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Agile Process and Methodologies: A Comparitive Study

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Abstract - *This paper is all about the comparative study of agile process. The paper will help other software development process models. Agile processes plays vital role in the areas of software project management, software schedule management etc. Customer satisfaction as well as faster development with low defect rate is the main aim of the agile processes. This paper reflects the comparison of the agile processes with other software development life cycle models. Agile processes are not always advantageous, they have some drawbacks as well.*

AGILE promotes ***continuous iteration*** *of development and testing throughout the software development lifecycle of the project.*

Key Words: Agile Methodology, Software development lifecycle, Extreme programming, Scrum

1 INTRODUCTION

In software development life cycle, there are two main parts, one is to emphasize on process and the other is the quality of the software and process itself. Agile software processes which are based on iterative and interactive development helps in changing the requirement according to customer needs .It helps in adaptive planning, iterative development and time boxing. It is a theoretical framework that promotes foreseen interactions throughout the development cycle. SDLC is a framework that describes the activities performed at each stage of a software development life cycle [1] and has various model such as spiral, waterfall and RAD model. The software development activities such as planning, analysis, design, coding, testing and maintenance which need to be performed according to the demand of the customer. It depends on the various applications to choose the specific model. In this paper, however, we will study the agile processes and its methodologies. Agile process is itself a software development process [2]. Agile process is an iterative approach in which customer satisfaction is at highest priority as the customer has direct involvement in evaluating the software [3].

The agile process follows the SDLC which includes requirements gathering, analysis, design , coding ,testing and delivers partially implemented software and waits for the customer feedback. Customer satisfaction is considered as highest priority with faster development time. The agile processes are :

1. Requirement gathering.
2. Analysis
3. Design
4. Coding
5. Testing
6. Delivery
7. Feedback from customer.

1.1 Characteristics of Agile Methodology

Agile process requires less planning. It divides the plan into small increments. It is used for short term project with a help of team. Agile is an iterative process as if you want to change any requirement in the middle of your project lifecycle then you can make a change as it is a iterative process you don't need to change the whole requirement which is been gathered earlier. This is the plus point of agile process. It is very difficult to change the requirement and design if you are using waterfall model.

The agile process is iterative process so changes can be made according to customer satisfaction.

Customer's needs is the priority for this process. New features can be added in between the process as it uses iterative process.

1.1.1 Iterative:

The main goal of agile methodology rather you can say it as objective is to meet the customer satisfaction, so it uses multiple iteration.

1.1.2 Modularity:

Agile process creates chunks and makes the system into manageable pieces as modules. Modularity plays an important role in software development life cycle.

1.1.3 Incremental:

The modules in agile process are developed in increments which are independent of each other, and integration of the modules takes place at the end.

1.1.4 Adaptive:

Iterative nature of agile process gives rise to new risks .Agile processes has adaptive characteristics which allows to make changes in real time requirement.

1.1.5 Collaborative:

As there are various modules and the team works on various modules, collaboration needs to done among them. Integration of modules is done at the end of software development process.

1.1.6 People Oriented:

Here customer satisfaction is given the first priority above all. The performance and productivity of the software depends upon its team.

1.2 Methodology

There are many methodology to implement Agile processes. We have discussed three methodology here which are most widely used. The two focus points for agile method is practices i.e extreme programming, pair programming and managing software projects i.e scrum.

1.2.1 Extreme Programming(XP):

It is the most successful methodology for agile process as it focus on customer satisfaction. XP requires maximum customer interaction to develop a software. It divides entire software development life cycle into small development cycles. It can offer any change in middle of the software process.

. Extreme programming starts with collecting user requirements. The development process is divided into various cycles as per the requirement, the no of cycles is decided in the iteration phase, prioritizing the requirements and estimating the amount of effort required to implement each cycle. Now each iteration is developed using pair programming. In the development phase the iteration plan needs to be adjusted according to new user requirements. Next step is to test the latest developed version for bugs, if detected; the bugs will be removed in the next iteration. After every acceptance testing project tracing should be done in which feedback is taken from the project that how much job has already been done.

1.2.2 Scrum:

The another popular method of agile development which increases productivity is Scrum. which is based on incremental software development process. In scrum method the entire development cycle is divided into a series of iteration where each iteration is called as a sprint. Maximum duration of a sprint is 30 days.

The first method is requirement gathering but not necessarily all requirement needs to be gathered at the beginning. The requirement can change at any given phase of the lifecycle in which the users can change their requirement and can add new ones. Prioritizing the requirements is the next phase and the list is known as product backlog [4]. A proper planning for sprint should be done i.e. no of sprints that are required for the development of software, sprint's duration, and what are the requirements from the product backlog should be implemented in each sprint. This particular list is known as sprint backlog. To keep record of how much work has been done one sprint meeting is held every day to take the feedback during each sprint. Reviews are been taken to check if all the requirements are implemented or to be implemented at the next sprint.

2. Advantages

Adaptive to the changing environment: In agile software development method, software is developed over several iterations. Each iteration is characterized by analysis, design, implementation and testing. After each iteration the mini project is delivered to the customer for their use and feedback. Any changes that upgrade the software are welcome from the customer at any stage of development and that changes are implemented.

Ensures customer satisfaction: This methodology requires active customer involvement throughout the development [5]. The deliverables developed after each iteration is given to the user for use and improvement is done based on the customer feedback only. So at the end what we get as the final product is of high quality and it ensures the customer satisfaction as the entire software is developed based on the requirements taken from customer.

Least documentation: The documentation in agile methodology is short and to the point though it depends on the agile team. Generally they don't make

documentation on internal design of the software. The main things which should be on the documentation are product features list, duration for each iteration and date. This brief documentation saves time of development and deliver the project in least possible time.

Reduces risks of development: As the incremented mini software is delivered to the customers after every short development cycle and feedbacks are taken from the customers, it warns developers about the upcoming problems which may occur at the later stages of development. It also helps to discover errors quickly and they are fixed immediately.

3. Disadvantages

Customer interaction is the key factor of developing successful software: Agile methodology is based on customer involvement because the entire project is developed according to the requirements given by the customers. So if the customer representative is not clear about the product features, the development process will go out of the track.

Lack of documentation: Though the least documentation saves development time as an advantage of agile method, on the other hand it is a big disadvantage for developer. Here the internal design is getting changed again and again depending on user requirements after every iteration, so it is not possible to maintain the detail documentation of design and implementation because of project deadline[6]. So because of less available information, it is very difficult for the new developers who join the development team at the later stage to understand the actual method followed to develop the software.
Time consuming and wastage of resources because of constant change of requirements: If the customers are not satisfied by the partial software developed by certain iteration and they change their requirements then that incremented part is of no use. So it is the total wastage of time, effort and resources required to develop that increment.
More helpful for management than developer: The agile methodology helps management to take decisions about the software development, set goals for developers and fix the deadline for them. But it is very difficult for the baseline developers to cope up with the ever changing environment and every time changing the design, code based on just in time requirements.

4. Comparison of Agile Process with other SDLC Models

Features	**Different Process Models**		
	Agile Process	***Spiral Model***	***RAD Model***
Definition	Agile process is the ability to both create and respond to changing requirements of software.	Spiral model is the software development model which focuses on managing risks.	RAD model is highly Adaptation of linear Sequential model, in Which component Based construction Is used
Adaptability	✓	✓	X
Testing Phase	Unit, Integration , System testing	Unit, Integration and System testing	Unit
Quality Factors	✓	✓	X
Risk Analysis	X	✓	X
Off-the- Tools	X	X	✓
Failure normally due to	Code	Code	Architecture and design
Knowledge Required	Product and domain	Product and domain	Domain
Entry & exit Criteria	X	X	✓
Mock up	✓	✓	X
Extendability	✓	✓	X
Project management involvement	✓	X	✓
Higher Reliability	✓	✓	X
Time Boxing	✓	X	✓

3. CONCLUSIONS

In this paper we have discussed the software development life cycle models, the characteristics of agile process, and spiral model, methodologies of agile process, advantages and disadvantages. In the comparative study of agile software development with other software development models we conclude that agile project is much better than other software development process in terms of productivity, performance, faster time cycles, risk analysis. Agile processes are implemented in important applications such as web based, testing tools, etc.

REFERENCES

[1] Tobin J Lehman, AkhileshSharma , “Software Development as a service: Agile Experiences”, in annual SRII Global Conference(2011).

[2] A. Ahmed, S. Ahmad, Dr. N Ehsan, E. Mirza, S.Z. Sarwar,“Agile Software Development: Impact on

Productivity and Quality", in the Proceedings of IEEEICMIT.(2010).

[3] B.Boehm and R.Turner, "Balancing Agility and Discipline: A Guide for the Perplexed, Addison, Wesley,2003.

[4] http://en.wikipedia.org/wiki/Scrum_(development)

[5] B.Boehm, " Anchoring the Software Process," IEEE Software, July1996.

[6] B. Boehm and D.Port,"Balancing Discipline and Flexibility with the Spiral Model and MBASE". Crosstalk, Dec.20