An End-User Metadata Model on Object and Element Levels for Business Intelligence Users

Yuriy Verbitskiy, University of South Australia, Adelaide, Australia
William Yeoh, University of South Australia, Mawson Lakes, Australia & Deakin University, Burwood, Australia

ABSTRACT

The effective use of metadata can offer end users an improved understanding and greater level of assurance during the Business Intelligence (BI) report analysis process. This paper reports key findings from a case study that investigates critical end-user metadata issues in a large Australian organization. The findings led to the development of an end-user metadata model on object (report and cube) and element (term and column) levels, which can support effective BI use and potentially increase user satisfaction at the case organization. The adoption and use of BI applications by business stakeholders may be improved by incorporating the end-user metadata model.

KEYWORDS

Business Intelligence, Element, End User, Metadata, Object

INTRODUCTION

In recent years BI applications have been consistently ranked among the top five technology priorities in a global survey of Chief Information Officers (Gartner, 2015). Business Intelligence (BI) refers to “a broad category of technologies, applications and processes used for gathering, storing, accessing and analysing data to help its users make better decisions” (Wixom & Watson, 2010). Hence meaningful information can be delivered at the right time, at the right location and in the right form (Negash, 2004) to assist individuals, departments or even larger units to facilitate improved decision-making. Despite the importance of BI applications, in many instances they are significantly underused, partly attributable to issues of user satisfaction (Chen et al, 2000). End-user satisfaction is essential to improving the uptake of BI (Chen et al, 2000). A key influence on end-user satisfaction with BI is end-user metadata (Foshay et al, 2007). End-user metadata is needed as many end-users are not technically-oriented and require substantial support to use BI applications and fully understand the BI cube or measurement and definition of a BI term, or the meaning of a column of data originating from other systems.

Indeed, a potentially valuable solution to the problem of poor user understanding of BI data and reports is the use of end-user metadata (Wells & Hess, 2002; Foshay et al, 2007). Metadata has been afforded many definitions over the years. It has been defined as simply ‘data about the data’. Importantly, metadata plays a crucial role in an effective BI environment (Sen, 2002; Little & Gibson, 2003). Metadata serves as a mechanism that provides the context about the data and information of a
BI report (Foshay et al, 2007). It addresses the how, when, why and what questions in a BI environment (Hess & Wells, 2002; Foshay et al, 2007). Gartner Research (2007) contends that metadata is one of the most important functionalities that a BI environment should deliver. Inmon et al (2008) and Wells and Hess (2002) further assert that without metadata to support BI reports, a BI application offers little value to an organization. While technical users understand the BI environment because it is one of their primary work objectives, business users need support that will help them feel confident about using the data and BI tools in general. Making available effective end-user metadata could provide such support.

Several studies discuss different types of metadata. Notably, metadata has been classified as business metadata (which relates to the data that is meaningful to business users) or technical metadata (which is used by information technology staff responsible for developing and administering a BI system) (Sen, 2002; Ballard, 2006; Shankaranarayanan & Even, 2006). In the technical domain metadata is crucial for building a data warehouse as developers need to know the data structures, source-to-target mappings, and data transformation rules during the data extraction, transformation and loading (ETL) processes (Ponniah, 2001). In the business metadata main, Foshay et al (2007) propose an end-user metadata taxonomy of four categories: definitional, data quality, lineage and navigational metadata. Despite these early studies on metadata types, to date there is little research that explores the detailed elements of metadata requirements for business users in an enterprise-scale BI environment. This paper aims to identify the key elements of business end-user metadata by conducting an exploratory interpretive case study at a large Australian organization. By synthesising key findings from the case study, the paper develops an end-user metadata model which may help BI practitioners implement metadata for business users.

The balance of the paper is set out as follows. First, the paper discusses the research methodology. Second, it presents and discusses related findings from the case study. Next, the paper presents an end-user metadata model emerging from the case findings. Finally, the paper draws conclusions and offers suggestions for future research directions.

RESEARCH METHODOLOGY

This study adopted an interpretive approach as the environment for BI and metadata effectiveness involves people whose opinions help determine success (Walsham, 1995). The views of BI stakeholders were sought as they could yield insights that might help to develop theory. The study used the single case method to explore end-user metadata issues leading to successful BI use within the real-life context of a large Australian higher education institution. In the past decade, the higher education sector has found many uses for BI. Higher education is therefore a suitable choice of industry sector for this research. The case study method was selected as it enables a deeper investigation of a phenomenon by capturing detailed “reality” and a rich picture that can reveal the highly complex and unquantifiable events associated with that phenomenon (Yin, 2009). According to Miles and Huberman (1994), a case study provides better explanations for the examined phenomenon.

The research project involved collaboration between the researchers and the organization’s BI unit. With more than thirty thousand students, the university believed it was crucial to exploit a powerful data analysis and performance management tool. The university acknowledged the importance of BI technology and strove to deliver it to the wider organizational community. Importantly for this study, the BI unit indicated that it did not have a consistent metadata model that benefited business users of the BI environment. Thus the university represented an ideal case organization for investigating metadata issues in a BI environment.
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