

An Empirical Validation of Object-Oriented Metrics in Two Different Iterative Software Processes

Mohammad Alshayeb and Wei Li

Abstract—Object-oriented (OO) metrics are used mainly to predict software engineering activities/efforts such as maintenance effort, error proneness, and error rate. There have been discussions about the effectiveness of metrics in different contexts. In this paper, we present an empirical study of OO metrics in two iterative processes: the short-cycled agile process and the long-cycled framework evolution process. We find that OO metrics are effective in predicting design efforts and source lines of code added, changed, and deleted in the short-cycled agile process and ineffective in predicting the same aspects in the long-cycled framework process. This leads us to believe that OO metrics' predictive capability is limited to the design and implementation changes during the development iterations, not the long-term evolution of an established system in different releases.

Index Terms—Software metrics, agile process, empirical validation, framework evolution.



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Manuscript received 12 Aug. 2002; revised 8 Aug. 2003; accepted 11 Aug. 2003.

Recommended for acceptance by A. M91.

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The Validation By Measurement Theory Of Proposed Object Oriented Software Metrics Sudoc Nas 12620003

Ralph D. Neal



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The Validation by Measurement Theory of Proposed Object-oriented Software Metrics Ralph D. Neal, 1996

Abstract Moving software development into the engineering arena requires controllability and to control a process it must be measurable Measuring the process does no good if the product is not also measure i e being the best at producing and inferior product does not define a quality process Also not every number extracted from software development is a valid measurement A valid measurement only results when we are able to verify that the number is representative of the attribute that we wish to measure Many proposed software metrics are used by practitioners without these metrics ever having been validated leading to costly but often useless calculations Several researchers have bemoaned the lack of scientific precision in much of the published software measurement work and have called for validation of software metrics by measurement theory This dissertation applies measurement theory to validate fifty proposed object oriented software metrics **The**

Measurement of Theory Validation of Proposed Object-oriented Software Metrics Ralph D. Neal, 1996

Object-oriented Metrics Brian Henderson-Sellers, 1996 Object oriented OO metrics are an integral part of object technology at the research level and in commercial software development projects This book offers theoretical and empirical tips and facts for creating an OO complexity metrics measurement program based on a review of existing research from the last several years KEY TOPICS Covers moving through object oriented concepts as they related to managing the project lifecycle the framework in which metrics exist structural complexity metrics for traditional systems OO product metrics and current industrial applications MARKET For software developers programmers and managers **Object-Oriented Metrics in Practice** Michele Lanza, Radu Marinescu, 2007-05-16 Metrics are paramount in every engineering discipline Software engineering however is not considered a classical engineering activity for several reasons In general if a software system is seen to deliver the required functionality only few people if any care about the internals Moreover defining understanding and applying software metrics often looks like an overly complex activity recommended only to trained professionals Lanza and Marinescu demystify the design metrics used to assess the size quality and complexity of object oriented software systems Based on statistical information from many industrial projects and generally accepted semantics they deduce many single and combined threshold values They show in detail how to identify collaboration and classification disharmony patterns in code how to visualize their results using the freely available CodeCrawler visualization tool and how to devise possible remedies The combination of theoretically sound results and practically tested procedures and solution paths makes this book an ideal companion for professional software architects developers and quality engineers The pattern oriented description of disharmonies offers easy access to detecting shortcomings and applying solution strategies This well written book is an important piece of work that takes the seemingly forgotten art of object oriented metrics to the next level in terms of relevance and usefulness Richard C Gronback Chief Scientist Borland Software Corporation **A Validation of**

Object-oriented Metrics ,1999 Many object oriented software metrics have been proposed and at least 14 empirical validations of these metrics have been performed However it was recently noted that without controlling for the effect of class size in a validation study the impact of a metric may be exaggerated It thus becomes necessary to re validate contemporary object oriented metrics after controlling for size This paper performs a validation study on a telecommunications C system that investigates 24 metrics proposed by Chidamber Kemerer 1994 and Briand et al 1997 The dependent variable was the incidence of faults due to field failures fault proneness Results indicate how many of the 24 metrics covering coupling cohesion inheritance and complexity are actually related to faults after controlling for class size and how many of these are useful for the construction of prediction models The accuracy of the best prediction model is also noted

Quantitative Approaches in Object-oriented Software Engineering Fernando Brito e Abreu,2002 A comprehensive description is provided of four areas of quantitative approaches in object oriented software engineering metrics collection quality assessment metrics validation and process management

Object-oriented Software Metrics Mark Lorenz,Jeff Kidd,1994 Project metrics Design metrics

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