Mapping stakeholders for system evaluation - the case of the Electronic Prescription Service in England

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Abstract

This paper discusses the process of identifying stakeholders for the evaluation of health information systems through a map. Defining the multiplicity of stakeholders associated with a new system as well as the nature of their relationships is an important aspect of evaluating any intervention. We report a study of the Electronic Prescription Service (EPS) in primary care in England. We describe the complexity associated with the process of identifying stakeholders and illustrating their dynamic relationships. Reflecting upon our experience of map-making *and* map-using*, we discuss the role of a stakeholder map to generate and communicate knowledge. The EPS stakeholder map – in its variety of possible alternative representations – reveals the complexity of the electronic prescribing scenario and the challenge of its evaluation. Recognising the drawbacks of a static two dimensional representation, we argue that a dynamic use of a stakeholder map and a reflective map-making practice is useful and important for the evaluation of IT programmes in healthcare.*

Keywords:

Information systems, Electronic prescribing, Community pharmacy services, Method, Evaluation studies as topic

Introduction

Health information systems are expected to improve the delivery of healthcare, raise patient satisfaction and support excellent work practices by healthcare professionals. The adoption of any health information system will be dependent upon a number of different stakeholders including the people who are directly or indirectly associated with and affected by it (patients, nurses, doctors, software developers, IT managers, product specialists) and a number of organisations and institutions that frame its adoption and functionality (government departments, regulators, health care institutions, professional bodies, technical service providers) [1-3]. Identifying the multiplicity of stakeholders associated with a new system as well as the nature of their interests and relationships one to another, constitutes an important prerequisite for evaluating any inter-

vention. A powerful means to do this is through the drawing of a map, a visual representation of entities and relationships.

This paper discusses drawing a stakeholder map as part of an evaluation study of the Electronic Prescription Service (EPS) in primary care in England. EPS is the National Health Services (NHS) new system for the electronic transmission of prescriptions. EPS is part of the UK National Programme for IT (NPfIT), which is delivered by the Department of Health agency, Connecting for Health (CfH). One of the main objectives of the EPS is to provide a more efficient and accurate NHS prescription service, able to cope with the issuing, dispensing and reimbursement of "around 1.5 million paper prescriptions" per working day [4]. This service is being delivered over two main releases of software and functionality, and our paper draws upon work investigating the introduction of the Electronic Prescription Service Release 2 (EPS2).

Stakeholders are often identified in accordance with their position relative to a focal system and/or an organisational position. In that way stakeholders may be distinguished, for example, as being either 'internal' or 'external' stakeholders relative to the owner organization [5]. Stakeholder importance may be identified by their power to influence, their legitimacy to make decisions, or their right to make claims (perhaps urgent or arbitrary) that have an immediate impact on the focal system or on other stakeholders [6]. In conventional maps, stakeholders are often depicted as revolving around an organization or system, and to have unidirectional and simple relations with it [5] but not with each other. Pouloudi and Whitley [3], however, argue that identification of stakeholders is a complex and dynamic procedure that requires taking into consideration that stakeholder inter-relationships are important, temporally and spatially bound, interdependent, dynamic and often conflicting. We contribute to this critical approach by discussing the complex nature of stakeholder mapping during the identification of stakeholders in EPS2.

The paper has two aims. First, we explore the complexity associated with the process of identifying different stakeholders and illustrating their dynamic relationships - *map making*. To do so we reflect upon our experience in drawing a stakeholder map as a methodological question. Second, we aim to discuss the benefits and drawbacks that emanate from using the map as an analytical tool - *map using*.

An Introduction to EPS2

At the core of EPS is the electronic transmission of prescription messages from prescribing systems, to a secure server - the 'Spine' - from which the prescription message can be sent to, or called by a dispensing contractor of the patient's choice. The service is being introduced into England over two releases. EPS Release 1 (EPS1) introduced and tested the technical infrastructure, with electronic messages holding copies of prescription content supplementing the traditional paper prescriptions. In EPS2, launched in 2009, the prescription switches to a digitally signed electronic message, offering a potentially paperless prescribing and transmission process. The prescription is transmitted from the prescriber through the Spine enabling the unique identification of patients, and service providers (prescriber and dispenser in this case). Access to the Spine for digital signing of prescriptions is allowed by use of a person specific smartcard, with chip and pin code. Software suppliers for prescribers and dispensers are expected to independently implement EPS2 compliant functionalities. Their systems are then subject to a CfH certification process before they can connect to the Spine. Prior to deployment of EPS2 prescriber systems in different Primary Care Trusts (the purchasers of healthcare for a geographic area), the Secretary of State must authorise the issuing of electronic (paperless) prescriptions and electronic signatures. This is done area by area, making electronic prescriptions legal in England for the first time.

A detailed description of the functioning of EPS compliant systems is outside of the scope of this paper. Information can be found on the CfH website[1].

Methodology

The stakeholder mapping for EPS2 was part of a wider project aimed at the evaluation of the Electronic Prescription Service. The evaluation began while software testing for EPS2 compliant systems was still in progress and EPS1 compliant systems were in use. The technology for EPS2 was not available for use at the start, but key stakeholders were preparing for initial pilots and successive deployments across PCTs in England. The data reported here was therefore based on stakeholders' initial experiences with EPS1 (e.g. feedback from pharmacists) and *expectations* for EPS2, *plans*, *prospected* problems and solutions. The study is based on interviews with a number of different groups and organisations including software suppliers for dispensing and prescribing systems, PCTs, community pharmacies and the Department of Health. Interviews were recorded when possible with participants' consent, and transcripts were used for the analysis. Written field notes were used when recording was not possible.

The map – in its successive cyclical revisions - was used during these interviews as a starting point for discussing roles and relationships of different parties and organisations in the pre-EPS business model, and in the development, adoption and use of EPS. The stakeholder map was (and at the time of writing

still is) constantly modified and further refined in order to reflect participants' viewpoints.

Results – Map-Making

Connecting for Health presents the expected benefits of EPS2 in terms of benefits for prescribing staff, dispensing staff, patients and their representatives[2]. Initially these appear as the three primary stakeholders of EPS2 as direct users of the system functionality (Fig 1). Prescribers (Pr) (typically General Practitioners - GPs) use EPS2 compliant systems for issuing prescriptions; patients (or their representatives) (P) use EPS2 systems to nominate the pharmacies where they wish to collect the prescribed medications; dispensers (D) (typically Community Pharmacists) use EPS2 compliant systems to receive the e-prescriptions, and then dispense and label products, record the dispensed medication and transmit the e-prescriptions onward to the reimbursement agency (NHS Prescription Services).
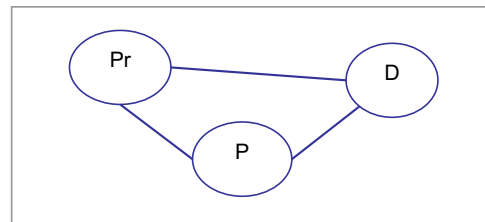
Figure 1- Three stakeholders - direct users of EPS systems

Reading the official documentation of EPS2 [eg. 4], the reimbursement agency could be interpreted as (at least) a secondary stakeholder. Yet, some interviewees thought of the reimbursement agency as one of the main beneficiary of a paperless system on the grounds that EPS2 would reduce manual paper handling and eliminate data entry duplication. Our initial map with the three main users would need to expand and include another perhaps less visible beneficiary in the Prescription Services (PS).

Further analysis of prescribers and dispensers revealed a multiplicity of different parties under these broad headings. For example, among the receivers of prescriptions, are Care Homes, requesting and collecting prescriptions on behalf of their residents. Among the dispensers, together with local small community pharmacies are larger organisations of pharmacy chains under the control of a multinational company, supermarket pharmacies, internet pharmacies, and dispensing appliance contractors. There are also the interesting hybrids – dispensing doctors and prescribing pharmacists. All these stakeholders may adopt EPS2 compliant systems, but differently - depending on their prospects, hopes and fears - and with more or less choice in terms of software or autonomy in organising their work practices around EPS2.

Moving from a perspective of system users to the stakeholders involved in the implementation of EPS2, the map extends to the software suppliers (SW) that develop and provide prescribing and dispensing solutions to prescribers (SWpr) and dispensers (SWd) respectively (Fig 2). Developers offer system compliant solutions responding to requirements presented by users, Connecting for Health, professional bodies and Royal Colleges. Prescribing and dispensing software solutions are different markets (and, usually, companies) in England and therefore we chose to present them in the map separately. The relatively simple map in figure 2 is rapidly revealed too restricted to illustrate the number of stakeholders associated with EPS2 and who might be incorporated in an evaluation.
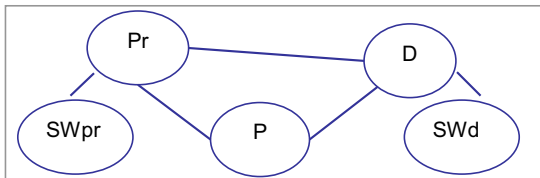

Figure 2- Five stakeholders - implementers and users of EPS systems

The delivery of EPS is a complex partnership between the Department of Health (DH), its agency Connecting for Health (CfH), the regional Strategic Health Authorities, the PCTs and dispensing and prescribing system suppliers. The role of CfH is to define standards, ensure these are adhered to, and to provide the infrastructure in order to support this service. The DH provides funding for community pharmacy to purchase EPS compliant systems (via PCTs) and also an ongoing allowance to pay for the maintenance of the required secure broadband connection. General practices also gain support for purchasing CfH accredited prescribing systems as part of their IT systems. Pharmacies and GP practices as independent contractors, however still make, at least in theory, the ultimate choice of which software to purchase and use.

If we follow financial exchanges, more stakeholders enter the map. Financial exchanges in connection with EPS relate not only to the payment and reimbursement of prescribed medications and appliances, but also to payment and reimbursement for software and services, connection to secure network, possible financial incentives to use the service, potential sale and purchase of prescribing/dispensing data and marketing opportunities for pharmaceutical products/medical services. This indicates the potential of EPS2 to condition important changes in the business of community pharmacies. For instance, the rise of internet pharmacies, or the capture and use of prescribing and dispensing data for research purposes. Indeed, patient data and information governance is a sensitive aspect of EPS2. The design of this system will potentially allow a comprehensive database of drug use (prescribing and dispensing) linkable to patient medical history. This could be incredibly valuable for research purposes and for medicine management, but also potentially subject to abuses and infringement of patient confi-

dentiality. An important stakeholder here may be the Information Commissioner.

Table 1- List of stakeholders
(not comprehensive, in alphabetical order)

AG	Aggregators
CP	Community Pharmacies (independent and chain headquarters)
CPst	Community Pharmacy stores (dependent from chain management/headquarters)
CP.pr	Prescribing community pharmacists
DAC	Dispensing Appliances Contractors
D	Dispensers (including CP, DAC, IP, etc.)
DH	Department of Health
DW	Drug and Medication Wholesalers
GP	General practitioners (family doctors)
GPd	Dispensing GP
IMS	IMS Health Pharmaceutical
IP	Internet Pharmacies
IC	Information Commissioner
NPA	The National Pharmacy Association
NPSA	National Patient Safety Agency
NP	Nurse prescribers
P	Patients (and carers)
PCT	Primary Care Trusts
Pr	Prescribers (including GP, NP, etc.)
PSNC	Pharmaceutical Services Negotiating Committee
PS	NHS Prescription Services
RS	Royal Societies
SHA	Strategic Health Authorities
SUS	Secondary Use Service
SW.gp	Software supplier for GP
SW.cp	Software supplier for CP

The above brief description of our attempt in map-making indicates the complexity found in the unfolding of interests that occur in the process of identifying stakeholders and representing their inter-relationships. Table 1 lists some (but not all, given space restrictions) of the stakeholders found to have a role or interest in EPS2 and Figure 3 illustrates examples of their interdependent relationships. The map can support further investigation of transactional, financial, regulatory, or professional relationships. Of course the map is never complete and never an exact illustration of all stakeholders and all their relationships. The drawbacks and the benefits of a map as a tool for analysis in evaluations are discussed below.

Discussion – Map-Using

The stakeholder map is intended to serve multiple purposes. It serves as an effective *communication tool*, used to elicit views and insights from interviewees by visualising presences and relationships. Over time and as it developed the map became a

means to *generate knowledge*. By developing an object which could be shared and discussed between the various stakeholders (and which each would recognise and be able to contribute to), we were making use of the map as 'a boundary object' [7]. Boundary objects are objects which allow the tacit difficult to express knowledge of one community to be expressed and shared by another community [8]. Through readers' different interpretation of the map and through constant discussions, the map's perceived gaps and 'errors' came to the fore, leading to further refinements and expansions, and allowing the interests and perspectives of stakeholders to be captured. This iterative process broadened our understanding of the meaning of EPS to different people and organisations. But to the extent that people differed on who was a stakeholder and how they fitted into the map, the challenge remained as to how to capture these multiple versions of reality.

The strength of a map as a means to *produce* knowledge derives from its three main features: *mobility*, *stability* and *combinability* [9]. The map is a mobile tool in the sense that it can be transferred between different people and organisations crossing boundaries. Using the map's mobility we could communicate our understanding of stakeholders and their relationships among researchers as well as between researchers and participants/stakeholders. The map also embeds information that is perceived as stable (relatively) when the map is transferred between people. In this way, information the map holds can resist distortions and misunderstandings that may emerge in any one place. Finally, the map is combinable because it enables further refinements and developments, inclusion of new stakeholders and new relationships, or a drilling down into stakeholders in more detail, for example into the complex structure of a PCT. Mobility, stability and combinability is what has allowed the map to develop from a simple three-stakeholder version (Figure 1) to the complex 28 stakeholder version (Figure 3).

The map reveals the complexity that surrounds EPS2 and the ways in which different stakeholders interrelate and contribute to it. However, the process of map-making is inevitably a process of selection and omission of stakeholders or relationships. For instance, figure 1 represents the typical flow of a prescription going from prescriber to patient and then to dispenser; however, some pharmacies provide a collection service which means that prescriptions go direct from prescriber to pharmacy, bypassing the patient. This could be considered an exception to the usual scenario – whether (and how) exceptions are represented in the map is an open question. Exceptions, being on the one hand by definition unusual, but on the other, as boundary conditions, are key areas of interest to any analysis. Map making is in other words both an intended and unintended mode of simplification as complexity is synthesised into a comprehensible and sharable picture [10].

A stakeholder map can only illustrate part of the 'whole' picture or one possible picture among many potentially to be drawn. This implies that a map is fundamentally *political* as it prioritises, accentuates and excludes stakeholders and their relationships, and embodies the worldviews of those who take part in its construction. As illustrated, our map started with three basic stakeholders who constituted our initial understanding of the 'pragmatic' view of EPS2. Through research we expanded the map in such a way so as to include additional stakeholders, who remained in the earlier version hidden. And there are many other potential stakeholders and relationships still to be discovered and presented. For that reason we would rather accept, in the spirit of Heisenberg and Schrödinger, that "*Every new attempt to represent the world in a scientific formulation, no matter how detailed and cumulative, will be swallowed up by the world expanding to contain it*" [11]. In that way, a map is not only a means to generate knowledge but it is also a means to hinder and hide it. Furthermore, a static 2 dimensional map in itself does not provide a rich account of

Figure 3- A more complex stakeholder map of EPS2 (a transaction flow of a patient's e-prescription and a professional relationship between general practitioner/prescriber and community pharmacist/dispenser shown as examples.)

the dynamic changing of relationships between stakeholders. Though, through layering of versions or digital animation a map may present or account for the historical development of stakeholder relationships, even if it cannot predict their future dynamics.

Conclusion

This paper discusses the strengths of map-making as a tool as well as the complexities and challenges surrounding a stakeholder map in terms of *map-making* and *map-using*. We present the iterative process of identifying stakeholders in the Electronic Prescription Service and some of the benefits and drawbacks of using a map as a methodological tool for data collection and analysis.

The map shows strongly how implementation and adoption of systems in healthcare takes place in a distributed landscape. In relation to our research topic this implies that electronic transmission of prescriptions does not start with a prescribing authority and end with a dispensing authority. Rather the EPS draws in a great number of stakeholders who mediate between prescribing and dispensing, each of whom has distinctive interests and a role in making this initiative work (or not). Understanding stakeholders and their interests as part of evaluating the adoption of EPS2, ultimately means capturing this distributed network of interests and relations.

Our research has also illustrated the limitations of a map in analysing stakeholders. The map is not an exact representation of the prescribing and the dispensing scenario in all its detail (although when it is taken out of the context of the identification process - it may be interpreted and judged as such). Our map, as a tool to identify stakeholders and their interests, constitutes one among many possible representations of the world of prescribing and dispensing. Cartographers are well aware that maps are an outcome of a reductionist activity that abstracts complexity from reality: "*...mapping allows for an understanding of terrain as only the surface expression of a complex and dynamic imbroglio of social and natural processes*" [12].

As our map-making and map-using research processes continue, we will investigate different variations of the stakeholder map; we will depict, explore, compare and superimpose: stakeholders, boundaries, transactions, flows, movements, and transformations of business models, connected with the introduction of electronic prescribing in primary care in England. We argue that a dynamic use of a stakeholder map, and a reflective map-making practice, has great potential to inform the analysis and evaluation of IT programmes in healthcare and beyond.

Acknowledgments

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