citizen of the world. At the same time, he felt he belonged to the community of learned people of his time. In a letter to another humanist, he wrote "among those who promote learning, regional distinctions are unimportant" because "every person who has been initiated in the Muses cults are my compatriots." (Berkvens-Stevelinck, 2005). In fact, Erasmus wanted to help build a society in which people would share a brotherly spirit and would be united by common studying. Thus, the members of the Republic of Letters had a commitment to their community, and shared similar goals, and expected to have similar experiences. They felt strongly about their community that offered a respite from a world of conflict and strife. They felt the community was their true home, regardless of the place of birth and the vagaries of history.

The second dimension of relational communities, influence, is strongly and amply illustrated within the Republic of Letters. Thus, the ideas expressed in letters

[2] For details on de Peiresc correspondence, see http://www.clas.ufl.edu/users/rhatch/pages/11-ResearchProjects/peiresc/06rp-p-corr.htm

influenced the correspondents' thinking and further work, as we will show in the analysis of the correspondence between Descartes and Princess Elisabeth. Because writing leaves a trace, written ideas can have a longer-lasting impact than orally expressed thoughts. Similarly, the analytical precision of written arguments leads to more convincing contentions, and thus to more durable influence. As we will show below, Mme du Chatelet attempt to establish ownership of her ideas is also an instance of a scientist trying to exert influence over her community.

The third dimension of relational communities, integration and fulfillment of needs, is obviously a strong feature of the Republic of Letters. The vast network of letter-writers provided correspondents with the information and sometimes the feedback they needed on their ideas Again, the correspondence between Descartes and Princess Elisabeth is a case in point, as we will show in the next section. At the same time, the case of Emilie du Chatelet illustrates how letters allowed her to participate in the intellectual communities of her time and thus fulfill her need for knowledge, and the need to share her own knowledge. From its creation in 1666 until 1979, the Paris Academy of Sciences did not include women as full members. Although formal statutes did not bar the admission of women, a firmly established tradition of excluding them from the prestigious institution existed for more than three centuries. However, during this period several women did make significant contributions to science. Through the use of letters, du Chatelet (and other women) managed to participate in the scientific community. Furthermore, she became a key character in the scientific community of her time, through her books, but most of all through her letters who allowed us to get in contact with many famous scientists. An analysis of her correspondence shows that she was corresponding with 9 famous scientists (Bonnel, 2000). Thus, du Chatelet's letters illustrate how letter writing

offered women a way to express themselves and access to domains forbidden before (e.g. science, philosophy) and share knowledge and thus fulfill her need for knowledge..

The above analysis shows that scientific communities such as the Republic of Letters, while relying almost exclusively on written communication, had all the features of relational communities. It also shows how the dimensions of writing play a role in the enactment of the community features.

Thus, writing is intimately bound both with the scientific enterprise, and with the ability to cooperate across distance. At the same time, we miss a theory that would explain the reliance of communities that excel at intellective tasks on writing – whether it takes the form of letters or online communication. Literacy[3] theory comes to fill this gap.

A literacy perspective on scientific communities

We use literacy theory as the overarching framework for understanding the role of writing in the development and flourishing of scientific communities. A series of communication theorists have shown how writing represents a technology that has profoundly changed the way our cognitive abilities, our personal interactions, and the organization of society (e.g. Bolter, 2001; Goody, 1987; Havelock, 1963; Ong, 1982). In other words, literacy has had an impact both on the development of the self, of individuality (because it requires quiet time in front of the clay tablet, piece of paper), as well as the development of community (by uniting more people who otherwise could not have been in contact with one another).

[3] "Literacy" in this context is not used to refer to a specific level of accomplishment in the use of written words, but to the existence of a system of writing (including the written words, as well the teaching of this system).

Analytically, we can use the four dimensions of writing that make it different, but complementary to the oral modality of communicating (Fayard and Metiu, 2008), to analyze the correspondences among scientists. The first main dimension of writing is objectification, which refers to the trace left by every written document, as well as to the fact that this trace becomes an object that can be further shared, distributed, re-read, thought about, modified. Objectification is an intrinsic feature of writing, and it enbles the other three dimensions. The second dimension is analytical precision (Ong, 1982). As Goody (1977; 1987) has argued, writing was needed for the development of logic and mathematics because of the difficulty of expressing orally complex ideas. Building scientific arguments, point by point, formulating intricate arguments, addressing the criticisms raised by a colleague all can be done better in writing. The third dimension of writing is reflectivity, which refers to the writer's ability to take time to think about what she writes, to play with various ideas as she thinks and/or writes, as well as to the increased introspectivity that accompanies writing (Ong, 1982). Reflectivity fosters the nuanced expression of ideas and of emotions in writing. Finally, fictionalization refers to the strong relationship that forms between writers and readers, especially in correspondences (Altman, 1982; Ong, 1982). The fictionalization process is dual, implying both the carving of one's writing to the needs of her readers, and the readers' interpreting the written words based on the image they have about the writer.

The literacy theory outlined above suggests that orality and literacy can only be understood in relation to each other. Furthermore, the four interrelated dimensions of writing explain the possibility of collaborating on complex ideas and of building strong relationships while communicating in writing. Because the literacy theory operates at the deep level of the modality (as opposed to the more surface level of the

medium), its explanatory power extends to all written communication – letter-writing, emails, online forums.

The dimensions of writing in scientific correspondences

In the following section we perform a qualitative analysis of the discourse in two sets of correspondents, the published correspondences of two prominent members of the Republic of Letters – the philosopher Rene Descartes (1596-1650) and the scientist Emilie du Chatelet (1706-1749) – to show how the dimensions of writing, as evidenced in their abundant letters, enabled them to be part of the intellectual communities of their time. (Please see the Appendix for a short biography of the authors, as well as for a short overview of their work.) Our analysis led to the emergence of the four dimensions of writing outlined above. We iterated several times between the findings from our analysis and the ideas put forth in theories of literacy to arrive at the four main dimensions of writing presented below. Our analysis demonstrates the usefulness of the literacy framework for understanding how writing supports the exchange of ideas and the development of scientific communities.

Objectification

In contrast with oral expression, writing and letters provide a trace. They allow multiple readings and thus facilitate understanding. In a letter dated May 21, 1643, Descartes writes to Princess Elisabeth of Bohemia, who was interested in his philosophy and with whom he had a lengthy correspondence: “and your mercy wanted to comfort me by leaving me the traces of your thought on a piece of paper, where I read them several times, and in getting used to think about them, I am less astounded, but I have even more admiration…” Descartes here expresses clearly the idea that through several readings of the same letter(s), he arrives at a deeper

understanding of his correspondent's thoughts. Because of the fixedness of writing, letters objectify ideas and allow intellectuals to develop and debate ideas, and members of distributed organizations to exchange ideas and explain the rationale for their actions to the headquarters.

Writing is permanent, therefore leaving a trace that allows for an ongoing dialogue. One consequence of letters' fixedness is that they can be used as proofs of one's ideas. For example, in the development of scientific thinking, letters can be used to support scientists' claims. When her argument with Mairan, another scientist, becomes public, Madame du Châtelet turns to her scientific correspondence for support. On March 22, 1741 she writes to her friend, the famous scientist Maupertuis, "You are the only one who knows whether it is Mr. De Koenig or I who critiqued Mr. De Mairan's dissertation, because I wrote to you at St. Malo in 1738, long before I knew Koenig even existed, almost the same things about it that are in my book". Letters provide solid proof on one's thinking.

Mainly, writing objectifies ideas such that they can be shared and then further discussed (in writing) with others. Furthermore, the written word is performative; i.e., it has important effects for those concerned. The trace left by the written word allows the writer to verify the accuracy of her understanding. Also, because the reader can always go back to check the written text, the recipients can re-read the letter and thus understand it better; the reader can also repeat the experience of connecting to the writer. Recipients can also share the letters with third parties, in part or in their entirety, which has strong consequences for the formation of communities as well as for the dissemination and the further development of the ideas expressed in the letters.

Analytical precision

Letters' written and asynchronous character allows them to become scaffolding spaces in which scientists and philosophers can develop their thoughts and clarify their ideas via multiple drafts. In the absence of gaze and facial expressions that provide feedback to a speaker, a writer has to make herself understood by being careful in the choice of words and the building of sentences. Furthermore, the lack of existential context leads the author to anticipate and address audience questions and concerns. The result of such effort is precision, sharpened analysis, and the development of ideas. For example, the scientific letters of Madame du Châtelet present an informal style and a sometimes chaotic flow, as well as numerous changes and corrections (Bonnel, 2000).

The analytic precision afforded by letters is probably most obvious in the case of scientific formulas that would be difficult if not impossible to state orally. For example, some of the letters between Elisabeth and Descartes include mathematical demonstrations that could not be done orally. The scientific and philosophical letters exchanged by Elisabeth and Descartes provide a propitious medium for articulating, formulating, and synthesizing knowledge; these letters contain philosophical arguments that are very well articulated, sometimes over nine pages. It would be difficult if not impossible to sustain such prolonged trains of thoughts in the absence of writing (Havelock, 1963; Goody & Watt, 1963).

Letter writing also provides correspondents with an opportunity to push each other to defend and develop their ideas. Many theories have been developed as a response to a query from knowledgeable correspondents. In this sense, letters constitute a realm for knowledge generation and development, a scaffolding space for the construction of new ideas and theories. For example, the whole correspondence between Princess Elisabeth and Descartes led him to develop his moral theory

presented in *The Passions of the Soul.* As Descartes starts answering Elisabeth's questions about the nature of the soul, and clarifying his previous work, he develops an explanation and the correspondence becomes work. Hence, when the Queen Christine of Sweden asks him for his moral theory, he sent her his correspondence with Princess Elisabeth telling her that they were the draft of his book on ethics.

As the examples above show, writing's analytical precision allows the clear and nuanced articulation and development of complex ideas. Because it is a solitary activity, writing permits more time to elaborate and change things than speech does. Thus, in contrast to the predictions of media theories, writing facilitates understanding and can clarify ambiguities by providing detailed explanations of actions and ideas. It also allows the expression of abstract thoughts and formulas, and therefore can support the development of complex ideas and theories. At the same time, letter-writing is interactive, and the correspondents can ask for clarifications and elaborations that extend the analytical preciseness of the letters. Writing, just as media richness theories purport, may not be able to provide as rich and as fast a feedback as oral communication. However, as we have shown, writing supports the transmission of rich information on ideas. Furthermore, in situations requiring complex and abstract explanations writing can do even more than speech in terms of expressing and developing complex, subtle ideas.

Reflectivity

The same as language plays a key role in the formation of the self (Bazerman, 1988; 2001), letter writing is key to the development of personally meaningful knowledge. Throughout their entire correspondence, Elisabeth asks Descartes many questions as she tries to make sense of his theory and assumptions, and she regularly thanks him for helping her understand and become more knowledgeable. The

correspondence also helped Descartes clarify his ideas on the question of the union of the body and the soul as it led him to complement and deepen his theories. Reflectivity allows Descartes to use the ideas from his correspondents to question his original ideas, advance them, and develop new theories.

Letters also provide a space to develop one's individual self, through the enactment of different identities. For example, Elisabeth takes the role of a princess, but also a student, and Descartes becomes alternately a philosopher, a mathematician, a tutor, and a personal adviser.

The above examples show that letter writing provides people with a space in which they can reflect on their ideas, to explore, deepen, and modify them, to turn them into coherent accounts. In contrast with prevailing tendencies towards extolling the virtues of oral communication and immediate feedback (Daft & Lengel, 1986; Short et al., 1976), the reflectivity dimensions points out the advantages of being alone in front of the page. At the same time, letter writing is not an isolated phenomenon, but a dialogue between the writer and the fictionalized other, through which the writer clarifies her thoughts and emotions for her reader.

Fictionalization

In order to make themselves understood by a distant reader who might not have all the contextual information to correctly interpret the written words, writers adapt their message to the image they hold of the reader. In letters, the fictionalization process is stronger than in other types of writing and is essential in supporting a continuous and lively dialogue (Altman, 1982). The letters of Descartes with Princess Elisabeth provide a striking example of such a dialogue (Beyssade and Beyssade, 1989). While Princess Elisabeth often refers to how she thinks Descartes will interpret her questions, Descartes often comments on how his replies might be understood by

Princess Elisabeth. For example, on August 18, 1645, Descartes writes to Princess Elisabeth, explicitly imagining and referring to the time she will take to read his letter: “as [my letters] do not include any news that you need to read promptly, nothing will trigger you to read them when you have other things to”. It is through such shaping of one’s written discourse, that is adapted to the partner’s understanding, that letters become privileged vehicles for the sharing and development of knowledge.

Our analysis of the correspondences of two prominent members of the Republic of Letters shows how the dimensions of writing – objectification, analytical precision, reflectivity and fictionalization – allow the sharing of nuanced, precise, detailed, well thought-out arguments, as well as their further development, and refinement.

Thus, we showed that writing is instrumental to the development of science. At the same time, writing also affords the basic conditions for community building. In contrast with views stating that orality is more conducive to community while literacy is more conducive to the development of individual ego and thought (Ong, 1982; Bolter, 2001), we show that in scientific communities, the importance of orality is reduced because writing is so intimately linked with the development of science.

Discussion

Our main goal in this paper was to show how the dimensions of writing – objectification, analytical precision, reflectivity, and fictionalization – enabled the development of scientific communities. As we showed above, writing is essential for the expression and exchange of ideas, abstractions, complex thoughts, demonstrations, arguments – in sum, for the entire scientific enterprise.

We also showed that one of the main scientific communities – the Republic of Letters – that relied primarily on letters for the exchange of ideas, was a real relational community whose members felt strongly about the group of connected intellectuals as they tried to fulfill their needs for learning and to influence the ideas of their time. In fact, some of the main dimensions of relational communities – specifically, influence and integration and fulfillment of needs – are better done via writing. It is hard to imagine that a physicist could affect the further development of his domain while arguing orally various points and theories. What matters for gaining influence in these communities is the writing (of books, of letters).

Thus, the literacy perspective proposed in this paper can help us explain the current flourishing of online scientific communities. Indeed, for many of these scientists, little of substance has changed with the advent of communication technologies: they were already part of transnational communities that communicated largely in writing. Similarly to Republic of Letters members whose correspondences allowed them to share ideas and feelings that would have been very dangerous if printed (some of the topics they wrote about in letters could be printed only 100 years later) (Hatch, 1998), nowadays grass-roots and radical organizations are using the web to proselytize and organize. Also, similarly to the way letters offered access to public space to women in the 18th century, current discussion forums allow women to participate in collaborative efforts largely male-dominated (Metiu and Obodaru, 2008). Another important similarity refers to the role of intermediaries. Individuals such as Mersenne, while not the most creative community members, played central roles in the network; similarly, moderators and forum founders are nowadays key to the functioning of online communities (Fayard et al., 2004).

What did change with the advent of information technology is the expanse of these communities, and the speed with which electronic communication exchanges take place. For example, nowadays a scientist or software developer or whatever can post a question to “everyone” (who has an Internet connection) and get an answer.

References

Altman, J. Gurkin. *Epistolarity: Approaches to a form.* Columbus: Ohio State University Press, 1982.

Anderson, B. *Imagined Communities*. London: Verso, 2001.

Bazerman, C. *Shaping written knowledge: The genre and activity of the experimental article in science*. Wisconsin: The University of Wisconsin Press, 1988.

Berkvens-Stevelink, C. "Introduction," in Berkvens-Stevelink, Bots, H. and J. Haseler (eds.), *Les grands intermediaries culturels de la Republique des Lettres. Etudes de reseaux de correspondences du XVIeme au XVIIIeme siecles*, Honore Champion, Paris 2005.

Beyssade, J. M., & Beyssade, M. (Eds.) *Correspondance avec Elisabeth et autres lettres*. Paris: Flammarion, 1989.

Bolter, J. D. *Writing space: Computers, hypertext and the remediation of print*. (2nd ed). Mahwah, NJ: Lawrence Erlbaum, 2001.

Bonnel, R. 2000. "La correspondence scientifique de la marquise Du Châtelet: La 'lettre-laboratoire, " in Silver, M-F., & Girou Swiderski, M-L. (Eds.), *Femmes en toutes lettres: Les épistolières du XVIIIème siècle*. Oxford: Voltaire Foundation.

Bots, H. "Martin Mersenne, 'Secretaire General' de la Republique des Lettres (1620-1648) " in Berkvens-Stevelink, Bots, H. and J. Haseler (eds.), *Les grands intermediaries culturels de la Republique des Lettres. Etudes de reseaux de correspondences du XVIeme au XVIIIeme siecles*, Honore Champion, Paris 2005.

Collins. *A Global Theory of Intellectual Change*. Belknap Press, 1998.

Daft, R. L., & Lengel, R. H. 1984. "Information richness: A new approach to managerial information processing and organization design." In Staw, B., & Cummings, L.L. (Eds.), *Research in organizational behavior*, 6: 191-233. Greenwich, CT: JAI Press.

Daft, R. L., & Lengel, R. H. 1986. "Organizational information requirements, media richness and structural design," *Management Science***,** 32: 554-571.

Descartes, R. *Correspondance avec Elisabeth et autres lettres***.** Paris : Flammarion, 1989.

Durkheim, E. (1964). *The division* of *labor in society*. New York: Free Press of Glencoe. (Original work published 1893).

Fayard, A-L., DeSanctis, G., and Roach, M. 2004. "Language Games in Online Forums," In D. H. Nagao (ed.) *Proceedings of the Sixty-Third Annual Meeting of*

the Academy of Management.

Fayard and Metiu, 2008. "Beyond Orality and Literacy: Letters and Organizational Communication, "working paper, ESSEC Business School.

Goody, J. *The domestication of the savage mind*. London: Cambridge University Press, 1977.

Goody, J. *The interface between the written and the oral***.** London: Cambridge University Press, 1987.

Goody, J., and Watt, I. (1963). "The consequences of literacy," *Comparative Studies in Society and History*, 5: 304-45.

Havelock, E. A. *Preface to Plato***.** Cambridge, MA: Harvard University Press, 1963.

Gusfield, J. R. *The community: A critical response.* New York: Harper Colophon, 1975.

Hatch, Robert A. 1998. "Peiresc as Correspondent: The *Republic of Letters* & the Geography of Ideas." *Science unbound: Geography, space, discipline,* (Chpt. 1) Umeå, 1998.

Kogut, B., & Metiu, A. (2001). Open-source software development and distributed innovation. *Oxford Review of Economic Policy*, 17: 248-264.

Kraut, R. E., Patterson, M., Lundmark, V., Kiesler, S., Mukhopadhyay, T., & Scherlis, W. (1998). Internet paradox: A social technology that reduces social involvement and psychological well-being? *American Psychologist*, *53* , 1017, 1998.

Latour, B. and S. Woolgar. *Laboratory Life: The Construction of Scientific Facts*. Princeton: Princeton University Press, 1986.

McCorduck, Pamela. *Machines Who Think: A Personal Inquiry into the History and Prospects of Artificial Intelligence*. A. K. Peters: 2004.

McMillan, D.W., and D.M. Chavis (1986). Sense of community: A definition and theory. *American Jouranl of Community Psychology*, 14: 6-23.

Merton, Robert K. (1968). "The Matthew Effect in Science," *Science* 159: 56-63.

Metiu, A. and O. Obodaru (2008). "Women's Professional Identity Formation in the Free/Open Source Software Community," Working paper, ESSEC Business School.

Moon, J. Y., & Sproull, L. 2002. "Essence of distributed work: The case of the Linux kernel." In Hinds, P. & Kiesler, S. (Eds.)**,** *Distributed Work: New Research on Working Across Distance using Technology*: 381-404. Cambridge, MA: MIT Press.

Nie, N., D.S. Hillygus, and L. Erbring. 2003."Internet Use, Interpersonal Relations and Sociability: A Time Diary Study" in Wellman and Haythornthwaite (eds.), *The Internet in Everyday Life*. Oxford: Blackwell Publishers.

Oliveira, J. G., & Barabas, A.-L. (2005). "Human dynamics: Darwin and Einstein correspondence patterns," *Nature,* 435: 1251.

Ong, W.J. *Orality and literacy*. New York/London: Routledge, 1982.

Schunn, C. D., Crowley, K., & Okada, T. (2002). What makes collaborations across a distance succeed?: The case of the Cognitive Science community. In P. Hinds & S. Kiesler (Eds.), *Distributed Work*. Cambridge, MA: MIT Press.

Short, J.A., Williams, E., and Christie, B. *The social psychology of telecommunications.* New York: John Wiley & Sons, 1976.

Stoll, C. *Silicon Snake oil: Second Thoughts on Information Technology*. New York: Doubleday, 1995.

Van Maanen, J., and S.R. Barley (1984). Occupational communities: Culture and control in organizations. In Staw, B.M. and L.L. Cummings (Eds.), *Research in organizational behavior* vol. 6, pp. 287-365). Greenwich, CT: JAI.

Von Hippel, E. G., and von Krogh, G. (2003). "Open Source Software and the "Private-Collective" Innovation Model: Issues for Organization Science, " *Organization Science*, 14: 209-223.

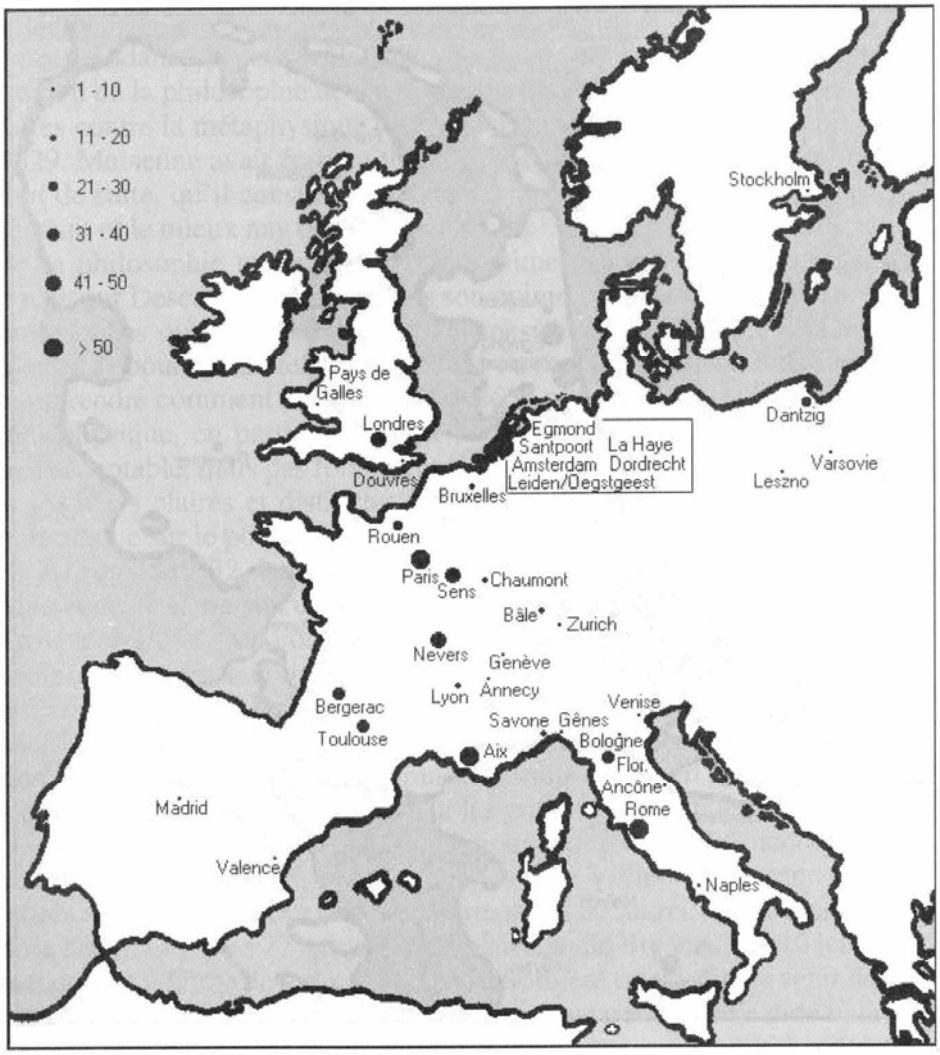
Walsh, J. P., & Bayma, T. (1996). "Computer networks and scientific work," *Social Studies of Science*, 26: 661-703.

Appendix. Biographies of the scientists whose correspondences we analyze.

René Descartes (1596-1650) was a highly influential French philosopher, mathematician and scientist. He is sometimes referred to as the "Founder of Modern Philosophy" and the "Father of Modern Mathematics". Much of subsequent Western philosophy is a reaction to his writings. His influence in mathematics is reflected in the Cartesian coordinate system used in plane geometry and algebra being named after him. He was one of the key figures in the Scientific Revolution. Out of 11 volumes of works, five contain his correspondence. The letters are not only appendices and annotations, but are actually part of the Cartesian philosophical enterprise. His correspondence with the Princess Elisabeth which triggered the writing of the *Passions of the Soul* illustrates perfectly the role of letters in the development of his work (Beyssade and Beyssade, 1989). We read the complete correspondence of René Descartes with Princess Elisabeth from May 16, 1643 to December 4, 1649, published in *Correspondance avec Elisabeth* (57 letters in total).

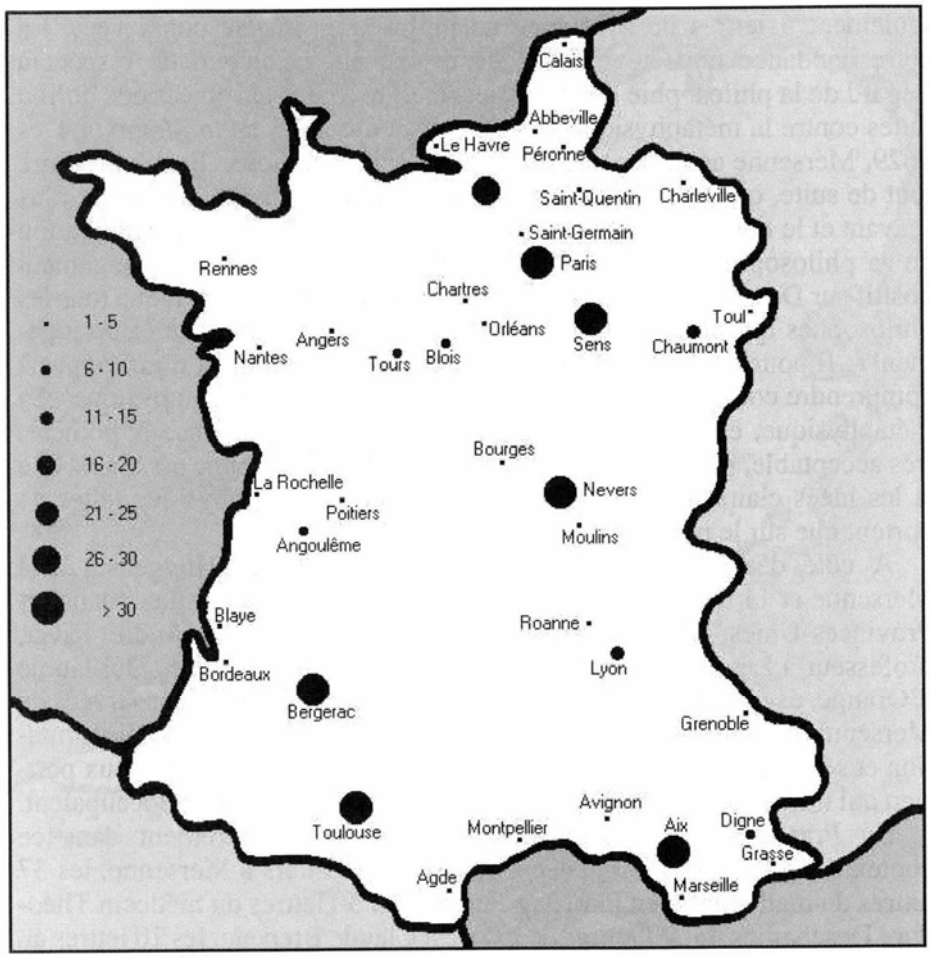
Emilie du Châtelet (1706-1749) was one of the first women scientists in Europe, a physicist, mathematician, translator and essayist whose greatest work was to translate from Latin to French, and to comment Newton's "Principia". Her extensive correspondence with Voltaire, Maupertuis, and many others served as laboratory for experimenting with ideas, hypotheses and theories (Bonnel, 2000). Our analysis is based on excerpts of the scientific correspondence of Emilie du Châtelet as reproduced in Bonnel, 2000.

Figure 1. The Mersenne network.



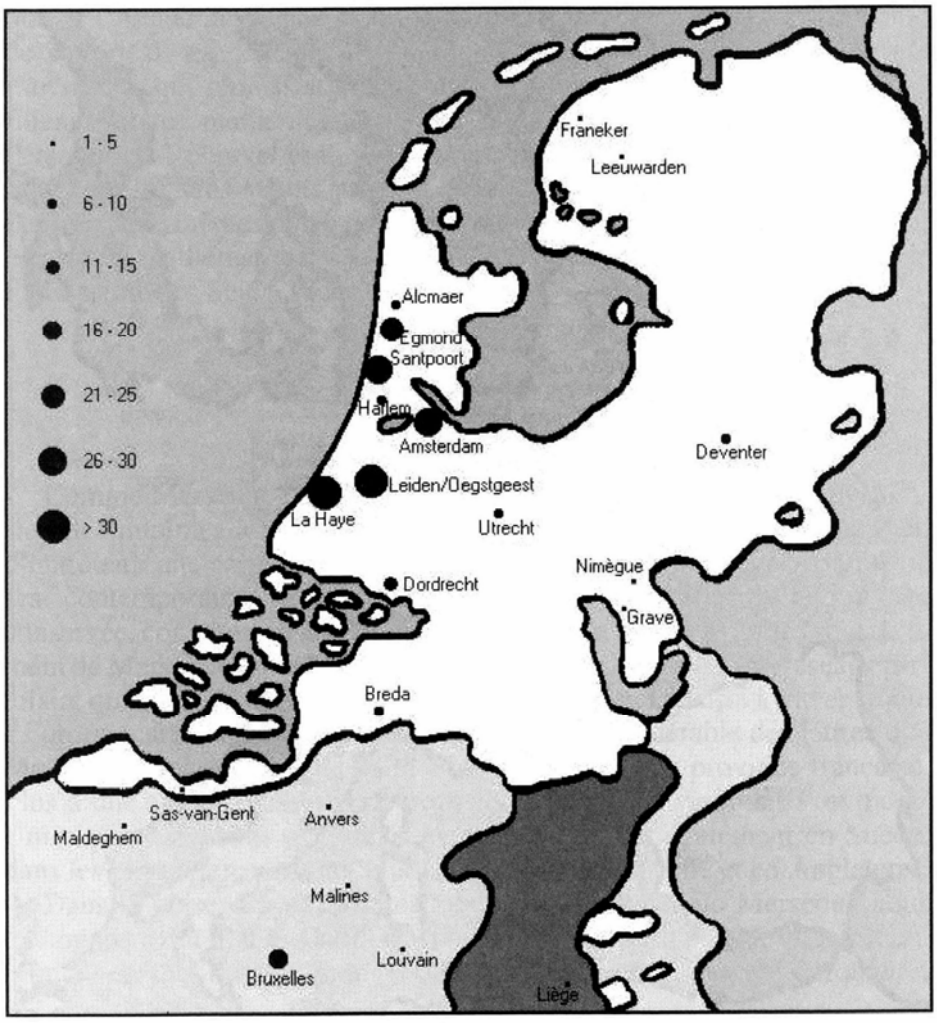
Carte 1: Pour la France et les Provinces-Unies on indique seulement les lieux où ont résidé des correspondants dont on a conservé au moins dix lettres (de ou à Mersenne).

Figure 2. French cities in which resided Mersenne's correspondents.



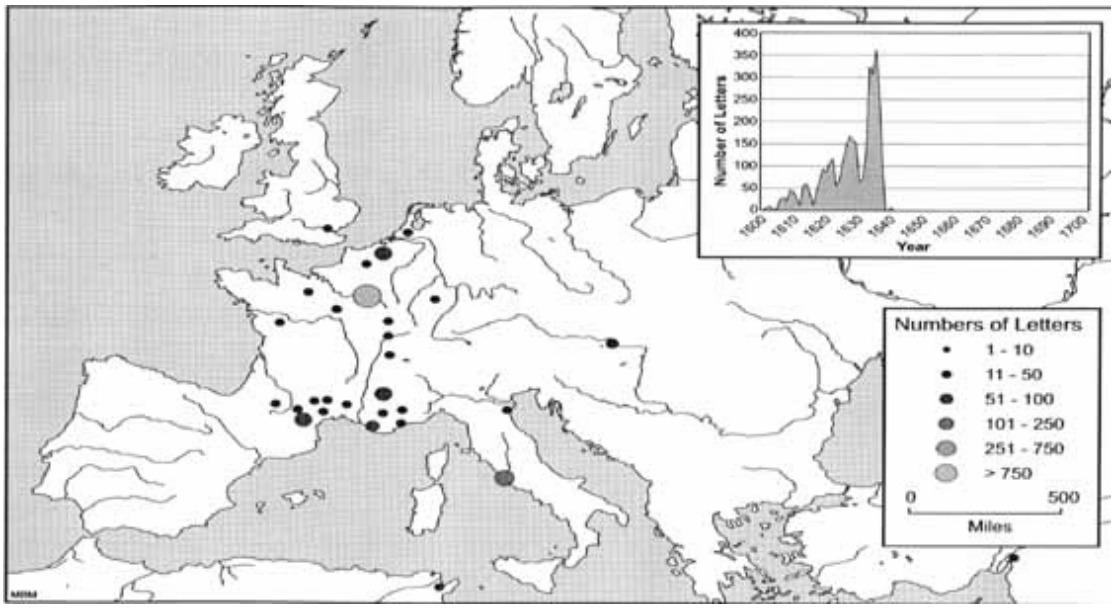
Carte 3: Villes françaises où ont résidé des correspondants de Mersenne.

Figure 3. Dutch cities in which resided Mersenne's correspondents.



Carte 2: Villes néerlandaises où ont résidé des correspondants de Mersenne.

Figure 4. De Peiresc network.



The figures above represent Peiresc's *published letters* (3,200) from all known published sources for the years 1598-1637. As explained above, these figures do not include known manuscript letters that remain unpublished nor do they include letters known to have been sent but are now presumed lost. Cities with fewer than 5 letters are not represented.

Source: http://www.clas.ufl.edu/users/rhatch/pages/11-ResearchProjects/peiresc/06rp-p-corr.htm

ESSEC

CENTRE
DE RECHERCHE

LISTE DES DOCUMENTS DE RECHERCHE DU CENTRE DE RECHERCHE DE L'ESSEC
(Pour se procurer ces documents, s'adresser au CENTRE DE RECHERCHE DE L'ESSEC)

LISTE OF ESSEC RESEARCH CENTER WORKING PAPERS
(Contact the ESSEC RESEARCH CENTER for information on how to obtain copies of these papers)

RESEARCH.CENTER@ESSEC.FR

2004

04001 ***BESANCENOT Damien, VRANCEANU Radu***
Excessive Liability Dollarization in a Simple Signaling Model

04002 ***ALFANDARI Laurent***
Choice Rules Size Constraints for Multiple Criteria Decision Making

04003 ***BOURGUIGNON Annick, JENKINS Alan***
Management Accounting Change and the Construction of Coherence in Organisations: a Case Study

04004 ***CHARLETY Patricia, FAGART Marie-Cécile, SOUAM Saïd***
Real Market Concentration through Partial Acquisitions

04005 ***CHOFFRAY Jean-Marie***
La révolution Internet

04006 ***BARONI Michel, BARTHELEMY Fabrice, MOKRANE Mahdi***
The Paris Residential Market: Driving Factors and Market Behaviour 1973-2001

04007 ***BARONI Michel, BARTHELEMY Fabrice, MOKRANE Mahdi***
Physical Real Estate: A Paris Repeat Sales Residential Index

04008 ***BESANCENOT Damien, VRANCEANU Radu***
The Information Limit to Honest Managerial Behavior

04009 ***BIZET Bernard***
Public Property Privatization in France

04010 ***BIZET Bernard***
Real Estate Taxation and Local Tax Policies in France

04011 ***CONTENSOU François***
Legal Profit-Sharing: Shifting the Tax Burden in a Dual Economy

04012 ***CHAU Minh, CONTENSOU François***
Profit-Sharing as Tax Saving and Incentive Device

04013 ***REZZOUK Med***
Cartels globaux, riposte américaine. L'ère Empagran ?

2005

05001 ***VRANCEANU Radu***
The Ethical Dimension of Economic Choices

05002 ***BARONI Michel, BARTHELEMY Fabrice, MOKRANE Mahdi***
A PCA Factor Repeat Sales Index (1973-2001) to Forecast Apartment Prices in Paris (France)

05003 ***ALFANDARI Laurent***
Improved Approximation of the General Soft-Capacitated Facility Location Problem

05004 ***JENKINS Alan***
Performance Appraisal Research: A Critical Review of Work on "the Social Context and Politics of Appraisal"

05005 ***BESANCENOT Damien, VRANCEANU Radu***
Socially Efficient Managerial Dishonesty

05006 ***BOARI Mircea***
Biology & Political Science. Foundational Issues of Political Biology

05007 ***BIBARD Laurent***
Biologie et politique

05008 ***BESANCENOT Damien, VRANCEANU Radu***
Le financement public du secteur de la défense, une source d'inefficacité ?

2006

06001 ***CAZAVAN-JENY Anne, JEANJEAN Thomas***
Levels of Voluntary Disclosure in IPO prospectuses: An Empirical Analysis

06002 ***BARONI Michel, BARTHELEMY Fabrice, MOKRANE Mahdi***
Monte Carlo Simulations versus DCF in Real Estate Portfolio Valuation

06003 ***BESANCENOT Damien, VRANCEANU Radu***
Can Incentives for Research Harm Research? A Business Schools Tale

06004 ***FOURCANS André, VRANCEANU Radu***
Is the ECB so Special? A Qualitative and Quantitative Analysis

06005 ***NAIDITCH Claire, VRANCEANU Radu***
Transferts des migrants et offre de travail dans un modèle de signalisation

06006 ***MOTTIS Nicolas***
Bologna: Far from a Model, Just a Process for a While…

06007 ***LAMBERT Brice***
Ambiance Factors, Emotions and Web User Behavior: A Model Integrating and Affective and Symbolical Approach

06008 ***BATISTA Catia, POTIN Jacques***
Stages of Diversification and Capital Accumulation in an Heckscher-Ohlin World, 1975-1995

06009 ***TARONDEAU Jean-Claude***
Strategy and Organization Improving Organizational Learning

06010 ***TIXIER Daniel***
Teaching Management of Market Driven Business Units Using Internet Based Business Games

06011 ***COEURDACIER Nicolas***
Do Trade Costs in Goods Market Lead to Home Bias in Equities?

06012 ***AVIAT Antonin, COEURDACIER Nicolas***
The Geography of Trade in Goods and Asset Holdings

06013 ***COEURDACIER Nicolas, GUIBAUD Stéphane***
International Portfolio Diversification Is Better Than You Think

06014 ***COEURDACIER Nicolas, GUIBAUD Stéphane***
A Dynamic Equilibrium Model of Imperfectly Integrated Financial Markets

06015 ***DUAN Jin-Chuan, FULOP Andras***
Estimating the Structural Credit Risk Model When Equity Prices Are Contaminated by Trading Noises

06016 ***FULOP Andras***
Feedback Effects of Rating Downgrades

06017 ***LESCOURRET Laurence, ROBERT Christian Y.***
Preferencing, Internalization and Inventory Position

06018 ***BOURGUIGNON Annick, SAULPIC Olivier, ZARLOWSKI Philippe***
Management Accounting Change in the Public Sector: A French Case Study and a New Institutionalist Perspective

06019 ***de BEAUFORT Viviane***
One Share – One Vote, le nouveau Saint Graal ?

06020 ***COEURDACIER Nicolas, MARTIN Philippe***
The Geography of Asset Trade and the Euro: Insiders and Outsiders

06021 ***BESANCENOT Damien, HUYNH Kim, VRANCEANU Radu***
The "Read or Write" Dilemma in Academic Production: A European Perspective

2007

07001 ***NAIDITCH Claire, VRANCEANU Radu***
International Remittances and Residents' Labour Supply in a Signaling Model

07002 ***VIENS G., LEVESQUE K., CHAHWAKILIAN P., EL HASNAOUI A., GAUDILLAT A., NICOL G., CROUZIER C.***
Évolution comparée de la consommation de médicaments dans 5 pays européens entre 2000 et 2004 : analyse de 7 classes pharmaco-thérapeutiques

07003 ***de BEAUFORT Viviane***
La création d'entreprise au féminin dans le monde occidental

07004 ***BOARI Mircea***
Rationalizing the Irrational. The Principle of Relative Maximization from Sociobiology to Economics and Its Implications for Ethics

07005 ***BIBARD Laurent***
Sexualités et mondialisation

07006 ***VRANCEANU Radu***
The Moral Layer of Contemporary Economics: A Virtue Ethics Perspective

07007 ***LORINO Philippe***
Stylistic Creativity in the Utilization of Management Tools

07008 ***BARONI Michel, BARTHELEMY Fabrice, MOKRANE Mahdi***
Optimal Holding Period for a Real Estate Portfolio

07009 ***de BEAUFORT Viviane***
One Share - One Vote, the New Holy Graal?

07010 ***DEMEESTERE René***
L'analyse des coûts : public ou privé ?

07011 TIXIER Maud
Appreciation of the Sustainability of the Tourism Industry in Cyprus

07012 LORINO Philippe
Competence-based Competence Management: a Pragmatic and Interpretive Approach. The Case of a Telecommunications Company

07013 LORINO Philippe
Process Based Management and the Central Role of Dialogical Collective Activity in Organizational Learning. The Case of Work Safety in the Building Industry

07014 LORINO Philippe
The Instrumental Genesis of Collective Activity. The Case of an ERP Implementation in a Large Electricity Producer

07015 LORINO Philippe, GEHRKE Ingmar
Coupling Performance Measurement and Collective Activity: The Semiotic Function of Management Systems. A Case Study

07016 SALLEZ Alain
Urbaphobie et désir d'urbain, au péril de la ville

07017 de CARLO Laurence
The Classroom as a Potential Space - Teaching Negotiation through Paradox

07019 ESPOSITO VINZI Vincenzo
Capturing and Treating Unobserved Heterogeneity by Response Based Segmentation in PLS Path Modeling. A Comparison of Alternative Methods by Computational Experiments

07020 CHEVILLON Guillaume, Christine RIFFLART
Physical Market Determinants of the Price of Crude Oil and the Market Premium

07021 CHEVILLON Guillaume
Inference in the Presence of Stochastic and Deterministic Trends

07023 COLSON Aurélien
The Ambassador, between Light and Shade. The Emergence of Secrecy as the Norm of International Negotiation

07024 GOMEZ Marie-Léandre
A Bourdieusian Perspective on Strategizing

07025 BESANCENOT Damien, VRANCEANU Radu
Multiple Equilibria in a Firing Game with Impartial Justice

07026 BARONI Michel, BARTHELEMY Fabrice, MOKRANE Madhi
Is It Possible to Construct Derivatives for the Paris Residential Market?

2008

08001 BATISTA Catia, POTIN Jacques
International Specialization and the Return to Capital, 1976-2000

08002 BESANCENOT Damien, FARIA Joan Ricardo, VRANCEANU Radu
Why Business Schools do so much Research: a Signaling Explanation

08003 De BEAUFORT Viviane
D'un effet vertueux de l'art. 116 de la loi NRE en matière de RSE ? La problématique est posée à échelle de l'Union européenne

08004 MATHE Hervé
Greater Space means more Service: Leveraging the Innovative Power of Architecture and Design

08005 MATHE Hervé
Leading in Service Innovation: Three perspectives on Service Value delivery in a European Context

08006 ***ROMANIUK Katarzyna, VRANCEANU Radu***
Asset Prices and Asymmetries in the Fed's Interest Rate Rule: A Financial Approach

08007 ***MOTTIS Nicolas, WALTON Peter***
Measuring Research Output across Borders - A Comment

08008 ***NAPPI-CHOULET Ingrid, MAURY Tristan-Pierre***
A Spatiotemporal Autoregressive Price index for the Paris Office Property Market

08009 ***METIU Anca, OBODARU Otilia***
Women's professional Identity Formation in the Free/Open Source Software Community

08010 ***SIBIEUDE Thierry, VIDAL Rodolphe***
Le programme « Une grande école : pourquoi pas moi ? ® ». D'une action de responsabilité soc_iétale de l'ESSEC à la responsabilité sociétale des grandes écoles françaises

08011 ***SIBIEUDE Thierry, VIDAL Rodolphe***
Enjeux et perspectives du sociétariat des groupes mutualistes complexes face aux stratégies de développement à l'échelle groupe : quelques enseignements du cas groupe MACIF

08012 ***FOURCANS André, VRANCEANU Radu***
Money in the Inflation Equation: the Euro Area Evidence

08013 ***CAZAVAN-JENY Anne, JEANJEAN Thomas***
Supply and Demand for European Accounting Research. Evidence from EAA Congresses

08014 ***FAYARD Anne-Laure and METIU Anca***
Beyond Orality and Literacy: Letters and Organizational Communication

08015 ***METIU Anca, FAYARD Anne-Laure***
CEO Compensations in Stakeholders' Regime: An Empirical Investigation with French listed Companies

Pour tous renseignements :

- **Centre de Recherche/Research Center**
  Tél. +33 (0)1 34 43 30 91
  research.center@essec.fr
- **Visitez notre site**
  www.essec.fr

GROUPE ESSEC
CENTRE DE RECHERCHE/RESEARCH CENTER
AVENUE BERNARD HIRSCH
BP 50105 CERGY
95021 CERGY-PONTOISE CEDEX
FRANCE
TÉL. +33 (0)1 34 43 30 91
FAX +33 (0)1 34 43 30 01
research.center@essec.fr

ESSEC BUSINESS SCHOOL PARIS-SINGAPORE.
ÉTABLISSEMENTS PRIVÉS D'ENSEIGNEMENT SUPÉRIEUR,
ASSOCIATION LOI 1901,
ACCRÉDITÉS AACSB INTERNATIONAL - THE ASSOCIATION
TO ADVANCE COLLEGIATE SCHOOLS OF BUSINESS,
ACCRÉDITÉS EQUIS - THE EUROPEAN QUALITY IMPROVEMENT SYSTEM,
AFFILIÉS À LA CHAMBRE DE COMMERCE ET D'INDUSTRIE
DE VERSAILLES VAL D'OISE - YVELINES.