

Innovation and Openness – is There Room for Both?

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Abstract

Focusing on people in healthcare delivery needs to be backed up by streamlined flow of health information at the point of care. Thus semantic coherence of health information now becomes a must rather than a mere option. Health IT is not delivering what is expected. We argue that this is in part due to the limitations in the communication between clinicians and techies resulting from the inevitable “cultural” mismatch. This paper explores new opportunities and challenges from both business and technical perspectives in the wake of Medicine 2.0 and presents new directions in the domain of information architectures and software development. openEHR prescribes an innovative development methodology which we propose will serve as an effective means to tackle communication problems. It is envisaged that the road to success is paved by innovation and openness (in a broader sense including open standards, a cultural change and appropriate roles for open source paradigm).

1. Introduction

Person centred care implies empowering patients and their environment in all steps of care delivery. If the care is now expected to take into consideration the very different aspects of individuals, then health IT should also take into consideration some new data, information and security requirements. From an IT perspective this means that a new user class with significantly different requirements comes into play. The clinicians with *clinical user* roles will inevitably have to perform substantial amount of *person user* actions on behalf of their patients. In other words the clinicians will become proxies for the subjects of care and their environment, and act as a gateway to the health record.

Now overloaded with many health IT requirements, putting clinicians into driver's seat is a necessity. Not only must we provide them with flexible and user friendly applications, but also address the many other IT requirements such as safety and interoperability. Mainstream software development methods all depend on a critical requirements collection phase where practically domain knowledge is elicited from users. This is the phase where the cost and quality of any software product is greatly affected [1]. Put simple any HIS can only be as good as the clinicians' contribution.

There is a practical limit of cognitive exchange in the clinician-techy communications during requirements collection. This is in part due to the essential difficulties of human communication; but in healthcare the depth, breadth and complexity of the domain severely pull down this limit.

2. Drivers for Innovation in Health IT

Currently most large scale health information systems (HIS) tend to be monolithic applications built upon the limited set of requirements that were available at the time of software design. The missing and/or wrong requirements at the outset combined with rapid changes thereafter due to high rate of change in medical knowledge and processes over time result in “big ball of mud” systems which are expensive to maintain, difficult to integrate and marked with low user satisfaction [2].

From a business perspective the penetrance of IT into healthcare market is not at the expected level. The “provider” centric market is already saturated and everyone is in a wait and see mode therefore avoiding big investments. The

ultimate market is the large scale “patient” or “community” centred one but vendors and their standards certainly could not deliver. It is expected that health information exchange will bring on the real benefits of health IT and set forth clear examples of ROI to businesses and the community [3,4].

The theory is that open environments using open standards would increase the ability of systems to effectively exchange information. However, experience has demonstrated that without sufficiently strong governance, standards end up replicating the issues of non-standards compliant implementations. In healthcare this can be seen in the variations of HL7 v2 for example.

Currently there is an inherent semiotic dissonance within machine to machine communications in healthcare. A lifelong, longitudinal, secure and shared electronic health record (EHR) for all is seen by many as the enabler for next generation eHealth systems. It is argued that while messaging is essential for interconnectivity, the EHR cannot be realised by simply collation of messages [5]. This is supported by the adoption of new approaches by the ISO in the 13606 standard very recently [6].

3. How to Engage End Users?

If the software requirements of HIS cannot be gathered at the outset (due to the aforementioned limitations), then a straightforward approach would be to follow an approach in which the requirements can be later added or modified without going through the costly recoding and testing phases again. This is why we need to put the clinicians permanently into the whole software development process and provide them with certain abilities to tailor the *blueprint* of clinical information. This blueprint consists of structure and semantics, dictated by some medical knowledge from which the clinical information are captured and persisted.

The openEHR two-level modelling formalism, which is adopted by both ISO and CEN, introduces a reference model which consists of informational items unlikely to change and fundamental common elements like data types and structures specific to healthcare, and an archetype model which models the semantics and structure of clinical information [7]. While the former is of concern to IT professionals, the latter is targeted to end users. By using this approach software development based on stable requirements can proceed independently from volatile domain specific requirements. This has the potential to generate more initial development which could lead to an initial greater capital cost of development, but at the same time leave systems developed in this manner more versatile and adaptable/extensible. There is not impediment, bar policy, to incorporating open source software derived services into a commercially delivered application.

4. Why We Need Openness?

While the above approach looks promising in building individual applications, giving all that flexibility may seem to violate many of the requirements of interoperability. This is exactly where openness comes into play: no standardisation body, company or governmental agency is capable of defining one standard model for all. This requires a collaborative environment in which clinicians and technical people discuss and create industry strength open standards and engineering specifications. This is typically a community based effort where contributions are voluntary. Open source model used for core tools and components may help in spreading the methodology to a wider community and better adoption. However another aspect often overlooked is the availability of the service and interface descriptions and the data itself. The structure and semantics of the data involved should also be made accessible. This is how we can achieve truly open systems (read interoperable!).

5. Discussion and Conclusions

We have argued that getting requirements in the first place in HIS development is hard and that there is a practical limit when working with domain experts. We pointed out to a solution by engaging main users, the clinicians, into the whole development lifecycle by allowing them to manage volatile clinical concepts and processes without depending on technical people. Experience has shown that developing clinical models in the form of archetypes using freely available high level tools proved to be straightforward and understandable by even the non IT skilled clinicians.

The importance of an open collaborative environment and open systems has been emphasized in order not to compromise interoperability. Introduced by the openEHR Foundation [8] and now adopted by ISO and CEN, the innovative two level modelling and development methodology is now attracting considerable interest. As the success of the approach largely depends on the quality of content models produced by the collaboration of many experts from over 70 countries, the governance of the organisation is very important and now presents itself as a big challenge.

Just defining standards is useless without enforcement. This is why we see the proliferation of “standards” rather than harmonisation and convergence. Now the big question is how to attract vendors to this equation and create a sustainable business ecosystem. It is envisaged that, in the whole big world of “interconnected” health IT, a diverse set of services and products will symbiotically coexist on the sole basis of openness.

Having a good track record in health IT, New Zealand also has active policies and initiatives towards open systems. It is not unrealistic to expect a great deal of leap forward by leveraging the current level of involvement of clinicians with computer based systems and years of experience into the “driver’s seat”.

6. References

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