

Building teamwork in an uncertain environment

Study of the COVID19 patients' management by healthcare professionals at a university hospital during the health crisis

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ABSTRACT

During the first health crisis linked to the COVID-19 pandemic, clinical departments had to change the way they usually operate to be able to take care of patients suffering from this new pathology. In the north of France, one hospital set up and opened new departments in empty unused premises and set up new clinical teams. This reorganization, set up in an extremely short space of time, required the implementation of a high level of person coordination and collective work at several levels. To understand this collective dimension of work, an exploratory study was carried out to: (i) characterize the design of this new work organizations, and (ii) identify the ways in which the new collective work could function.

CCS CONCEPTS

• **Applied Computing** → Law, social and behavioral sciences; Social and professional topics.

KEYWORDS

Collective work, Work organization, Work system, Healthcare professionals

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1 INTRODUCTION

The onset of the health crisis linked to the COVID19 pandemic imposed an unprecedented health and social situation on our societies. Hospital structures had to cope with urgent and often radical reorganization of their services. Hospital staff was faced with an absolute emergency and the dual challenge of: (i) care for patients suffering from a new and unknown pathology that was highly contagious, without overloading healthcare professionals, and (ii) provide general population with sufficient continuity of care without encouraging the spread of the COVID-19 epidemic.

During the first half of 2020, a hospital in the north of France decided to open new specific wards dedicated to patients with COVID-19: the COMED units. These COMED units were opened either in empty wards in a dedicated building or in wards already in operation. In a few days, five units were completely created, both in terms of physical environment, dedicated teams and work organization (COMED 1 to 5). Two units were partially modified in terms of work organization (COMED 0 and the intensive care unit, located outside the building).

Healthcare professionals involved in the COMEDs said afterwards: “*We’ve done it*”. They described the situation as “extraordinary”, in particular because of the speed (3 days) with which services were set up (in terms of material, physical and organizational aspects) and the ease of interaction within the teams. They expressed the need to report “their story” and their collective professional experience. This paper presents the study carried out to describe and explore this ‘experience’ in order to (i) identify and understand the process of designing this new work system, and (ii) to question the way in which newly-formed teams, faced with uncertainty, functioned, expressing a strong sense of efficiency. This understanding of work and its organization will shed light on



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ways of managing this type of - crisis - situation and to be able to capitalize on this specific and local experience.

2 THEORETICAL FRAMEWORK

Research carried out in hospitals [1] shows that nursing staff is known as requiring the performance of a variety of tasks (technical, administrative, clinical, etc.), requiring or not specific equipment, in a given period of time (but more or less plannable and predictable), and dependent on coordination between different actors (local managers, care assistants, nurses, doctors, psychologists, etc.), but also between different departments (emergency, pharmacy, examination, etc.).

Taking care of patients in hospital is by nature a collective activity [2]. It can be referred to a “*team sport*” [3]. The analysis of hospital work and work organization therefore requires an analysis of collective work, i.e. the way in which people cooperate effectively and efficiently in a given situation [4, 5]. In most studies on teamwork, the importance of a structure of shared knowledge and representations between agents has been widely emphasized, in terms of “*operative common frame of reference*” [6], “*team situation awareness*” [7], “*common ground*” [8] or “*shared mental models*” [9]. In the literature [6], “*skills pooling to prepare and carry out an action*” is described: “*this pooling of skills, at the same time as it completes each person’s representation of the task to be carried out, constitutes a common frame of reference making it possible to adjust each person’s decisions according to the knowledge of the others*” (p. 128-129, our translation). Teamwork relies on shared knowledge about the domain and the tasks, on common communication codes, and on a mental model of partners [10]. Two essential activities for efficient teamwork are identified [10]: the interdependence management (named “*interferences*”) and the facilitation of the teamwork by the members themselves. Teamwork presupposes task coordination activities (i.e. operative synchronization [11]), i.e. who does what and when, and activities for developing and sharing the shared knowledge (i.e. cognitive synchronization [11]). The temporal stability of actors working together enables the elaboration and maintenance of the shared knowledge, which facilitates coordination activities.

Within the context of the COVID19 pandemic and especially the COMED units running, the healthcare professionals were in a completely new environment and interacted with new teammates. Moreover, the work situation was unusual in that professionals knew neither the exact number of patients involved, nor the true nature of the pathology that the healthcare teams would have to deal with, and even less the duration of the care they would have to provide. They had to manage a crisis, they were “*confronted with an event, usually unexpected, the consequences of which will develop over time with a dynamic that can be very rapid, producing major risks that exceed the pre-existing resources in terms of action procedures and players*” [12] (p.532). A crisis evolves over time and involves considerable uncertainty as to the parameters that define it [13]. Moreover, a crisis evolution is discontinuous and marked by peaks of acceleration, and it can take an unexpected turn at any time following the occurrence of a particular event or react in an unintended way to an action taken against it. Crisis “managers” may therefore have to readjust resources as the crisis evolves. They

may also have to review certain priorities as a result of difficulties encountered. A crisis is a complex dynamic situation with strong constraints on the scheduling of actions, in which several goals have to be managed and achieved at the same time [14, 15] and whose evolution may be unpredictable and irreversible. Managing this type of situation requires specific individual and collective skills [16].

The objective of this exploratory study is to understand how the newly formed professionals’ teams, faced with great uncertainty, were able to manage patients with COVID19, paradoxically with a strong feeling of efficiency: how could the coordination activities be implemented, knowing that they could not be based on prior common/shared knowledge? How did “efficient” professional knowledge emerge, with a diversity of staff for whom “*a lot of elements were new*” - the locations, the colleagues, the information system, the patients’ pathologies and how they evolved, the protocols, the equipment, etc.? How did they learn, transmit and circulate within these “ephemeral” teams?

3 METHODOLOGY

3.1 The participants

Between June 2020 and August 2020, semi-structured interviews were conducted with 11 professionals who worked in the COMED departments. These professionals were of different status: managers (n=2), doctors (n=5) and student nurses (n=4). This diversity of profiles supports enables to question the diversity of work situations.

Thereafter, we will designate the people (some of the managers and some of the doctors) who participated in the design and organization of the work system by the term “designers-organizers”.

3.2 The interviews

The interview grid was organized in three parts: (i) professionals characteristics of participants (how long they had been in their job, in their position and in the institution), (ii) for those who organized the work in the COMED units, the COMED units and the work organization (person’s entry into the project, characteristics considered to be decisive, prescribed and actual tasks from the work organization perspective, characteristics of individual and collective work as organized), and (iii) the work in the COMED units (person’s entry into the job, characteristics of the work environment, prescribed and actual tasks, characteristics of individual and collective work). It should be noted that, for some of the participants, the Project and Actual Work dimensions overlapped. The aim was to collect data from a diachronic perspective, showing how the different dimensions of work organization and collective work evolve over time.

3.3 Data analysis

Data was analysed by a thematic content analysis of the verbatims. The Systems Engineering Initiative for Patient Safety (SEIPS) model [17] supported and structured the description of our results. SEIPS links the work system and patient safety through care processes. It presents the work situation as composed by five elements: the person working (e.g. their motivations and needs, their skills), the tasks (e.g. the tasks that are given and the tasks that are carried out,

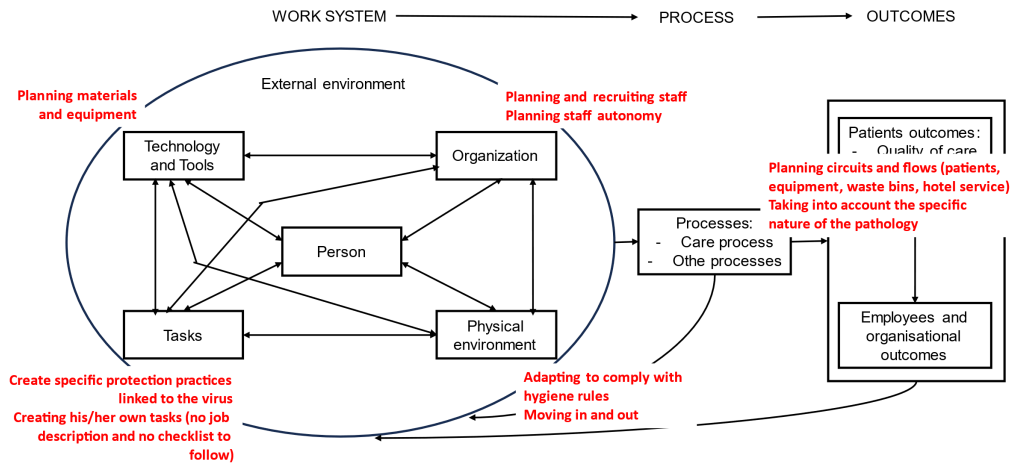


Figure 1: The components of the SEIPS system during the design phase of unit and work organization (adapted from Carayon et al. [17])

characterization of their diversity and autonomy of performance), the tools and instruments made available (e.g. medical devices and information and communication technologies), the work organization (e.g. collective work and its coordination, work planning and supervision), and the physical work environment (e.g. the design of workspaces, thermal environments). All these elements, both individual and collective, produce work processes that will have an impact on patients (in terms of care quality and patient safety) and on operators and organization.

4 RESULTS

Before describing the collective work, we first present how the designers-organisers (in this case, a health manager and a doctor for each COMED) have planned the first elements of the work organization in a very short space of time and have helped to build the organization, included the prescribed work, and make it evolve in response to new events.

4.1 The work system design

Three main steps emerged from the analysis as regards to the design of the work system: the design of the unit and work organization, the start of collective work, and finally the stabilisation of collective work.

4.1.1 Designing the unit and work organization. The first phase consists of designing the organizational framework: workers (workforce and job profiles), the materials and equipment, the circuits and flows (figure 1).

The objective, as expressed by the ‘designers’, was to ensure that the units were running smoothly so that they could welcome patients and ensuring the staff safety. Based on the SEIPS model, we can characterize the tasks of designer-organizers as follows.

- Plan the type and number of materials and equipment needed in the unit and rooms (beds, medical equipment, protective equipment, hygiene equipment, etc.).
- Identifying the characteristics of the current physical environment to design the new department in compliance with hygiene rules - an important aspect given the newness of the pathology - and planning the moving in and moving out phases between departments.
- Designing the work organization and, in particular, the various tasks to be carried out by staff, based on two key factors. First, the time taken to carry out each task had to include the time dedicated to protective practices linked to the new virus (time for dressing and undressing, time for entering rooms). Second, the individual and collective allocation of tasks and the degree of specification of certain tasks were left partly to the discretion of care staff. The designer-organizers chose to prescribe the high-level objectives leaving staff autonomy over the individual and collective organization of work. The critical point was to welcome and care for patients, everything else took a back seat.
- Then plan the circuits and flows considering their different nature (patients, equipment, accommodation, waste), their different levels (on each floor and throughout the building) and the specific nature of the pathology.

Designer-organizers were not used to perform this kind of tasks. They were elaborating an organization rather than adapting one, and they were given a great deal of leeway in implementing them. There was no referential to follow and it was up to the designer-organizers to use their knowledge and the characteristics of the current situation to design a system in which the work could be done. This also led to a high degree of autonomy in defining the

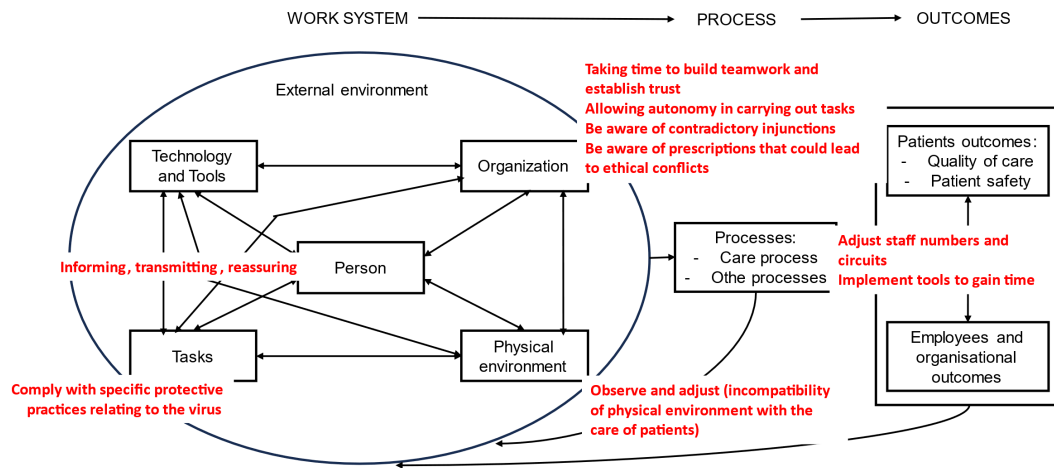


Figure 2: The components of the SEIPS model during the set-up of the work organization (adapted from Carayon et al. [17])

responsibilities to be assumed and the very limits of their actions. These characteristics were a striking feature, differentiating the work from usual work.

A second striking feature was the high level of cooperation with the support functions: support staff were identified as available, including to visit departments, and as being responsive, in a very short space of time, to requests from the designer-organizers. This type of collective work between different professions and functions had not been identified before the crisis.

A final highlight was the availability of all the necessary material resources and equipment, with virtually no restrictions and in a very short space of time. The usual circuits and procedures were shortened, and orders were accepted regardless of quantity. This high availability of material resources made it easier to set up the services.

4.1.2 At the very beginning, initiating work organization. This phase corresponds to the opening of COMED units, the welcoming of staff and their arrival on site, and the first moments of collective work (Figure 2).

The designer-organizers' tasks were as follows.

Continuing the equipment planning phase and setting up work-flows. When the activities were set up and started up, the designer-organizers adapted and adjusted certain elements:

- The physical environment: carers realised the environment was not always compatible with the care of certain patients. For example, some closed rooms did not allow visual checking on the patient's condition. Carers had to enter the rooms and expose themselves further to the virus. Or vice versa, open environments for patients who need to be protected had to be reviewed.

- Circuits and flows: the circuits were not yet fully functional, so they made continuous adjustments. For example, to cope with a large flow of patients when COMED3 first opened, the size of teams had to be adjusted.

Organize individual and collective work. The designer-organizers, health managers and doctors, have been vigilant on two keys factors:

- Always welcoming new staff to the departments. Before arriving in the department, a collective information session was always organized: this consisted of a presentation of the physical working environment (visit to the changing rooms, description of patient flow), clarification of certain procedures (particularly dressing and undressing) and explanation of the work objectives. Very few prescriptions in terms of objectives were given, they focused on people. First, staff had to comply with protection procedures and put in place operating methods enabling them to be exposed to the virus as little as possible. Second, the patients' well-being had always to be the priority. There were no instructions on how work should be organized. Then, on arrival in the department, the frame of reference was built with existing staff by transmission: either between staff who were already in the department and arriving staff, or between staff who already knew the disease or a similar disease and those who did not. The transmissions therefore consisted of a cognitive synchronization activity both on the partner's model and on the domain. In parallel, each member of staff who was already present, whatever their function or status, took care to reassure the new staff, to "take care" of each colleague by introducing themselves and explaining their working methods. This attention to all colleagues, whether they are at the

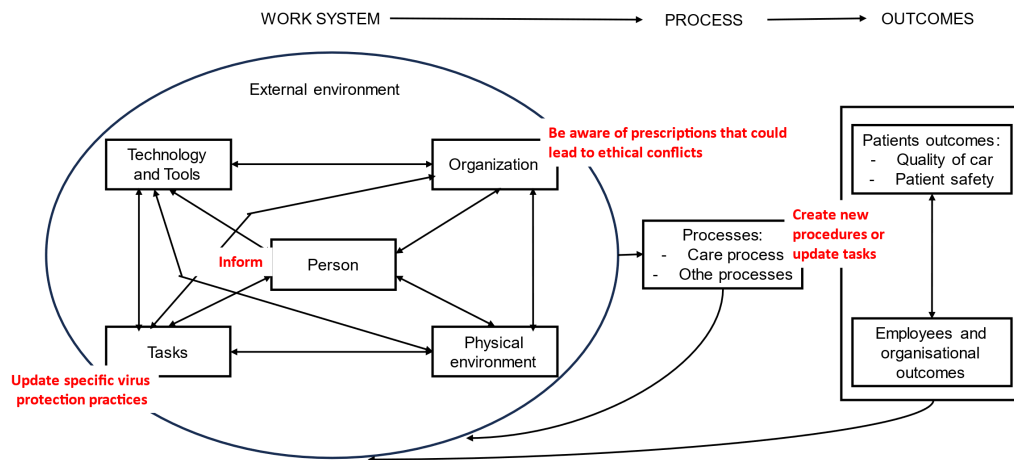


Figure 3: The components of the SEIPS model during the organization stabilisation phase (adapted from Carayon et al. [17])

same hierarchical level or not, is a departure from the usual way of working.

- Being vigilant to avoid contradictory injunctions. The managers tried as far as possible not to issue paradoxical orders to ensure the safety of their staff. Some rather complicated ethical conflicts have arisen (for example, at the beginning of the crisis, families were not allowed to visit patients, even though they were very ill). The managers tried to adopt common positions.

4.1.3 Finally, stabilising the work organization (7 to 15 days). The third phase was identified as occurring after a week or two from the opening of the unit: the people interviewed identified a form of regularity, a form of stability and stabilization (Figure 3).

As far as equipment and processes are concerned, it is no longer a question of "putting in place" but of "updating" (procedures, for example). Circuits were functional, staffing levels were adapted. Time was to develop new supports (e.g. job descriptions) or practices could be adapted to usual objectives set outside the COVID context.

In terms of work organization, the way of working is stabilized, organizational and work rules were in place. The communications objectives were changing: it was now more a question of transmitting information (e.g. how the disease is developing, how the pandemic is evolving, what new practices need to be put in place) rather than "reassuring" colleagues.

4.2 Collective work

4.2.1 The diversity of new teams. The work teams that were set up to integrate the COMED units and intensive care units could differ according to three criteria: whether or not the operators knew the clinical specialty, whether or not they knew the colleagues in the

team and whether or not they knew the work environment. These three criteria were identified by the operators as having been a determining factor in the way in which the work was subsequently carried out.

4.2.2 Setting up multi-level meetings. Meetings were held at different levels of the organization and over different periods of time (Figure 4). From the start of the crisis, a hospital crisis unit met daily. In the COMED building, a staff meeting was rapidly set up after a few days and was held daily with staff from the different units. Intra-COMED meetings were set up by some departments. Participants described vertical communication that differed from the hospital's usual mode of operation, characterized by its frequency (daily) and its time perspective (very short-term decision-making).

Every morning, a medical staff meeting was held at the COMED building (bringing together representatives from each COMED unit and two medical coordinators) to take stock of the beds occupied and planned discharges, and to discuss the issues of the day. Following this meeting, the medical coordinators met with the hospital's deputy director to review needs and issues. Based on this information, the deputy director and the quality department prepared the reports for the crisis unit meeting. From a vertical point of view, after this meeting, the doctors and managers went back to the departments and reviewed the day's work with the teams. Following the crisis unit, information concerning the departments was passed on to the medical staff.

4.2.3 Exchanges within COMED units and between departments. Both formally and informally, the collective work during this COVID period was different from usual work. Some COMED units set up meetings to which all the department's medical and paramedical staff were invited and during which new information about the disease and procedures was passed on. People running these

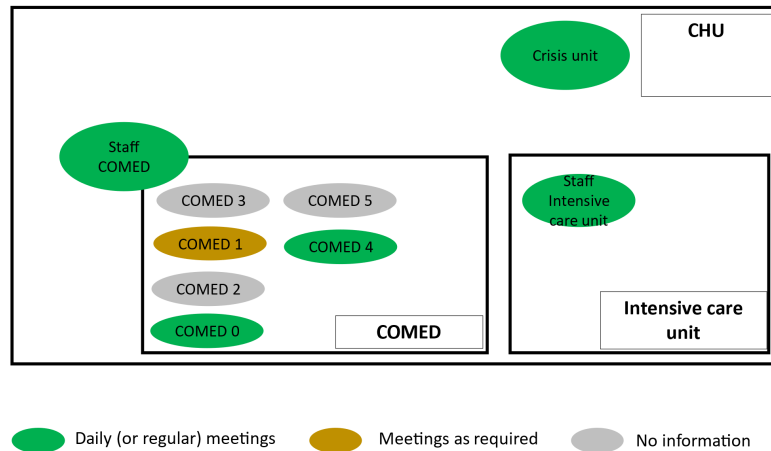


Figure 4: The multi-levels meetings

meetings were very careful not to pass on procedures or injunctions that were paradoxical for nursing staff (which could, for example, lead them into ethical conflicts), to be as factual as possible and to reassure them about the situation despite the uncertainties.

In the departments, when new staff were welcomed, the existing staff were careful to pass on information about the pathology and how the department operates in terms of task allocation. Communication, which is usually described as highly hierarchical in the hospital environment, was simplified here, with no real distinction between hierarchical levels. Knowledge about the disease was built up gradually and collectively, through the transmission of knowledge from the “experts” but also through the transmission of observations from people “in the field”, as close as possible to the patients.

An unusual, more cooperative and collaborative way of working emerged also between the different COMED units, with staff offering help to staff in other units.

Finally, professionals emphasised the presence of a common objective, shared by all the actors, and taking priority over all the others: to be able to care for patients “*It had to be done*”.

5 DISCUSSION

In the literature, “fluid teams” are defined as “*groups with unstable membership that organization create and hold responsible for one or more outcomes*” [15]. At least seven situations that increase the usefulness or inevitability of fluid teams in organizations are identified [15]: five of these are the result of managers choices’ and two are imposed by circumstances not under the control of managers (for example, extreme environmental turbulence). During the COVID crisis, the healthcare professionals of the university hospital were in the second category of situations (they managed a crisis in an very uncertain environment) and could be considered a “fluid teams”.

In “fluid teams”, the risk of dysfunction is based on two main elements: a reduced sense of belonging to the team (because of low individual commitment to group success and lack of cohesion) and a reduced ability to get the job done effectively (because of loss of individual knowledge and lack of share mental models) [15]. We may note that some of these points are similar to those identified in the literature on collective activity [6–10]. To avoid the dysfunctions, managers and designers have an important role: they can set up work process structures that maintain overall consistency (for example, by creating simple structures, by according attention to communication and training, by designing motivating role). This is what happened in the situation analyzed in our study. Although they didn’t have a standard to follow and they were not used to carrying out this type of task, the designers-organizers used their knowledge of hospital operations to design a system in which the work could be done.

Two major factors contributed to the success of the work during this period. (i) The collective work during this COVID period was different from the usual work. Communication, usually described as highly hierarchical in the hospital environment, has been simplified here, with no real distinction between hierarchical levels. Collective activity was modified: new teams emerged, at different levels of the organization and met on a daily basis. Information was not only provided in a top down manner, but also from the bottom up: the work and findings of frontline staff enrich the knowledge related to the disease and enabled an effective work organization. As far as exchanges between and within units were concerned, aspects of cooperation and mutual aid stood out, and the competitive aspects disappeared. (ii) The presence of a common objective, shared by all the actors “taking care” of the patient, while preserving the staff safety, was the priority. This was made possible by a less prescriptive, more flexible way of organizing work, and easier access to numerous resources, with simplified procedures (some of this results have been identified in the context of an emergency

department in an another hospital [18]). The autonomy given to the various actors was based on trust and mutual recognition of the skills of each profession.

In such a context of uncertainty, this was a very different way of working compared to usual way of operating [19]. Despite the situation, people interviewed appreciated this freedom to organize their work and the way they worked together. This opened up new questions about the meaning given to usual work and about the current working conditions/methods of work organization put in place within the current system.

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