

## The challenge of measuring quality performance of healthcare services – the case of the DAN indicator in French hospitals

**Adrian Zicari**

ESSEC business School  
zicari@essec.edu

**Marie-Léandre Gomez**

ESSEC business School  
Gomez@essec.edu

**Philippe Lorino**

ESSEC business School  
[lorino@essec.edu](mailto:lorino@essec.edu)

**Mathias Waelli**

EHESP  
[waelli@ehesp.fr](mailto:waelli@ehesp.fr)

**Clause Sicotte**

Université de Montréal  
[Claude.Sicotte@umontreal.ca](mailto:Claude.Sicotte@umontreal.ca)

**Jean-Yves Bonnefond**

[bonnefond@cnam.fr](mailto:bonnefond@cnam.fr)

**Etienne Minvielle**

minvielle@ehesp.fr

### Abstract:

This paper aims at analyzing the anesthetic file indicator (DAN, for its acronym in French) a commensuration tool in the field of healthcare. This indicator was created by the French Ministry of Health and the HAS (National Authority for Health) and it reports the completeness and accuracy of the anesthetic file. All hospitals in France (either public or privately owned) have to report this indicator, which is released to the public in an official website.

Our paper is based on empirical data collected during a three-year research project that included site observations, 25 semi-structured interviews (done in four public and privately owned hospitals) and attendance to meetings in the Ministry of Health and the HAS.

The chosen theoretical framework is an activity-based view on practice and instruments, based on the works of Vygotsky and Engeström. With this theoretical lens, the DAN is studied both as the object of activity and an instrument of that activity. Furthermore, the expansion of the influence of the DAN to the community of anesthesiologists is also analyzed as well as the failed attempts and limits to expand its activity.

We expect our contribution to be two-fold: firstly, to exemplify the implementation and deployment of national quality performance indicators in the field of healthcare. Thus, this study would cast light on the success and shortcomings of a commensuration tool imposed by regulation. Secondly, our study stands to contribute to a better understanding of the implications of commensuration for practice, in such a complex setting as hospitals. As a consequence, our research calls for further debate about the criteria for what a desirable anesthetic practice means.

# **The challenge of measuring quality performance of healthcare services – the case of the DAN indicator in French hospitals**

## **Introduction**

Calculative practices have spread in our societies, and among them, commensuration, as the transformation of qualities into quantities with the view to develop common metrics for disparate units (Espeland & Stevens, 1998: 316), is particularly important (Callon and Muniesa 2005). Quality of care and safety ratings are representative of this trend. They have been developed in most countries, in France in the last decade, with the explicit goal to improve medical practice. However, little research has investigated how calculative devices interact, are integrated, used –or not, in activities. This paper aims at analyzing the use of a commensurating tool in the field of healthcare, one of the indicators for quality of care and safety, the anaesthetic file record indicator (DAN). Our study is based on empirical data collected during a three-year research project. We expect our contribution to be two-fold: firstly, to exemplify the implementation and deployment of national quality performance indicators and secondly, to contribute to a better understanding about the implications of commensuration for practice, in complex setting such as hospitals, mobilizing an activity-based view on practice and instruments (Leont'ev 1981, Vygotski 1986, Engeström et al. 1999; Rabardel 1999, Lorino 2007, Clot 1999).

## **Commensuration and calculative practices**

The social role of calculative practices has been stressed recently only. Miller (2001) has called for greater attention to these practices, and in particular to how they “alter the power relations that they shape” (Miller 2001: 379). He positioned calculative practices as technologies of government, and showed how some calculative practices (such as standard costing and discounting) in management accounting impacted individuals and organizations. Boedker and Chua (2013) outlined that calculative devices influence practices and actors not only through rationality and cognitive processes. They stress the role of affect, and highlight that there is a mutual construction between the development of accounting and control tools, and emotions and feelings.

Among calculative practices, commensuration is particularly pregnant in our societies (Callon and Muniesa 2005). Considering commensuration as a social process, Espeland and Stevens (1998) define commensuration as the transformation of qualities into quantities with the view to develop common metrics for disparate units (Espeland & Stevens, 1998: 316). Commensuration both unifies and distinguishes objects (Espeland & Sauder, 2007). It unifies "objects because all entities measured bear a common relationship to each other derived from their shared metric [which makes] the forms of heterogeneity that exist among them less visible " (Espeland & Sauder, 2007: 19). It distinguishes objects because it also creates unavoidable comparison relationships between them. Rankings and ratings are therefore "a powerful engine for producing and reproducing hierarchy since they encourage the meticulous tracking of small differences" (Espeland & Sauder, 2007: 20). Waguespack and Sorenson (2011) illustrate this phenomena and signal that ratings can be influenced by the status of the organizations ranked. They showed that, in the context of the Motion Picture Association of America's parental guidance classifications of movies, films produced by major

producers and directors received more lenient rating than those produce by independent or peripheral companies. They explain this bias by the rating agency being industry-based. They compare the practices of industry-based ratings with state-based ratings and show that, when the rating agency is industry-based, the identity of producers influence the process and lead the classification “serving as yet another means through which powerful actors retain their positions of privilege”. (Wagespack and Sorenson 2011: 551). Déjean, Gond and Leca (2004) have highlighted that the launching of an evaluation tool is a source of power. They showed how an entrepreneurial company that developed a rating in corporate social performance used this tool to develop its own legitimacy and power. They also argue that the development of such tool legitimize an emerging field such as corporate social responsibility: “Introducing a measurement system that eventually acts as a disciplinary system can give the institutional entrepreneur considerable systemic power. Such a measurement system renders actors predictable – and thus governable – and the entrepreneur who introduces the system may be in the position of controlling a tool that is essential for the functioning of the whole industry” (Déjean et al. 2004: 746). This study confirms the power of rating organizations over a field, controlling who is part of the field, and the level of performance of the various players.

So far, little research has focused on the impact of ratings for the organizations ranked or for the users of the rankings. Focusing on the impact of journals rankings on junior academics, Malsch and Teyssié (2015) have narrated the stress caused on these rankings and ho they can impact the decision to choose an institution. Studies on TripAdvisor rating have exemplified these phenomena (Scott and Orlikowski 2011; Jeacle and Carter 2012). Jeacle and Carter (2011) consider that TripAdvisor managed to create trust because it fulfils the criteria for certainty, controllability and order. Scott and Orlikowski (2011) showed that TripAdvisor modified the whole tourism industry – traditional guides, travel agencies, hotels and customers habits- by allowing a more rapid and on-time evaluation, and wider access to the rankings and ratings. However, little research has focused on how rating tools are used by existing and already powerful rating organizations to maintain their power. Research on institutional maintenance

### **Ratings as an evaluation instrument: insights from activity theory**

Activity theory can be considered as one of the social practice frameworks (Nicolini 2012: 109), as it defines and relates work, knowledge, social institutions, artifacts, and human behavior. Compared to other practice-based approaches based on Bourdieu, Giddens, or Schatzki for instance, the distinctive feature of activity theory is the importance devoted to instruments as mediators of activity. In activity theory, instruments are much more than artifacts that are used for activities and make it possible. Inspired by the Marxian view of activity and work, activity theory scholars emphasize that mediating instruments dramatically impact activity and can also transform the actors. Moreover, instruments materialize historical and social features of the society and the social group in which they have been developed. As asserted by Blakler (1993), mediation makes history, culture, rules and power manifest in human action.

Activity theory has been developed by the Russian psychologist Vygotsky, then by his disciple Leont’ev who refined the definition of activity, during the first third of the 20th century, based on

Marx' view on work. They developed the idea that work was as a collective activity: work is always "performed in conditions of joint, collective activity [...] Only through a relation with other people does man relate to nature itself, which means that labour appears from the very beginning as a process mediated by tools (in the broad sense) and at the same time mediated socially" (Leont'ev, 1981, quoted by Lorino 2007). In activity theory, the collective dimension of work is rooted in two characteristics: activity is interactional, meaning that different actors interact, they interact with their environment, with the object of activity, with the instruments they use; activity is transactional, meaning it achieves some transaction with the world to transform it. As synthesized by Lorino (2007), "to view collective activity as a coordination of individual activities would be somehow the same error as viewing conversation as a coordination of monologues" (Lorino 2007:2).

Activity theory was reintroduced in Western countries in the 80's. It has spread in organization theories and management studies in early 90's, particularly with the work of Y. Engeström and his colleagues on the so-called CHAT, Cultural and Historical Activity Theory. Building on Vygotsky and Leont'ev's work, Y. Engeström has developed the collective dimensions of activity theory. Engeström proposes an activity theory system in order to analyze activity. Activity is object-oriented, it has a purpose, and subjects produce and use instruments in order to transform the object of the activity into an outcome, given the specific social context that comprises informal and formal rules, as well as division of labor. Engeström and his team have used this system to analyze activity in various contexts such as hospitals (for example Kerosuo, Kajamaa, and Engeström 2010), new product development (Miettinen, Lehenkari and Tuunainen 2008), and most of all to explain the evolution of activity and the problems and conflicts emerging in work. Conflicts can rise from diverging interpretations of the various elements in the system, as well as contradictory relationships between them.

These conflicts are frequent, because activity permanently evolves, subjects also expand their knowledge and the way they work, thus the activity system is not stable, it is highly dynamic, as pointed out by Lorino (2007). Activity cannot either be described as the execution of pre-existing plans. Rather, it is built in the on-going flow of living and situated experience. Actors mix improvisation and the use of schemes and plans to adapt the activity to the permanently evolving context. The transformation of organizations can often be explained through the difficulties met by collective activity. It is not only a matter of intelligibility; it is also a matter of actionability (Lorino 2007).

Instruments play a central role in these interactions, they crystallize the dynamics of activity. Rabarbel (1999, 2005) has characterized the status and the role of instruments in activity. Instruments are not only artifacts; they have a dual nature and include schemes of utilization. From the one hand, as artefacts, they own various initial features that oppose their inertia to actors and structure their possibility of action. From the other hand, as scheme of utilization, they feed the intelligibility of the world for actors: actors interpret them as potential or actual source of activity. Schemes of utilization mix individual and organizational norms of utilization (rules of coordination, structure of roles in the utilization of the instrument). Without schemes of utilization, artefacts are not instruments.

Through this dual nature, instruments mediate collective activity. They simultaneously constrain and enable activity by attaching it to a generic class of meaning, a generic “utilization of the instrument”. In the one hand, Constraints derive from both their physical and structural features, but also the social habits that orientate their utilization scheme. In the other hand, instruments enable collective activity: they allow doing things that would have been impossible otherwise. Potential constraints and affordances (Gibson, 1977) are infinite and human agency plays a key role in enacting some of them. At times actors can deviate from generic prescriptions, achieving a stylistic innovation. This stylistic innovation can provide a critical view of generic practices. If it is convincing and effective, it can be imitated and it can transform the genre of activity. This iteration between genre and style is one of the key mechanisms of organization dynamics. “Genres” dynamize personal activities, styles dynamize generic practices (Clot, 1999). As a consequence, there is a close relationship between instrument and practice in activity theory: the instrument allows a wide range of possible use, but only a few will be actually activated. Instruments can also point at potential and impeded activity, one source for innovation. Actors can also find lots of way to do which are not formally represented in the instrument (Lorino 2007).

We draw on the role of instruments in activity to analyze the use of anaesthetic folder record indicators for doctors’ practice in the context of French hospitals. Hereafter we present the empirical study.

### **Empirical study: The implementation and impact of the DAN indicator**

The anesthetic file indicator (DAN, for its acronym in French) is an indicator created by the French Ministry of Health and the HAS (National Authority for Health). This indicator is part of quality performance indicators for care and safety series, a collection of metrics that all hospitals (either State or privately owned) in France have to report. The results for DAN for each hospital have been made public since 2009 through a web page of the Ministry of Health.

The DAN is a composite indicator that consolidates data from 13 criteria. The indicator reports the completeness and accuracy of the anesthetic file. The anesthetic file is a collection of records (either manual or digital) for each step of anesthetic care for a surgical inpatient. In France, anesthetists tend to work in large teams and it is not uncommon for the patient to be cared by different professionals at each step of the process (i.e. initial consultation, surgery, post-anesthesia). Thus, the anesthetic file addresses the need for information sharing among specialists, by helping them to coordinate their efforts (for instance, not having to repeat the same question), and reducing risks (for instance, if a patient’s condition implies some particular risk this fact recorded in the file).

The DAN is a traceability indicator – a higher score meaning a more complete and accurate filling of the anesthetic file. It is a second degree indicator as it provides a result on the information brought by another tool (i.e. the anesthetic file). Each year, the DAN for each hospital is calculated according to a random sample of 60 inpatients. The indicator is the proportion of anesthetic files completely filled to the 60 anesthetic files chosen. The nationwide target for this indicator is 80 percent, and

each hospital's results are classified from A to D. It is implicitly assumed that a higher DAN score is better performance for anesthetic care.

There are two particular issues about the DAN indicator in comparison with the other quality of care indicators. Firstly, the DAN is an indicator that brings information about a process that is completely in the realm of one particular medical specialty – i.e. anesthetics. While other IPAQSS indicators involve several areas or practices in the hospital, the DAN's scope is focused only in anesthetics. This implies that all the process is under the control (and responsibility) of the same professional team and that the result of the DAN is attributed to that anesthetic team, instead of being shared with other medical areas in the hospital. The SFAR (French Society of Anesthesiologists) took active part both in the creation, the implementation and then the use of this indicator.

### **Data collection and analysis**

We based our method on a practice-based approach of work, and more specifically, an activity and instrumental perspective. Thus, we designed our methodology in order to identify the various activities around the DAN, analyzing the different points and arrays of the triangles: the subjects, the objects, the outcomes, the instruments, the communities, their rules and divisions of labor.

We collected data from multiple sources. We completed on site-observations and interviews. Observations were performed in the anesthetics consultation offices and on the surgery area of one large Parisian hospital, during 5 days (daytime and night shifts). The researchers aimed to follow the path of the anesthetic file inside the hospital, and how this file was filled and used. This seemed important in order to capture the activity of anesthetic physicians, and the role of the anesthetic record before analyzing more precisely the activity around the DAN.

We also attended three meetings (two to three hours) that were related to the DAN indicator in the offices of the National Health Authority in charge of evaluation and regulation, and the Anesthesiology physicians society.

The researchers performed 25 semi-structured interviews based on observations, focused on practices and made in site. These interviews were made in four public and privately owned hospitals, chosen according to Yin's (2008) recommendations for sampling cases: diversity in size, structure (public/private, university hospital/non-university hospital) and previous results for the DAN. Interviews were made with anesthesiologists (including chief senior specialists), specialized nurses and physicians who are responsible for quality. Table 1 details the four cases studied. The president of the Anesthesiology physicians society (who is chief senior anesthesiologist in one of the visited hospitals) was also interviewed. Interviews took from 20 minutes to two hours and they were frequently made during working hours. This latter allowed for a better understanding of the situation because interviewees were able to provide examples, documents and more easily access to information. Interviews were made on a semi-structured format. The interview guide was based on the use of anesthetic files and the results from the DAN indicator. The interviews were recorded and then transcribed, for the analysis of the use of the DAN.

	Case	Hospital A	Hospital B	Hospital C	Hospital D
Type of hospital	public / private	Private	Public	Public	Public
	Type	Oncology Center	Research hospital	Research hospital	Non-research hospital
	Paris / Provinces	Paris area	Paris (ApHp)	Provinces	Provinces
	Number of Beds	339	753	1318	617
	Number of stays in Surgery	4 321	7 910	18 069	6 690
	Number of ambulatory surgery	1663	2 107	5489	1 856
	DAN outcomes <sup>1</sup> Class Rating Evolution	83% A Stable	79% B stable	79% C stable	80% B Stable
Interviewees	Number of interviews	5	9	3	3
	interviewees	- Head of anesthetic service (3 interviews) - Head of unit anesthetic physician - Anesthetic physician - Nurse	- Head of anesthetic service (2 interviews) - 4 Anesthetic physician - care workers in charge of processing the patients'anesthetic file - Hospital quality manager	- Head of anesthetic service - Nurse - Anesthetic physician	- Head of nurse - non-anesthetic head of unit physician - Hospital Quality manager

**Table 1: Description of the cases studied**

## Results

The DAN indicator has become an object of activity for only a small number of doctors and nurses, those assuming managerial responsibilities or interested in quality management. Nevertheless, the activity developed around the DAN by a few people has consequences for the anesthetic activity of their community. As a secondary degree indicator, it is always related to other practices of every day work. So even unknowingly by practitioners, the DAN has strong implications for the healthcare practices, as it is going to be analyzed in the following points.

### **1. The DAN indicator as an object of activity**

It appears that only a few physicians and nurses know about the DAN indicator even if they are generally likely to support it. Chief anesthesiologists, assuming managerial responsibilities and thus accountable for the DAN, and some specialized nurses and physicians interested in quality management are aware of the DAN and use it. For instance, Dr. B, responsible for a care unit in hospital A says: "I read rapidly the indicator and I ran to the next task". Even most of the anesthesiologists have quite a faint idea about the DAN. According to Dr. V., responsible for the

coordination of quality at hospital C: “The anesthetic teams are probably not much interested in the yearly scores...”. Actually, the DAN has become an object of activity for a small number of people.

For the chief anesthesiologists, monitoring and analyzing the DAN indicator is today a requisite, they have developed this activity. The Dan indicator has thus become an object of activity. Figure 2 represents this activity system developed by monitoring the DAN, with the DAN as an object of activity.

In the four cases studied, they were people involved in the audit or the analysis of the results from the anesthetic service. Chief anesthesiologists are responsible for the information collection about the DAN. In our cases, chief anesthesiologists fulfilled the information required in the national software, at least partially; along the years, some have delegated this task to a colleague more specifically in charge of quality management in the department, more scarcely to nurses interested in quality management.

When completing the audit, physicians fulfill the required task and count the presence of the required information on the patient folder. However, they also develop new tasks. For instance, a physician who collected the 60 anesthetic files analyzed them and took notes about potential problems. The results of the DAN are then presented to the anesthetic team and weak points are discussed. For instance, in a hospital, the chief anesthesiologist considered that the current amount of lost files had to be reduced. In another one, the criterion “access to upper respiratory way” is either not filled or wrongly filled in 25% of the cases. While this figure corresponds to the national average, the medical team did not expect to have this score. Thus, the chief anesthesiologist urged specialists to correctly fill this criterion. He has also insisted in the importance of indicating the name of the anesthesiologist in each file (this information is sometimes missing). In the third hospital, the chief anesthesiologist compares the hospital’s scores with those of other hospitals in the region. In the last hospital, the scores indicate different ways of working in the two sites. In the smaller location, practice tends to be more informal (“familiar”, as some interviewees said). Consequently, the “care in post-intervention room” criterion is informed only in 40% of the cases, while the larger site fills this criterion in 98% of the cases. Also in the smaller location, the doctor’s signature for allowing the patient to go home did not appear in more than 60% of the cases. “I did not realize that in that site, this was not well filled. This allowed us to better measure how we work. If there is a problem and the judge takes the file and sees that the patient went out without the doctor’s signature? Now we measure risks better” (person who participated in the collection of data for the DAN). “...I asked nurses not to send patients home just because they received a phone call (from the doctor)” (quality manager, hospital D).

In all four cases, the anesthetic file has been modified in order to make the filling process easier, and to increase the DAN score. In hospital C, the anesthetic file has been adapted in order to leave less leeway and to force choices: in the “conclusions” section of the file, where there was a blank space before, now there are two boxes to tick: either standard risk or high risk. Most of the potential improvements are related to the use of information systems. In the four hospitals, interviewees sustain that a positive relationship exists between spread of information systems and completeness of anesthetic files. For instance, hospital A prepared a macro in the information system that allowed



physicians to sign with their initial name letters only. Hospital C relies on putting the initial consultation and the final document in the information system in order to improve its DAN scores.

## **2. The DAN indicator as an instrument of activity**

The DAN indicator has also been used as an instrument of activity, with the aim to improve coordination between anesthesiologists and safety of the anesthetic practice. Here, the DAN is no more the object of the activity, but an instrument that is used for the medical activity, more precisely focusing on the coordination, as presented in Figure 3. For instance, in hospital B, a task group has worked on the “difficult intubation” criterion (a key security issue, related to the capacity to access the upper respiratory area), which is frequently filled wrongly. They designed a training session for the whole service.

Inside the anesthetic community, arguments such as “we have to better fulfill the criteria in the patient file because it will improve our DAN score” has no impact on doctors, it can even be counter-productive. The legitimate argument might be scientific, or related to the safety of patient. Hospital A’s head of anesthetic department explained: “for many reasons [...] it is problematic to let a patient going out of the surgery area without the validation of an anesthetic doctor. I told the nurses to systematically require the validation of the physician, and the doctors to physically sign, not just make a call. [...] but nothing changed because they considered that it was blocking the process for the patient. Then I found this article from the Anesthesiology Journal, with a multi-centric survey showing that when anesthetic sign, there is less mortality because there is more awareness. This argument was legitimate. They collectively decided to move on<sup>2</sup>”.

The DAN indicator is also used as an instrument when heads of anesthetic departments negotiate resources with the director of hospital. They establish a link between information systems and the DAN score. Thus, the DAN scores are used as an argument for asking for additional resources to hospital managers. For instance, in hospital B the chief anesthesiologist asked the hospital administrator to repair a failing computer system that was in the surgical area, as the “peri-anesthetic incidents” criterion was negatively impacting on the DAN scores.

There may be various reasons why activity has rather well developed around the DAN indicator, contrary to other quality and safety indicators that have met difficulties (oppositions or no interest). The way the indicator was built can explain in a certain way: the indicator is more legitimate when it has been built with the contribution of the one whose activity is evaluated. There is also a specificity of the anesthetic professional culture: the professional genre of anesthesiologists is highly favorable to scores, processes, and procedures, which they constantly use in the medical activity, compared to other medical disciplines. Nonetheless, there is the will from anesthesiologists to professionally prove the quality of their work and to be acknowledged as good professionals.

“This might be somehow corporatist, but this is necessity for us. We have to demonstrate that our profession is improving. And to show it. This is historical, our profession has been mistreated. In the

---

<sup>2</sup> From notes, not from audio transcript

60's-70's, anesthetists were not trained the same way as other specialists, and in particular surgeons. The image of the profession was not good and during the 80's and even 90's, there was a very aggressive action of the profession to show that we were at the same level than other doctors, and even better than surgeons and by the way this is true today. I mean, when we look at quality of outcomes. Anesthesia is one the most advanced discipline. The scientific production is excellent, etc. Nevertheless, we still feel inferior, and we always want to demonstrate how good we are. The DAN, we will put the energy needed to be at the top level and communicate on it." (Head of anesthetists department).

### ***3. Expanding the activity to the community of anesthesiologists***

The DAN indicator has become both an object and an instrument of activity at the professional community level, through the expansion of activity by the Anesthesiologists society, as presented in Figure 4. Inside this society, the committee in charge of quality and safety analyzes and discuss the DAN scores when the national results are published. They also propose trainings on some safety items that have been identified through the DAN indicator performance. This kind of activity was expected and is rather classical.

More surprisingly, the board of the society created a new activity with the use of the DAN for research purpose. The implementation of the DAN indicator as a compulsory indicator at the national level was a conflicting issue between the national health authority and the Anesthesiologists society. The proposition of the national health authority to give access to a national database for free to the board of the Anesthesiologists society modified their position. They accepted and even decided to stabilize the DAN structure, so that longitudinal studies would be possible, while they previously wanted to make the DAN evolve. The board of anesthesiologists society entered in the research project, prepared the procedures for searching data and the gathering was then performed in the national health authority site. Based on that information, a team of anesthesiologists prepared a paper for an international scientific journal.

### ***4. Failed attempts in expending activity***

From now, we have exemplified the development and the expansion of activity with the DAN at various levels. We also observed that the DAN indicator creates new possibilities of outcomes that are not completed: delayed, reported, forgotten because they are eventually not a priority. For instance, the professional anesthesiologist association identified a group of hospitals whose DAN performance has dramatically collapsed. They suspected that this collapse might be due to organizational or managerial problems, such as not enough people. They decided to contact them and to propose to meet them in order to try to help and find solutions, discussing from peer to peer. However, these actions have not been implemented eighteen months afterwards, mostly due to agenda overload of the members of the board of the anesthesiology society, and the priority given to their own organizational problems. In all the cases we studied, interviewees provided us with stories about desired tasks, in order to improve their activity (either the activity of analyzing the

DAN, or the activity regarding care, using the DAN as an instrument) that was not achieved, for various reasons. For example, analyzing the DAN indicator, physicians in hospital B elaborate possibilities of improvement in the paper version of the anesthetic file. They design a new version, which is ready. But before sending it for print, they discover that there is a new version of the anesthetic file at the Regional level, and that they will have to integrate it. They decided to postpone their modifications to do both at the same time. In another case, it is the lack of resources that delayed and then postponed the changes. In most of the cases, in these difficulties to expand the activity, the subjects evoke the “community” level and the “division of work” (to refer to the activity theory frame) as the reasons for blocking. Nonetheless, the subjects can also consider as problematic other parts of the activity. Based on poor results in some items of the DAN, a chief anesthesiologist proposed and implemented action plans to improve the quality of coordination. The actions were implemented. However, these efforts were not explicit in the DAN score, which increased slightly only. He considered that this was due both to the way the DAN is built and collected, but also to the time-frame: the DAN is collected once a year, based on last year activity. The sensibility of the indicator to the changes is low. Here, we can interpret that the DAN indicator did not allow the link between the various activity systems (notably the analysis of the DAN, and the medical activity), and in a dynamic perspective of the activity.

##### ***5. The limits of the DAN as an instrument evaluating the quality of the coordination***

The Dan indicator was designed with a certain interpretation of activity that cannot cover the full range of local situations. It highlights certain elements that have been considered as keys and thus says nothing about others. As an instrument, it orientates towards certain parts of activity and therefore alludes at others. For instance, the DAN indicator evaluates the quality of information in the records, once the records have been found. We observed in hospital B, an old and large one, that the DAN was evaluating the emerged side of an iceberg in the anesthetic file journey. In this hospital, one of the key issue for the quality of the anesthetic record was its availability. It was a concern for all the physicians in this hospital. They are all afraid of facing an emergency situation without the anesthetic record available. We observed that it could take hours to find out some folders, which were not in the archives, as they should be, but in the office of a nurse in a given service. Tracking a folder to prepare an appointment between a patient and an anesthesiologist could turn to a real detective inquiry. Two or three people in the anesthetic service spent their mornings in retrieving the folders doctors developed specific questions during appointments with patients to guarantee that the file was the good one. However, these efforts to contribute to the activity and guarantee correct conditions for both physicians and patients are not taken into account by the indicator, whose score is rather good in this hospital. This discrepancy can become problematic, as the indicator can be perceived as disconnected from the actual activity, not being an instrument, but an artifact only. It can also have consequences on the motivation of the subjects, as well as their health, if they are told that the DAN indicates that the quality of the activity is fine whereas they have a diverging interpretation of their activity.

Another limit of the DAN as an instrument evaluating the quality of the coordination is the perimeter of the use of the DAN. The DAN has been designed as an indicator for intra-disciplinary coordination. It has been limited to anesthesiology. However, we noticed that the anesthetic folder was used not only by anesthesiologists but also by surgeons, doctors and nurses from other disciplines. Some

activity around the DAN could have developed outside anesthesiologists. However, the other communities failed so far to develop this activity, or to develop an activity with anesthetists on the coordination of care, which would be highly sensible, but complex due to the different communities and culture they are grounded on.

### **Elements of discussion and conclusion**

We have analyzed how the DAN is mobilized both as an instrument and the object of activity for anesthesiologists. Activity theory has served as a frame to capture the various elements of activity, but most of all to understand their dynamics: the various activities are related, the analysis of the performance through the DAN is not disconnected from the medical activity, they form a system of activity that moreover evolve in time. We have focused on anesthetic professionals, physicians and nurses. We have not analyzed the activity of quality managers around the DAN, or the use of the DAN for the national authority, whereas they are using the DAN. Most of all, their activity is somehow linked with the activity of anesthetic professionals, and would be necessary to provide a complete understanding of this system of activity.

Activity theory proves also an insightful frame to identify the tensions and problems in activity, as well as detecting the conflicting elements in the frame. Activity theory researchers such as Y. Engeström or Y. Clot, consider as a key issue in their research to intervene in activity, and to provide tools to the subjects, in order for them to solve the problems. They design their methodology in order to achieve this step that is key in their approach: they have a different relationship with the cases they study, building intervention agreements and contributing actively to the emergence of new activity systems. But this means that they mostly consider cases where the activity is blocked, impeded, and that practitioners need an external intervention to help. In this research, we did not use activity theory in this way. We were in an interpretative posture, trying to account for the way practitioners see their activity, without playing an active role in the design of this activity. We used activity theory, as a specific practice-based perspective on work giving a particularly important role to the instruments as they mediate activity, transform it, as well as the actors. The status of the research and the researchers is thus different from more classical activity theory research, and we also studied organizations where there was no need for intervention, with an activity which is not blocked, even if there were some problems and some people more exposed than others, but which may represent a large proportion of anesthetic departments in French hospitals. It would be nevertheless of high interest to investigate the role of the DAN in a hospital where the activity is much more problematic.

In our analysis of the use of the DAN, we have considered both the use and the non-use of the DAN. This is a major contribution of the activity theory for the study of work: first, activity theory does not consider that using an instrument in a different way than what has been planned by the designers is a problem. All kind of activity is taken into account without judgments on their legitimacy per se. Second, activity theory values what is done and what is not done. In this paper, the non-use of the DAN indicator reveals various interesting points: the non-use of the instruments, the non-achievement of some tasks, the delay in some outcomes holds different value for the subjects. Some non-use appears as not an issue (for instance the use by anesthetists only), whereas others, such as the delays in getting more resources to solve problems identified by the DAN indicator, seem more

frustrating for those involved. Further steps in research could investigate further these various points.

The story of the DAN indicator offers an opportunity to discuss social implications of commensuration in such a complex realm as healthcare. While all the stakeholders – doctors, hospital managers, national health authority, patients- may have different but not necessarily contradictory expectations, the fact that public officials and the professional association chose the DAN implied a conscious choice of some information over several other possibilities.

Far from being an obvious metric for anesthetic care, the DAN measures a quite specific issue – the reliability of the anesthetic file. While this is certainly helpful – it may be argued that a well-filled anesthetic file could positively impact anesthetic care quality, we do not know how both variables interact. Otherwise said, a good DAN score does not necessarily mean that anesthetic practice is good in that hospital. The same consideration goes for comparability of DAN results along hospitals, as it is difficult to claim that anesthetics is “better” done in a better-scoring hospital.

It is possible that the professional association preferred the DAN as an indicator on which intra-professional dynamics were measurable – and thence opportunity for improvements were at hand. As an improving indicator may well reflect on the public consideration of the medical specialty, the professional association may have chosen to begin with a low-hanging fruit – an indicator where progress was achievable, particularly if the DAN results for each hospitals were to be published. Besides, an indicator focused on a process could be perceived by peers as a less controversial one (e.g. a ratio of incidents). However, it may be argued that useful information is not captured by the DAN – which leaves the question open about its long-term relevance. Once most hospitals will have achieved the 80% target, would the DAN be meaningful?

Our research calls for further debate about the criteria for what a desirable anesthetic practice means. By doing this, we follow Lorino’s (2012) calls for higher public opinion involvement in the debates about how calculations (“logarithms”) are made.

## References

- Blakler, F. (1993). Knowledge and the Theory of Organizations: Organizations as Activity Systems and the Reframing of Management, *Journal of Management Studies*, 30(6): 864-884.
- Boedker, c. & Chua, W.F. (2013). Accounting as an affective technology: A study of circulation, agency and entrancement. *Accounting, Organization and Society* 38 : 245-267.
- Callon and Muniesa (2005). « Economic markets as calculative collective devices. » *Organization Studies*, 26 (8), 1229–1250.
- Clot, Y. (1999). *La fonction psychologique au travail*. Paris: P.U.F.
- Déjean, F., Gond, J-P., & Leca, B. (2004). Measuring the unmeasured: An institutional entrepreneur strategy in an emerging industry. *Human Relations*, 57(6): 741-764.

- Engeström, Y., Miettinen, R. and Punamäki, R.-L. (1999) (eds.). *Perspectives on Activity Theory*. Cambridge: Cambridge University Press.
- Espeland, W. N. & Sauder, M. (2007). Rankings and reactivity: How public measures recreate social worlds. *American Journal of Sociology*, 113(1): 1–40.
- Espeland and Stevens (1998) Commensuration as a social process. *Annual Review of Sociology*, 24, 312-343.
- Huault, I. & Raynelli-Weiss, I. (2011). A market for weather risk? Conflicting metrics, attempts at compromise, and limits to commensuration. *Organization Studies*, 32(10): 1395-1420.
- Jeacle, I., & Carter, C. 2011. In TripAdvisor we trust: Rankings, calculative regimes and abstract systems. *Accounting, Organizations and Society*,
- Leont'ev, L. (1981). *Problems of the development of the mind*, Moscow: Progress Publishers.
- Lorino, P. (2007). "The instrumental genesis of collective activity. The case of an ERP implementation in a large electricity producer." (P. Lorino). Essec Research Center, DR07014 mai 07.
- Lorino (2012) "Du chiffre, adored ou exécré, au chiffrage, pratiqué", in Hoarau, C., Malo, J. and Simon, C. (eds.) *Comptabilité, contrôle et société : mélanges en l'honneur du professeur Alain Burlaud*. Paris : Foucher
- Lorino, P. Tricard, B. and Clot, Y. (2011). "Research Methods for Non-Representational Approaches to Organizational Complexity : The Dialogical Mediated Inquiry", *Organization Studies*, 32(6): 769-801.
- Malsch, B. & Tessier, S. (2015). Journal ranking effects on junior academics: Identity fragmentation and politicization. *Critical perspectives in accounting*, 26: 84-98.
- Miller, P. (2001). Governing by Numbers: Why Calculative Practices Matter, *Social Research*, 68 (2): 379-396
- Nicolini, D. (2012). *Practice Theory, Work & Organization: an introduction*. Oxford: Oxford University Press.
- Rabardel, P. (1999). Le langage comme instrument ? Eléments pour une théorie instrumentale élargie. In *Avec Vygotski* (Ed, Clot, Y.). Paris : La Dispute.
- Scott, R. and Orlikowski, W. (2012). Reconfiguring relations of accountability: Materialization of social media in the travel sector. *Accounting, Organization & Society*, 37: 26-40.
- Taupin, B. (2012) The more things change...Institutional maintenance as justification work in the credit rating industry, *M@n@gement*, 15: 529-562
- Vygotski, L. (1986). *Thought and language*. Cambridge: The MIT Press.
- Waguespack, D.M., & Sorenson, O. 2011. The Rating game: Asymmetry in Classification. *Organization Science*, 22(3): 541-553.

Yin, R.Y. (2008). *Case Study Research: Design and Methods*. Oxford : Sage.