RESEARCH ARTICLE OPEN ACCESS

Amalgamation of the Initial Phases of Project Management Life Cycle for Customer Involvement and Improved Competence, To Deliver a Quality Product

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ABSTRACT
Consider the software development life cycle models development, testing and deployment phases are repeated by neither touching nor revising the requirements and design phases. There are many times original requirements are changed intermediate in the project and sometimes new requirements being added by removing existing requirements. Unattended requirements and design phases lead delivering a poor quality product as well unsatisfied customer. The problem I found here is the requirements and design are always not attended considering any of the methods waterfall/Agile/DevOps models and the expert advices are not considered always for requirements change. Melting down the requirement phase to two sub phases, amalgamating the requirements and design to Decision phase by including customer and architects from different teams helps in streamlining process and improving the quality of the end-product.
Keywords :— Software Project life cycle, Requirements, Design, software quality, competence, W5HH principle

I. INTRODUCTION

Customer, without customer there is no project and is considered to be active all along the project. If the customer is active in the project till the development or code phase begins, the projects never lose its grip for quality and continuity. It doesn't mean the project stake holders or team are unable to bring the success of the project and cannot be highlighted as the reason for failure. Customer involvement at the initial phases strengthens the project roots, and gives a good start to the later phases of the project for the project to be more successful instead going challenged or failed. Existing life cycle models like sequential, iterative & incremental, and continuous integration and continuous delivery projects are good at their respective designs. Minor tweaking or modification of requirements and design phase of the software development life cycle model can improve the competence and the quality of the product as well maintain the project life cycle flow with continuity.

This paper is based on the following research questions for delivering a quality product to the end-customer.

1. Why are the changes required to improve the quality?
2. What modifications are required in the life cycle phases?
3. When the customer involvement is required in the project life cycle?
4. Who of the stake holders are considered in the modified phase of the life cycle?
5. Where can be the requirements are further analysed more?
6. How the changes impact quality of the product?
7. How much of the mining of the requirements help in improving the continuous quality of the product?

II. CONTINUOUS QUALITY METHOD

What is a W5HH principle? [4]
Boehm suggests an approach (W5HH) that addresses project objectives, milestones and schedules, responsibilities, management and technical approaches, and required resources.

A. Why the changes are required to improve the quality?

This question enables in our mind to assess the validity of the existing process, methods and techniques of the software project management.

As per the Chaos report, on an average 50-60% of the projects are going challenged and approximately 20% of the projects are failed leaving the rest as successful. Projects to be executed are always having one or other issues like insufficient requirement's or product being shelved before deployment for not given enough study on the requirement's. This lead to decreasing of the satisfaction levels of the customer.
Second point also can be considered, many a times the design phase is less focused. Requirements are not getting completed to the pseudo code, resulting the development of half of the requirements and the product being shelved upon the life cycle method flow gets interrupted.
As per chaos report the successful rate is 39% for agile and 11% for waterfall. [Chaos, 2015].

CHAOS RESOLUTION BY AGILE VERSUS WATERFALL

SIZE	METHOD	SUCCESSFUL	CHALLENGED	FAILED
All Size Projects	Agile	39%	52%	9%
	Waterfall	11%	60%	29%
Large Size Projects	Agile	18%	59%	23%
	Waterfall	3%	55%	42%
Medium Size Projects	Agile	27%	62%	11%
	Waterfall	7%	68%	25%
Small Size Projects	Agile	58%	38%	4%
	Waterfall	44%	45%	11%

The resolution of all software projects from FY2011-2015 within the new CHAOS database, segmented by the agile process and waterfall method. The total number of software projects is over 10,000.

Fig. 1 Chaos resolution report comparing Agile and waterfall.

This paper analyses about the Continuity, competence, customer involvement which are the shortcomings of the existing life cycle models.

How to say continuity is to be improved?
Existing models, for their project plans and duration execution goes fine as long as the change requests are not in place. And whenever a change request strikes the project when at the middle of development phase, either entire cycle is revamped for small projects or pushed to the successive project lines. The continuity breaks always because of not handling the change requests properly, instead entertaining the handling issues, if the changes are anticipated or like proactive analysis is done with respect to the consideration of requirements, the project execution flow is so smooth as waterfall (by its name) and the continuity is too maintained.

The two major and important phases of the software development life cycle when combined can be added to any of the existing life cycle models.

Current methodology:

The entire life cycle or the project is depending on the requirements as well design phases. In the current methods, customer provides requirements and these are analysed by the business analyst, project manager and very minimal stake holders are involved to convert them to the technical requirements for designing the product.

Proposed change in the current methodology:

Everything is right, and then what is the problem? Perfect and no matter whatever it is the project is minced to many chunks and being executed. This is giving lot of confidence to the project team and resulting the product or software not long lasting to the end-customer, considering the project is more successful, saying it improved by accelerating the pace in the current approaches and methods. This is good but many a times there is a gap in the continuity of the project and more integration issues are being observed at the deployment phases.

Here the requirements are mined and are divided into two equal one is mutable and second is immutable. Mutable are always changeable and entertains change in request when comes dynamically. Design phase gets divided into two chunks and each chunk and mutable chunk is prioritised as P1 and immutable chunk is prioritised as P2 and both executions are started in parallel. Project Manager needs to check for any slippages not to happen in both the chunks. If there is any slippage or change in requests then a ***replica-chunk*** need to be created based on both the mutable and immutable chunks such that the continuity is not disturbed in the life cycle. The replica-chunk is closely attended by the amalgamated team and can work to complete the chunk before the P1 and P2 are completed. If the P1 and P2 are ready for deployment then P3 need to move to mine-2 for big size projects and need to be completed in small size projects.

Water fall model do a continuous analysis of requirements and converting to design phase and by then the product gets outdated and being shelved in some scenarios leading to the project as challenged and failed. Agile method is an unstructured and lack of emphasis on necessary design and documentation, and project goes off-track if the final outcome is not properly planed. Similar shortcomings are for the rest of the models too [360 logica]

The paper speaks about prioritizing the requirements and design phases helps resolving the issues and strengthens the project life cycle to deliver a quality product. A minor tweak or little change in the respective phases could lead to successful and deliver a competent product.

Brainstorming of requirements aligning them to the current and future trends with respect to the product line requirements.

B. Why the changes are required to improve the quality?

Requirements need a brainstorming discussion which the end result need to the align the requirements to the current trends and future requirements.

In light of this data, the questions remain –
How to make the projects more successful?
What can be done to increase quality?

This paper showcases the following points to answer the above questions,

- Melting down the business requirements to the technical requirements and adopting the best design methods using the finalised requirements.

- Working on the mutable and immutable requirements by prioritising the mutable requirements to be developed.

C. When is the customer involvement required in the project life cycle?

A customer is always involved in the project in the documents and not physical or vocal for most of the times in the software projects. Every input to the project team is always given by the stake holders. This is a best industry trend but sometimes if the team who interfacing the customer has not clear the requirements to the project team, then the project success starts declining.
This paper strongly recommends a continuous customer involvement almost at every phase of the project life cycle. Success and quality are directly proportional to the customer involvement. A project manager and customer if are on same page, then the project execution goes very smooth and its quite important that the customer presence in the amalgamated phase lead to strengthen the requirements and the project design.

Why customer involvement is required in design phase instead requirements phase?

Many a times customer gives a single line requirement, for example, design me a television which can be viewed by 50 people even they sit from 15-20ft far. Here the project team is required to further analyse on the product competence. When the project tem interacts with customer detailing the current trends and further analyse the requirements in detail. Such discussions provide confidence to the customer. Customer can come to know in what way the product can be competent and he can sell the product which lasts for some time instead getting failed.

Therefore, customer involvement helps in strengthening the requirements and making the product more aligned to the requirements focusing the current trends.

D. Who of the stake holders can be considered in the modified phase of the life cycle?

The new amalgamated phase is the combination of requirements and the design phase. Who are required to be in this phase? As this is the combination of requirements and design phase, a brainstorming of requirements is necessary and the core team members are required to analyse and modify the requirements to technical. A team of total six members including project manager, customer, architect, developer, tester and technical support are required in the new phase.

Why we need a team of six and what will they be doing in this new phase?
At first Project manager is required for every phase of the life cycle and is continued from the existing lifecycle models. Second one who got added new in the lifecycle is CUSTOMER. This addition is important and critical and involvement of customer in this phase and with project team outcomes better requirements and better design. Always the project team and customer can by in sync about what is needed for the project and what can be done for the project. The participation goes and grows the requirements and design of the project stronger. Third member of this team is Architect and is always there from the past and is continued in this new model too. Fourth member of this team is Developer, is also continued from the previous life cycle models. Fourth and the new addition to this team is Tester. This addition brings value to the team and the phase, tester validates and verify the requirements and design as well can suggest the requirements can be changed or accordingly. Next comes the key/Fifth addition in this phase is technical support. This addition is key to success of the project, how can it be say, we have the technical support team who talks to different customers and are always on top of the product lines. All the six member team will process the requirements and dig the gold(mining) out of the requirements and design the product appropriately.

E. Where can be the requirements are further analysed more?

Requirements are the ones which always need the analysis irrespective of whether they are static/immutable or dynamic/mutable. Once the new team of amalgamated phase is formed the next task is to differentiate what are static and dynamic requirements. Anyways static requirements are always considered as stable requirements and till the deployment phase they cannot change at any circumstance. This is more or less the same approach of the existing methods of the models.

The importance of this new team comes now in differentiating the dynamic requirements and analysing them further with respect to the product competence. A continuous feedback and feed forward discussions among the amalgamates (new team) can lead to finalise or add more detailed requirements helping the architect and developer to give a better design to the product.

Below is the pictorial representation of the flow of the requirement classification as well analysis.

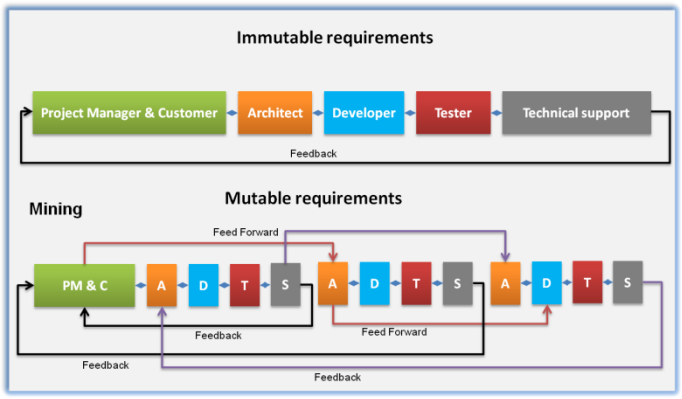

Fig. 2 Static and dynamic requirements analysis

F. How the changes impact the next phases?

Any change irrespective of whether it's a small or big the impact is more for the project and project team. This paper speaks about combining the two important phases to single phase to provide a possible and better output which can help the successive phases flow like a pure waterfall.

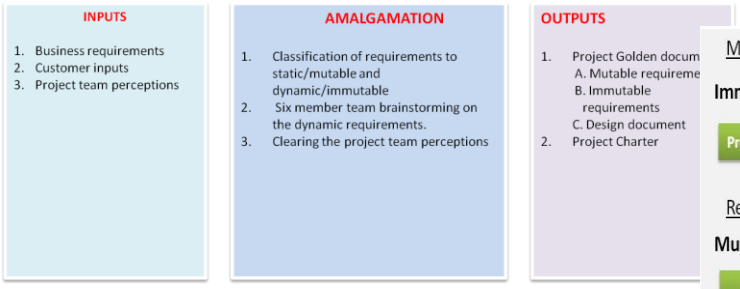

Fig. 3 explaining the impact of the changes

As mentioned in the above figure a golden document got derived from this phase. Why it's called the golden document? As there are lot of analysis (mining) of the requirements is carried in this phase and have come up with the new updated project design. A project manager is now more confident in carrying these requirements and the design to the next phases of the project.

G. How much of the mining of the requirements help in improving the continuous quality of the product?

The requirements received from customer or business analyst [BA] are at a higher level and are broken down to number upon the understanding of the respective BA or project manager. Melting phase analyse the technical depth of the business requirements. In general, there can be two types of requirements, first one is immutable and the second is mutable. Immutable requirements never disturb the flow of project irrespective of waterfall or agile or devops. Mutable requirements dwells the confusion from flow of the project to the stakeholders. Project scope creeps, higher the project cost and delay the project. Standish Group defined project success as being delivered on time, staying on budget, and reaching completion with all planned features intact. Quick project completion, staying on budget and timeliness delivery of project can be achieved by practicing the following method.

Requirements when tabulated for design are always showcased as immutable. Once the designers start working on requirements, then the requirements getting considered as mutable and are analysed at design and development phases by branching further. With these parallel phases of requirement & development at the same time are delaying the project and the quality of the product is getting lowered. Re-scheduling of plans, adding additional resources to the project means like fire-fighting. Instead if a little care is taken and branch out properly the requirements by predicting properly the products competence, it energises the resources working for the project and the respective projects can be seen in the success column moved away from the challenged column.

Following is the proposed flow of the decision phase which combines the requirement as well design.

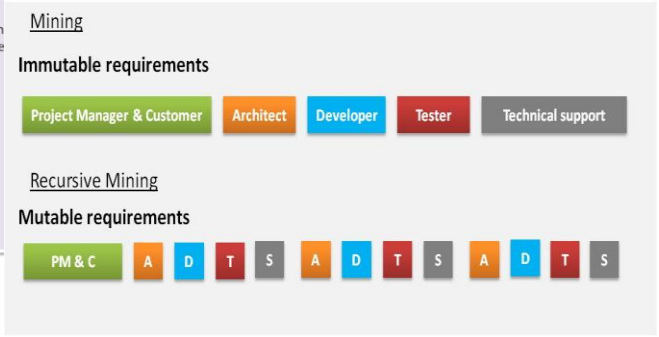

Fig. 4 Mining of the mutable requirements

Competence means something been qualified physically and intellectually. How this is applied to a project or product? A product always needs to be on top in the competition. This values the satisfaction levels of the customer. And the product or project can always be considered as successful. Nevertheless the reasons people compile to showcase the delay or schedule/budget overruns of the project, Project manager or stake holders consider customer satisfaction as the key element for the project success.

III. EVERYTHING IS SEQUENTIAL

All the existing life cycle models right from water fall through Agile to DevOps, the phases are going sequential with a change in time. The sequential flow is not changed. With

this we can consider there cannot be much change in the flow except the time. If we consider the time on x-axis and life cycle phases on y-axis, there is no much change in the phases except modularization of the phases and the execution goes incremental.

Following figure depicts the flow and execution methodologies and the changes between each model [SpecIndia Blog].

In waterfall model all the phases are executed for once and the product is deployed. And in the Agile approach the code, test phases are executed recursively to deploy the product.
Coming to DevOps, code, test & deploy are recursively being executed. Design phase is not looked back in any of the methodology, only code, test and deploy are executed again with respect to the methodology.

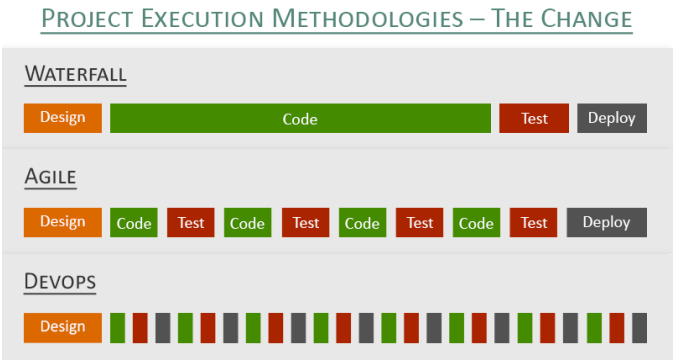

Fig. 5 Project execution methodologies

This paper prioritizes and showcase the importance of the initial project life cycle phases to get combined and adding core team members and customer to further analysis and design the project requirements.

IV. CONCLUSIONS

A minor tweak in the project management life cycle helps in resolving many shortfalls of the previous life cycle models.

Customer involvement in the amalgamated phase makes the product continuous competent and continuous involvement of customer and other core members in the new phase helps in improving the quality of the product. Combining the requirements and design phase can resolve the problems of both waterfall and agile in a way that the product design is customized with the updated requirements which are regressed by the new core project team.

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