

What Formal Models Cannot Show Us: People Issues During the Prototyping Process

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Abstract. Modelling a process using techniques such as Role Activity Diagrams (RADs) [13] can illustrate a large amount of useful information about the process under study. What they cannot show as easily however, are the informal practices during that process. In this paper, we analyse the prototyping process as part of an IS development strategy across five companies. Interview text from project managers, prototypers and other development staff across the five companies was analysed. Interestingly, results point to several key recurring issues amongst staff. These include non-adherence to any prototyping guidelines or standards, sketchy change request procedures, concern over time and cost deadlines and the importance attached to developer experience during the over-all process. The notion of prototyping as a simple and easily managed development strategy does not hold. Our analysis provides complementary qualitative data about the opinions of prototyping to inform business process re-engineering of those formal RADs.

1 Introduction

A commonly cited reason for systems being delivered late and over budget is inadequate requirements elicitation due to poor communication between developers and users. Prototyping, as an information systems discipline, provides an opportunity for free and unhindered interaction between developers and users in an attempt to overcome this problem [2, 4]. The prototyping process itself can be modelled formally using a technique such as Role Activity Diagrams (RADs) [13, 9] where actions and interactions between the different prototyping staff in the form of roles can be shown by lines joining, and internal to, the set of roles. What techniques such as RADs cannot show however, are the different concerns encountered during the process, some of which may influence the effectiveness of that very process.

In this paper, we focus on those issues found in the prototyping process of five companies, all of which used prototyping as part of their IS development strategy.

Interview text with twenty different members (in ten interviews) of the prototyping team across the five companies was analysed using principles of grounded theory [7] and the key issues extracted. A number of centrally recurring issues emerged from our analysis, in particular those related to change requests, standards and quality issues, developer experience and perception of the user by the prototyper.

Our analysis provides an insight into the less tangible reasons why prototyping may not deliver the benefits it promises. It also allows reflection on the formal RADs with a view to the possibility of business process re-engineering; it may also inform the manner in which future prototyping projects can be viewed and finally, it highlights the importance of carrying out qualitative analysis of textual documents using theoretical techniques such as grounded theory. As part of our analysis, we refer back to the prototyping RADs of each of the five companies studied and assess whether the informal data we collected can inform the prototyping process in that company (expressed using RADs).

The paper is arranged as follows. In Section 2, we describe the motivation for the research and related work. In Section 3 we describe the format of the interview text, the companies studied and the grounded theory approach adopted for text analysis. In Section 4 we look at the extracted information and comment on the themes running through the text. We then discuss some of the issues that arise as a result of our analysis (Section 5) and finally draw some conclusions and point to future work (Section 6).

2 Motivation and Related Work

The motivation for the work described in this study stems from a number of sources. Firstly, the prototyping process is widely promoted for the benefits it may provide; capturing user requirements accurately and pro-actively involving the user is bound to provide advantages, in theory at least. Yet very little literature has been published on some of the key human issues (i.e., qualitative issues) that may arise during this process [1]. Such issues could have a profound effect on how prototyping is perceived and carried out.

Secondly, it is our belief that the majority of problems in the IS world stem from the *process* of IS development (we view the end product as merely a function of that process - getting the process right must be a priority). In particular, those problems related to the subtle influences during development. Using notation such as RADs does not allow for these subtle influences to be modelled. Extraction of the informal aspects during the prototyping process thus complements the knowledge already incorporated into RADs. We also believe that whatever the type of information system, whether web-based or more traditional in nature, problems of an informal nature will always occur and that they therefore need to be documented.

A third motivation arises from a previous study using the same data [6]. A personality test carried out on prototyping development staff (including some of the staff used herein) concluded that prototypers tended to be extrovert in nature, while project managers tended to be less extrovert. Analysis of some of the problems during the prototyping process may give us further insight into these personalities and an indication of the motivation of the different staff involved.