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Abstract

At the start of an empirical study into the patient care process (PCP) a number of ontological, epistemological and methodological challenges were identified. The PCP appeared to be an "objective", manageable, reality which is carried out by individuals with their own "subjective" understanding of the process, its purposes, organisational constraints and their roles. The dual perception of the PCP has called for establishing and defending a philosophical foundation for cross-paradigmatic research, i.e. the research that can combine analytic techniques such as modelling, with non-positivist methods suitable for describing the dynamics and complexities of the social world from the perspective of human actors. "Subtle realism" offers an alternative to the ontological and epistemological dichotomy of positivist and non-positivist frameworks and allows the researcher to apply methods of ethnographic research without abandoning the commitment to arrive at a plausible account of objective reality. Cross-paradigmatic methods, though not entirely new in IS research, are still considered contradictive. In this article we argue that methodology based on the philosophical assumptions of "subtle realism" justifies the use of a mix-method approach, where ethnography is combined with highly structured modelling techniques. Resolving ontological and epistemological challenges is the first step towards developing a research method that will potentially bridge the gap between the formal, context-insensitive language used by systems analysts, and the informal, textual representation of socially situated data.

Keywords: research methods, subtle realism, process modelling, patient care process

1. Introduction and Description of the PCP Study

The Australian Health Care System (HCS) has been ranked 12th among 191 nations assessed by the World Health Organisation (WHO). Australians have life spans second only to those in Japan at a relatively moderate cost of about 8.5% of GDP (WHO 2000) and enjoy universal access to medical care. Improved efficiencies observed through the 1990s have been largely attributed to a clearer separation of purchasing and providing health care, assisted by case-mix funding of hospitals and shifting some essential health care services to the community. However these efficiency gains may prove unsustainable in the long run as some observers, both in Australia and overseas, are predicting a dramatic increase in health care costs. The main cost driver is new technology, including IT, and its ability to increase the capabilities of medicine (Newhouse 1993; Fett 2000). To offset these forces, Government officials have promised further efficiency improvements through the use of competition and

output-based benchmarking (Podger 1999), which in practice means a further tightening of the budget for public hospitals in the face of increasing demand for high quality health care.

Drastic changes in reimbursement procedures and increasing competition cause health care providers to act as firms with a business orientation (Klischewski and Wetzel 2003). Under harsh economic pressures the providers may resolve to blatant cost-cutting measures, including the outright withdrawal of service. The increasing occurrence of blocked hospital access, hospital ambulance bypass and lengthening queues for elective surgery (Richardson et al. 2003) are all manifestations of these symptoms. In other words, once the most obvious inefficiencies in public HCS have been eliminated, the system may respond to the neo-classicists' change from service delivery to satisfying clients' needs with an unintended result – that of no service or inferior service.

After a decade of outcome-based performance management which treated health care essentially as a "black box" which was expected to respond to macro-economic incentives for "satisfying customer needs", it is time to redress the balance that has shifted too far from the core business of "providing health care services". It is time to look inside the "black box" and conduct a micro-level systems analysis in a search for a less obvious but sustainable ways of improving technical efficiency in health care settings. Recent theoretical and practical developments in the areas of IS and management of organisations provide a range of methods for analysing health care providers' problems in the process of service delivery.

The *objective of this paper* is to demonstrate:

a) how ontological and epistemological challenges have influenced the evolution of an empirical study and
b) how the practical difficulties incurred in the course of a case study were resolved through the selection of an adequate theoretical framework.

The *objective of the original PCP study* was to analyse the patient care process (PCP) in the acute care ward of a public hospital. In other words, the original PCP study pursued a practical goal to investigate information, organisational and operational problems in the PCP and develop a number of alternative solutions that would, as a minimum, eliminate obvious deficiencies such as information bottlenecks, redundant procedures etc., and would possibly, in consultations with the stakeholders, emerge as a blueprint for redesigning the PCP using appropriate IS solutions. A special challenge was to convert the results into a model suitable for requirements definitions to inform a long overdue replacement of the existing hospital information system.

The PCP is defined as a logical sequence of activities performed by clinical, managerial and administrative staff of the acute care ward to manage patients' progression from admission to discharge. The advantage of focusing on the *process* of health care delivery is two-fold:

- the PCP outcomes, measured in patient flow per unit of time, are linked to performance measurement indicators (e.g. length of stay, admission waiting time)
- the PCP is a truly cross-functional customer-focused process so the operations on the ward can be assessed in terms of value-adding activities that serve organisational goals and ultimately the needs of the patients. Conceptually we have followed here Davenport's definition of business process as a specific ordering of work activities across time and place, with a beginning, an end, and clearly identified objectives, inputs, and outputs (Davenport and Short 1990).

In the next section we provide a review of existing practices and methodological frameworks used in IS and organisational research. This is followed by two sections that explain why the original PCP study needs to be redefined in terms of cross-paradigmatic research, and outline the ontological, epistemological and methodological foundations of the redefined PCP study. We conclude with the summary of our journey from an unremarkable original design of a hospital case study to the change in our perception of the PCP and ontological, epistemological and methodological challenges that emerged from our understanding of the PCP as an "objective", manageable, reality which is carried out by individuals with their own "subjective" understanding of the process. The suggested resolution of ontological and epistemological challenges is a necessary first step towards developing a research method that will potentially bridge the gap between the formal, context-insensitive language used by systems analysts, and the informal, textual representation of socially situated data. By approaching methodological issues from that perspective we wish to demonstrate "practical" relevance of seemingly "abstract" philosophical constructions.

2. Overview of Existing Practices and Methodological Frameworks

Systems analysis and decision support, as applied disciplines within Systems Science, have an established record in the area of health services research (Boldy 1981; Pollock et al., 1994). The Business Process Redesign (BPR) movement stimulated application of analytical methods such as Business Process Modelling (BPM) (Willcocks and Smith 1995; Nwabueze 2000). BPM in health care provides a vehicle for multi-dimensional system thinking, offers a dynamic view on the process, and is goal and performance-measure oriented (Kwak and Lee, 2002). BPM methods address issues of process efficiency and effectiveness by investigating activities carried out by health care providers according to organisational goals and with the use of information technology. In this context, systems analysts should resist the tendency to see user requirements as fixed, functional role-oriented, and assume that users just want to computerise existing manual systems (Flynn 1992).

BPR has been routinely used, predominantly in production industries, in projects that build on IT innovations with the aim of automating or re-designing existing work processes to increase the effectiveness and efficiency of an organization (Maull et al, 2003). These projects have usually taken the managerial perspective and, since the purpose is to *re-design* the process, the developers' attention was biased towards *defining the desired process* rather than *understanding the existing one*. In such cases the IS designers relied on extensive consultations with clients, usually top management, to achieve an understanding of their vision of the re-designed business process. However in health care, where safety is a paramount issue, and is typically ensured by the long-established tradition of active coordination of tasks in ways that fundamentally go beyond the formal specification of roles, the "revolutionary" methods of process re-engineering have proven to be unsuccessful (Beynon-Davies 1995). It can be argued that for the health care industry, an evolutionary rather than revolutionary method of improving work practices seems to be better suited. Consequently more attention should be paid to capturing the existing process before launching a BPR project.

In the UK and US, process re-engineering in health care has been used as a response to the growing pressures on the health care industry to increase quality and efficiency while containing costs. US literature generally reports the overwhelming success of BPR projects (Boland 1996; Maull et al. 2003), however in the UK the lessons learned from the mixed results of such projects are that BPR (being a large exogenous shock to the public health care system) triggers social dynamics of organisation and these dynamics are likely to be

multifaceted, to vary with time and reflect organisational context (Nicholson 1995; Probert et al. 1999; Packwood et al. 1998; Homa 1998). This is consistent with the results of other IT research that looked at the successes and failures of significant IT implementations (Barley 1986; Beynon-Davis 1995).

Traditionally, BPR projects in health care aims to link business processes to the outcomes, as determined by the stakeholders, usually those who fund and support the IS development. From that perspective IT is treated *as a material cause,* and the relationships between IT and an organisational structure are assumed to be orderly and to hold regardless of context (Barley 1986). Research in the area tends to use positivist epistemology, i.e. asserting that the knowledge of causal relationships allows the stakeholders to manipulate the natural and social world alike (Boland 1985). In positivist studies the role of the researcher is to capture the objective physical and social reality by using an appropriate set of constructs and instruments, where understanding of phenomena becomes primarily a matter of adequate modelling and measurement. Any discrepancies would be attributed to measurement error. The researcher is seen to play a passive, neutral role in the investigation and does not intervene in the phenomenon of interest. This positivist perspective in IS research is constantly reinforced by stakeholders, usually senior managers, who are less inclined to concentrate on "soft" human issues, preferring the approach that is grounded in "facts" predicted with statistical certainty.

This approach has been criticised by researchers working within interpretive epistemological tradition. Orlikowski and Gash (1994) argue that an understanding of people's *interpretation* of technology is critical to understanding their interaction with it. Weick (1990) notes that "cognition and micro-level processes are keys to understanding the organizational impact of new technologies." (p.17). Interest toward non-positivist research has been fuelled by acknowledging the failure of developers to adequately recognise and incorporate end-users' expectations and assumptions about technology into the systems requirements and design. This has resulted in a large number of applications either not being used at all, or not used as intended, or not to the full extend of their functional capacity (Beynon-Davis 1995; Quaglini et al. 2000).

Interpretive studies are not dominant in IS research, but they do have more than a foothold (Orlikowski 1993, 1994; Zuboff 1988; King 1996). Although these studies proved that the difference in users' acceptance of information systems relates to their subjective "meanings" and expectations, they do not address the task of relating the differences in "meanings" to the requirements definition stage of IS development. Jirotka and Goguen (1994) state that a methodological framework is needed for conducting an analysis of work processes and addressing the problems of constructing requirements from such analysis. They also argue that a program of research is needed to explore how a range of concepts (e.g. "task", "role", "user", "social", "technical", "cooperation" etc.) that have been accepted unproblematically by systems analysts, are actually used in specific contexts of domain organisations.

Evidently, a much more detailed understanding of organisation and workers' interactions, in particular IS users, is essential to avoid unwanted consequences when information systems are deployed. However, methodologically solid qualitative studies centered on the users' perspective and providing an in-depth analysis of the work process are rare, because of:

1) the relative unpopularity of qualitative studies among academic disciplines with strong positivist traditions, such as IS and medicine, and

2) since they take a long time to complete, there is an inherent risk associated with sustainability of dedication in both the researchers and the staff at the settings.

Independently from IS research, there has been an increasing interest in non-positivist research in health (Pope and Mays 1995). McNulty and Ferlie (2002) noted that there is a growing awareness that the study of input/output relations is not enough and that the "black box" of the health care organization exerts important mediating effects. They argue that the search for "universal laws" within the organisational domain is a chimera and the adoption of experimentalist methods like those used in the Cochrane model of Evidence-Based Medicine at the organisational level is unlikely to be fruitful. Pettigrew (1990) has also challenged "rational, linear theories of planning and change where actions are seen as ordered and sequenced in order to achieve rationally declared ends and where actors behave mechanistically and altruistically in the pursuit of organisational goals" and suggested "to link the content, context and processes of change over time to explain the differential achievement of change objectives" (p.268).

3. Methodological Challenges of the PCP Study

In view of the evidence, both in the literature and from our initial experience at the acute care ward, we have changed our focus in analysing the PCP. We have discovered that even within the confines of a single ward, the health care processes can not be interpreted in the same way as manufacturing industries organise and control supply, production and distribution of goods and services. A large modern hospital is a special kind of service organisation organization, both in terms of the number of different products it delivers and because of the range of different occupational groups and technological systems which need to work smoothly together (Packwood et al. 1998). Health care organisations do not have a simple line of command structure, but are characterised by a number of autonomous and semi-autonomous groups whose concerns with health matters differ. Hospitals are not particularly noted for "organisational health", being described as "the essence of everything bad about bureaucratic organizations. They function in spite of the system, only because of the enormous professional devotion of their staff" (Jaques 1991 p.112). Thus the hospitals because of their complex power interplay, functional separation into departments and the extreme specializations of many professional groups, present one of the hardest tests a BPR approach can possibly face.

As a result we have deviated from the positivist approach assumed by default by many BPR researchers and attempted to capture the complexity of the social context in a hospital ward. The PCP, which was originally defined in strictly operational terms as a logical sequence of activities that ensures patients' progression from admission to the ward to discharge, is now viewed as a social process as well. Our task of investigating information, organisational and operational problems in the PCP became a major challenge as we are now focusing not just on the "mechanics" of the work process but also on the social aspects of it. Unlike the organisational context typically expressed in terms of structure, centralisation, and functional divisions each with it's own functional goals, inputs and outputs, that are usually well documented and relatively easily observed, the social context is less tangible and relates to the notions of "meaning", perception of ones role in the PCP and its goals, informal work practices, etc. "The meanings that the study participants attribute to their activities, as well as the purposes (objectives) and a participant's own role in achieving those objectives may vary between the individuals depending on a participant's position in organization and his/hers values and perceptions. Either way the activities performed by study participants are assumed

to ‘make sense’ from their point of view, even if this is not immediately obvious to the observer the process” (Boland 1985 p.194).

Unlike information, organisational and operational flows that can be analysed and even modelled independently using techniques such as an Event-Driven Process Chain (EPC) (Scheer 1999) before being connected into a coherent dynamic view of the PCP, the social aspects penetrate each and every dimension of the PCP as a shadow, which is intangibly present in each facet of the work process.

By getting inside the “black box” of the ward with the view of the PCP as a social phenomenon, we have increased the methodological complexity of the task many-fold. Among other challenges, the study’s perspective has to be changed from a single perspective of either the “customer” who commissioned a BPR project, or the “clients” (i.e. the patients) whose predominant interest is to return to the “*the best possible*” health state, to the perspective of the ward staff which form a heterogenous group of people with various views on the PCP. Our methodological approach needed to be compatible with the “social view” on the PCP, a domain that is better explored within the non-positivist framework.

The objectives of the refined PCP study were reformulated as follows:

- To produce a valid description of the PCP that includes, rather than “explains away”, the social context of the information, organisational and operational flows.
- To allow for multiple perspectives of ward staff, yet somehow derive a single account of the future state of the PCP (including IS solutions), which is in some sense “more efficient” and presents a “better value” than the existing PCP.
- To present the researcher’s account of the PCP in the form of requirements definitions compatible with the formal, context-insensitive rules for IS development.

To fulfil these objectives we had to review ontological and epistemological and methodological foundations of the original PCP study.

4. Ontological and Epistemological Perspectives of the Refined PCP Study

We were facing a dilemma: on the one hand we wanted to carry out the BPR objective of making the PCP “more efficient” and enabled with IS innovations. That implies that we view the PCP as an “objective” and “manageable” reality.

On the other hand we are conscious that unless we present the PCP as a social phenomenon from the perspective of the end-users, i.e. accommodate their “subjective” views, the future of the IS may be doomed.

It immediately follows that the re-formulated objectives of the study cannot be achieved within a single “paradigm”, either positivist or interpretive. The study seems to be in violation of “paradigm incommensurability” (Burrell and Morgan 1979) as we arrive at a “mixed-method approach” (also called a “cross-paradigmatic” approach) which “challenges not just incommensurability conjecture,… but the very independence of paradigms” (Klein and Myers 2001; p. 226). However, we are not alone in this quest. The foundations for a cross-paradigmatic approach in IS research have been defended on theoretical and methodological grounds (Lee 1991) and successfully applied in practice (Kaplan 1988; Gable 1994).

Some published studies avoid discussion on ontological or epistemological issues and simply apply a mixture of quantitative and qualitative techniques such as questionnaires, interviews or participant observations. However, Falconer and Mackay (1999) rightfully argue that the ignoring of ontological issues leads to a methodologically flawed research design. While the positivist research tradition has largely established a working consensus on philosophical and methodological issues, researchers adopting alternative positions cannot treat methodological issues as a technical matter and need to relate the study design to some philosophical assumptions, methodological principles and practices.

Our contradictive view on the PCP as being an "objective", manageable, reality, which is nevertheless carried out by individuals with their own "subjective" understanding of the process, has been resolved within the ontology of "subtle realism" (Hammersley 1992a), based on the assumption that reality *does* exist independently of the observer, however, there is no way in which the researcher can escape the social world in order to study it.

"Subtle realism" rejects the positivist assumption that scientific inquiry is "value-free" and that researchers, as impartial observers, can objectively evaluate the phenomena. This critique is particularly relevant to health care research since researchers may be closely allied to doctors and other health professionals whose assumptions and understandings may be very different from those of patients or other stakeholders. It is also apparent that from the "subtle realist" position it is not possible to achieve a single "optimal" state of affairs in the social world even if general laws are known and the relevant initial conditions are manipulable. The very notion of an "optimum" always carries a value judgement, and can only be achieved from a particular point of view, for example, from the perspective of an organisation's senior management. More often than not, there are "winners" and "losers" in every endeavour pursuing organisational change, including the changes brought about by IS.

Epistemologically, "subtle realism" maintains that the researcher's claim about independently existing phenomena may be more or less accurate, however, any given reality can be represented from a range of different perspectives, and each perspective is potentially true. This approach accepts that representations of reality are always representations from a particular point of view and that it is futile to search for "a body of data uncontaminated by the researcher" (Hammersley and Atkinson 1995 p.16). This position creates a possibility of multiple, non-competing, valid descriptions and explanations of the same phenomenon. The researcher's claims about reality, as well as the claims of the subjects of his research, are expected to be complementary because all of them relate to an independent, underlying reality, therefore the researcher has a chance of converging them into a multi-faceted description of the phenomenon of interest.

"Subtle realism" offers a middle position between positivism and subjective idealism, while accommodating some ideas of relativism. "Subtle realism shares with scepticism and relativism a recognition that all knowledge is based on assumptions and purposes and is a human construction, but it rejects these positions' abandonment of the regulative ideal of independent and knowable phenomenon" (Hammersley 1992a p. 52.)

For example, just like within the positivist framework, the structure of an organization is objective, however, individual perceptions of this objective reality may vary, so the researcher is left with the task of detecting these different interpretations of reality. The existence of multiple complementary accounts of reality often reflects the conflicting interests of social groups. The researcher's claims about reality, as well as the claims of the

subjects of his research, are expected to be complementary not in a sense of "social harmony" but in the sense of completeness. The researcher's task would be incomplete if only a selective representation of these various interpretations is produced.

It is not inconsistent with epistemological assumptions of "subtle realism" that subjects may develop "shared meanings" about the social phenomenon. However, that inter-subjective agreement is not merely a product of the "shared human cognitive apparatus" (Archer 1988), rather the shared constructs are both the product of social interaction of the study subjects with each other, and also the result of subjective experiences of the "shared" social world. These experiences allow testing and refining of one's own subjective interpretations of organisational rules, practices, and social contexts. Common experiences (e.g. as a member of a particular profession, such as nursing) provide the foundation for a shared view on social reality.

Subtle realism is equally appropriate for the use of qualitative and quantitative research techniques. As an alternative to the ontological and epistemological dichotomies, it allows the researcher to apply the methods of interpretive research without abandoning a commitment to arrive at a plausible account of objective reality. By alleviating the ontological and epistemological dichotomies, subtle realism provides a theoretical foundation for cross-paradigmatic research and methodological triangulation**.**

5. Suggested Methods for the Refined PCP Study

The purpose of this section is to suggest the best methods for an empirical study that would best suit the refined objectives and be consistent with theoretical assumptions of "subtle realism".

Our empirical investigation of the refined PCP took the form of an ethnographic field study where we employed methods of participant observation, opportunistic interviews and document analysis. It is outside the scope of this article to elaborate on the use of these text-book techniques (Miller and Dingwall 1997; Fulop et al. 2001).

Conceptually, the mixed-method approach allowed the combination of an ethnographic approach to data collection with modelling techniques to bridge the gap between the formal context-insensitive language used by systems analysts with the informal, textual representation of socially situated data.

Operationally, our approach involved iterative cycles of collecting data using an ethnographic approach and using these data for creating a process model.

5.1 Ethnography

Ethnography shares with phenomenology its interest in people's ability to interpret the social world, to assign meanings to social phenomena and their own actions. "Central to the way in which ethnographers think about human social action is the idea that people construct the social world, both thorough their interpretation of it and through the actions based on those interpretations" (Hammersley 1992a p. 44). Hammersley and Atkinson (1995) suggest that the commitment to understanding study participants' perspectives implies that in practice, the researcher seeks to employ methods that facilitate access to the participants' meanings, rather than disguising them. However, Hammersley (1992b) also argues that the interest towards "meanings" from participants' perspectives is more appropriately understood as a means to

the end rather than as an end in itself. Ethnography is more concerned with participants' practices than with their perspectives and cognitive categories (Murphy et al. 1998).

Cavaye (1996) advocates reducing the dependence of IS research on an interpretive model that concentrates on eliciting meaning and developing "constructs" from the participants' perspective. In terms of requirements analysis, the use of the interpretive model is frequently limited to identifying and interpreting the relevant classes and categories in the documents generated and distributed within an organisation. The IS design is based on these classes and categories, but the practices through which the documents are written, read and used are largely ignored. This limits the opportunity of connecting BPR with IS development. Heath and Luff (1996) in a study on the use of medical records in British General Practice reasoned that "by ignoring these practices, the design not only discounts the indigenous rationality oriented to by the doctors themselves in the producing and reading the records, but fails to recognise that such practices are themselves inextricably embedded in the day to day constraints of *in situ* medical work." (p. 360).

In the refined PCP study the attractiveness of ethnography is that it allows the researcher to experience the work practices first hand, while observing the participants as they go around their daily routines. Eventually the researcher achieves the stage of "interpretive understanding" Lee (1991), and is able "to make sense" of the observed activities as the participants' views on the social reality becomes more and more transparent. Both the participants and the researcher experience the "shared" objective reality that forms everyday common sense and everyday meanings that underline the observed activity patterns.

5.2 Process Modelling

Producing a process definition of such a complex phenomenon as the PCP that accommodates different perspectives of human actors within a large teaching hospital can amount to a task that challenges human cognitive abilities. To assist in this task, the study complements an ethnographic approach to data collection with highly structured modelling techniques used in business systems analysis and reengineering. Business process modelling differs from other modelling techniques used in software engineering (such as Interactive Structure Model, Business Structure Planning etc.) in that it seeks to capture organisational human activities at the level of operations, rather than supporting IT strategic development or merely concentrating on data structure, storage and retrieval.

Modelling is intrinsic to the comprehension of complexity. Paper-based business process models in the form of graphical presentation of clinical pathways, workflow diagrams and organizational hierarchies have been used in the health care industry for decades. Graphical representations of the work processes are used for educational purposes, to provide guidelines in decision making, and to delineate role-determined responsibilities within the organizational hierarchy (e.g. Role Activity Diagram method).

Also, though this is a less frequently acknowledged function, graphical representation provides an opportunity for staff to compare their individual mental models and assumptions against perceptions of reality of other members of the team, which can lead to the revision of the cognitive models (Wastell 1994). Models can be used as a common basis for a debate of problem areas, promote mutual understanding and facilitate reconciliation of different viewpoints (Davis 2001).

In the refined study the PCP is modelled using a computer-aided analytical tool with a degree of complexity comparable with the phenomenon of interest. We have selected the ARIS house conceptual framework (Scheer 1999; Davis 2001) as a major tool for the development of expressive and intelligible graphical notations for baseline process capture and representation. The idea is to adapt the ARIS "objects" by assigning them

- the meanings from the participants' perspective (i.e. "the purpose of the PCP" is expressed in terms of organisational goals); and
- characteristics (properties) specific to an individual participant and/or a social group.

Boland (1979) argues that at every level of task performing, there is an actor who identifies (notices, pays attention, treats as meaningful) organisationally relevant objects (the persons, events, information), and interprets those objects through interactions with other actors. Expressed in terms of the model's "objects" and the corresponding relationships, the differences in the actors' interpretations of the (problem) situation are shown as different patterns of formal and informal communications and actions that target various objectives in the hierarchy of organisational objectives.

In fact, our data seems to support the positivist assumption that variations in the pattern of behaviour between professional groups are largely determined by their roles, and are also reflected in their role-determined view on the purpose of the PCP that are shared among the member of the same professional group. For example, "effective discharge" has been identified as one of the documented organisational objectives of the final stage of the PCP where criteria (or means objectives) for "effectiveness" are two-fold: "promptness" and "safety". Through the direct observation and opportunistic, situation-specific interviewing we have discovered that from the allied health professionals' point of view ensuring patients' "safety" is paramount, with "promptness" being a secondary objective. At the same time the ward management sees the hierarchy of objectives in the reversed order with promptness being a primary objective, however conditional on maintaining a certain standard of patients' safety. In practice, each individual discharge is being subjected to negotiations between the two independent professional groups, each with its clearly identified set of responsibilities until a compromise is achieved. Paradoxically enough, the "effectiveness" of discharge in the context of this particular ward is routinely achieved because of (rather than in spite of) the existing disparity in the social groups' perception of the purpose of the PCP, with one of the group (allied health) primarily advocating interests of the individual patients while the management's role is primarily to serve an overall hospital's objective of providing a steady stream of health services to the designated population. In this case the hospital organisational structure provides a necessary condition for the negotiation process to be successful; this is because the "objective reality" ensures organisational and financial independence of allied health department from the ward.

The scope of this paper which targets methodological issues first of all does not provide for more elaborate result presentation. In the model, which is, in the end, the researcher's own perception of the PCP, this small fragment of the PCP as well as the preceding stages are depicted as consistently and repeatedly observed EPCs performed by the members of various professional groups (nurses, doctors, management, allied health and administrative staff) according to one or another organisational goal.

However, the social aspects of the PCP can be traced down to the individual level. Variations in behaviour of staff members belonging to the same professional group were interpreted as related to differences in personal characteristics (eg. risk aversion, professional competence)

and to the differential access to organisational and information resources. The latter is depicted as an alternative structural pathway in the model, in essence a "shortcut", that allows an "object" (a staff member) with particular properties (characteristics) to achieve the same objective using ones' personal, mostly informal connections.

Modelling of the PCP includes repeated cycles of refinement and validation through both consultations with the participants and continued observation, and is concluded with business systems analysis conducted from the alternative perspectives of the participants. Finally, a set of scenarios depicting a range of alternative "efficiency gains" based on the different perceptions of the hierarchy of goals is presented. The choice of the "optimal solution" is left to the study participants. It is hypothesised that the "power" group will be best positioned to select its preferred scenario.

6. Conclusions

This paper describes our journey that started from the conventional task of investigating information, organisational and operational flows in the PCP, evolved into the stage where the PCP was defined both as an objective, manageable, reality and a phenomenon of the social world populated by individuals with their subjective and/or shared understandings of the PCP. The dual perception of the PCP has called for establishing and defending a philosophical foundation for cross-paradigmatic research.

"Subtle realism" offers an ontological and epistemological solution to the dilemma and provides a theoretical foundation for methodological triangulation, i.e. the combination of an analytic technique of BPM with non-positivist ethnographic research.

Combining modelling techniques with an ethnographic approach to data collection and interpretation is, in our view, one way to address the problem of the inherent "objective-subjective dichotomy in systems analysis" (Goguen 1994). This combination offers a practical solution to the problem of converting the rich and textured conclusions of an ethnographic enquiry into formal requirements definitions that suit the purposes of both IS development and business process redesign.

The practical output of the study is a representation of the PCP from the different perspectives of the study participants. The final product of the research is a multi-faceted model of the PCP (incorporating process definition and analysis) that captures the contextual complexity of the hospital ward, the reliability of which can be established with some level of confidence (methods for establishing validity and reliability in qualitative research are discussed in Murphy et al. 1998).

The challenge of this study was to reconcile the highly structured modelling concepts, used by business process analysts for requirements definitions with the "subjective" views of the participants. So far we have been able to reduce the variations in work practices using process diagrams. We believe we have achieved this without compromising on the contextual complexity. This is because the purpose of the PCP study is to depict the *process*, i.e. the observable chain of events, (notwithstanding their complexity), not to reflect on the participants' "meanings" *per se*, although undoubtedly it is the meanings that guide the alternative behaviour patterns. However the search for "deviant cases" that would defy the rigid structure of EPC continues.

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