Tracking the Student's Performance in Web-Based Education Using Scrum Methodology

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***Abstract*— The Internet, communication and mobile technologies are emerging as predominant paradigm in the learning of students. Various technologies have created numerous opportunities for the learners to explore in the learning landscape. Even though traditional teaching and learning are still popular in India, the scope for Web based education is positive. It is commonly believed that the Web based education is poised to penetrate deep into the educational system in India in near future. While global web-based education system faces different subjects, ideas and different kind of talented student's, the biggest challenge is communication and tracking the performance of student's. To deal with this challenge, we can use scrum. Scrum is the essence and one of the powerful agile methodologies. This paper presents about scrum and scrum backlog.**

***Keywords*—Scrum framework, Proposed Framework, Comparison, Artifacts, Conclusion.**

I. INTRODUCTION

Agile methodology is used to overcome the problems of waterfall (SDLC) because waterfall does not accept changes immediately. Agile always expect and accept the changes required by the clients. It consists of many methodologies like crystal, XP, Scrum etc. Scrum is one of the most popular agile processes using in IT, Business, Education etc. Scrum fixes time boxes (i.e) it sets own deadlines to complete the work. Scrum work is based on sprint. It consists of 3 main roles (product owner, scrum master and the development team), 4 meeting's (Sprint planning, Daily scrum, Sprint review, Sprint retrospective meeting) and 3 artifacts are product backlog, sprint backlog and burn down chart. In this paper, we focus on how this backlog used in web-based education and to track the performance using the same.

The main objectives

- F2F teaching globally using scrum.
- Enhance best communication among all.
- To explore the suitability of Scrum methodology in educational system.
- To develop a framework to integrate Scrum methodology into teaching and learning process.
- Tracking the quality in terms of student's performance and satisfaction.

II. SCRUM FRAMEWORK

Scrum is an agile software development process developed by Jeff Sutherland and Ken Schwaber in 1996. Scrum divides a project into iteration named as sprints. A sprint takes about 30 days (4 weeks) and each sprint (iteration) adds value to the project in terms of working software code, which presents new (additional) software functionality.

Scrum is one of the popular and powerful methodology which consists of many advantages and the same is using in software field in successful way. Scrum characteristics are Meetings, Scrum role and the artifacts.

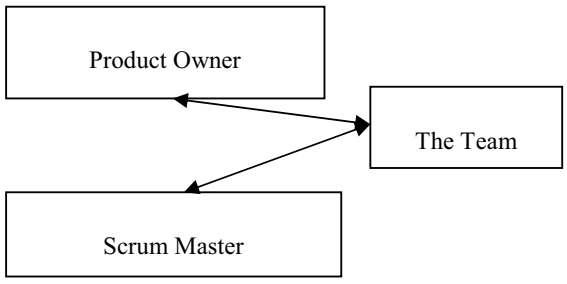

Fig. 1. Scrum Framework

A. Product Owner

It is person who is responsible for taking the inputs from the customers, team members, end users and stakeholders and defining features of the product, desired outcomes. He / She, is responsible for whole project.

B. Scrum Master

Scrum master helps the team to accomplish the assigned task. He/she removes interferences and blocks to the team's success, facilitates meetings and oversees the implementation of Scrum.

C. Team Members

The members of the team self-organize and work towards implementation of the assigned task. The size of an ideal team is typically five to ten people.

D. Product Backlog

Product backlog contains the prioritized requirements that need to be considered during software development process. A unique identifier is used for each requirement. Product backlog also contains information such as category, the status, the priority and the estimate for the feature of the requirement. New requirements can be added in product backlog.

E. Sprint Backlog

Sprint backlog is the starting point for each sprint. Initially, a set of requirements is taken from the product backlog and expanded into the sprint backlog. These requirements are refined in the sprint. Usually, new requirements are not added to the Sprint backlog.

III. PROPOSED FRAMEWORK

A proposed model named Web based collaborative learning environment using scrum. In the proposed framework, teacher/expert assumes the role of Product owner in Scrum framework. He/she determines learning objectives and is responsible for monitoring and evaluating the members. He/she will monitor and facilitate the team progress. In addition, product owner provides the team with reference materials, web links of texts, video and audio learning materials, answering questions and providing examples.

In nutshell, product owner is responsible for:

-Determining what needs to be learned;

-Monitoring and improving the quality of educational results;

-Evaluating and judging the educational results

The team members are responsible together, as a team, for complying with the acceptance criteria. The student teams are structured and empowered by the product owner in such a way that they can organize and manage their own work.

Student team is self-organizing. They are multi - disciplinary, with all required skills and personal development themes to be bootable to achieve the learning goals together and can develop personally. The student team members may determine themselves if they want to contribute their qualities, or that they want to develop new areas.

One of the members of the team assumes the role of Scrum master (Student Master). The student master takes care of the learning of the team and ensures optimum learning of the team members. The main responsibility of student master is creating transparency in the progress of the team by properly communicating the actual progress up-to-date.

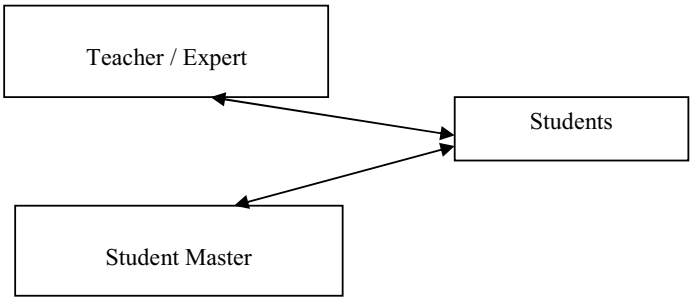

Fig. 2. Proposed Framework

IV. COMPARING THE SCRUM ROLES WITH PROPOSED WEB-BASED EDUCATION ROLES

Here we have given the scrum roles, proposed roles of web-based education and the responsibilities of each member in the team.

TABLE I: COMPARISON

Scrum Roles	**Responsibilities**	**Proposed Roles in Web-based Education**	**Responsibilities**
Product owner	Responsible for the success and failure of the project. He/she is the decision maker who controls the product backlog.	Instructor/Expert/Teacher	Gives instruction to the master, expert and the learner. Creates product backlog with list of subjects/content.
Scrum master	Responsible for an implementation that is whole process	The Student master	Removes barriers. He/she is responsible for the whole process.
The development team	The success of scrum is depend on the development team.	The Students	Has the right to do everything within the boundaries of the project guidelines to reach the sprint goal. They can teach the subject in detailed manner.

TABLE II: TERMINOLOGIES IN SCRUM AND WEB-BASED COLLABORATIVE LEARNING ENVIRONMENT USING SCRUM

Scrum Terminologies	Proposed web-based Collaborative learning environment using scrum
Product Owner	Teacher/Expert
Scrum Team	Students
Scrum Master	Student Master
Product Backlog	Learning goals

V. ARTIFACTS

A. *Product Backlog*

It refers to sequence of the work, arranged in an order (priority). Product owner gather and define the items (subject/concept) of product backlog, place in the right sequence. In this, items can be inserted, removed and updated by the product owner based on the changes requested by the learners.

TABLE III: PRODUCT BACKLOG

Subject/concepts	Priority
As a learner, I want to know who my teacher/expert is.	1
As a learner, I want to add and save a wish list.	2
As a learner, I want to know my progress.	3

Product backlog updated continuously. It is mainly created in sprint planning meeting and it contains release backlog.

B. *Sprint Backlog*

Breaking the feature in to several set of tasks is called sprint backlog which is updated every day by the team members/ experts.

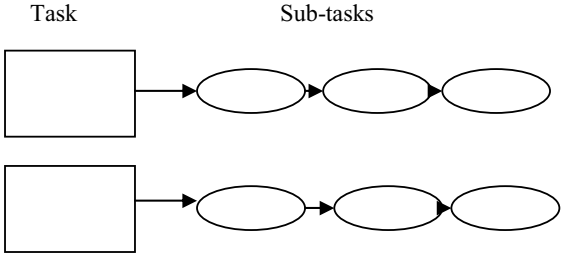

Fig. 3. Sprint Backlog.

TABLE IV: TASK STATUS

Subject Name	Chapter No	Task Description	Status	Rough Estimated efforts (in hours)	Remai -ning Efforts in hours
Testing	1	Basics of concept	Completed	9	0
	2	Details of subject	Completed	7	0
	3	Conducting meeting with learner to measure the learning capability of learners	In progress	11	6

Product backlog, Sprint backlog are currently using in IT field to track the performance of the team. The same concept can be implemented in web-based education when we connect Instructor, Master, Expert and the learner together.

VI. CONCLUSION

In this fast moving world, learners/students are expecting teaching in different way, they want to learn concept in theoretical and practical way. Web 2.0 technologies can be effectively used in developing the learning process of the learners. At the same time, learner's performance and progress need to be monitored continuous to provide better quality. In web-based collaborative learning environment using scrum provides frequent meeting with teacher and learner which will enhance greatest communication among the team and the quality is measured in terms of learning progress of the learners, teaching, immediate feedback, progress of the student's, best communication between expert, other learners (using sprint planning, daily meeting, and sprint retrospective meeting). So frequent meeting based on product backlog and sprint backlog will help to track and improve the performance of the learners / students. Scrum provides greater adaptability, improves quality, team co-operation, and greater responsibility of each member in a team. Hope this concept will help our young generation to learn a lot using the proposed concept called web based collaborative learning environment using scrum which enhances powerful self-learning, self-motivation for the learners.

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