

Chapter 11

Questioning the Key Techniques Underlying the Iterative and Incremental Approach to Information Systems Development

Angus G. Yu
University of Stirling, UK

ABSTRACT

The iterative and incremental development (IID) approach is widely adopted in information systems development (ISD) projects. While the IID approach has played an important role the management of many ISD projects, some of the key techniques have not received critical appraisal from the academic community. This paper aims to fill the gap and examines three such techniques through a case study. First of all, the gap between the theory of user participation and the reality of user's lack of real influence on design and development is explored. The author proposes the concept of "participatory capture" to explain the side effect of user participation. Secondly, the assumption that evolutionary prototyping converges to a successful design is questioned. Thirdly, the side effect of the timeboxing technique is considered. The paper suggests that the IID approach represents the learning approach as categorized in Pich et al. (2002) and it might be ineffective in dealing with the significant uncertainties in ISD projects.

INTRODUCTION

The iterative and incremental development (IID) approach has long been proposed as a solution to the so-called "software crisis" (Larman & Basili,

2003). Indeed, the concept can be traced back to the seminal paper by Royce (1970). While IID has been built into a number of recent and current information systems development (ISD) methodologies, some of the key techniques have not received critical appraisal from the academic community.

DOI: 10.4018/978-1-4666-0930-3.ch011

This paper aims to fill the gap. Through a case study, the author explores the research question: to what extent might IID help or hinder successful ISD project management? The paper starts with a brief survey of the IID literature, highlighting three key techniques for further examination. The case study project is then described followed by discussions of the IID techniques. The nature of the IID approach is then briefly discussed within the scheme of project management approaches categorized by Pich et al. (2002). The last section outlines conclusions and further research questions.

THE IID APPROACH

The IID approach is not designed by a single source. Rather it has come “independently from countless unnamed projects and the contributions of thousands” (Larman and Basili, 2003). At the simplest level, the IID approach refers to a way of developing information systems that emphasizes a number of techniques including user participation, incremental evolution and time-boxed iteration. The approach is shared by a number of ISD methodologies, including Rapid Application Development (RAD, see Eva, 2001; Martin, 1991), Dynamic systems development methodology (DSDM, see Stapleton, 1997), SCRUM (Schwaber, 1995), Rational Unified Process (Kruchten, 2000), eXtreme Programming (Beck, 2000) and various other “agile” methodologies (Highsmith, 2000; Lin & Shao, 2000). IID has been construed as the way to overcome the weaknesses of the “Waterfall Model”, or “the sequential process” (Kruchten, 2000). The IID approach recognizes that requirements cannot be “frozen”. It thus dispels the misconception about the need for complete requirements before design and development. IID also acknowledges the inseparability of design and development. At a theoretical level, IID advocates a flexible, social constructive approach to product management,

unlike the traditional planning-based approach (Koskela & Howell, 2002b). Koskela and Howell (2002a) examine SCRUM in particular and concluded that it is based on “alternative theories of planning, execution and control”.

While the IID-based methodologies may represent a step forward in the thinking of information system development, they have not always been successful in resolving ISD project challenges. Despite the proclaimed intention of the IID proponents to address system development failures, the rate of failures has remained high (see e.g. Charette, 2005; Goulielmos, 2004). There could be multiple explanations to account for this lack of success. One is that “effective” methods are not applied (see Humphrey, 1998 for such a discussion in the context of software engineers’ practices) or applied incorrectly (see Highsmith, 2002 for an example of incorrect use of timeboxing). Another possibility is that there might be fundamental weaknesses with the IID approach itself. Many publications and training courses have been made available to practitioners based on the first explanation (Humphrey, 1998). This article, however, critically examines the possible weaknesses of the IID approach itself. Three key techniques are identified that are common to IID-based ISD methodologies, namely user participation, evolutionary prototyping, and timeboxing, each is briefly outlined below.

User Participation

User participation, also loosely referred to as “user involvement”, is central to IID. Martin (1991) emphasizes the need for user involvement during Joint Application Design workshops. Stapleton (1997) describes it as “absolutely vital”. Of DSDM’s nine principles, three are about user involvement. Of course, the so-called traditional systems development approach also involves users, as acknowledged by Stapleton (1997). The question is not if users should be involved, rather it is which users and how they are to be involved.

13 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/chapter/questioning-key-techniques-underlying-iterative/64961

Related Content

R

(2007). *Dictionary of Information Science and Technology* (pp. 563-590).

www.irma-international.org/chapter//119579

Information Architecture as an Enabler for Business Development: A Case Study

Henrique S. Mamede (2016). *Handbook of Research on Information Architecture and Management in Modern Organizations* (pp. 382-396).

www.irma-international.org/chapter/information-architecture-as-an-enabler-for-business-development/135777

Assessing the Political and Socio-Economic Impact of Corruption among Nations

Richard N. LaRocca (2014). *International Journal of Information Systems and Social Change* (pp. 18-40).

www.irma-international.org/article/assessing-the-political-and-socio-economic-impact-of-corruption-among-nations/119555

Collaborative Commerce and the Hotel Industry

Michelle Rowe and Alfred Ogle (2008). *Information Communication Technologies: Concepts, Methodologies, Tools, and Applications* (pp. 988-1001).

www.irma-international.org/chapter/collaborative-commerce-hotel-industry/22716

Bulgarian Traditional Folklore Celebrating Food and Sustainability

Diana Bogueva, Dora Marinova and Vladislav Todorov (2021). *International Journal of Information Systems and Social Change* (pp. 1-14).

www.irma-international.org/article/bulgarian-traditional-folklore-celebrating-food-and-sustainability/284399