Chapter II

Software Life Cycle

Learning Objectives

- Construct a preliminary analysis and design for a health information system
- Distinguish between approaches that successfully involve the client and approaches that do not
- Compose a method of collecting requirements from healthcare professionals that visually presents information to them that they readily understand
- Apply different stakeholder matrices to determine the future of a legacy healthcare information system and illustrate the importance of politics

An example of an admissions process for a patient as seen by a nurse depicts a typical use of computers in healthcare (see Figure 2.1). While the process is impressive in many ways, it also leaves open the possibility of improvement through re-design of workflow and introduction of further automation. This chapter describes the software life cycle for healthcare information systems. The emphasis is on the development of a requirements document and a design document for a system. The emphasis is on working with executives and end-users to understand what will work. Finally, sections on system acquisition and system retirement are presented.

The traditional software life cycle defined in ISO 12207 (Rada & Moore, 1997) begins with requirements capture and ends with retirement. The system development life cycle remains largely unchanged over the years, though it calls increasingly for end-user involvement. The system development life cycle is basically the same in healthcare as in numerous other industries. However, what to expect in implementing the life cycle in a health environment is different from what to expect in other environments. The assessment of healthcare information systems requires subjective
Figure 2.1. A Typical Case. These are the observations of an experienced registered nurse (RN) about the use of information systems in her unit.

In the Ambulatory Surgery Unit where I work, the registration process begins with the infamous white card. This card is completed by the physician who requests that the patient be registered for her/his surgical procedure. The white card contains patient demographics, insurance, medical service to which the patient is to be admitted, and procedure.

The Admissions Unit then generates a medical record and a medical record number for the patient by entering this information into a patient management information system. A red card (small plastic addressograph plate that looks like a credit card) is also produced for the patient and includes the patient’s identifying information. This red card, a demographics fact sheet, physician orders, previous test results, and old records are sent to our unit the day before surgery. The unit secretary then prepares a paper chart for the patient which includes the necessary paper documentation forms.

On the day of surgery, the patient registers with our unit secretary. The secretary then gets the patient’s paper chart. On our unit most documentation is done by paper. The only clinical information system to which we have access is a pathology laboratory system but only to view results and not to make orders. Lab tests and medications are ordered with a paper form. Radiology tests can be ordered by the physician entering the request for the test into a radiology clinical system or via paper.

Converting to an automated system on this unit would involve extreme process reengineering. I would hope that eventually this would happen. In two years, the unit will be in a brand new state of the art building, and I asked my manager if she knew whether we would be using a computer system, and she said that it was discussed, but all of the details were not finalized.

or qualitative methods as well as objective or quantitative methods (Heathfield et al., 1997):

Health care information systems (IS) cannot be treated purely from the objectivist perspective. ... Whilst health care IS have a functional objective, ... the perception of health care IS will always involve an element of aesthetics, politics and sociology. ... The provision of an evaluation framework which takes account of these factors is important in the move towards professionalism in medical informatics.
Extending Lifetime of Biomedical Wireless Sensor Networks using Energy-Aware Routing and Relay Nodes
Carlos Abreu and P. M. Mendes (2014). *International Journal of E-Health and Medical Communications* (pp. 39-51).