A Software Engineering Approach to the Development of Computer-Based Patient Record Systems

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Background. The development of Computer-Based Patient Record systems (CPR) is attracting increasing interest from the health care information management community, as a greater number of institutions and companies around the world enter the arena and create their own solutions, many of them counting on highly specialized development teams, centered on the assurance of quality for CPR software systems. On the other hand, there is often a lack of a pre-defined vision for the development process, which leads to systems of a poor technical quality that do not achieve the desired expectations of managers and users. When a vision is achieved, we have a development process led by a set of steps, defined by methods. Failure of implementation, user dissatisfaction and low utilization looms large when this is not achieved. The aim of this poster is to describe the main methods, tools and procedures in SE, emphasizing some of its aspects, in an attempt to offer a general view of the area and to demonstrate to people wishing to implement CPR system that the effective use of the SE paradigms is the best way to follow, with direct benefits to the institution, users and collaborators.

Software Engineering. Many definitions have been proposed for SE, but all of them relate to the need for methodical engineering processes during software development. These definitions comprise a set of three fundamental elements: methods, tools and procedures. Methods detail the means to build software systems, while tools provide automated or semi-automated support to these methods. Procedures represent the conjunction of methods and tools, and make possible a clear-cut and efficient development process, assuring to both developers and customers that software quality will be achieved [1]. Three general phases usually form the divisions of a development process [1,2]: **Definition**. This phase focuses on the definition of system analysis, software project planning and requirements analysis. **Development**. Focuses on the implementation through the steps of software project, coding and tests execution. **Maintenance**. Focuses on possible changes, such as corrections, adaptation and functional improvement.

Several years ago, as the complexity of SE methodologies increased, CASE tools (Computer-Aided Software Engineering) have made their debut. They help the developer during the entire development process, from management to analysis and design; some tools even helping to generate coding. It is important to emphasize that CASE tools increase the productivity considerably in the development of large health information system. The HELIOS project is an excellent sample of a SE environment for development of medical systems; an initiative that should be followed [3].

Discussion. Software Engineering is a difficult and somewhat intensive effort, involving many steps, methods and techniques, and requiring the collaboration of experts in the field. This should not discourage its utilization in the CPR field, however. An interdependent series of phases must be followed in order to develop complex software systems. CPR systems are usually very complex pieces of software, therefore they need detailed requirements analysis, the choice of a proper model, special management and planning software to support its development, a well defined interface project, considering all possible human factors, a strong participation of users in the development process; etc; however, many institutions are still not aware of the value of the SE approach, and failing to implement steps and tools that ensure the quality of the end product.

References

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