The materialization of articulation work and its implications on nursing practices

Barbara Mellini

Sapienza University
Via dei Marsi, 78 Roma

barbara.mellini@uniroma1.it

ABSTRACT
The ethnographic study presented aims at highlight how nursing is carried out in practice. Cooperative informal practices in nurses daily work are described considering their relation to nurse professional mandate. The role of locally designed organizational artifacts and their relation with articulation work is exploited and, starting from the analysis of these informal tools, leading criterion on how work is organized in the wards are highlighted and translated into implications for design.

Keywords. Locally Designed Organizational Artifacts; Situated Planning; Computer Supported Cooperative Work; Ethnography.

ACM Classification Keywords. K.4.3. Organizational impact

General Terms. Human Factors; Computer Supported Cooperative Work; Ethnography

Introduction

This paper is about an ethnographic research carried out to highlight how nurses work is conducted in practice. It is a multisite user study that started to gather requirements for the computerization of the nurse record and was then refocused on coordination activities given their relevance on daily work. It is highlighted how the user study allows the researcher to enter a professional domain and to respond properly to the need for support that emerges from the analysis of specific areas of work.

In order to return an activity-oriented representation (Sachs, 1995) on nurses work, the identification and deep understanding of some aspects of nurses practices has been

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considered as crucial. The main research questions are related to i) the objectives of nursing; ii) the tasks and procedures through which nurses' activities are carried out; iii) the pool of resources, tools and knowledge necessary to accomplish them; iv) the strengths and weaknesses of the activities in current practice.

As it emerges from the priorities pictured, the research work is undertaken under a communication-as-constitutive (CCO) perspective on organizing and organizations, which enables to rethink the ontology and the epistemology of organizations as *in action* features. A specific attention to communication processes and daily practices has been paid by tracing the production of meaning that comes out from the socio-material surround. Through this process, the role of cultural artifacts created and used to perform professional roles and organizing is exploited: by understanding which models, which contents and which functions locally designed artefacts (Button and Sharrock, 1996) support, relevant issues related to computerization and to the development of integrated e-health systems emerge.

1 Issues on nurses professional renewal and mandate

An important starting point for the discussion on nursing is related with profession building: a legislative process made in Italy and worldwide in the last two decades for the empowerment and autonomy of nurse profession. It guided relevant reforms in order to make nursing achieve those attributes that are generally regarded as characterizing a true profession.

Major reforms on nurse profession in Italy started in 1990 with the establishment of the Bachelor in Nursing Science (Law 341/1990) (OJ n. 274 of 23/11/90), the closure of professional courses (DM of 24/07/1996) and the determination of the degree as a prerequisite for the exercise of the profession (MURST decree of April 2, 2001). Moreover, Law 42/1999 abolished the term "auxiliary" from the definition of the profession, established the nursing register (DM 739/94) and introduced tools for the documentation of nursing care (nurse record), that become a key factor for defining an area of autonomy and accountability, since this documentation is filled by nurses without the supervision of medical staff.

A clear professional mandate for nurses founds the reforms on workforce modernization.

The "new" nursing (Calamandrei, 2000) can be described as "the scientific discipline that seeks to resolve and take charge of the various human needs, in a holistic sense, as with respect to its phenomena of health / illness. It requires a great deal of scientific knowledge, as well as the competence in critical judgment and clinical work. [...] The nurse sees in the patient and in the process of "to care", that is taking care of the patient as a whole, the ultimate sense of her profession "(Lombi and Stievano, 2011. p. 126).

Several considerations should be made in order to understand on which tasks and on which kind of knowledge nursing is becoming an autonomous and legitimized discipline. In fact, this definition on the "new" nursing gives a vision of nurse as a

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professional engaged exclusively in dual therapeutic relationships, and this statement doesn't reflect the roles experienced by nurses in the wards (see next paragraph).

Given this, although a workforce reconfiguration in the healthcare domain may result in opportunities for change in professional jurisdiction (Nancarrow and Bortwick, 2005), some issues have to be considered.

Policy makers may fail in understanding organizational dynamics while they institute new professional roles. Thus, a policy-implementation gap, with workforce development unlikely to be aligned with policy intent arise (Currie et al., 2010). This is happening for what concerns the introduction of autonomous documentation to support the new professional role: the nurse record. Although it should have been a mandatory tool for documenting nursing and complementary to the medical record from 1994, it is present in about the 45% of Italian hospitals.

A second point to take into consideration is that new roles are challenging: in fact, new roles creation brings within the formal recognition of a set of knowledge and skills which redefine in a complete new light role and profession. Moreover, the expansion of the nursing role relies on the acquiescence of the medical profession (Nancarrow and Bortwick, 2005).

These issues are experimented at different layers by the nurse category nowadays in italian hospitals for several reasons. First, given the transitional period, nurses with different education on "what nursing is" (that refer to the "new school" and to the "old school" on how work should be accomplished) are co-present in hospitals. Second, the autonomy of this category, in relation to the medical one is still extremely heterogeneous between hospitals and within wards. Last but not least, as already stated, those artifacts that are considered as crucial for the empowerment of nursing (i.e. the nurse record) are still far from being fully operational.

2 Fieldstudies on nurses practices

Ethnographic studies on nurses work in the wards offer a view on nurses work which is not only oriented to the dual professional-client relationship that founds the new model of nursing professionalism (Dingwall et al., 1988).

This studies highlight that often nurses have to act as an intermediary between individual needs and organization constraints, such as standardized protocols, institutional procedures, etc. (Dingwell and Allen, 2001). Far from the mission of a profession built on a dual relationship with the patient, the core nurses competence outlined is on management: more than persons, nurses deal with populations of patients trying to make different agendas (patients, relatives, organization agendas) fit together (Dingwell and Allen, 2001).

In fact, focusing too closely on the professional-client relationship leads us to ignore those elements of nurses' work which is performed apart from the therapeutic relationship, but that makes a vital contribution to clinical efficiency (Allen, 1997).

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This double perspective, on the patient and on the organization, required to nurses to work efficiently, is not investigated in deep in literature in terms of activities carried out by nurses during their work.

It is on the transitional space of this shift of focus and on how it is accomplished in practice that my research aims at contributing for orienting the development of ict based solutions that may support nurses activities as a whole.

3 Context of the research

The data presented in this paper are part of a data corpus composed of field notes and pictures collected within 2 emergency departments and a plastic surgery ward of two Italian hospitals during 20 sessions of observation and shadowing of about 4 hours each and carried out between February 2011 and July 2013.

The research path started with the objective of supporting the introduction of the electronic nurse record in one of the emergency departments and in the plastic surgery ward in February 2011. It happened that when I went into the wards I found nurses practices very divergent as with respect to the ones I knew from literature on nursing: much more flexible, much less focused only on the dual relationship with the patient. Moreover, nurses had concerns about the introduction of the Electronic Nurse Record because of the lack of support it could give to organizational tasks and they pushed my attention in order to get insights from local informal artifacts.

Given this, I decided to refocus the research and to use the possible introduction of nurse record as a springboard, as a starting point for talking about IT tools for nurses: in fact, although it is a very standard tool, centered on the patient, its computerization and the questions that computerization poses, open a space for reasoning on how it can constitute the starting point for supporting nurses work practices in an integrated way.

Then I decided to explore a second context (the second emergency department) that had already in use the electronic nurse record in order to understand how coordination issues where managed. I found that the use/non-use of the nurse record had an impact mainly on how nursing work on the patient is accomplished and documented, but not at all on how organizational activities are envisioned, planned and carried out: that remains an informal and invisible work.

4 Methodology: from ethnography to design

Some authors (Bannon, 1991; Dourish, 2006; Halverson, 2002; Hughes et al., 1992; Kelder & Turner, 2005) have criticized the assumption that we can move from user studies to design in a straightforward manner. This passage is always a critical one, where a “translation” of the knowledge produced in the data gathering phase is required to make it of some use for the following design phase. Although there can be no doubt that a better domain knowledge increases the chances of adopting a sound

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design approach, to make the knowledge gathered during the user study coherent with the next design activities is a complex and multifaceted task. To effectively inform design, I decided to move away from individualistic user models, as for instance the personas used to gather and summarize user requirements (Cooper, 1995), to more collective, activity oriented concepts (Sachs, 1995).

To move from observations to design requirements I started the data analysis by building narrative scenarios (Carroll, 2000) and workflows of the observed activities (Preece, Rogers, Sharp, 2002). Through this process the more institutional scenarios and flows were easily pictured and key macro-areas of activities emerged. What remained out from this framework are all those unofficial practices and informal parts of work that are not in the workflows, and that are indeed carried out by nurses in order to make the flows work.

To frame this part of work implied a methodological shift where the core of the analysis becomes to define how nurses are able to manage the institutional workflow in a situated context, handling complications and conciliating different visions on the work itself.

In an ecological perspective, I decided to explore this part of the work by adopting nurses' point of view, following their strategy: I started from the analysis of the informal artifacts they create and use to accomplish coordination practices.

These tools are directly produced by nurses in order to support work and their filling is not mandatory by the hospital, it is done in autonomy and without any obligation: these tools are threated by nurses as connectors of activities that would otherwise lose continuity.

They are relevant since they embed a sort of "mental model" of *nursing in practice* that defines what is relevant and what is not for the users during their daily practices.

By analyzing the leading criterion that guided the structure and the functions of these objects and by relating them with the analysis of the areas of work identified as critical, we can picture what nurses need and want to organize their work.

I decided to analyse them in terms of structure, position, functions and ways of compiling (Bjorn and Hertzum, 2011) in order to highlight the leading criterion used by nurses in organizing their work.

5 What do nurses do at work?

Looking at the activities carried out by nurses in the observed wards, we can identify three macro-areas in nurses field of professional action: implementation, documentation and planning.

Implementation: This area refers to the activities that concerns with *nursing* and with the *to care* process in strict sense, that is to assist the patient and to provide to his needs (i.e. parameters' monitoring, drugs administration, catheter positioning, hygienic and nutritional care, etc).

Documentation: In this area activities such as data entry and information recording are included. Typical activities of this domain are: to fill the nurse record and the

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medical record; to include in the record the day-to-day updates (i.e. clinical parameters' report, etc) and the referred documentation (such as x-ray reports, results of blood tests, etc.). This work is personalized by patient in the sense that documentation is filled and assembled for each patient, thus tracing his clinical history. The documentation produced in this area includes and is included in the patient record, which has been one of the most studied and digitalized artifacts in hospitals. Its main peculiarity is that it is a polyphonic and multifaceted artifact, since it acts as privileged reference for three different purposes: medical, economic and legal.

Planning: the activities included in this macro-area are related with anticipation, coordination and management. They comprise the tasks necessary to make the ward as a whole work and they are managed entirely by nurses. They include, for example, the activities of planning drugs orders or request blood exams and expert consultancies; but they are also related with the organization of space and time routines (i.e. organize the fast for the patients that have to make blood tests the day after, or sort the drugs in the closet in a way that allows other nurses to find them) and with the generation of alerts referred to important issues arose during the shift (i.e. to point out the entrance of a new patient in the ward, etc.). Part of this activity is performed through the use of official documentation. Specific official forms or IT dedicated systems are set for each typology of request to be made in order to ask for a service or an asset to the hospital (i.e. one dedicated form for asking for cardiologic consultancy, one for radiologic consultancy, an IT system for blood requests, an IT system for medical radiological reports, etc., for a total of about 15 forms and 2 IT systems). Another part of this work is done through the creation of informal artifacts for the accomplishment of articulation practices (Gerson and Star, 1986) by the nurse in charge and by the nurses out of turn, which are present in the ward mainly in the morning hours.

As already stated, I decided to focus on this part of nurses work, that is how the informal coordination processes necessary to make the official ones work are carried out in practice through the creation of informal artifacts for supporting the awareness on the status of the ward (Heath and Luff, 1992) and the situated planning of activities (Baldram, 1998).

This area emerged as critical both from observations and from literature, since it has to be performed maintaining a double perspective on work, centred sometimes on the patient and sometimes on the ward and based on the capability of nurses to shift between one focus and another in order to be efficient.

6 The duplicity of nurses professional vision and the need for support in shifting perspective

Given that professional mandate and actual nurse practices don’t completely merge, the core point of my research was to understand and exploit how nurses seek to reconcile these apparently dichotomist professional visions on assisting the patient and organizing the ward.

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This double perspective is not sustained by the official documentation in use in the wards, where hospital forms, IT systems and patient record act in a not integrated neither flexible way in displaying information. Moreover, although it is required to nurse to accomplish tasks that require frequent shifts of perspective, officially no meditational artifact is present to support them. The creation and use of locally designed organizational artifacts (Button and Sharrock, 1996) helps nurses in this task. In fact, as already stated, the nurses out of turn and the nurse in charge spend most of their time in planning and structuring the organization necessary to the ward to work efficiently. In order to support the need for frequent shifts of focus between "the eye on the patient" and "the eye on the ward", they build these tools for sustaining awareness (Heath and Luff, 1992) and situated planning (Baldram, 1998). Through the selection, unification and visualization of relevant information on the work to be done, they help other nurses in maintaining this necessary double vision that shifts continuously between the single patient and the ward as a whole and that I traced in different contexts.

7 Locally designed organizational artefacts as embodiment of articulation activities and their implications on design

Looking at the locally produced artifacts in use in the wards can be "ecologically" considered a starting point for the understanding of which are the kind of activities that needs to be supported in the ward and through which criterion they are articulated by nurses.

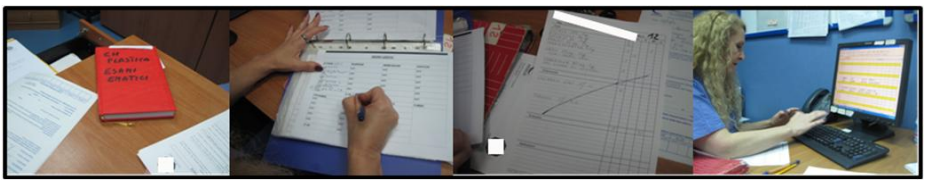

Fig. 1. Images of in-use locally designed organizational artefacts. From left to right: the blood samples agenda, the medication organizer, the therapy organizer, the overview sheet

There are four locally designed artifacts that I choose to analyze in this paper because of their structure, function and use:

The blood samples agenda: this artifact primary use is to appoint the dates of blood exams and fasts for the patients. It's function is to provide nurses with time orientation over the tasks to be accomplished. In fact, it is a simple agenda used by those nurses that deal with organizational tasks. From this primary use, secondary uses (that have to deal with time orientation) have been developed for this object: it started over the time to be dedicated to more general appointments and mid/long time deadlines, where also inter-professional communications could be written and organized.

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The medication organizer: this tool works as a weekly planner where all issues about medications in the ward are reported: i.e. the drug used for a medication, when a patient has been medicated and when the medication needs to be dismantled. It includes both the work already done and that just planned, unifying all the information on a core activity in a single device.

The therapy organizer: this tool is devoted to support nurses during the drugs order and during the drugs administration. It works as a mediation artifact that help nurses in the management of the whole process that goes from a drug prescription (medical task centered on the patient), to the drug order (nurse task centered on the ward), to the sorting of the drugs (nurse task centered on the ward), to the administration of the drugs (nurse time oriented task centered on the patient). This tool is composed by cards (one per patient in the ward) where time, dosage and route for administration are the organizing criterion. Since frequent shifts of focus are necessary to accomplish the therapy organization for the whole ward, the therapy organizer has been structured in order to support it in an integrated way: i) it resumes in a unique tool all the therapies prescribed in the record by the doctors for all the patients in the ward; ii) it organizes the information for the administration phase; iii) it helps in the drugs order when an overview of the used drugs is required; iv) it uses the same criterion of sorting used in the drug closet, assuring consistence between tools.

The overview sheet: this artifact is attached to the whiteboard and provides the staff with an overview of the patients present in the ward. It uses a spatial configuration, using the ward structure itself (number of bed and room) to signal where the patient is and who he is. It serves as a check for being sure of who is the patient at a specific bed in a structure where the bed number is often used as leading identification criterion.

This preliminary analysis of the informal tools in use allows us to figure out some leading organizational criterion for articulating work across locally designed artifacts that might be useful to inform the development of new e-health systems.

Time orientation: whilst the data entry concept, which is the most adopted for digitalizing the patient record, focuses on the past, in the sense that the digital record serves no other goal that archiving what has already happened (i.e. information already acquired), locally designed organizational artifacts are based on anticipation and focus on the future: they are conceived as planning devices.

Double perspective: Many work activities are efficiently coordinated mainly because nurses are able to anticipate others' actions or external events, thus modifying their behavior in advance. Such an anticipatory behavior requires the nurse to take into consideration several aspects that may have an impact on the efficiency of the ward. Shifts of perspective are often required to nurses in order to reconcile the duplicity of their work focus: the single patient and the ward as a whole. Locally designed tools support these shifts, thus acting as mediation artifacts, as embedded cognition distributed in the workspace (Hutchins, 1995) in order to materialize and support specific perspectives on the work to be done.

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Task orientation: Some core tasks need a dedicated visualization and planning, such as it happens for therapy or medications. This form of display of information that is task oriented help nurses in defining which is the level of accomplishment of a specific type of work and to have it visible at a glance.

Cross check space orientation: Visualization of information that are space oriented and related to the ward as a whole support nurses in having always an updating view on the major issues related to all the patients present in the ward and, increasing the awareness on specific events, constitute a proactive method for risk management.

8 Concluding

The research carried out aims at uncover nurses work in order to inform developers of IT based system for e-health on how nurses practices are accomplished in the wards. It emerges that the most part of the organizational work is done informally, generally out of the professional mandate (focused on the relation with the patient) and through locally designed tool that materialize articulation work: organizational artifacts such as the blood samples agenda, the medication organizer, the therapy organizer and the overview sheet.

These tools used by nurses outline on one side the lack of official documentation devoted to organizational tasks and the lack of integration between the core activities carried out in the wards (planning, implementation, documentation); on the other side they offer relevant information on which are the leading criterion used as key leverage points for organizing work from an activity based perspective.

Although they have no formal value within the hospital, they help nurses in dealing with the issues related to the duplicity of focus typical of their profession and they highlight how time, task and space orientation are crucial issues to take into consideration if planning devices to support nurses work want to be introduced in wards.

Supervisor

Professor Alessandra Talamo.
Department of Developmental and Social Psychology,
Faculty of Medicine and Psychology,
Sapienza University, Rome.

References

1. Allen, D. (1995)The nursing-medical boundary: a negotiated order? *Sociology of Health and Illness* 9, *4*: 498-520

Proc. of CHItaly 2013 Doctoral Consortium, Trento (Italy), September 16th 2013 (published at http://ceur-ws.org).

2. Bannon, L. J. , (1991). From human factors to human actors. The role of psychology and human-computer interaction studies in system design. In J. Greenbaum & M. Kyng (Eds.), *Design at work: cooperative design of computer systems* (pp. 25-44), Lawrence Erlbaum Associates, Hillsdale, NJ.
3. Bardram, J. (1998). *Collaboration, coordination and compter support: an activity theoretical approach to the design of computer supported cooperative work*. PhD. Thesis. Aarhus: Aarhus University, computer science department.
4. Bjorn P. and Hertzum M. (2011). Artefactual Multiplicity: A study of emergency-department whiteboards. *Computer Supported Cooperative Work*, 20 (1&2), 93-121
5. Button, G. and Sharrock, W. (1997). The production of order and the order of production." *ECSCW'97 Proceedings of the Fifth European Conference on Computer Supported Cooperative Work*
6. Calamandrei, A., (2000). I fondamenti della scienza infermieristica.: metaparadigma e paradigmi. *Nursing oggi*, 1: 9-19.
7. Carroll J. M. (2000), Introduction to the special issue on "Scenario-Based Systems Development*", Interacting with computers*, 13 (1), pp. 41-41.
8. Cooper, A. (1995). *About Face: The Essentials of User Interface Design*, John Wiley & Sons, Inc. New York, NY, USA.
9. Currie, G., Finn, R., Martin, G. Role Transition and the Interaction of Relational and Social Identity: New Nursing roles in the new NHS. *Organization studies* 31- 941, 2010
10. Dingwall, R., Rafferty, AM., Webster, C. *An introduction to the social history of nursing*. Routledge, London, 1988
11. Dingwell R, Allen D. The implications of healthcare reforms for the profession of nursing. Nursing Inquiry 2001;8(2):64–74..
12. Dourish, P. (2006). Implications for Design, CHI: *Conference on Human Factors in Computing Systems* Montréal, Québec, Canada.
13. Gerson, and Star, S. L. (1986). Analyzing due process in the workplace. ACM *Transactions on Office Information Systems* 4, 257-270.
14. Halverson, C. A., 2002. Activity theory and distributed cognition: or what does CSCW need to do with theories? *Computer Supported Cooperative Work* 11(1/2).
15. Heath, C.and Luff, P. Collaboration and control: crisis management and multimedia technology in London Underground control rooms. *CSCW Journal* 1-1 (69-94), 1992
16. Hughes, J. A., Randall, D., & Shapiro, D., 1992. Faltering from Ethnography to Design., Paper presented at the ACM conference on Computer-supported cooperative work, Toronto, Canada.
17. Hutchins, E. *Cognition in the Wild*. Cambridge MA: MIT Press, 1995Latour, 2005
18. Kelder, J., & Turner, P. (2005). Lost in Translation? Critical Reflection on Qualitative Approaches for Informing Information Systems Design, Proceedings of QualIT2005: Challenges for Qualitative Research. Brisbane, Australia.
19. Lombi, L. and Stievano, A. (2011). Introduzione alla sociologia della salute. Manuale per la professione infermieristica. Franco Angeli: Roma.
20. Nancarrow, Susan A, and Alan M. Borthwick, (2005) 'Dynamic professional boundaries in the health care workforce'. *Sociology of Health and Illness* 27/7: 897–919.
21. Preece J., Rogers Y., Sharp H. (2004). *Interaction Design*, APOGEO, Milano
22. Sachs, P. (1995) Transforming work: collaboration, learning and design. *Communications of the ACM* 38: 36-44.

Proc. of CHItaly 2013 Doctoral Consortium, Trento (Italy), September 16th 2013 (published at http://ceur-ws.org).