Traditional SDLC Vs Scrum Methodology – A Comparative Study

M. Mahalakshmi[1], DR. M. Sundararajan[2]

[1]*Research Scholar, St. Peter's University, Avadi , India*
[2]*Asst. Professor, Department of Computer Science, Govt. Arts College for Men, Nandanam, Chennai-35*

Abstract— **Many new software development approaches were introduced to fit the new cultures of the software development companies. Most software companies nowadays aim to produce valuable software in short time period with minimal costs. Software development is expanding and is becoming more complex. Customer requirements are frequently changing and making it even more difficult. Traditional SDLC are not able to meet the requirements of the market. Scrum Methodology were thus introduced to meet the new requirements of the software development companies. This paper presents a review of Scrum Methodology, describes about it and difference between Traditional SDLC (Waterfall) and SCRUM.**

Keywords— **SDLC, SCRUM, SCRUM Roles, Meetings, Artifacts**

I. INTRODUCTION

Software Development Life Cycle (SDLC) consists of few phases like planning, analysis, design and implementation. Many number of SDLC models have been created like Waterfall, Spiral and V-model etc. Software development process is otherwise called as SDLC. There are many number of new approaches, SCRUM (Agile methodology) is one of them. Agile consists of many methodologies but SCRUM is most famous and powerful methodology which provides benefit to companies. SCRUM is simple for managing difficult projects. SCRUM is an agile process. It is used at many companies with success when compare to traditional SDLC model.

In our comparative study we are going to discuss about which model is best whether traditional or new SDLC model.

II. WATERFALL [8]

The Waterfall model is one of the traditional SDLC model, it follows only the sequential order. It flows steadily downwards. It is used in software development process.

We cannot change anything based upon customer requirements, since it follows sequential order.

This leads to face these problems - Customer will not get satisfaction, requirements will be in pending, no profit, waste of time.
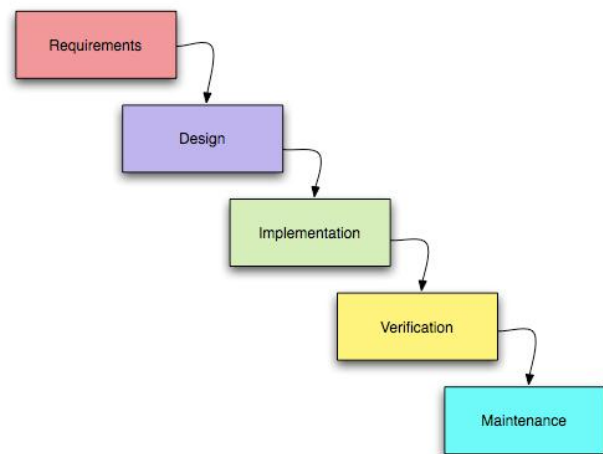
Fig 1. Traditional Model

III. SCRUM [2]

SCRUM was initiated by Ken Swaber in 1995. It was included in agile methodology since it contains the same concepts of agile. A SCRUM is a team pack, where everyone in the team acts together. It delivers the project within time and with minimal cost.

How SCRUM differs from Waterfall?

- Different Roles
- Different Meetings
- Different Characteristics
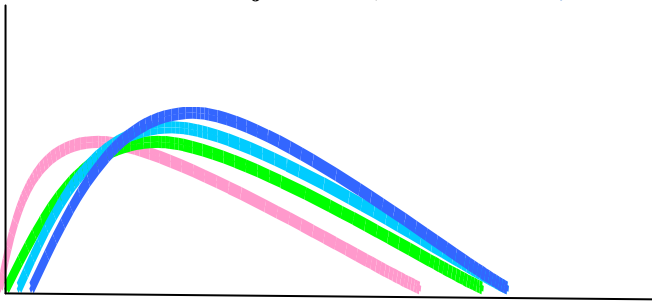- Different Artifacts
- Different Language

Fig 2. SCRUM Development life cycle

IV. SCRUM ROLES [3]

Different scrum roles are there like Product owner, Scrum master, Scrum team.

A. Product Owner

- Customer representative
- Works with the team
- He / She maintains the product backlog
- Prioritizes product requirements
- Interface between the team and the business
- Define the features of the product
- Decide on product release date and content
- Be responsible for the profit
- Prioritize and adjust features, as needed
- Responsible for final approval
- Accept or reject work results

B. SCRUM Master

- Helps the team members and responsible for removing obstacles.
- Scrum master has a leadership role over team members
- Be responsible for managing the process
- He/ She responsible to run the daily scrum, sprint planning meetings
- Maintains documentation required
- Protect the team from external interferences

C. SCRUM Team

- Develops product
- Each team member is responsible for their work.

- They contributes their best for each sprint
- Includes 5-10 people in a team
- Two kind of teams are there, like self-organizing and cross-functional team.
- Responsible for failure or success
- Team members can be Programmers, testers, user experience designers, etc

V. MEETINGS

A. Sprint planning meeting

- Sprint planning meeting is conducted by the product owner , team member and the scrum master
- Product owner is responsible for prioritizing the items which is more important.
- Sprint planning meeting focusing on what to do and how to do

B. Sprint

Changes will not accepted while in Sprint

C. Daily Scrum

- Scrum master and development team members report to each other
- Daily meeting about 15 minutes

Three questions are generated in this sprint
- What they did yesterday?
- What they plan to do till next meeting?
- What difficulties are there in their way?

D. Sprint Review meeting

Is done after every Sprint and the product owner reviews and revised the sprint planning meeting after review meeting, Provide feedback after sprint review meeting
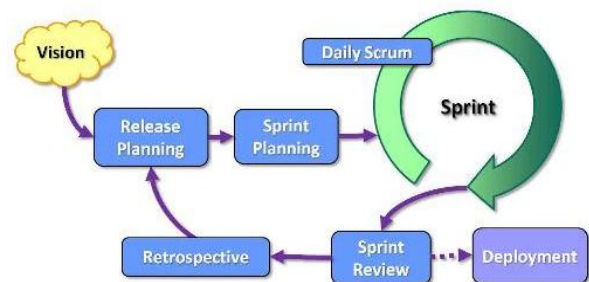

Fig 3. Scrum methodology

E. Scrum retrospective meeting [4]

- Discuss about their experiences and problems faced

- Discuss about what to be followed and not to be followed to improve further and typically 15–30 minutes of meeting. It will be done after every sprint

Whole team will participates in this meeting, Scrum Master, Product owner, Team and Customers also

VI. ARTIFACTS

A. Product Backlog

The product backlog is an ordered list of "requirements" that is maintained for a product. It contains Product Backlog Items that are ordered by the Product Owner. Product owner decides about the priorities of the user stories. Product owner can re-prioritize the list during or end of the sprint. It is transparent to all stakeholders.

B. Sprint backlog

The *sprint backlog* is the list of work the Development Team must address during the next sprint. Requirement should not be changed during sprint execution.

C. Burndown chart

The sprint burn down chart is a displayed chart showing remaining work in the sprint backlog. Updated every day, it gives a simple view of the sprint progress. It also provides quick visualizations for reference.

VII. CASE STUDY

Let us have a comparative study which model will be effective in the below models and the advantages & disadvantages of choosing the model.

1. Traditional Model (Waterfall Model)
2. New Methodology (SCRUM)

VIII. COMPARATIVE STUDY OF WATERFALL VS SCRUM [8] [11]

A. WATERFALL

- Waterfall follows each step in a linear path.
- Plans all features for simultaneous implementation
- Designs all features
- Implements all features
- Tests all features
- Each phase of development proceeds in order without any overlapping.
- Each phase task to be completed within a specified time period

-The documentation and testing happens at the end of each phase, which helps in maintaining the quality of the project.
- In waterfall model the defect were found very late

If requirements is not clear in this model, it is difficult to complete the project. After completing the first phase only we can proceed with next phase.
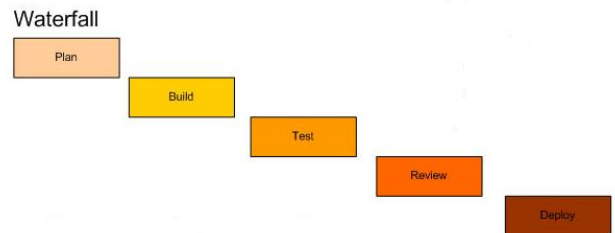
Fig 4. Waterfall Model phases

Advantages [9]

- It is sequential model, So it's easy to implement.
- The amount of resources required to implement this model are minimal.
- Proper documentation is followed for the quality of the development.

Disadvantages [8] [9]

- The problems with one phase are never solved completely during that phase and it leads to many problems
- If client want the requirement to be changed ,it will not implemented
- Freezes scope – Customer requirements contract
- Estimates schedule – Delivery time is intended

In spite of the disadvantages, the many advantages of this model ensure that it remains one of the most popular models used in the field of software development.

B. SCRUM [6]

- Scrum is series process of sprints.
- Scrum is a Lightweight Process Framework .
- Scrum is the Agile process frameworks.
- Scrum is tries to build a better approach of handling software development.
- As compared to traditional project management approach, Scrum has very less documentation and is less complicated.
- A short, fixed schedule per cycle with adjustable scope.
- A repeating events, milestones and meetings.
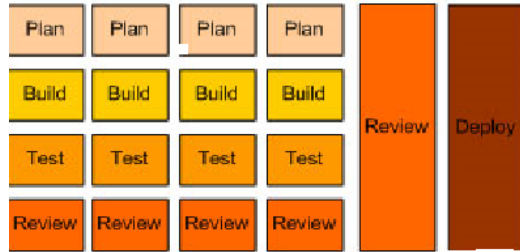
Fig 5. SCRUM Design

Advantages

- Scrum provides customer satisfaction by optimizing turnaround time and responsiveness to requests.
- Increase the quality
- Accept and expect the changes
- Provide better estimates while spending less time creating them
- Be more in control of the project schedule
- Scrum is ideal for rapidly changing, accumulating requirements.
- Benefits to customer and project manager
- Scrum is fast, quick and can adapt changes easily
- Freezes schedule – Short Sprint by short Sprint
- Estimates scope – Top feature, then next feature
- Never changes the schedule, or Sprint
- Adjusts the scope if needed to meet release dates
- Work estimates are much easier.
- Work proceeds and completes more logically.

Disadvantages [7]

- Documentation is very less
- Team members dedication is very important
- Team work is highly essential
- If team members does not cooperate well, the project will face failure

TABLE I
Comparison between Traditional (Waterfall) and SCRUM (Agile) [11]

Waterfall	SCRUM
Deals with project	Deals with product
Traditional model consists of different phases	SCRUM methodology consists of different sprint
Does not expect changes	Expect changes and accept the changes
More documentation	Less documentation
Project cost determined during planning	Project cost set during project
Probability of success is low	Probability of success is high
Team flexibility and creativity is limited	Team flexibility and creativity is unlimited
Sequential	Overlapping
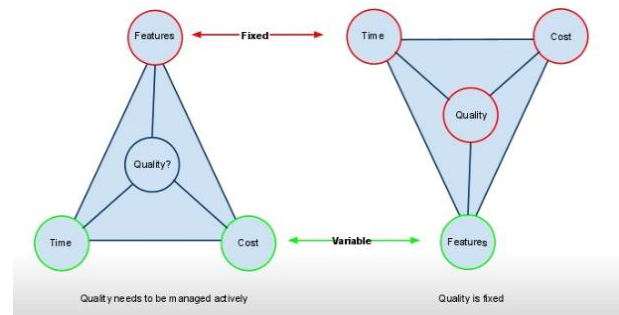
Fig 6. Waterfall Vs SCRUM

IX. CONCLUSION

As we discussed on Traditional SDLC model(Waterfall) and New SDLC methodology (SCRUM) advantages and disadvantages, it depends upon the organization which model to choose.

- SCRUM is best if the requirements frequently change.
- WATERFALL is best if there is no change in the requirements.

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