Open Source Software in Electronic Healthcare Records (EHR): Is It the Future?

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Dear Sir,

I agree that Open Source Software (OSS) can deal with nearly all of the problems that proprietary software (closed source software) either deals with poorly or cannot deal with at all. One of the biggest problems with proprietary software is becoming obsolete with time. By its nature, OSS is developed in a multi-centric fashion where many programs are developed with multiple programmers on different continents. This multi-centric nature makes OSS highly resistant to becoming outdated. On the other hand, although I am a strong supporter of OSS, I have my apprehensions about its implementation in the healthcare domain generally and in Electronic Health Records (HER) specifically.

Argument *for* Open Source Software

Most commercial software available at the moment is manufactured in an environment of encrypted closed source (proprietary) fashion, which makes a lot of the users who are professional programmers frequently hindered by 'buggy' software that they are powerless to fix, improve or debug. This led to the thought process that all software should be maintainable and fixable by the *end user(s)* and *not* the main developer or distributer. The building blocks of an OSS model are firstly, that the *source code* of the software has to be openly available to everyone and anyone; secondly, if the source code is used, which is protected under an open source license, it has to be contributed to the community of users. This whole cycle will eventually allow the software users to utilize, change, and eventually improve the software, and to redistribute it in its modified form, thirdly, the developer(s) makes his money not from the source code, but from the product and support that is provided. Finally, intellectual property is not a part of the business model, so piracy is not an issue. Thus, by redefining the 'rules of the game', the problem of piracy is eliminated and the need for absolutist licensing agreements becomes obsolete[1]. To put it into perspective, the best example of OSS versus closed source propriety software would be comparing computer operating systems from Microsoft® (closed source) with the less known Linux Kernel (open source). Obviously, Microsoft® is the dominating operating system worldwide, but most software developers and hardcore programmers would tell you that Linux Kernel is a much more stable product, and yet it is available free to download on the internet.

Proprietary software (closed source) come with built-in problems that have caused trouble for most of professionals in the medical field. Some were summarized by Ignacio Valdes, MD in Linux Medical News which include[2]:

1. Patients outliving their software due to corporate buy-outs, and bankruptcy.
2. Staff training, re-training and re-re-training especially in a mobile workforce.
3. No one vendor with enough engineering resources.
4. Corporate agenda not in harmony with customer needs.
5. The costs that come from commissioning closed source systems remain considerably high. And unfortunately once a customer is locked into proprietary software (vendor lock-in); its makers can demand premium prices, since most of the time the client would find it even more expensive to change[3].

The biggest advantages of OSS, which are crucial to developing countries: it is cheaper than proprietary software; the ability of businesses and governments to tailor any existing code to its specific needs; that the resulting products are substantially more stable and bug free than their proprietary alternatives; and finally it would be the prevailing intellectual property model where the licensing is much easier and facilitates the exchange of information and innovation of code[1].

Argument *against* Open Source Software

There are issues to be resolved with increased involvement of OSS in healthcare computing, and they are:

1. *Risk management and culpability*
As healthcare professionals, we are usually very strict in assessing the safety of the pharmaceuticals we prescribe, so we must be *as* cautious with the software that holds private patient information and, even more importantly, the software that supports 'clinical decision making'[3]. Globally, proprietary control and culpability generally go hand in hand so in the event of a medical accident relating to such software there would be clear action against a commercial supplier (closed source proprietor). In this situation the status of open source software is less clear. For example, would every clinician/programmer who had contributed to the development of a program or software share the liability if a patient fatality? And, who would carry the responsibility of indemnifying the clinicians in such cases?

2. *Who updates the OSS?*
The finest developers in the world, let alone in the region, will have suboptimal results or will fail in clinical computing initiatives (e.g., point-of-care electronic medical records systems) unless they let clinicians, especially clinicians with a *Medical Informatics* background, take the leadership role. There is an advantage in diversity of supply and, given the small number of players (decent programmers with a clinical background) in Medical Informatics, the opportunity to enhance the robustness of healthcare computing will fail[3]. It is also important to note that the open source model does not work in a 'vacuum'. The reality of the matter is that the majority of freelancers will at best give the downloadable software a 'quick look', another small percentage might download the source, and only a very tiny fraction will actually contribute actively to the project if they actually need it. Also, the idea that having the source code openly available to decent programmers would allow them to fix problems and take over the system's development is at best very optimistic. Reading a code written by another developer (even if it is well structured) is not an easy task. Bugs are as likely to be introduced as fixed[3].

3. OSS development – the development of OSS is incremental, with users making occasional small changes with 'patchy' dissemination. This could lead to technical support challenges.

4. *Support* – arguably there is considerably less training and support available for OSS compared with proprietary software like Windows. For medical practitioners with little computer training, complicated open source instructions might be more technically demanding than the windows user-friendly point-and click interface[4].

5. *Expenses* – there is a common misconception that OSS costs nothing. This is not generally true[1]. Commercial companies can, and *do* make money out of OSS by charging for services such as distribution, warranties, support, education, installation and tailoring[4].

6. *Security* – since OSS is freely accessible, it is only logical that all of the defects and security flaws are easily found; therefore closed source advocates argue that this actually makes it easier for a malicious person (hacker) to discover security flaws. They also argue that OSS may allow 'hackers' to know the weaknesses or loopholes of the software more easily than closed source[5]. These weaknesses are pretty harmless in an OSS like Wikipedia (the free encyclopedia), but they can be disastrous if only one niche in the armor is found in a supposedly secure Electronic Healthcare Record (EHR) system of a large district general hospital like the Salmanyia Medical Complex (SMC).

Conclusion

The open source software phenomenon is a model that has been very fashionable recently. Whilst it may be an important part for the way forward in healthcare computing, there are a number of key issues which still need to be addressed. Unfortunately Bahraini healthcare has a history of horrendous fragmentation in its computer systems, and the use of open-source software is no solution to this. Moreover, it could be a dangerous distraction. In my opinion OSS in healthcare is the right solution to the wrong problem.

Yours sincerely,

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