

ADAPTING SCRUM METHODOLOGY FOR STUDENT COUNSELING

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Abstract- Modern institutes and companies are drifting from traditional software development models to well optimized Agile development. Agile works out to produce efficient deliverables. Scrum, an Agile methodology follows an incremental and iterative approach. In this way, Scrum is able to cope up with the continuous changes in the requirements. The paper briefly describes the scrum methodology along with the sprint design, product backlog, daily sessions and sprint retrospectives. The focal point of the scrum technology is to carry on with the changing requirements of the end users. The paper focuses on a research of adapting Scrum framework of Agile development for the purpose of Student Counselling. In Scrum methodology, the process is incremented with Sprints of about two to four weeks so the progress is aligned with the requirements. In this experiment, scrum is used to design an effective and productive solution to improve the score of students and lead them to become fast learners. From The results obtained from the analysis of the old and new strategy, it is inferred that the scrum technique upgraded the performance of the students. The paper intends to show how scrum development technology is easily and efficiently applicable to real life situations.

Keywords- Scrum methodology, agile development, sprint design, product backlog, sprint session

I. INTRODUCTION

Keeping up with the students and their performance is the principle way for student counselling. The basic targets are: (1) to help the students with their academics in different ways. (2) To make an increment in the student's performance when required. Here, the goals are set to achieve the best performance from the students. Initially, we studied the data of the students studying in a particular semester. According to their academic performance, some of the students scored very well. While scores of some of the students were average. Also, quite a few performances required a good amount of attention and hard work. This was the result of the analysis. Now, to achieve better performance for all the students of the batch, the counselor needed a new strategy. This is where we would apply scrum methodology for building a new improvised plan for the student counselling for the betterment of the students. Scrum is a framework of Agile development. It can be used for solving complex adaptive problems and creating productive and smart solutions with the highest possible value. Scrum does not follow a pre-defined or specified technique. It rather furnishes different processes and techniques as per the specific problem. It has its own scrum team. Scrum consists of associated roles, artifacts, events and rules. These rules hitch the components of the scrum together. Each time box includes all the events considering their maximum possible duration. The next important is Sprint. It is the soul of the scrum. Sprint is a time box of two to five weeks. At the end of one sprint an updated increment of the product is discharged. In this paper, we describe how we have largely solved these problems by adopting a management approach called Score adapted from Scrum Agile development methodology. Among different components of Scrum methodology, the 15 minutes meeting is main which discusses things like (1) what they did since the last meeting, (2) what problems they encountered, and (3) what they plan to do for the next meeting. In-depth technical meetings are scheduled on an ad hoc basis. Whenever we require longer discussion, we schedule an on- demand meeting and since the only scheduled meeting is the Scrum, such meetings are way easier to arrange. The main goal of our problem is to analyze the issues coming in the middle of a good score for the students. Considering the previous score of the students, they are divided into three categories by the counsellor. This division was completely on the basis of their previous academic score. Different categories of students will have different strategy to achieve the desired target. Sprints will be designed and applied for all the students to boost up their performance. After every sprint, the students will be attended to verify whether the process is rightly followed or not. At last the ideal situation or the goal will be achieved within the required period of time. The results can be verified by analyzing the score of the next semester students. Overall, the paper employs the idea of adapting scrum methodology in real life situation. It briefly illustrates and scrabble the solution with which an ideal condition can be achieved to a certain extent. In the core of this paper, we have briefly detailed the application and its various aspects. It states all the calculations and graphical representations of the data analyzed before. We picked the

topic to step out to solve a real life problem using the methodology that we studied with the hopes of giving a contribution in the wide areas and standards of the subject.

II. THE REMOTE STRATEGY

Originally, the students were guided by the student counsellor for their academics. The counsellor also helps for any issues or difficulties faced by the students. So, the basic way was to guide the students whenever required. According to this strategy, the counsellor did not have prior information about where the students lack and what kind of help they need. The detailed information of the student's studying and working hours, how much they time they allot for their studies, their study plans and, difficult aspects were not entirely focused on. These were not yet explored by the counsellor. Also, a noticeable point was that the students were only helped and guided when they approached themselves. But, the job of a student counselor is to focus on each and every student and assist them during the entire curriculum. Some of the students were not able to catch up with everyone due to this reason. Furthermore, different students have different methods of studying. Some of them build a plan and stick to them whereas some of them are less concerned and just study during the exams. But, to obtain a good score they have to study according to a study plan and commit to it. The student counselors need to make sure that the students are focused on their studies, they are attending the classes and completing their assignments. Extra classes were conducted for the important concepts. The students were assigned tasks and given assignments to complete. But, this was not clearly efficient for some students. This was because they did them with the intentions of just completing them and not with the intentions of way of studying and learning. This is why they actually wasted their time rather utilizing it in a right way. From this, it can be vividly stated that a change was required in this system.

III. THE MODERN STRATEGY

With an intention to solve the issues faced in the old process, we used a different contemporary strategy. We used Scrum methodology of Agile development here. We thoroughly studied the framework and its components. Considering the previous data and results, we divided the students into three categories:

- (1) Fast learners (8.5-10 SGPA)
- (2) Average learners (6-8.5 SGPA)
- (3) Slow Learners (0-6 SGPA)

The fast learners are considered as the students who have an ideal score. They would not need to work upon their schedules. They just have to maintain their score and continue their way of studying. The planning is to be done for average learners and in case of slow learners. We took in account various task performances and their Time Capacity. The ideal situation or the target is listed below accordingly. We will design sprints for both average and slow learners separately. Results will be calculated after each sprint and amendments will be done as per the requirement.

III(A). TASKS & COMPARISON

- Fast learners(FL) –ideal

Table I Fast Learners

| No. | Task Name | Time(hrs/week) |
|-----|----------------------------|----------------|
| 1 | Attendance | 28 |
| 2 | Study | 18 |
| 3 | Notes | 6 |
| 4 | Related Project/Assignment | 4 |
| 5 | Learn new Technology | 3 |
| 6 | Online Research | 2 |
| 7 | Refer Books | 10 |
| 8 | Solve doubts with teachers | 2 |
| 9 | Social Media time | 7 |
| 10 | Extra reading habit | 10 |
| | Total | 90 |

As shown above, the table states the ideal situation. The study planning of the fast learning category of students is stated. As we can see, they spend their week working hard and completing as much as they can. They make themselves batter day by day. They maintain their attendance, study every day and make notes for required revisions. Besides all that, they contribute their time to gain extra knowledge from projects, assignments, reference books and online research. They do not waste much time on social media which plays as a benefactor. They also cultivate extra reading habits which is good for motivation, vocabulary and relaxation.

- Average learners(AL)

Table II Average Learners

| No. | Task Name | Time(hrs/week) |
|-----|----------------------------|----------------|
| 1 | Attendance | 20 |
| 2 | Study | 6 |
| 3 | Notes | 3 |
| 4 | Related Project/Assignment | 1 |
| 5 | Learn new Technology | 0.5 |
| 6 | Online Research | 0.5 |
| 7 | Refer Books | 3 |
| 8 | Solve doubts with teachers | 0.5 |
| 9 | Social Media time | 15 |
| 10 | Extra reading habit | 2 |
| | Total | 51.5 |

On the contrary, the average learning students do not spend the right amount of time for studies and work. They believe in study when required attitude and don't work too hard. They waste a lot of time in other unproductive activities. These students too need to put their time in studies and thus their study plan need to change.

- Slow learners(AL)

Table III Slow Learners

| No. | Task Name | Time(hrs/week) |
|-----|----------------------------|----------------|
| 1 | Attendance | 15 |
| 2 | Study | 3 |
| 3 | Notes | 0 |
| 4 | Related Project/Assignment | 0 |
| 5 | Learn new Technology | 0 |
| 6 | Online Research | 0 |
| 7 | Refer Books | 2 |
| 8 | Solve doubts with teachers | 0 |
| 9 | Social Media time | 24 |
| 10 | Extra reading habit | 1 |
| | Total | 45 |

Similarly, Slow learners are also in a place where they need to step up and start working hard to achieve a good score. They have got a lot to catch up for their academics.

Different sprints are designed for both average and slow learners.

Initial comparison of the study plans of average learners and slow learners with the ideal condition is shown below:

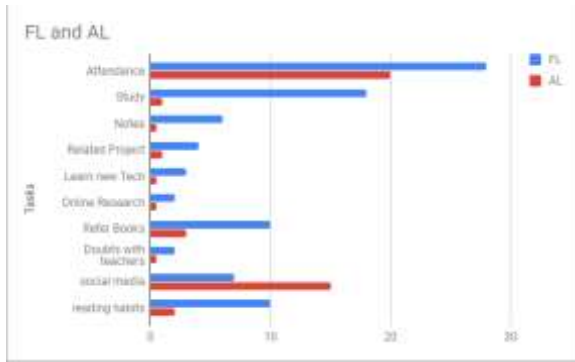


Fig. 1 FL and AL (comparison)

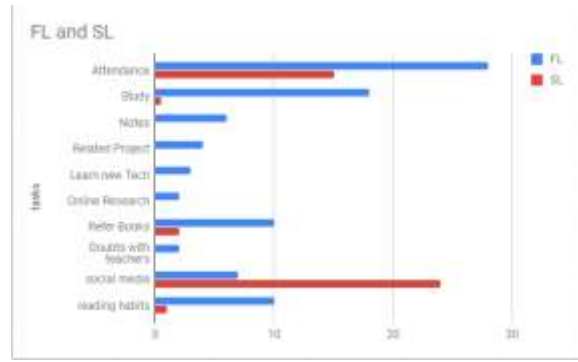


Fig. 2 FL and SL (comparison)

III (B). SPRINT DESIGN

Sprint is a collection of tasks performed during a time-box of about a period of one month or less than that. At the end of a sprint, a working, releasable and well-designed product increment is manufactured and delivered. Every sprint has a goal to achieve and it needs to be accomplish all the tasks by the end of the sprint.

The Sprint starts with a gathering of all the members and the tasks of the sprint are discussed. All the members are made clear what to perform along with their specified deadlines. The product owner, the person who requests the work and mentions the requirements is also a part of meeting. Every member can speak up and contribute their share in the meeting. All the doubts are cleared at the end of the meeting and then the work starts.

Every sprint discharges a new and updated version of the product ready to give better results. After the sprint is completed, the increment is released and the next sprint is started right away. The basic Sprint process can be well understood by the following diagram:

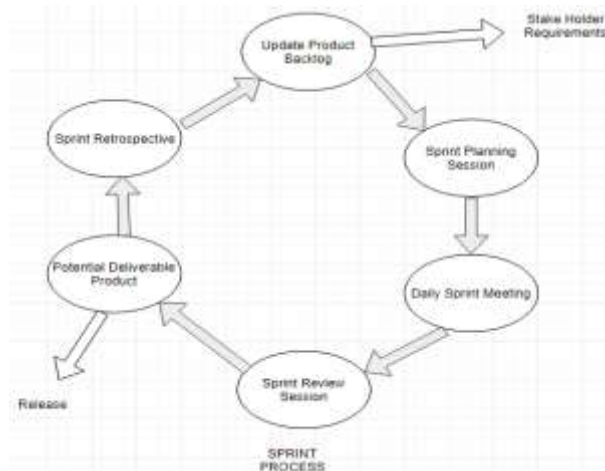


Fig. 3 Sprint Process

Update Product Backlog: - In the simplest definition the scrum product backlog is simply the list of all the things that needs to be done in a sprint. It replaces the traditional requirement specification artifacts. The Scrum Product Owner verifies the Scrum Product.

Sprint planning session: The Sprint planning session is including the entire scrum team along with the scrum master and the product owner. Over the gathering, the product owner introduces the main features required for the customers or the end users. The requirements obtained forms the product backlog. The team then elaborates the tasks of the user story and creates the sprint backlog. All the initial doubts are cleared and the process to achieve the target of the sprint is noted.

Daily scrum meeting: The sprint process is then started after the session is completely planned. Every day 15-minute meeting is conducted to discuss everyone's progress and problems. These meetings are known daily scrum meetings or Status meetings. Three main topics discussed are:

1. What is done or finished?
2. What to do today?
3. Are there any obstacles?

Sprint Review Session: In scrum methodology, each and every sprint delivers a potentially usable and efficiently working product. That suggests that at the end of the sprint, coded and tested software is obtained. Accomplishments are discussed and appreciated in this session.

Potentially Deliverable product: A Potentially Shippable Product is the sum of the Product Backlog Items delivered each Sprint. Delivering Potentially Shippable Product each Sprint is fundamental to the Scrum because when work is divided into simple pieces it can be finished in short iterations.

Sprint retrospective: Sprint retrospective describes the tasks accomplished in the delivered sprint and emphasizes on the improvements that could be solved in the next sprint program. With the help of sprint retrospective, the scrum team will focus on the commitment that what the team will do in the next sprint.

IV. ADAPTING SCRUM

In the case of student counseling our main target is to help the average learners and slow learners improve their score and get better results. For them the counselor can design different study plans for both the categories and encourage them to adapt it. This adaption will take a time of about a month. Considering one sprint of a month, the changes will be noticed in the plans and work of students at the end of the first sprint. The counselor has designed and targeted the ideal situation for all the average and slow learners. According to the plan, three sprints will be required for the average learners and five sprints for the slow learners. The counselor guided the students to follow the plan as stated. Students were motivated to achieve a better result and to obtain a good academic score for the betterment of their future.

Table IV Study plan of five sprints (5 months) for Slow Learners:

| Task | old | S1 | R1 | S2 | R2 | S3 | R3 | S4 | R4 | S5 | R5 | Target | Final |
|----------------------------|-----|-----|-----|------|-----|------|------|------|----|----|----|--------|-------|
| Attendance | 15 | 18 | 18 | 20 | 20 | 24 | 22 | 26 | 27 | 28 | 27 | 28 | 27 |
| Study | 3 | 6 | 5 | 9 | 8 | 14 | 12 | 16 | 14 | 18 | 16 | 18 | 16 |
| Notes | 0 | 0.5 | 0.5 | 2 | 1.5 | 4 | 3 | 5 | 4 | 6 | 5 | 6 | 5 |
| Related Project/Assignment | 0 | 1 | 0.5 | 1.5 | 1 | 2 | 1.5 | 3 | 2 | 4 | 3 | 4 | 3 |
| Learn new Technology | 0 | 0.5 | 0 | 1 | 0.5 | 1.5 | 1 | 2.5 | 2 | 3 | 2 | 3 | 2 |
| Online Research | 0 | 0.5 | 0.5 | 1 | 1 | 1.5 | 1 | 2 | 2 | 2 | 2 | 2 | 2 |
| Refer Books | 2 | 3 | 3 | 5 | 4 | 6 | 5 | 8 | 7 | 10 | 8 | 10 | 8 |
| Solve doubts with teachers | 0 | 0.5 | 0.5 | 1 | 1 | 1.5 | 1 | 2 | 2 | 2 | 2 | 2 | 2 |
| Social Media time | 24 | 20 | 22 | 18 | 20 | 16 | 14 | 10 | 13 | 7 | 12 | 7 | 12 |
| Extra reading habit | 1 | 3 | 2 | 4 | 3 | 5 | 4 | 7 | 6 | 10 | 7 | 10 | 7 |
| Total | 45 | 52 | 49 | 66.5 | 60 | 75.5 | 64.5 | 81.5 | 79 | 90 | 84 | 90 | 84 |

*S stands for Sprint

*R stands for Result after the sprint *unit- hours/week

Table V Study plan of three sprints (3 months) for Average Learners:

| Task | old | S1 | R1 | S2 | R2 | S3 | R3 | Target | Final |
|----------------------------|------|-------|-------|------|-----|----|----|--------|-------|
| Attendance | 20 | 22 | 22 | 25 | 25 | 28 | 28 | 28 | 28 |
| Study | 6 | 10 | 10 | 14 | 13 | 18 | 16 | 18 | 16 |
| Notes | 3 | 4 | 4 | 5 | 5 | 6 | 5 | 6 | 5 |
| Related Project/Assignment | 1 | 2 | 1.5 | 3 | 2.5 | 4 | 3 | 4 | 3 |
| Learn new Technology | 0.5 | 1 | 1 | 2 | 2 | 3 | 2 | 3 | 2 |
| Online Research | 0.5 | 0.75 | 0.75 | 1 | 1 | 2 | 1 | 2 | 1 |
| Refer Books | 3 | 6 | 5 | 9 | 7 | 10 | 8 | 10 | 8 |
| Solve doubts with teachers | 0.5 | 1 | 1 | 1.5 | 1.5 | 2 | 2 | 2 | 2 |
| Social Media time | 15 | 12 | 12 | 10 | 10 | 7 | 10 | 7 | 10 |
| Extra reading habit | 2 | 5 | 5 | 8 | 8 | 10 | 8 | 10 | 8 |
| Total | 51.5 | 63.75 | 62.25 | 78.5 | 75 | 90 | 83 | 90 | 83 |

*S stands for Sprint

*R stands for Result after the sprint *unit- hours/week

The table IV shows the study plan designed by the student counselor for the slow learners. All the important tasks are taken into account. The old time capacities are mentioned and the target of all the sprints are calculated. The counselor will conduct every day 15 minutes meeting with the students. During this meeting, the counselor discusses the problems faced by the students in the current methodology and based on the problems the counselor can give some sort of immediate guidance. According to the results of the current sprints the target of the next sprint is decided. The counselor centered the attention on the slow learners (SL) and made sure whether they are working hard to achieve their target or not. Similarly, the counselor has designed a study plan for average learners too i.e. table V. They are led by the counselor to get to the right track and work hard for their future.

V. RESULT & ANALYSIS

- Average Learners

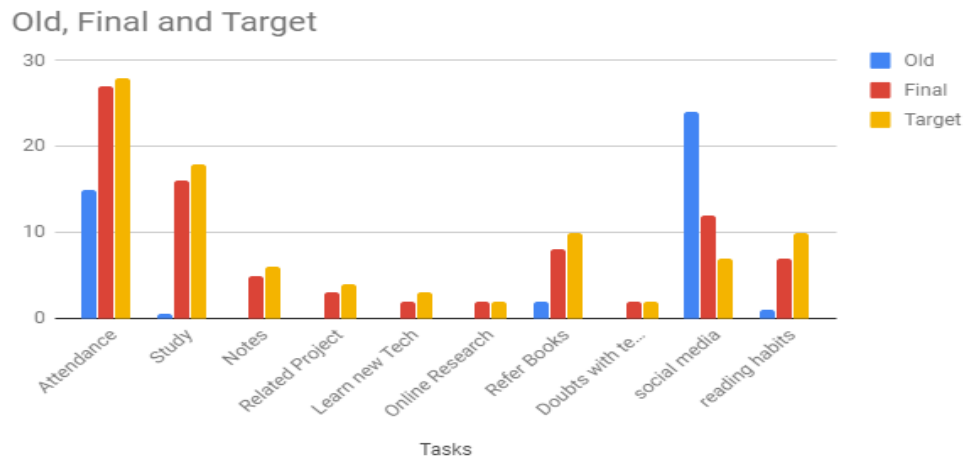


Fig. 4

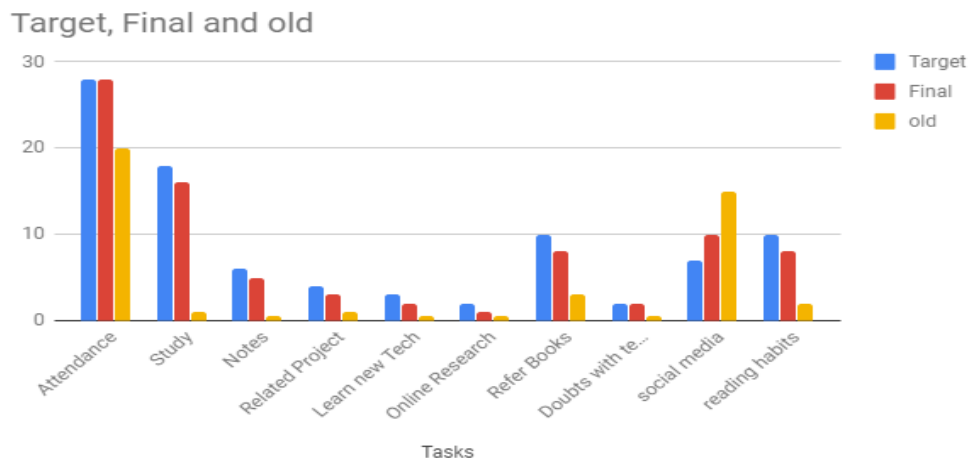


Fig. 5

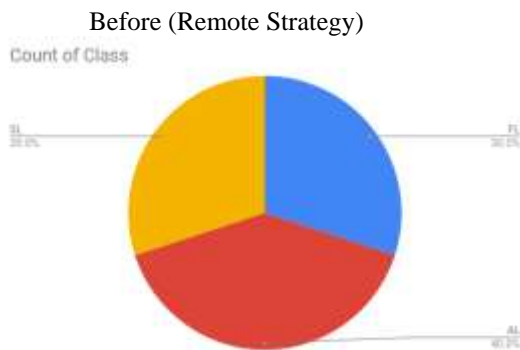


Fig. 6
 [FL:AL:SL = 30:40:30]

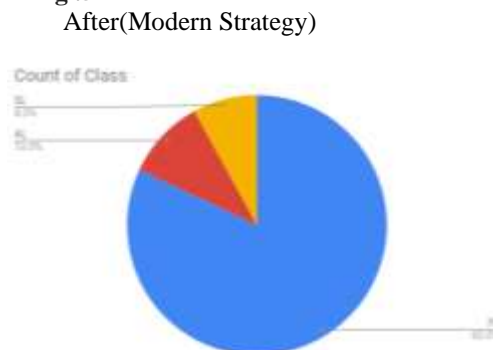


Fig. 7
 [FL:AL:SL= 82:10:8]

As shown above, scrum methodology has played as a benefactor to achieve the better scores for the average and slow learners. The application of this technology has made major changes and the ratio of fast learners has increased with a great extent. Fig 6 and 7 shows specific improvement in each and every task compared to the old work.

VI. CHALLENGES

There are various flaws considering Scrum methodology in student counseling problem. For these reasons, Scrum methodology cannot work effectively and produce result as per ideal situation and expectations. In the taken problem, if the students have any kind of social problems, he/she might have difficulties in concentrating on studies. These problems may lead to failure for this technology because such problems are not taken into consideration for study planning. So before adapting this methodology it should be made clear that the counselor is aware and taking care of such areas. The counselor should take a survey and maintain information about the students regarding various aspects like **Personality Trait of Student, Student's Temperament, Student's Attitude towards studies/ other areas, Communication Skill, Student's behavioral Pattern, Stress factor, Mental Strength, Sense of adaptability/ Inter-personal Relation, Sense of Working in group/ team**. The counselor should take in account the social, family and personal situations which create major disaster at this place. If the all the above mention states get a positive response, then it is liable that the students of Average learning or Slow learning categories will catch up with the study plans get better at academics for good. But, if the counselor is unable to get a constructive and beneficial result through the survey, then first of all the students will have to deal with their personal problems and start to focus on academics and study plan designed using the Scrum methodology.

VII. CONCLUSION

This paper dictates that Scrum can be implemented to solve problems of various categories and fields. Genuine assessment leads us to fill in the space of estimated and actual capacities. This discontinuity might be created due to lack to proper tracking of every task covered in the sprint backlog. To overcome such issues, sprints are designed in an augmented fashion. Accurate tracking of tasks, hard work, team work and smooth, motivating and effective communication are necessary aspects of Scrum development technology. Real life situations are complicated and tangled but they can get a better solution using this methodology. Considering the results obtained from the above application, it can be vividly stated that Scrum technology is very well applied to get productive results. As per the current scenario, Scrum already conquers the Computer Application world and is proved as efficient strategy for any applicable issues.

VIII. ACKNOWLEDGEMENT

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