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THE IMPORTANCE, CHALLENGES AND PROSPECTS OF TAKING WORK PRACTICES INTO ACCOUNT FOR HEALTHCARE QUALITY IMPROVEMENT: NURSING WORK AND PATIENT STATUS AT A GLANCE WHITE BOARDS

Abstract

Purpose

This paper underlines the importance of taking work practices into account for Quality Improvement purposes, highlights some of the challenges of doing so and suggests strategies for future research and practice. Patient status at a glance, a Lean-inspired QI intervention designed to alleviate nurses of their knowledge mobilisation function, is deployed as an illustrative case.

Design

Ethnographic data and practice-based theories are utilised to describe nurses' knowledge mobilisation work. The assumptions about knowledge-sharing embedded in patient status at a glance white boards (PSAGWBs) are analysed drawing on actor network theory.

Findings

There is a disparity between nurses' knowledge mobilisation practices and the scripts that inform the design of PSAGWBs. PSAGWBs are designed to be intermediaries and to transport meaning without transformation. When nurses circulate knowledge for patient management purposes, they operate as mediators, translating diverse information sources and modifying meaning for different audiences. PSAGWBs are unlikely to relieve nurses' of their knowledge mobilisation function and may actually add to the burdens of this work. Despite this nurses have readily embraced this QI intervention.

Limitations

The study is limited by its focus on a single case and by the inferential (rather than the empirical) nature of its conclusions.

Originality

This paper illustrates the importance of taking practice into account in healthcare QI, points to some of the challenges of doing so and highlights the potential of practice-based approaches in supporting progress in this field.

Introduction

The quality of healthcare is a global concern and the past two decades have witnessed an exponential increase in initiatives designed to augment organisation and delivery processes. As the rigorous evaluation of quality improvement (QI) has become more widespread, there is mounting evidence that an intervention that has been successful in one location will not necessarily deliver the same results elsewhere. ~~This has stimulated an appreciation of the need to better understand the inter-relationships involved in the content-context-implementation triangle. Theory-driven approaches to QI are widely believed to be central to this aim, necessary to better understand the problem to be addressed, how an intervention has its effects and the modifications and conditions required for successful implementation in different contexts. Despite recent advances in this field, however, relatively little attention has been paid to how work practices, that is the material and cognitive processes through which healthcare activities are accomplished, may be taken into account for QI purposes.~~ Deploying nursing work and Patient Status at a Glance Whiteboards (PSAGWBs) as an illustrative case, in this paper I demonstrate the importance of attending to work practices for QI purposes, highlight some of the challenges of doing so, and underline the potential of practice-based theories, particularly actor network theory and activity theory, to advance the science and practice of theory-driven QI.

Background

As the appetite for QI in healthcare has grown, the need to develop the underpinning science has become increasingly apparent. In recent years field leaders have developed guidance to support clinical teams to build greater clarity into the design and reportage of local QI projects (Ogrinc et al., 2008). The aim is to increase the rigour and cumulative insights of the large volume of service-led literature which hitherto has

tended to be a-theoretical, -a-contextual, a-historical and remarkably poor at describing the problem to be addressed, the organisational context, the implementation process and the QI intervention. Additionally, there is a growing body of social scientific literature endeavouring to advance theory-driven QI, with important contributions generated by the growing number of large-scale case study evaluations of centrally-driven QI programmes, policies or regulatory changes (Benn et al., 2009; Greenhalgh et al., 2009; Dixon-Woods et al. 2011). Although well-suited to analyses of the complex inter-relationships involved in QI required for theory generation, what has emerged from this literature is an understanding of quality improvement as a change management issue located in *organisational* rather than practice concerns. Accordingly, much academic attention has been directed at meso-level factors consequential for success with authors turning to theories arising from social psychology, organisational studies, knowledge management and innovation studies to advance understanding (Robert and Fulop, 2013). Although it is understandable that the specific implementation and evaluation challenges presented by large-scale programmes have stimulated inquiry along this particular path, the net result is that higher order topics, such as culture, group norms, leadership, resources and strategy, figure prominently in the literature (see, for example, Powell, Rushmer and Davies, 2009), with micro-level contextual factors, such as work practices, notably absent. A small number of studies have employed normalisation process theory to understand QI interventions which directs attention to systems of work in assessments of the ‘coherence’ of an intervention in a given context, even here, however, the focus is on the normative constraints of the environment in enabling an intervention to become embedded in an organisation, rather than the performative aspects of QI interventions and their interaction with practice (Pope et al., 2013).

The neglect of work practices for QI purposes is exactly the reverse situation to the allied field of adverse event root-cause analysis, where much of the prevailing theoretical and empirical work typically focuses on the relationship between individual performance and the immediate work environment and fails to take into account wider organisational factors (Waring, McDonald and Harrison, 2006). Thus it would appear that work practices are held to account when things go wrong, but are not taken into account when intervening to ensure things go right. All too often interventions are routinely imported into

healthcare from other fields – such as aviation or manufacturing – with little consideration of sector differences and progress straight to implementation with scant attention to problem diagnosis as a precursor to intervention selection and/or development. This, as Dixon-Woods (2013) has observed, is equivalent to by-passing the laboratory and pre-clinical and pharmacokinetic stages of drug development.

The trend in healthcare to uncritically implement ready-made solutions for poorly-specified problems can be explained, in part, by QI tools' symbolic value in securing organisational legitimacy (Dimaggio and Powell, 1983). Healthcare systems operate within an institutional environment which generates distinctive cultural pressures about appropriate ways of acting; the guidelines, checklists and protocols that have propagated in healthcare, can be understood as an attempt to signal to the outside world that the organisation is making a good faith effort to achieve valued ends. It is also the case that service providers face challenges of such magnitude, that without a pre-existing QI toolkit, frontline staff would be paralysed by the complexity of the issues that confront them. But the immediate pressures on both the 'blunt' and the 'sharp' ends of service delivery are only part of the explanation. At a more fundamental level, it is also the case that many of the practices targeted by QI are at best poorly-understood, and at worse largely invisible to the organisation. Feminist scholars, for example, have drawn attention to the invisible work of women employed in service sector posts, poorly remunerated because their role is believed to rest on natural attributes rather than workplace skills (Pringle, 1989). Workers themselves are not always aware of their contribution to an overall activity (Nardi and Engeström, 1999), lack a language with which to describe certain tacit skills (Hampson and Junor, 2010) or the confidence with which to assert their claims and/or may feel obliged to offer official rather than realist accounts of how the work is done (Dourish, 2001). Yet there are significant dangers in taking the formal organisational plan as an indicator of real-life work activity as innumerable workplace studies have shown, and considerable evidence too, that technology implementation and/or workplace restructuring advanced on the basis of only work that is visible will run in to difficulties (Westerberg, 1999). Unless scholars and practitioners connect with work in their analyses, there is a risk that QI initiatives remain disconnected from the activities they are designed to support and/or change and this will be consequential not only for

the effectiveness of the intervention but may have unintended negative consequences, although healthcare has a poor record of attending to this possibility (Dixon-Woods, 2013).

No work is intrinsically visible or invisible, however; work is made visible through a number of indicators and this may change according to the perspectives through which it is viewed (Muller, 1999; Star and Strauss, 1999). In this paper, I argue that theoretical frameworks derived from practice-based theories offer a useful lens through which work activity might be rendered visible for QI purposes and that actor network theory (ANT) is of value for analysing QI interventions, the assumptions about the work on which these are based, and the relationships between human and non-human actors in a given field. I will illustrate my argument through the analysis of PSAGWBs and nursing work.

The case study

Patient Status at a Glance Whiteboards

Patient status at a glance is a process module from the UK National Health Service (NHS) Institute for Innovation and Improvement's Productive Ward Series. Founded on Lean methodology (Womack, Jones and Roos, 1990), Productive Ward is a high profile example of the growing number of QI methods applied to healthcare, which draw on paradigms originating in systems engineering and management science (Waring and Bishop, 2010; Radnor, Holweg and Waring, 2012). Members of the Institute worked with Toyota to consider how hospital care could be streamlined. Intended to empower frontline staff to improve the quality and efficiency of their services, the programme comprises 13 modules and tools, clinical facilitation, conferences, training and web-based support (Morrow et al., 2012) and focuses inter alia on de-cluttering ward storage areas, structured inter-shift handover and patient status at a glance.

PSAGWBs are underpinned by the principles of visual management (Grief, 1991) and the idea that making issues more visible provides a shared picture of operations. Communications boards are often used in Lean environments to aid team decision-making by displaying relevant, up-to-date information. The purpose is to make information on a patient's status widely available and reduce the number of times

nursing staff are interrupted by queries. While there have been anecdotal reports of local successes, as yet, there has been no rigorous evaluation of Productive Ward either in whole or in part. Nevertheless, it has been widely adopted in the UK and beyond and is generally regarded as a successful example of the implementation of a large-scale quality improvement intervention (Morrow et al., 2012).

Critical to the diffusion of Productive Ward in the UK was the effectiveness with which its originators were able to frame the intervention differently in order to win the hearts and minds of its target audiences. While the language of ‘productivity’ in the notion of Productive Ward had resonance for managers and board members, it was its strap line – ‘releasing time to care’ - that connected with the professional values of frontline nurses who would be largely responsible for implementation (Robert et al., 2011). While care-giving is central to their professional identity, little-by-little contemporary healthcare systems have pulled nurses away from this professed metier (Dingwall and Allen, 2001). In this context, interventions that purport to release time to care have self-evident appeal. In the second part of this paper I will use ethnographic research on the ‘organising work’ of hospital nurses and make inferential insights derived from actor network theory to raise some critical questions about the aspirations invested in PSAGWBs and their likely impact on nurses’ work. Building on this analysis I will make some suggestions for how the theoretical approaches deployed here might contribute to making work practices more visible in order to advance the science and practice of theory-driven QI.

Theoretical framework

Practice theories share a number of conceptual similarities (Nicolini, 2013) and their origins can be traced through praxeology (Bourdieu, 1977; Bourdieu, 1990), ethnomethodology (Garfinkel, 1967), structuration (Giddens, 1984) and activity theory (Engeström, Engeström and Vähääho, 2002; Engeström, 2008).

Practice theories all conceive of social phenomena as created by human agency through actions made possible by an array of materials. They emphasise that human subjects do not relate to the world directly; bodily activity is always mediated by artefacts. In healthcare, these may be material artefacts such as

surgical instruments, protocols or paper-based forms, or psychological artefacts such as heuristics, medical concepts, categories and methods. Artefacts are structured in different ways and these ‘affordances’ (Hutchby, 2001) shape the possibilities for action. Indeed artefacts do not just support human endeavour, they transform the nature of the task. For example, the creation of a ‘to do list’ by committing to paper what as previously in the mind of the individual transforms the task from ‘retrieval of the list from memory’ to ‘remembering to look at the list and reading the items on it’ (Norman 1991). Thus of particular interest is the relationship between artefacts and human action and how practice is distributed between them (Berg, 1997a; 1997b; 1999). ANT’s insistence on linking human and nonhuman actors makes it possible to study such associations, and provides a vocabulary for the task. In the same way that activities can be redistributed between workers, they can also be shifted between people and artefacts. ‘Delegation’ is the term used to refer to the actions that a nonhuman entity is being asked to fulfil when enrolled into practice (Latour, 1998) and ‘prescription’ is the term that denotes the activity the nonhuman entity imposes back on its human users (Latour, 1998). Tools and technologies are understood to embody assumptions – termed a ‘script’ - about the context into which they will be introduced and these will have implications for existing work organisation. ANT affords an analytic sensitivity to the relationships between the heterogeneous elements comprising a field of practice.

Study Aims

This paper draws on data generated in a wider study designed to better understand the nursing contribution to healthcare delivery, referred to here as ‘organising work’. Nursing’s claim to expertise is predicated on a holistic model of patient care informed by a bio-psycho-social approach. Yet research demonstrates nurses not only experience significant material constraints in realising their ideals, their work extends far beyond clinical care. In numerous ways, nurses support and sustain the delivery and organisation of health services and the demands and complexity of this work are increasing (Duffield et al., 2007). The aim of this study was to shine a light on this relatively invisible aspect of nursing practice to contribute to debates about the contemporary nursing mandate (Allen, 2014a, b; 2015 c).

Study Design

Forty UK hospital nurses working in adult care settings in clinically-oriented roles were shadowed between March and August 2011. My focus was on what nurses did, the tools they used and what these practices revealed about their underlying knowledge. On average eight hours of fieldwork was undertaken with each participant. The primary sources of data were non-participant observation, insitu ethnographic interviews, and the analysis of material artefacts. Ethnographic interviews were tailored to the role under observation and designed to better understand aspects of nurses' work practices. I collected examples of the documents nurses used in their work – check lists, care pathways and care plans - taking care that none of these contained patient information. Field data were recorded in a spiral-bound jotter and word-processed at the earliest opportunity. Observations were low-inference, capturing what was actually said and done without interpretation. Research ethics approval was granted by the University.

The selection of participants was informed by an expert reference group drawn from nurse education, research, service and policy. A typology of environments identified as likely to be consequential for nursing practice was developed in order to purposively select a maximum variation sample of role formats to capture the full spectrum of nurses' organising work. Exhaustive coverage of all specialities or the full nursing function was not intended; the purpose was to identify roles that would yield rich data given the research aims. Twelve roles were selected initially, with others subsequently added as a result of the concurrent analysis. The final sample comprised service-based rotating roles (undertaken by different team members periodically) and roles occupied by individuals on a permanent basis. Only two participants were male. Nurses were recruited through line-managers but assured participation was voluntary. Signed consent was obtained and individuals informed they could withdraw from the study at any time. I shadowed several participants working in specialist nursing roles, including the acute pain management and colorectal nurses, nurses who worked in roles that included a gate-keeping function, such as the cardiac coordinator, the stroke coordinator and the anaesthetic pre-assessment nurses, and others, like the rehabilitation specialist nurse and the discharge liaison nurses, whose primary responsibilities related to the negotiation of interfaces to secure transfers of care. I shadowed nurses in

service-based coordinator roles in the Emergency Unit, Medical and Surgical Assessment Units, Short Stay Surgical Unit, General and Cardiac Surgery Intensive Care Units as well as general ward areas.

Nevertheless, this was not a study of nursing *roles*; practices were the unit of analysis.

Data generation and analysis proceeded concurrently. Observations and interpretations were routinely shared with the individuals I shadowed and also senior nurses within the organisation. These conversations were a constructive check on the face validity of the emerging analysis and were unlikely to have had any biasing effect on participants' practices as they were typically asked at the end of shadowing episodes as part of a sense-checking conversation about the individual's role. Throughout the study, I periodically reviewed the whole data set, drawing out similarities across, and differences between roles, so as to assemble findings into broad themes. Once fieldwork had ended, all data were entered into computer-assisted qualitative data analysis software (Atlas/ti) to support data management. An initial coding frame facilitated data retrieval and was subsequently refined in accordance with the emerging analysis. Organising practices were the focus of concern. My aim was to describe these as explicitly as possible and the artefacts that supported them, tease out the knowledge and skills that underpinned them and explicate the system features which made them necessary. The analysis progressed through reading and re-reading all materials, identifying patterns and relations, and attending to how the data related to the theoretical framing. Ideas generated inductively from the data were considered in the light of relevant literatures and sensitising concepts. The study revealed that nurses contribute to the organisation of healthcare systems through four domains of practice (self-citation). For the purposes of the current analysis I will focus on one such domain: nurses' work in creating the knowledge flows that support the practical delivery of healthcare.

Findings

The challenges of knowledge sharing in healthcare

Healthcare is knowledge intensive work but knowledge sharing is challenging. While the language of 'team' is frequently used in this context, teamwork in healthcare is complex (West and Lyubovnikova 2013), with patient care widely distributed across time and space and typically progressed through

individual rather than collaborative activity. The demands of knowledge sharing are further compounded by the fact that trajectories of care are constantly evolving in directions which are not always predictable (Strauss, Fagerhaugh and Suczet, 1985). Yet despite this complexity, fragmentation and uncertainty, it is rarely, if ever, that all participants come together to share information and negotiate their respective contributions. Ward rounds and team meetings are important, undoubtedly, but compared to the dynamism of trajectories, they are relatively infrequent events and they are never attended by everyone involved in a case. Furthermore, the patient record, the traditional medium of inter-professional communication, is increasingly being shaped by its archival (Fitzpatrick 2004) function in order to meet the requirement for auditable systems of clinical governance, and this has undermined its value in supporting ongoing work activity (Allen 2013). Located in the sites of care, it falls to nurses to support everyday knowledge flows and it is the burdens associated with this function that PSAGWBs are intended to alleviate. In the analysis that follows, I first describe the practices through which nurses created a working knowledge in the study site. I will then apply an ANT lens to uncover the assumptions that are made about this work in the script PSAGWBs embody and raise some critical questions about how far the work of knowledge sharing can be redistributed from nurses to these artefacts.

Creating a working knowledge: Nurses' practices

Hospital nurses work continuously in the sites of care whereas others operate across a wider landscape and offer temporally intermittent services. In the daily comings and goings of health professionals and service managers around patients, nurses were a central information source and a common link.

'Well we're the link really, the dieticians and the physios and everyone tell us and then we communicate it to everyone else'.

Trajectory narratives

Nurses fulfilled this 'link' role through the generation and circulation of 'trajectory narratives'. Trajectory narratives are narratives of encapsulation (Knorr-Cetina, 1999) and a working record of individuals' on-

going care. They are created by nurses when patients enter the service – through what is misleadingly called the nursing admission process - and then set into circulation within the nursing team through the equally misleadingly termed ‘nursing handover’. This is misleading nomenclature because trajectory narratives extend far beyond nursing interventions to include a summary of the current status of an individual’s overall care, understood as ‘not only [...] the physiological unfolding of a patient’s disease but [...] the total *organization of work* done over that course, plus the *impact* on those involved with that work and its organization’ (Strauss, Fagerhaugh and Suczet, 1985: 8, original emphasis).

Within the nursing body, the construction of trajectory narratives was a collaborative endeavour. Nurses worked together during handover to assemble a picture of the patient, their care, and the associated resources and activity. The following extract is a typical example.

Night Staff Nurse: Bed 7 [name] 96 came in with chest pain. She has a respiratory infection and is on IV antibiotics. She’s on 24 hour obs, NFR [not for resuscitation]. She’s variably continent. She’s for a residential home but I think she’s going to need increased physio.

Coordinator: She transferred fine from bed to chair with the Zimmer

Staff Nurse: She’s variable

Night Staff Nurse: Yeah we need to refer her to the physio.

Plot summaries

Nurses made a written record of trajectory narratives during handover. These notes were rather like ‘plot summaries’ and included actions (completed and outstanding) germane to the whole trajectory of care. Whether inscribed on scraps of paper, pre-printed handover sheets, or the unit coordinator’s book designated for this purpose, these plot summaries were highly portable, easily accessible summation of the status of a care trajectory that could be readily updated. This latter affordance is important: trajectory narratives are dynamic artefacts, continuously revised during ongoing work activity, through scrutiny of the medical record, attendance at ward rounds and team meetings and dialogue with the network of actors involved in a given case.

When coordinator had attended nursing handover she had written the information in the book in black. I noticed that since we had done the ward round new information had been added in red - so it was very easy to see changes that had taken place. It now also included actions required such as 'OPA' [outpatients appointment] 6-8 weeks, DN [District Nurse] (this was followed by a box which I presume was there so this could be ticked off when done); weigh - Sunday; NG [nasogastric tube] keep in 48 hours; 30 mls fluid; encourage fluids, TTHs [tablets to take home], ? home over weekend, sutures next Thursday.

Nurses' plot summaries were a pragmatic condensation of the current trajectory status that was unavailable elsewhere and functioned as an important aide memoire.

The doctors are handing over to each other.

Doctor 1: Why did he put him on [drug] and crossed him off [drug]?

Coordinator: I'll just check; it might be in my book.

Pain Specialist Nurse: Now I will look at the medical notes, but quite often the easiest thing to do here is to look in the book [it] is like our bible'.

Nurses' tended to rely on their plot summaries rather than the nursing and medical record as the primary information source, and their importance was evident in the panic engendered if they were mislaid or lost.

We go to the next patient who is sleeping. Coordinator thinks she is 'Nil by Mouth' and looks to consult his handover sheet. Coordinator: Don't say I've lost that already! That would be a disaster!

Sensemaking

The work involved in maintaining trajectory narratives entailed more than accumulating information, important though this was. Decisions had to be taken about what to take note of and what to ignore, the relationship between different knowledge sources had to be adjudicated and inconsistencies and

anomalies resolved when elements of a story did not stack up. In other words, trajectory generation and maintenance, involved sensemaking (Weick, 1995).

Night Staff Nurse: In cubicle □ 75, subtotal gastrectomy. He's an ERAS (Enhanced Recovery After Surgery pathway) patient. He's got e coli in his wound.

Staff Nurse: That's a funny place to get e coli

Night nurse: Bed 3 □ 74 year old lady. I can't understand this transfer as she came from gynae but she was under urology. I didn't think you could transfer from an outlier to an outlier.

Staff Nurse: You can't; not really.

Not to be mistaken for interpretation, sensemaking entails authorship. Thus through their knowledge mobilisation nurses *created* the narratives which supported the work.

Translation

There is a growing recognition that the notion of narratives is a useful concept for helping us to understand the reasoning processes, interaction and information sharing in healthcare settings. Narratives are a workable medium for representing knowledge that is time and context dependent and often uncertain and ambiguous (Mønsted, Reddy and Bansler, 2011). Moreover, one of their advantages as a mechanism for knowledge-sharing is that they can be modified for different audiences. Indeed, close examination of nurses' use of trajectory narratives in their everyday interactions with the network actors involved in patient trajectories, reveals that these are not circulated in the same form: nurses select out and elaborate on those elements relevant to the work purposes of different contributors. Compare the following two examples. In the first, the coordinator concentrates on those details relevant to the work of the physio-therapist and in the second, it is the doctor's concerns that are oriented to.

Physiotherapist: I did the stairs with him but I'd better do them again

Coordinator: He went down to the concourse because Consultant said he needed to get up and about but when he came back he looked terrible [...]

Coordinator: [Name] has a terrible chest, awful green sputum. It's been sent for culture. She needs to mobilise.

Physio: We couldn't do anything yesterday; she was too ill. Is she on antibiotics?

Consultant: Any issues?

Staff Nurse: Probably! Let me check [she takes the handover sheet from her pocket].

Staff Nurse: [Name] slipped off the commode in the night.

Consultant: I saw the incident report. Is her mood better?

Staff Nurse: Not really.

Consultant: And this new gen?

Staff Nurse: [checks list] He has low BP and sore groins.

Consultant: Are we applying Canestan?

Staff Nurse: [] – it's like raised rash. [reading from list] He's allergic to gluten but you probably don't need to know that!.

So while the work of nurses involved the construction and maintenance of a master trajectory narrative, they used this as a resource for the creation of multiple narratives adapted to the needs of the situation. Knowing what version of a story to tell, involved the ability to recognise and appreciate others' work purposes and their distinctive ways of understanding the same situation so that the relevant information is prioritised, what Boland and Tanski (2001) refer to as perspective-taking. The repair work undertaken by the nurse in the second extract in the reference to gluten intolerance (*'you probably don't need to know that!'*) is particularly revealing of the normative expectation that information sharing should be tailored to the needs of the audience.

In supporting knowledge flows, then, nurses are not simply functioning as a distributed memory as some have suggested (Bowker, Star and Spasser, 2001); they bring about translations. 'Translation' is the broad term used within ANT for the processes by which network elements are held together, through the alignment of goals and concerns, or by keeping contradictory elements apart. It has both a geometric and a semiotic meaning, referring to the movement of an entity in space and time, as well as its translation

from one context to another. The latter has parallels with the translation from one language to another, with the necessary transformation of meaning this implies (Gherardi and Nicolini, 2005).

[Translation is] the process of making connections, of forging a passage between two domains, or simply establishing communication. [It is] an act of invention brought about through combination and mixing of varied elements.

(Brown, 2002: 3-6, quoted by Cressman, 2009)

The means by which nurse support knowledge flows are incredibly subtle, with much of this work taking place on-the-fly (Albolino, Cook and OConnor, 2007) and woven through the warp and weft of everyday interactions with the network of providers involved in a given case.

Coordinator: Bed 18 [Name] they have seen her and want her referred to an OT [occupational therapist] and a social worker

Staff Nurse: Her daughter does not want anything I spoke to her. But I get the impression she thinks she's going to improve. I did say that she was not fit enough for surgery.

Coordinator: I thought they spoke to her.

Staff Nurse: If she's OK on the stairs she can go home at the weekend.

Coordinator: So we just want physio, not OT [writes in book].

As this extract reveals, out of each interaction new sensemaking and translations arise, with questions in one context, transformed into answers in another, in an ongoing continuous process. It is, however, demanding of time and resources and PSAGWBs are intended to alleviate some of these burdens.

PSAGWBs and the limits of delegation

In healthcare, at ward and unit level, white boards have been used for many years to indicate bed occupancy, the allocation of staff and patient's responsible clinician. However, PSAGWBs are designed to be more than a bed board. They are intended to be a central resource for all essential patient information: vital signs scores, discharge planning progress, safety and risk indicators, dietary information and inter-professional referrals. Indeed in many ways PSAGWBs are well-aligned with the home-grown tools developed by nurses to support their work in managing information flows. Much of the information they include replicates that featured in trajectory narrative plot summaries, the main difference being that PSAGWBs made this publically accessible. Although electronic white boards exist, they were not available in the study site: information was added to PSAGWBs using coloured marker pens and/or magnetic symbols. PSAGWBs were located at the nurses' station, providing a focal point for knowledge-sharing and actors attending the ward typically stopped at the PSAGWB as the first port of call. For some, the information appeared to be fit for purpose, but having studied the PSAGWB, many others would then consult with nurses.

On arrival at the ward Patient Access Nurse goes straight to the white board (this I discover is pretty standard) where she checks on the outliers. [...] Having scrutinised the white board Patient Access Nurse tries to establish who is coordinator. She seems to know which wards work with a coordinator and which do not. Where they do not her job is made more challenging as she has to ask each individual nurse about information on discharges etc.

There were several reasons for this.

Maintaining information currency

First, the currency of the information could not be guaranteed. Healthcare environments are turbulent and fast-flowing and nurses had to work hard to ensure the information was up to date; it often wasn't. If the ward had been particularly busy, PSAGWBs could remain unattended to for several days. Unlike the plot summaries that nurses carried around in their pockets and which could be readily amended on-the-fly, nurses had to leave the clinical areas in order to update the PSAGWB. So there was inevitably a lag between a change in the patient's status and this being recorded on the PSAGWB.

A doctor comes onto the ward and studies the white board. [...]

Dr: Any issues?

Ward manager: With whom?

Dr: Monday team patients?

Coordinator: We need a medical review of this one ((points to white board)) no this one ((points to another bed space))

Dr: What do you mean by a medical review?

Coordinator: Dr X

Dr: OK ((locates the patient's notes and studies them)): She's not a Monday team!

Coordinator: Who is she then?

Dr: Thursday team

Coordinator: Has it not been changed ((looking at the board))? She came up from Poppy Ward.

Coordinator returns to the board and cannot work out which nurse is caring for the patient in cubicle B. The name is on the bed board but no nurse is allocated to him. [...] She goes down to the cubicle to find that it is in fact empty. A staff nurse informs her that this patient was a 'DNA' (did not arrive). Coordinator goes back and scrubs the name off the bed board.

Confidentiality and localisation

Second, consistent with many QI initiatives, each unit had adapted PSAGWBs for its own purposes and for patient confidentiality reasons much of the information was conveyed using a singular system of symbols. While localisation is widely believed to encourage ownership of quality improvement

interventions and is positively promoted by leaders in the field, for those who circulated multiple wards, it was almost impossible to understand anything other than the most obvious information and many needed an interpreter to make sense of the content. Indeed, in some settings, my own inquiries indicated that even the local staff did not understand all aspects of the PSAGWB content.

When I first recorded these details [of the white board] I wasn't clear what all of them meant. I asked the health care assistant who at the time was amending the board. I asked her what 'FS' was, but she did not know and said: 'the qualified do all that'. [...] Also unclear was 'rv/ptwr'. The NA asked one of the staff nurses what 'rv/ptwr' meant. [...] The nurse did not know what the abbreviation denoted.

Coordinator (to receptionist): You put the wrong colour on my board! You're confusing me.

Receptionist: Sorry! Anyway who's confusing who? You with your black writing on there!

Ward manager (who has overheard the conversation from the office): I agree!

Coordinator: For me it's plain to see [...]; you should be used to it by now!

Script: intermediaries and mediators

Third, while issues of currency and localisation are not insurmountable at a more fundamental level PSAGWBs are based on a 'script' which assumes that the challenge of information-sharing in healthcare is one of access and availability. From an ANT perspective, they are designed to be *intermediaries* and to transport meaning without transformation (Latour, 2005: 39). But as we have seen, when nurses circulated knowledge for the purposes of ongoing patient management, they were not simply accumulating information and transmitting it in an unmodified form; they drew on their clinical and organisational knowledge to interpret, translate and contextualise information for different purposes and for multiple stakeholders. Furthermore, out of each interaction, new understandings of the trajectory emerged. In creating a working knowledge, then, nurses operated as *mediators*; that is, they modified the

meaning or the elements they are supposed to carry (Latour, 2005: 39). Indeed, nurses expected members of the healthcare team to discuss patients in person and were critical when this did not happen.

Ward Manager pointed out the 'Medical Review Forms'. These are blue forms on which nurses write down jobs that need attending to by the doctor. At the top of the form there is a section for ward and date and the following text: "Nursing Staff - identify patients for priority review"; "Medical staff - please see the nurse in charge or ward coordinator for verbal handover on the patients below"

Coordinator shows me another set of patient's notes which read 'two more antibiotics, home tomorrow and review by consultant'. Coordinator explained that some of the doctors come to see patients and don't speak to the nurse and so the only way of finding out what is going on is to check the notes.

This analysis should not be meant to imply that PSAGWBs had no value. Many of the conversations between nurses and other team members took place in front of the PSAGWBs and they usefully displayed the totality of the work on a ward or unit.

As we arrive on the ward one of the junior doctors approaches Senior Nurse and asks if she can discuss a few patients. They stand in front of the bed board.

This was of particular value to the ward coordinators and, in the turbulence of the acute sector environment, the PSAGWB was a means by which overall activity could be reviewed and prioritised. However, to assume that PSAGWBs can substitute for nurses' work in supporting knowledge flows around individual patients in order to release time to care is an immense underestimation of the complexity of nurses' knowledge mobilisation function and the fluidity of healthcare work in the hospital environment.

Prescriptions

It is also the case that PSAGWBs make certain prescriptions on nurses. They require updating in response to changes in patient's status arising from decisions taken at the bedside or in interaction with

healthcare providers. Much of the information will first be recorded as plot summaries and thereafter transferred to the PSAGWB, creating another step in the process.

I asked the staff nurse whether they tended to use the white board to manage their work rather than handover sheets. She said that they used notes on paper but that they recorded everything on the board so that the nurse in charge could see what had been done.

Furthermore, whereas nurses' plot summaries are private backstage artefacts, PSAGWBs are front-stage technologies. Having a neatly presented PSAGWB was an important signifier of a well-run ward and their on-going maintenance was an additional demand on nurses' time.

Patient at a Glance White Boards	Nurses' Working Knowledge Creation Practices
Non-human actor	Human actor
Assemblage of codified items denoting patient status	Narratives of encapsulation
Generic information aimed at wide audience	Contextualised information translated for the audience
Front stage displays requiring updating and maintenance	Backstage plot summaries, updated on the fly

Table 1: Key features of PSAGWBs and nurses' working knowledge creation practices

Postscript

Since this particular project ended I have retained continuing contact with the study site, and interestingly three years on, PSAGWB use has been standardised in many clinical service areas and their content simplified. Detailed clinical information is no longer included; their content now reflects the fact that PSAGWBs appear to have most value for the purposes of bed management and discharge planning, rather than on-going organisation of individual patient trajectories. Whilst such organizational learning is laudable, PSAGWBs have been rolled out across the UK and beyond.

Conundrum

How is it, then, that nurses have been so effectively enrolled in a QI initiative which is such a poor fit with their daily work practices? Part of the answer to this question is located in nurses' on-going struggle for professional legitimacy. For the last 40 years or so, nursing has pursued a professional project (Larson, 1977) based on claims to a distinctive care-giving expertise and, as a consequence, organising work has been regarded as at best an adjunct to the core nursing function (Davies, 1995), and at worse responsible for taking nurses away from their 'real work' with patients. All the academic and educational efforts of the profession in recent history have been directed at strengthening patient care delivery rather than understanding other dimensions of the nursing role. As a consequence nurses themselves are ambivalent about this aspect of their function, are not necessarily aware of its overall contribution to healthcare delivery and, constrained as they are by the 'virtue script' (Gordon and Nelson, 2006), do not have a language with which to describe their practice or skills that underpin it. While nurses' knowledge creation work could be better supported to release time to care, it is difficult to design a QI intervention to improve or support any activity that is not well-understood.

Discussion

The analysis presented here is not a formal evaluation of the success of PSAGWBs in releasing time to care, but a prospective ANT-informed analysis of their likely impact and possible unintended consequences on nurses' work. These are logical inferences intended to highlight the importance of taking practice into account for QI purposes, rather than an empirically grounded evaluation of PSAGWBs' effectiveness. Examining the implementation of Lean in a UK surgical setting, Waring and Bishop (2010) report that health professionals claimed the group responsible for implementation of QI initiatives lacked understanding and experience of departmental processes. As we have seen, such arguments may have legitimacy. Faced with the pressing need to improve the quality of services, , leaders of QI are in danger of ignoring local activity, and/or dismissing too readily staff concerns as evidence of resistance and something to be managed, rather than knowledge to be taken into account in the development of the intervention. Yet as the data presented here indicate, important as this is, it is not

straightforward to achieve. The PSAGWB example was not just a case of the imposition by managers of inappropriate quality improvement frameworks that disregarded professional practice; nurses themselves readily embraced these processes. Thus as well as highlighting very clearly the importance of putting practice into context for quality improvement purposes, this case study points to some of the challenges of doing so.

Leaders in the field have recently underlined the need for theoretical developments to better understand the inter-relationships between content, context and implementation in QI in order to move on from the predictable lists of factors consequential for implementation expressed at such a high level of abstraction they are of little value to those on the ground (Bate, 2013). Some have called for the development of more detailed taxonomies of QI interventions and the associated contextual factors consequential for their success (Øvretveit, 2013). Others have argued for greater attention to process issues (Robert and Fulop, 2013). The theoretical influences drawn upon in this paper, focused as they are on network actors (human and nonhuman) and their interrelationships in a field of activity, offer much promise for progressing understanding as a bridge between these approaches.

In the field of computer supported collaborative work, the importance of understanding work processes for the purpose of system design has spawned a body of studies deploying practice-approaches designed to inform technology development and there is clearly a need for more fundamental research of this kind in healthcare in order to inform the science of QI. For the purposes of developing and implementing QI interventions in practice, frontline staff often have an intuitive grasp of the salient features of a work setting even if they find these difficult to articulate (Allen, 2009) and this has led some to call for greater collaboration between practitioners and social scientists (Dixon-Woods et al., 2011). Nevertheless, there can be very real challenges in finding a common language through which to build the bridges between academic ivory towers and swampy practice lowlands (Marshall, 2014). Practice-based approaches offer a useful starting point for such conversations, not least because they focus on the material and cognitive processes through which healthcare activities are accomplished and with which clinicians are familiar and provide a language to describe their interrelationships. Activity theory and ANT have potential value here. The basic unit of analysis in activity theory is the 'activity system', that is the constellation of inter-

related practices and artefacts oriented towards a shared object. Activities are not regarded as belonging to an individual but are part of a collective endeavour with an associated division of labour, tools, artefacts, norms, rules and conventions. Taking practice seriously for QI purposes would thus entail attending first to the activity in question, its actors (human and non-human) and their inter-relationships and how an activity is distributed between them. It would also focus attention on the QI intervention's intended purpose and how it will intervene in a field of practice (script), the actions that are to be 'delegated' to it and the actions it imposes on users (prescription). These conversations would lay the foundations for the development of logic models and programme theories to support the diagnostic, developmental, implementation and evaluation stages of QI. More work is clearly necessary to develop and test such a framework. I am currently leading a project which deploys these ideas in the development, implementation and evaluation of a paediatric early warning track and trigger tool (<http://www.nets.nihr.ac.uk/projects/hsdr/1217817>); my purpose here is to signal this fruitful future direction of travel. Such new framings are important, because how we think about QI and the relationship between content, context and implementation has implications for how an issue is problematised, how we go about changing and how we research it. While this study is limited by its focus on a single case and by the inferential (rather than the empirical) nature of its conclusions, it builds on and contributes to a growing body of research which has highlighted the dangers of service developments which do not take into account invisible work practices.

Conclusion

Drawing on PSAGWBs and nursing work as an illustrative case, in this paper I have argued for the importance of putting practice into context for quality improvement purposes, highlighted some of the challenges of doing so, and have suggested that practice-based approaches, specifically activity theory, and ANT, offer potentially useful resources for progressing this field, furnishing a common frame of reference to support the clinical academic partnerships necessary to underpin theory-driven QI. Moreover, rather than QI being understood as an organisational change management challenge, it might be reconceptualised, in whole or in part, as fundamentally a practice development endeavour.

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~~Lean methodologies are increasingly being deployed in healthcare and underline the importance of current state analysis. However, the focus is on accurate service process mapping rather than the work practices through which these are executed.~~