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Ethnography and survey analysis of a computer decision support system in urgent out-of-hours, single point of access and emergency (999) care.

Executive Summary

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Executive Summary

Background

Digital information and communication technologies promise to modernise health care and reduce costs. Nonetheless, it has proved difficult to embed these technologies in everyday use. There is now an impressive body of international research which shows that the everyday processes of health care work and organization are central here. Digital technologies seek to change working practices and workforce configuration and – at the same time - they require concerted action by the health care workforce to bring them into use. However, whilst research has concentrated on how health care work and organization shape the outcomes of particular technological interventions, it has rarely explored the implications of these findings for workforce management and planning. This is in part because of a focus on understanding why an intervention does (or, often, does not) become embedded in practice; and in part because the case-study focus of previous research has not endeavoured to make wider, more systematic claims to inform workforce planning and policy.

Aims

This project aims to inform workforce planning and policy by undertaking a detailed comparative analysis of the workforce implications of a particular technology, a computer decision support system (CDSS).

Our objectives were to:

1) understand the impact of the technology on everyday work and service delivery;

2) identify education and training needs for staff engaging with the technology;

3) examine the implications of the CDSS for workforce reconfiguration and management planning.

Methods

To enable systematic cross-case analysis we used Normalization Process Theory (NPT) which offers a robust framework to analyse how technological interventions are used in different settings.

Our study combined ethnographic and survey methods to conduct three case studies of a CDSS in use.

The ethnography used non-participant observation, interviews and documentary research. These data comprise nearly 500 hours of observation conducted between 2008-2010; and 61 interviews with call-handlers, clinicians, organizational managers and stakeholders including policy-makers, commissioners and system developers. We collected documents describing the CDSS design, development and evaluation, minutes, training materials and publicly available policy documents, reports and media releases.

A survey of call handlers was conducted to record demographic information and to capture skills, experience and training and assess trust in the CDSS and the wider organization. A total of 166 questionnaires were distributed, with an email reminder after 3 weeks, and 103 (62%) questionnaires were returned completed.

Ethnographic data were coded independently, analysed jointly in data clinics and imported into Atlas.Ti. We examined data within each setting and then across settings structured around our research questions and Normalization Process Theory. We used a mixture of analytical approaches including thematic analysis and matrix/charting techniques to facilitate comparison.

Survey data were double entered in MS Excel, checked and corrected. The data were exported to PASW Statistics and descriptive statistics calculated.

Our methods were integrated developmentally: the ethnography informed the survey design which, in turn, supplemented the observation and interviews. We also combined data across methods to explore convergence and contradiction.

Results

We studied a CDSS designed to enable prioritization and management of telephone calls to emergency or urgent care services. It is almost exclusively used by clerical staff in our settings (although it can also be used by clinical staff).

Our settings were:

- An established emergency call-handling service provided by an Ambulance Trust (referred to as 999).
- A new single point of access call-handling service for urgent and unscheduled care provided by the same Ambulance Trust (referred to as SPA)
- An established out-of-hours call-handling service and face-to-face patient prioritization at an Urgent Care Centre, run by a GP out-of-hours service (referred to as OOH)

This same technology is used distinctively in each setting reflecting important differences between urgent and emergency care and the context of the work. There are differences in workforce characteristics (e.g. age, qualifications), roles and organizational hierarchies in the three settings. While there is a common training programme, training practice varies across the three settings.

We analysed our data using the four domains of NPT (*coherence, cognitive participation, collective action* and *reflexive monitoring*) and this also structures our longer report. The domain of ***coherence*** encompasses the ways in which an intervention is understood as meaningful, achievable and desirable and ***cognitive participation*** considers if and how the actors necessary to deliver the intervention are enrolled into action. These processes of sense-making and engaging a range of actors are essential to the third domain, c***ollective action*** which focuses on the work that people do to bring an intervention or technology into use. The final domain of ***reflexive monitoring*** looks at the processes of appraisal and adjustment that are necessary to keep an intervention in place.

C*oherence:* was achieved around the CDSS even though local contexts varied considerably. Across all three sites, there was agreement that the CDSS was suitable for the (varied) tasks and that appropriate resources were in place to enable effective implementation, although these varied between settings. There were differences between settings where the CDSS replaced an established system with existing staff and where the service and/or the staff were new. Knowledge, experience and work identities built through doing call-handling work influenced the coherence of the CDSS for staff in different settings. Coherence was underpinned by wider understandings and discourses, notably about i) rationing ii) modifying caller/patient behaviour and iii) the legitimacy of evidence based medicine.

Cognitive participation: in all three settings key players were successful in enrolling a network of diverse actors – people and technologies - necessary to bring the CDSS into use. Managers in 999 and OOH had to work harder to enrol call-handlers and the CDSS developers had higher engagement with the 999 setting which helped build trust and foster enrolment and legitimation of the CDSS. Effort was expended in enrolling a range of staff

although not all staff were in the same position regarding the CDSS – for example call-handlers' enrolment was mandatory and they had very little power to resist its introduction.

Collective action: the work of organising and enacting CDSS call management and triage requires collective purposive action. In 999 call-handlers used the CDSS in the management, categorization and prioritization of emergency calls and it was viewed positively despite the apparent *intensification* of their work. In SPA the CDSS facilitates the management of urgent care calls, sorting by urgency and enabling referral to services and/or the giving of health advice. This work is *extended* beyond 999 work despite being similar. In OOH the CDSS managed calls to out-of-hours care and face-to-face attendees at an Urgent Care Centre. At OOH work was both extended and became more *scripted.* The operationalization of the CDSS has changed the work in each setting. Call-handling uses expertise based on discretion, negotiation and translation skills and it requires emotional labour. The skills created and sustained by introducing the CDSS include experiential, embodied and clinical expertise. Using the CDSS offered the call-handlers an identity as health workers and not as generic call centre operatives. Some existing divisions of labour and hierarchies were disrupted; for example, at 999 and SPA a new role – clinical supervisor – was introduced.

Reflexive monitoring: although similar monitoring, appraisal and adaptation mechanisms keep the CDSS in place, there were differences in how these mechanisms were operationalised across the three settings. Successful deployment of the CDSS entailed significant and long-term involvement from the developers including the need to adapt the system for each setting. All three sites devoted additional staff resources to support call-handlers, including clinical supervision (999 and SPA only) and audit and training staff. Audit processes were operationalised differently in OOH compared with 999 and SPA. Call-handlers understood the need for audit, and valued it. They trusted the CDSS, whilst recognising that it 'failed' in some circumstances.

Conclusions

The work of bringing the CDSS into use and maintaining its everyday use (*collective action*) was enabled by a range of actors who established *coherence* and secured buy-in (*cognitive participation*) and engaged in on-going appraisal and adjustment (*reflexive monitoring*). This effort has been expended to bring the CDSS into use and continues to be required to keep it in everyday use. The four constructs of collective action, coherence, cognitive participation and reflexive monitoring play out differently in each setting.

The CDSS must be understood both as a computer technology ***and*** as a set of practices related to that technology, kept in place by a network of actors in particular contexts. The CDSS changes call-handling work and creates a new worker identity (of health care call-handler) that needs to be recognised and supported. The three settings are characterised by different 'work' and different workforce characteristics. While there is a common core of training the content and format of this varies across the three settings. The skills and divisions of labour created and sustained by introducing the CDSS are not just those required to operate the computer system 'by rote' but are also about individual experiential, embodied expertise and team sharing of knowledge. While there may have been a vision of a clinician-free environment, two settings have found it necessary to introduce additional clinical supervision, and all three settings have expanded their workforce.

This report details three case studies where a CDSS has been brought into use and appears to have a strong chance of normalising (becoming routine). However, it is essential to recognise that this has been achieved, and will only continue to be maintained, by the efforts of those involved in the specific settings and if the wider context continues to support the coherence, cognitive participation, and reflective monitoring processes that surround this collective action.

Policy-makers and practitioners should recognise that although single technologies can be made to work in different settings, this takes more effort than simply slotting a technology into place. Not least, technological interventions may require new resources to support their effective use, for example, requiring new roles, new organizational functions and considerable management time, all – perhaps – on an on-going basis.

Addendum

This document is an output from a research project that was commissioned by the Service Delivery and Organisation (SDO) programme whilst it was managed by the National Coordinating Centre for the Service Delivery and Organisation (NCCSDO) at the London School of Hygiene & Tropical Medicine. The NIHR SDO programme is now managed by the National Institute for Health Research Evaluations, Trials and Studies Coordinating Centre (NETSCC) based at the University of Southampton.

Although NETSCC, SDO has managed the project and conducted the editorial review of this document, we had no involvement in the commissioning, and therefore may not be able to comment on the background of this document. Should you have any queries please contact sdo@southampton.ac.uk.