Implementation of Scrum Methodology for Optimizing the Working of Edcational System

Nilima yadav, Sarvesh Tanwar

Abstract— This paper will contain the implementation of a very successful and high performance oriented concept of SCRUM (Agile Methodology) into a totally new domain area i.e. Education. Scrum and education sector are two very different concepts and are very uncommon to each other .This paper will help us to guide how SCRUM will be mapped and implemented into the working of an education system and how can it improve productivity and better monitoring of the various activities which were done on an unplanned basis. We have provided real scenario based mapping of various stakeholders from SCRUM concept to those in the Education system who will be part of the model and will be responsible in implementing the processes in such a way that SCRUM comes out to be a better implication to them in terms of performance monitoring of the faculties as well as the students .This paper will also help us check the impact of SCRUM methodology apart from the software projects and processes.

Index Terms: Scrum, Sprint, Product Owner, Retrospection, Product Backlog, Scrum Artifacts, Scrum Meetings, Burn Downchart.

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1 INTRODUCTION

A Software development process is basically used to de-velop software product which followed specific process. Software development process is also known as software process life-cycle (SDLC) [2]. It comes into category of soft-ware development life cycle. There are number of models with variety of tasks and activities, Agile is one of them

1.1 Agile

Agile software development is an iterative ,incremental and time boxed approach which comes into under group of soft-ware development methods where requirements and solu-tions evolve through collaboration between self-organizing and cross-functional teams. It promotes adaptive planning and conceptual framework that promotes foreseen interactions throughout the development cycle.

1.2 Scrum

Scrum is a process used for agile software development basi-cally it is a framework rather than full process or methodology [3]. So software development team is responsible to decide detailed description "how everything is to be done in the project" .In scrum, a series of iteration is known as a sprint which decides the progress and time boxing for the project. Scrum is daily used for those projects which have rapid changes and highly emergent requirements.

Fig 1 : Iterative and incremental approach
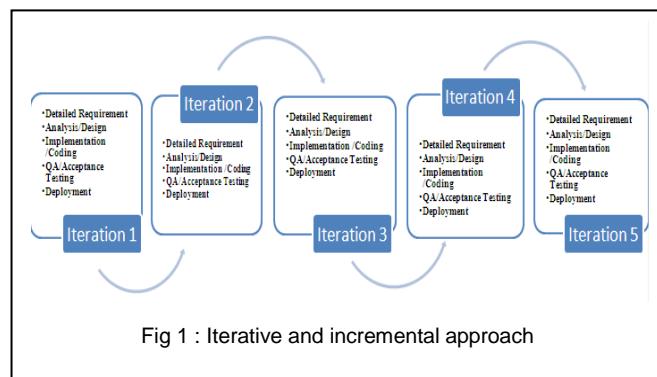
2 SCRUM ROLES

There are many key persons with different roles and responsi-bilities who give their guidance, which make scrum model best from other models.

2.1 Product owner:

- Single person responsible for maximizing the develop-ment effort.
- Responsible to give new visionary direction in develop-ment of product [1].
- Design product backlog list which is indirectly "the voice of customer" and prioritizes the user story in product Back-log by ensuring the value of the work the Development Team does.
- Final approval and stamping of requirements questions is done by product owner.
- Decide the acceptance or rejection for each product incre-ment which may be gives the direction to continue or end the development process.
- Take decision regarding product "shippable mode".
- He/she has a role of leader who may be a member of the development team but we cannot combine his/her role with scrum master.

2.2 Scrum master:

- Scrum master works as team's coach who helps the team members to achieve their goals with high performance [1].
- Scrum master is not traditional project manager because he/she works as project manager com as developer with team members.
- Scrum master gives the direction to team members by this they can only focus on the goal which they have selected during each sprint.
- Helps the team members if they get any obstacles.
- Creates a favorable environment for the team' self-organization

- He/ She Has a leadership role over team members.

2.3 Scrum development team:

- Scrum development team has two functionality one is Cross-functionality and second is self organizing.
- Self-organizing / self-managing, without externally assigned roles [3].
- Cross functionality in scrum team enables team members should to do different kind of work in a team.
- Scrum development team members come with various job titles like (Developer, Tester Executives, Customer)
- Each team members contributes their best they can do for each sprint.
- Negotiates commitments with the Product Owner.
- Average Size of development team is recommended.

3. SCRUM MEETINGS:

3.1 Sprint planning meetings:

- The product owner and team member along with the scrum master conduct a sprint planning meeting for deciding which product backlog item they would take to convert, working product in each sprint.
- Product owner is responsible for prioritizing the items which is more important.
- Daily scrum and sprint execution: The team members are free to select balanced amount of work which they can implement without any technical obstacles.
- The team member's pull work from product backlog and complete it in the sprint.

3.2 Sprint review Meeting:

- Sprint review meeting only demonstrates an incremental working product to the product owner and everyone else.
- Live demonstration is necessary rather a report.
- End of sprint review meeting, the product owner reviews and revised the sprint planning meeting.
- The scrum master helps to product owner and stakeholders to revising the product backlog items with new priorities.
- It is like inspection meeting for external stakeholders (even end users) to attend and proposed or refine the requirements.

3.3 Sprint Retrospective Meeting:

- Sprint retrospective meeting is conducted after completion of each sprint
- The team member generates and reflects on its own process during this they can inspect their behavior and take appropriate action for future sprint.
- Three things are going to be noticed :
  1) Is everything going well?

2) Need any improvement?
3) Stop, if problem occurred?

3.4 Daily scrum meeting:

- Scrum master and development team members append a total of 15 minutes at the same time and place to reporting to each other.
- Three questions are generated in this sprint during sprint execution and some common addition fetchers are detected to achieve the sprint goal.

3.5 Backlog Refinement Meeting:

The product backlog which is decide by the product owner is further analyzed at granular level and certain refinement added into it which make it more helpful in developing a release backlog.

4 SCRUM ARTIFACTS:

Scrum artifacts are the various documents that are created before or during the sprint in the project.

4.1 Product backlog:

- Prioritize ranked list with desired functionality and set of user story which is atomic unit of work.
- Priorities of the user stories are decided by the product owner.
- Product owner can re-prioritize the list during or end of the sprint.
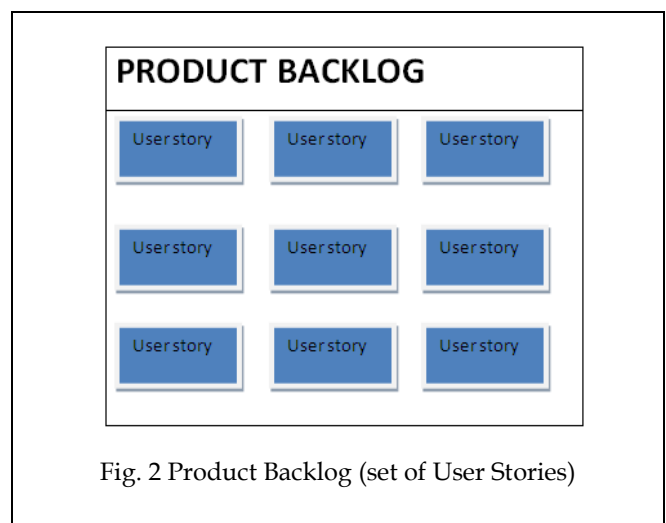- It is transparent to all stakeholders.

Fig. 2 Product Backlog (set of User Stories)

4.2 Product backlog items:

- Product Backlog Items are nothing just as user story.
- Product Backlog Items defines the product widely and prevent it from technical fault.
- Effort estimation is calculated by relative unit that is story point.

Fig. 3 Collection of story point comes out as smallest component
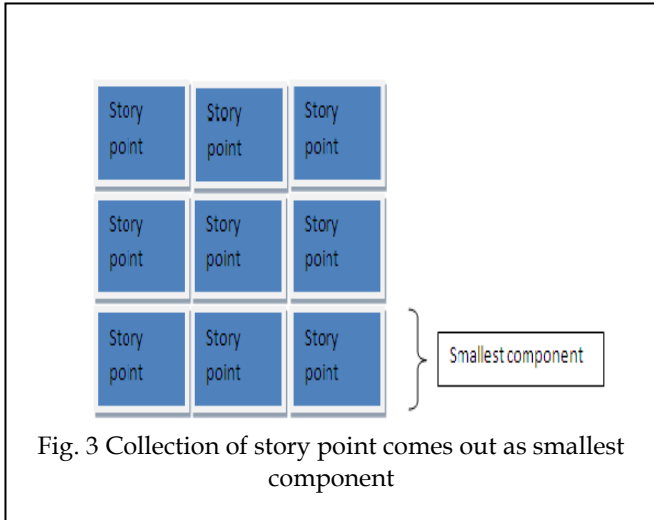
4.3 Sprint backlog

- Product backlog items are decided or negotiated between the team members and by product owner, during sprint planning meeting.
- Requirement should not be changed during sprint execution.
- Initially team members defined the task during sprint planning meeting.
- Transparent to all team members and it can be revised during daily scrum meeting.

Fig. 4 User Story as divided into subdivided task
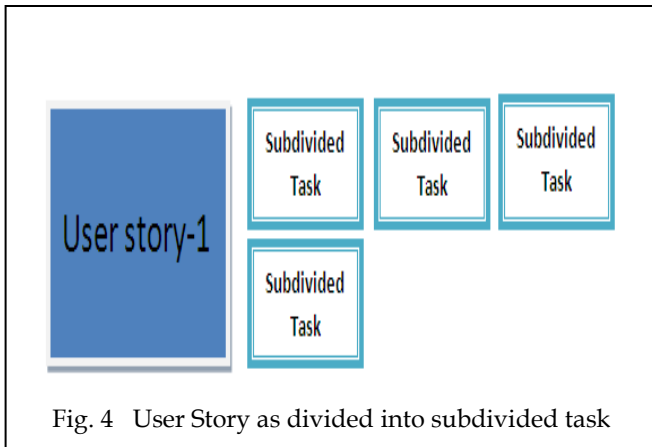
4.4 Sprint task:

- It is targeted how to achieve or completed product back log items.
- Eight hours in one day dedicated to each team member for sprint task.
- Re-estimate the reaming task.
- Entire tam collaboration is needed.

4.5 Burn down chart:

- Signifies the total reaming work hours in one sprint.
- It is estimated day by day, which may go up or go down.
- Team gets self organized by on the basis of day by day work [1].

Fig. 5 Burn down chart
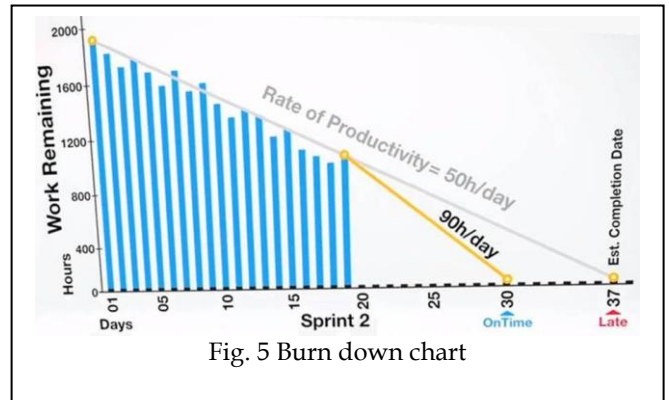
5. ISSUES:

- The only problem with scrum methodology is that it is not applicable to fixed cost project.
- Fixed cost project are evaluated in terms of monitory fixed investment and fixed engagement of skilled user which might increase or decrees the cost dependent upon the project management technique followed.

6. PROPOSED APPROACH FOR EDUCATION SYSTEM

In this paper we will provide a technical solution to an educational system through which they can keep a track of all the working in their semester and also provide them tools with the help of which they will be able to measure their performance at the end of the semester.

6.1 Methodology

We have mapped the Scrum Model Key Roles members with the following Key Roles members of the Education system.

Table.1: key roles of members in academics

Educational Key Roles	Scrum Key Roles
Head of Department	Product Owner
Coordinator	Scrum Master
Faculty	Team Member

- HOD has been mapped with product owner who will take care of the following activities?

- Decide tasks (Product Backlog) which needs to be allotted to the Scrum master (Coordinator).
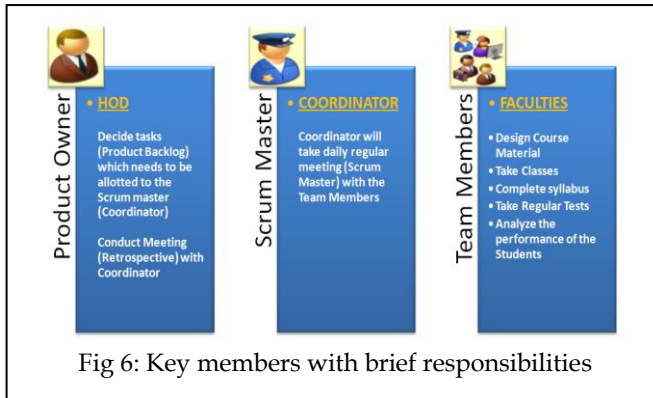- Conduct Meeting (Scrum daily meeting Retrospective meeting,) with co-coordinator and teachers.

Fig 6: Key members with brief responsibilities

- **Coordinator has been mapped with Scrum Master who will take daily regular meeting (Scrum Master) with the Team Members and answer the following Points:**
  - What did you teach yesterday?
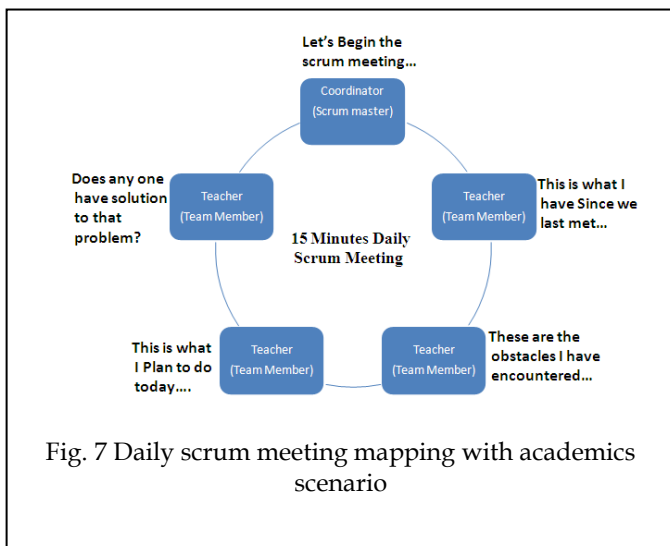 - What will you teach today?
  - Are you facing any problem?

Fig. 7 Daily scrum meeting mapping with academics scenario

- **Faculties will be mapped to Team Members who will take care of the development of the students by following activities:**
  - Design Course Material.
  - Take Classes.
  - Complete syllabus.
  - Take Regular Tests.
  - Analyze the performance of the Students.

- **Create Syllabus Completion Chart (Burn Down Chart)**
  - Course completion chart
  - Marks chart
  - Attendance chart with respect to subject

- Time boxed syllabus completion would decide a sprint.

7   PROPOSED AUTOMATED SOLUTION:
The Automated system will have the ability to Plan, Track and Monitor the entire process of a semester in an educational institute which will be taken care of by an automated system which will have the features:
- One semester will be considered as one project.
- Faculties will register themselves through registration. If already registered they will use the previous ID.
- One of them will be made HOD by system admin.
- The HOD will then make coordinator.
- The coordinator will then add faculties.
- The faculty will be allotted with subject   syllabus by scrum master.
- HOD will decide work for the Coordinator   and The Faculties (product backlog).
- Coordinator will take up the task in the sprint backlog will be allotted to Faculties (team member).

7.1   Module description:

- **Task allocation module**
  - o   Product backlog define by product owner.
  - o   Allot product backlog to coordinator.

- **Attendance module**
  - o   Each faculty and coordinator will keep the record of the attendance of the student.
  - o   Upload the list of student.

- **Assessment module**
  - o   Self analysis.(regarding students)
  - o   Original marks.
  - o   Graph plotting.

- **Release backlog**
  - o   Attendance list of student in 1 sprint.
  - o   Course completion in 1 sprint by faculty.
  - o   Number of marks in the test (marks analysis).

- **Burn down chart**
  - o   Course completion.
  - o   Marks chart.
  - o   Attendance chart with respect to subject.

- **Retrospective meeting**
    - o If faculty is not able to finish their work they will write a comment about it and submit in to HOD.

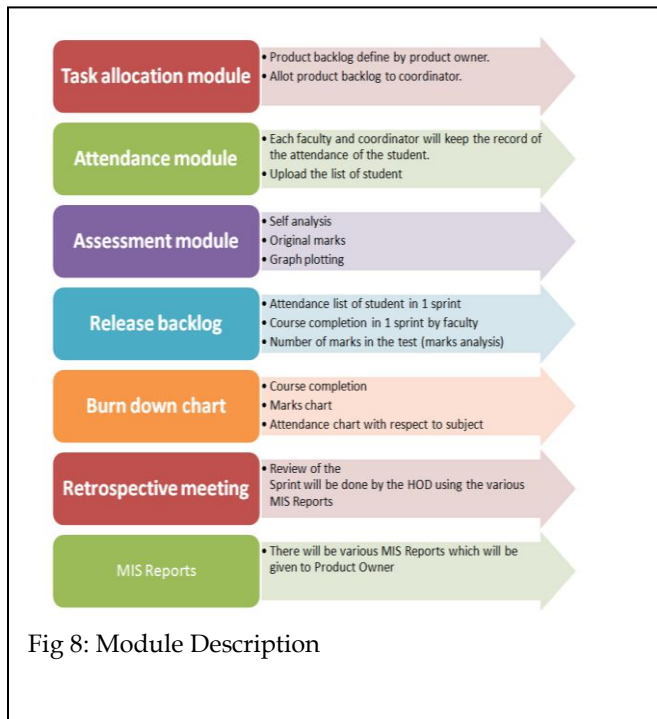Fig 8: Module Description

We would like to propose the following Technology for development of the Project.

Table 2: Technology description

TASK	TECHNOLOGY
Code Development	ASP.NET 4.0 Using C# , Ajax
Database	SQL Server 2008
Reporting	SSRS Reporting 2008
Tools	Visual Studio 2010

9. CONCLUSION:

From the overall study and research of the scrum method we have come to a conclusion that the implementation of scrum methodology into education system would increase the performance more than 40%. Better monitoring and control would enable the education system to have a barterer track of what need to be done and at time which will help them in better performing their tasks.

REFERENCES:

[1]http://www.mountaingoatsoftware.com/topics/scrum
[2]http://en.wikipedia.org/wiki/Scrum_%28development%29
[3]http://scrummethodology.com/.