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Reengineering of Module for Public Sector & Complexity Measurement

By Ashok Kumar, Anil Kumar
Kurukshetra University, Kurukshetra, India

Abstract - This paper is based on reengineering of module for public sector, it deals with the measurement of complexity as well as effort measurement of module during Reengineering of module at design time. This methodology reduces more than 75% resources as compared to conventional and structural Methodology. It also, enables to reengineering of module faster, high quality, high reliability, and also increases level of reusability & productivity.

Keywords : *Conventional Methodology [8], Structural Methodology [8], Excel Template [9].*

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Reengineering of Module for Public Sector & Complexity Measurement

Ashok Kumar[α], Anil Kumar[Ω]

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I. Introduction

Today public sector is an integral part of Govt. and performance of it, has considerable scope for improvement. However, these sector such as govt. hospital, depends on information system, which have been engineered in earlier days, such legacy system using procedural methodology, db handling , GUI etc. As services grow in size or the requirement of public increases continuously, due to this there is accelerating need software maintenance. It has been observed that, the cost of the maintenance is much higher than the cost of reengineering of the software. And also continue maintenance of such system become tedious and cost approach and occurrence of software failure is more due to poor documentation, poorly structured & transparency, and also changes technology infra structured in hardware and software, complexity of module increases continuously, and finally logic code written is outdated hardware and software. Therefore, maintenance is not a good choice. Reengineering, is much better than maintenance. It is an approach to solve problem of legacy system. Its aim is the qualitative improvement of existing software and the extension of its life expectancy. It consists of examination (reverse engineering) and alteration (forward engineering) of legacy system.

II. Purposed Work

The purposed methodology, used to reengineering of module of public sector i.e. more suitable, for available tools and techniques. It will create significant improvement to measure the complexity and effort of module individually by using Excel Template[9]. The Excel Template that is used to measure complexity of each and every modules of hospital are Modified Method Hiding Factor (M-MHF), Modified Attributes Hiding Factor (M-AHF), Modified Method Inheritance Factor (M-MIF), Modified Attributes Inheritance Factor (M-AIF), Modified Coupling Factor (M-CF), and Modified Polymorphism Factor (M-PF); And the Excel Template that are used for measuring effort of each and every modules of hospital during reengineering of the modules are, Modified Weighted Method Per Class (M-WMC), Modified Depth of Inheritance (M-DIT), Modified Number of Children (M-NOC), Modified Coupling Between Object (M-CBO), Modified Response for a class (M-RFC) and Modified Lack of Cohesion in Method (M-LCOM).

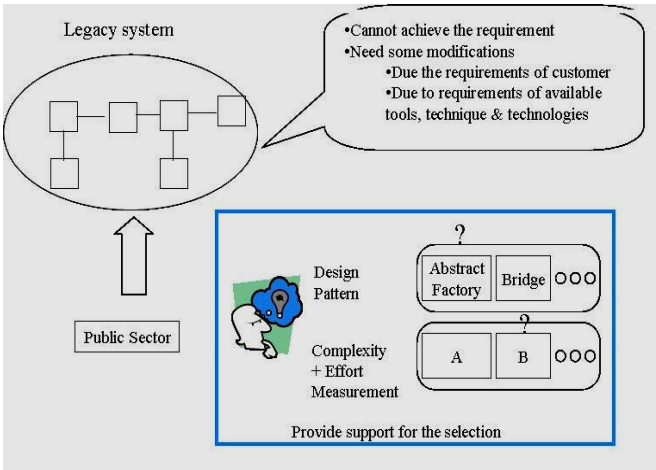
It also specifies causes of errors and the use of the safety design concepts, to prevent minimize errors by detecting them, before undesirable effect takes place. The excel template provides facility to reengineering the modules in such a way that help enables the doctors to better serve their patients, Reducing the time spent by staff filling out forms, Control over the costs incurred by diagnosis – related groups, Increased nursing productivity, Faster and informed decision-making by doctors, Improve decision support for the management, Cost-effective patient transactions.

III. Problem Description

HMS is powerful, flexible, easy to use and has designed & developed to deliver real conceivable benefits to hospitals and clinics. It is designed for multi specialty hospitals, to cover a wide range of hospital administration and management processes.

Hospital Management System is a product of our deep experience in delivering successful solutions to various customers in the healthcare space and our expertise in developing unique Intellectual Property in the form of products and re-usable components for the Healthcare Industry.

Author α : Professor, Department of Computer Science & Application Kurukshetra University, Kurukshetra, India.
E-mail : Anilbest2005@gmail.com
Author Ω : Asst. Professor, Computer Science & Engg. Vaish College of Engineering, Rohtak, India. E-mail : Bestanil2005@rediffmail.com



The legacy system (i.e. hospital) is engineered by using Conventional and Structured Methodology. Conventional methodology, based on SDLC, there is no way to measurement of complexity and effort of module during reengineering of module as well as this methodology not support reusability and also productivity of module not very much effective.

Structured Methodology is slightly improvement of conventional methodology. If we reengineering the module by using this methodology, it help to measure control but not support reusability, but help in productivity and quality of analysis and design. It will provide more effective analysis & more stable or maintainable design. However, both these methodology not support today's available tool and techniques.

IV. Results and Discussion

There are twelve excel template that are used to determine complexity of module that are more efficient as compared to other methodologies. Six excel template [9] such as M-MHF, M-AHF, M-MIF, M-AIF, M-PF & M-CF are used to determine complexity of each and every module of the system, as well as it also provides facilities to hide information, to increase reusability & productivity of modules, measure the degree of method overriding in class inheritance and also measure degree of coupling among different types of modules.

Other six excel template[9], such as M-WMC, M-DIT, M-NOC, M-CBO, M-RFC & M-LCOM, are used to determine effort i.e. required to reengineering of the module during Post Martem Methodology[1 2,3].

Table 1 : 'Complexity measurement values i.e. determined by Complexity Measurement Template'

Sr No	Activity	Post Martem Methodology	Conventional methodology
1	HMS Staff	36.5141	60
2	Emergency	70.47	85
3	Enquiry	46.806	78
4	OPD	52.9121	75
5	Managing Unit Doctor	51.8	77
6	Examination	33.1916	56
7	Nurse Detail	36.914	62
8	Patient Status	20.4	56
9	Pharmacy/Drug	61.2712	80
10	Laundry	33.4272	75
11	Kitchen	33.4272	75

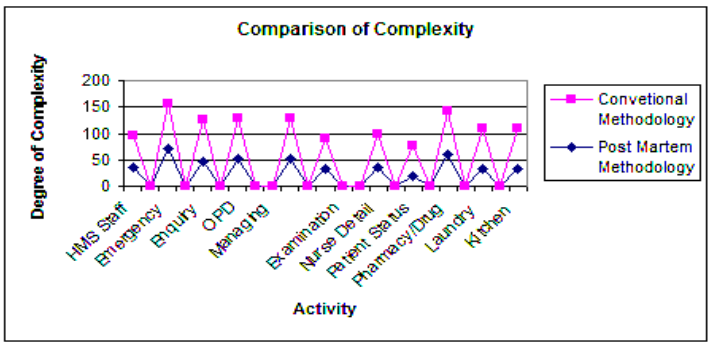


Fig.1 : 'The above graph show complexity of reengineering of module by using values given in table 1

Table 2 : 'Effort Measurement values are given below i.e. determined by using effort measurement template'

Sr No	Activity	M-WMC	M-DIT	M-NOC	M-CB0	M-RFC	M-LCOM
1	HMS Staff	3	4	3	2	2	3
2	Emergency	3	9	3	1	2	4
3	Enquiry	3	3	4	2	2	4
4	OPD	2	20	4	2	2	4
5	Managing Unit	5	20	9	4	4	5
6	Doctor Exam	2	8	3	1	2	4
7	Nurse Detail	2	9	3	1	2	4
8	Patient Status	3	4	5	2	2	2
9	Pharmacy/Drug	4	14	7	3	2	4
10	Laundry	1	2	1	1	2	2
11	Kitchen	1	2	1	1	2	2

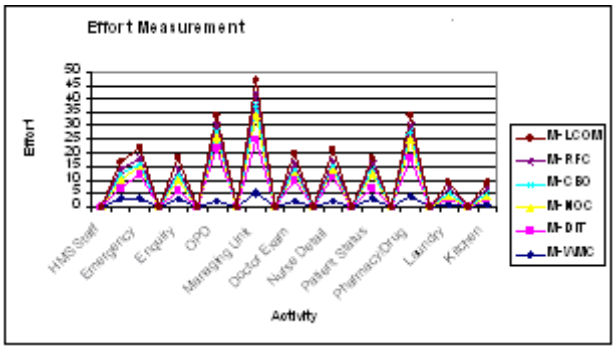


Fig. 2 : 'The above graph show effort required during reengineering of module by using value given in table 2'

The design of modules based on purposed methodology provides facilities such as:

- It enables the doctors to better serve their patients.
- Reducing the time spent by staff filling out forms.
- Control over the costs incurred by diagnosis – related groups.
- Increased nursing productivity.
- Faster and informed decision-making by doctors
- Improve decision support for the management
- Cost-effective patient transactions

The purposed methodology also, allows the developer to communicate using well-known, well understood names for the software interactions. Common design pattern can improved over time, making them more robust than ad-hoc (in-formal or unplanned) design.

V. Conclusion

Overall objective of this paper, is that modules are design in such a way that if any time any where any module need for reengineering in future, it is easily takes place. As well as it provides facilities to determine complexity[3,4] and effort from that module, where reengineering happens. It does not need to determine complexity of entire modules again and again. And it will focus on optimization and increase productivity[7], reusability[7], flexibility[7], understandability and also support reliability of modules[10].

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