A Constructivist approach? Using formative evaluation to inform the Electronic Prescription Service Implementation in Primary Care, England

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Abstract. As part of the National Programme for IT (NPfIT) in England, the Electronic Prescription Service (EPS) is being implemented in two releases. The first release placed barcodes on prescriptions and is widely implemented. Release two (EPS2), the electronic transmission of prescriptions between GP, pharmacy and the reimbursement body, has just started implementation. On the NPfIT agenda, community pharmacies have been predicted to benefit from changes in work practice following the full EPS implementation. The study focused on how the advanced EPS (EPS2) might alter dispensing work practice in community pharmacies on issues such as; workflow and workload; and the bearing of these issues on improvement in quality of service and safety. This paper demonstrates how findings of the pre-implementation study were used to provide formative feedback to the implementers. A mixed ethnographical method that combined non-participant observations, shadowing and interviews, before and after implementation, was used to qualitatively study eight community pharmacies across three early adopter Primary Care Trusts (PCTs) in England. Key implementation issues were fed-back to the PCTs as part of the EPS2 rolling-out process. Staff access to dispensing terminals needs to be improved if electronic dispensing is to be encouraged. Also, as a safety issue, pharmacists are planning to print off electronic prescriptions (tokens) and dispense from them. Although safer, this could increase workload. The EPS2 could positively alter work practice by improving certain demanding aspects of dispensing whilst reducing human errors. For example, the high demand of customers handing in prescriptions and waiting for them to be dispensed could be reduced through automation. Also, the extreme variation in workload during various times of the day could be evened out to improve workflow and provide a better service; however, in order for this to be fully realized, technical issues such as number of staff per dispensing station and dispensing from tokens would need to be addressed.

Keywords. EPS, e-prescription, EHR, EPR, healthcare modernisation, clinical work practice, social constructivism, safety, medication automation, quality of care.

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1. Introduction

Community pharmacies in England are part of an ambitious national programme (NPfIT) to computerise health; part of a wider e-Government agenda[1]. In the UK GP practices are computerised, and virtually all prescribing is done electronically. A paper prescription (called an FP10) is printed and signed by the doctor, and the patient takes that to a pharmacy to be dispensed. The prescription is endorsed by the pharmacist and posted to a national centre which arranges payment for the pharmacist. The concept of the Electronic Prescription Service was one of four strands of a national information strategy first set out in 2002[2]. The EPS implementation commenced in 2008 with the initial phase (EPS1) rolled-out across early adopter Primary Care Trusts (PCTs). The key feature of EPS1 was the inclusion of a barcode on the FP10. The barcode, when scanned in the pharmacy, automatically transferred patient information from the paper to the computer screen, usually eliminating the need to type the medicine labels. The advanced phase (release 2 or EPS2), enables prescribers to authorise and send prescriptions electronically and send them to a centralized system, commonly called the spine (technically called N3). Prescriptions then can be downloaded and dispensed by the pharmacist[3]. The patient's role in this is to nominate the pharmacy that will do the downloading and dispensing. Electronic prescriptions open up the possibility of integration with Electronic Health Record (EHR) programme, although the EPS can exist in isolation of EHR.

Community pharmacies as key stakeholders of this agenda have been predicted to benefit from the full EPS roll-out in terms of: freeing dispensing staff from work associated with re-keying prescription information; giving dispensing staff scope to streamline workflow by preparing medications in advance; and, managing stock more effectively[4]. Our study focused on how EPS2 will alter community pharmacies by doing a pre and post implementation study of workflows, workloads and priorities of community pharmacies. The research also explored anticipated issues and perceptions of the full roll-out from pharmacy professionals, how the implementation process was understood, and the pharmacist's ability to influence patient safety. This paper demonstrates how some of our pre-implementation findings were used to advise key stakeholders.

2. People, technology and the concept of social constructivism in healthcare.

A fundamental theory in the study of people and their work practices is that which conceptualises that it is human beings that *appropriate* technology through formative feedback. Described as social construction of technology, this theory critically opposes technological determinism and theorises that through everyday use, people influence and shape technologies and how they become useful. In the healthcare environment, it is important that the use of technologies does not become a barrier to providing care but are instead tools of know-how that can be appropriated to suit high quality care provision. For example, when May et al[5] used an ethnographic study to explore the spatial and temporal relationships between health professionals and patients in the context of how technologies are used in telepsychiatry, they concluded that the technologies needed to be appropriated well in order to avoid interfering with clinical professionalism. May et al[5] demonstrated how the boundaries between hard and soft technologies such as the technical and the social are blurred and how the social need to

be taken into account (for example in a clinician-patient relationship) in order for the technology to work effectively.

The theory of constructivism builds on other socio-technological theories demonstrated by Greenhalgh[6]; Berg and Van der Lei[7], Eden et al[8] and Harrison et al[9]. Significantly it recognises that there is an on-going assessment of systems before and after implementation and that it is through the re-engineering by users that the system becomes successfully adopted. Studying how the EPS might alter work practice include attaining a deeper understanding of how it could be shaped by social and organisational processes of its users. The need for this deeper sense of understanding informed the ethnographic framework used in the data collection and analysis.

3. Data and the analytical method

Qualitative methods were employed that used an ethnographic framework of non-participant observation and shadowing of community pharmacy staff, as well as interviewing. Baseline data were collected in eight sites across three PCTs in the Midland and Northern regions of England. The PCTs were classified as early adopters of the EPS. As the first phase of the service (EPS1) had already been rolled-out, the study focused on the pharmacies that were about to receive the implementation of the second (EPS2) roll-out. These pharmacies were classified as first-of-type sites. The pharmacies were sampled according to which were available as first-of-type or 'semi-first-of-type' sites that were due to implement the EPS2, and also according to their geographic location, size and ownership (independent or chain). Overall, 84 hours of observations were conducted in addition to extra hours of shadowing and interviewing staff. The observation and shadowing were written up as case studies. The case studies, together with the interviews were thematically analysed. In the analysis, implementation issues were identified on key themes such as the prioritisation and organisation of work; and the fluidity of work (workflow) and workload.

4. Findings

Prioritisation and organisation of work – A majority of the sites tended to prioritise customers who hand in their prescriptions and wait for them to be dispensed. This is termed walk-in (wait-in) dispensing. Most walk-in prescriptions were for acute treatments. Some pharmacists offered a 'collection and delivery' service whereby prescriptions were collected from the GP practice, dispensed and delivered to the customer; these tended to be repeat prescriptions. Repeat prescriptions on average were 70% of prescriptions dispensed in each site. In pharmacies that had large numbers of walk-ins, resources were sometimes very stretched as walk-in customers required immediate attention compared to 'collection and delivery' customers. As a result, the dispensing of 'collection and delivery' prescriptions tended to be fitted around walk-ins. However, as 'collection and delivery' prescriptions tended to be greater in quantity than walk-ins, how dispensing was organised and prioritised was sometimes problematic. In order to combat this problem, some of the pharmacies had a prioritisation system of using coloured baskets to organise the dispensing process. Under the EPS2 system, in order minimise this problem and continue to retain current safety practice, pharmacists planned to process electronically transmitted prescriptions as they currently do. This means that even with EPS2, dispensers can print-

off the electronic prescriptions (called tokens) and process them as they do with a current FP10. Whilst this could indeed retain the current safety practice, it could also increase the time taken (and cost) of dispensing as dispensers will have an added workflow activity of printing prescriptions onto specialized FP10-like paper before processing and dispensing.

Workflow and Workload - The amount of work, such as the number of items dispensed in relation to the pharmacy's dispensing support system, appeared to influence the fluidity of work. Predictably, the greater the pharmacy's dispensing resource, the higher the workload. The bigger pharmacies, which had more staff, dispensed more items (over 400 items) per day, whilst the smaller pharmacies dispensed around 100-150 items per day. The workload also varied in relation to the type of dispensing service the pharmacy offered. In some of the pharmacies that offered a 'collection and delivery' service, the workload tended to range from moderate to very high depending on how many 'collection and delivery' items needed to be processed and dispensed. This was done in addition to other duties such as dispensing to walk-in customers, date checking, packing away medicines, answering telephone queries and so on. Under the EPS2 system, these different prescriptions will be streamlined into electronically sent prescriptions (whether acute or repeat), thereby eliminating the extreme workload and workflow variation associated with dispensing. The electronic transmission however introduces a new issue for pharmacies that do not have an adequate number of dispensing stations. Dispensing staff often jostled for terminals which sometimes disrupted the workflow and elongated time taken to dispense prescriptions. If staff have to log in and out whenever they need to use a terminal (in order for the system to record each user's activity), this issue would be exacerbated, especially if dispensing directly from terminals is encouraged. Since some pharmacy systems are quite sensitive and therefore prone to crashing, the logging in and out of system between too many dispensers could cause potential problems to the dispensing process. In this case, EPS2 would be more beneficial if staff had greater access to dispensing stations.

5. Discussion

The introduction of technology into work places radically changes the way work is done and introduces a potential number of ways of doing that work[10]. Work is therefore engineered through using the most suitable way and an on-going assessment of the technology. MacKenzie and Wajcman[11] describe three layers of technology; these are the physical object or the artefact, activities or processes involved with the artefact, and how to operate the artefact. The introduction of EPS 1 and 2 into community pharmacies encompasses changes in all the three layers described by Mackenzie and Wajcman[11]. Whilst the extended baseline study of this work is currently being examined socio-technically in another article, this paper highlights how the preliminary findings (discussed in the results) were used to inform early adopter PCTs through review reports the study team produced for the PCTs. The constructivist approach enabled the study team to use methods that showed how EPS2 could be socially appropriated to suit current practice of safely dispensing medicines. This was done by observing current practice and providing a platform for potential users to converse about the intended use of the system. As part of the on-going assessment of EPS2, this became a useful information source for key implementer stakeholders, and crucially

identified some key potential benefits, and implementation issues that could become barriers to effective use of EPS2 in community pharmacy work practice.

6. Conclusion

Our preliminary findings indicate that EPS2 has the potential to add value to current dispensing work in terms of smoothing out workflow and improving the management of workloads. There may also be safety benefits for patients and this will be assessed in detail in the final stages of the study. However, issues such as dispensers printing tokens to dispense from, could become barriers to the streamlined workflow and increase the cost of dispensing. In addition, pharmacies need extra technological support such as more dispensing terminals in order to maintain a streamlined workflow. It should however be noted that the benefits and implementation issues identified in this literature are a result of eight site visits to first-of type-sites. Therefore the findings may not be attributable to all implementation sites in terms of the potential effects of the EPS in relation to current work practice.

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