Chapter 29
Evaluation of Health Information Systems:
Challenges and Approaches

Elske Ammenwerth
University for Health Sciences, Medical Informatics & Technology, Austria

Stefan Gräber
University Hospital of Saarland, Germany

Thomas Bürkle
University of Erlangen, Germany

Carola Iller
University of Heidelberg, Germany

ABSTRACT

This chapter summarizes the problems and challenges that occur when health information systems are evaluated. The main problem areas presented are the complexity of the evaluation object, the complexity of an evaluation project, and the motivation for evaluation. Based on the analysis of those problem areas, the chapter then presents recommendations of how to address them. In particular, it discusses in more detail what benefits can be obtained from applying triangulation in evaluation studies. Based on the example of the evaluation of a nursing documentation system, it shows how both the validation of results and the completeness of results can be supported by triangulation. The authors hope to contribute to a better understanding of the peculiarities of evaluation in healthcare, and to provide information how to overcome them.

INTRODUCTION

It is hard to imagine healthcare without modern information and communication technology (ICT). It is evident that the use of modern information technology (IT) offers tremendous opportunities to reduce clinical errors, to support healthcare professionals, and to increase the efficiency of care, and even to improve the quality of patient care (Institute of Medicine, 2001).

However, there are also hazards associated with ICT in healthcare: Modern information systems (ISs) are costly, their failures may cause negative effects on patients and staff, and possibly, when inappropriately designed, they may result in healthcare professional's spending more time with the computer than with the patient. This all could have a negative impact on the efficiency of patient care. Therefore, a rigorous evaluation of IT in healthcare is recommended (Rigby, 2001) and is of great importance for decision makers and users (Kaplan & Shaw, 2002). Evaluation can be defined as the decisive assessment of defined objects, based on a set of criteria, to solve a given problem (Ammenwerth et al., 2004).

The term ICT refers to technologies as such. Whether the use of these technologies is successful depends not only on the quality of the technological artifacts but also on the actors (i.e., the people involved in information processing and the organizational environment in which they are employed). ICT embedded in the environment, including the actors, is often referred to as an IS in a sociotechnical sense (Berg, Aarts, & van der Lei, 2003; Winter et al., 2001).

Many different questions can lead the evaluation of IT. Within evaluation research, two main (and often rather distinct) traditions can be found: The objectivist (positivistic) and the subjectivistic tradition (Friedman & Wyatt, 1997), which are related to the dominant use of either quantitative or qualitative methods (for details, see Chapter XII).

Despite a large amount of published evaluation studies (e.g., van der Loo, 1995) found over 1,500 citations on evaluation of healthcare IT between 1967 and 1995, and Ammenwerth and de Keizer (2004) found 1,035 studies between 1982 and 2002; many authors report problems during evaluation. One of the main problems frequently discussed is the adequate choice of evaluation methods. While objectivistic researchers tend to concentrate on quantitative methods, subjectivistic researchers mainly rely on qualitative methods. Sometimes, a mixture of methods is applied. For example, qualitative methods are used to prepare quantitative studies, or quantitative measurements are used to support qualitative argumentation. However, there is still usually one tradition which dominates typical evaluation studies, leading to a focus either on quantitative or qualitative methods.

Many researchers point to the fact that this domination of one method or tradition may not be useful, but that a real integration of various methods from both traditions can be much more helpful to get comprehensive answers to given research questions. The integration of the complementary methods (and even beyond this, of data sources, theories and investigators), is discussed under the term triangulation.

In this chapter, we first want to review some of the underlying reasons that make evaluation of healthcare IT so difficult. We will structure the problems into three main problem areas: the complexity of the object of evaluation, the complexity of the evaluation project, and the motivation to perform evaluation. We will discuss means how to overcome the discussed problems.

As one more detailed example, we then discuss what benefits can be obtained from applying triangulation in an evaluation study. Based on the example of the evaluation of a nursing documentation system, we show how both the validation of results and the completeness of results can be supported by triangulation.

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