

STW302CEM Group Reflective Report

CAKE WEBSTORE: A cake ordering web app delivered with Scrum

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Assignment report submitted for the partial
fulfilment of BSc (Hons) Computing degree.

Module Title Agile Development

Module Code: *STW302CEM*

Course Title: *BSc (Hons) Computing*

Course Code: *EECU033*

Submission Date: *05 Nov 2019*

Submitted To: *Sudeep Lal Bajimaurya (Module leader)*



Faculty of Engineering, Environment and Computing

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Project background

Cake Web-store is a web application developed in Django web framework, made exclusively for the management and dealings of cake shop related inquiries and orders. It will facilitate customers to order cakes online, track the progress of the order and when finished cake can be collected from the shop. Major features include:

- **Cake Inventory:** The customers can view different categories of cakes and their details suited to occasions from weddings to birthdays. The admin of the store is able to perform creation, update, deletion, and retrieval of cake details.
- **Customer account:** To place an order, the customer first needs to register on the web app. After successful registration, log in details will be provided to customer enable order placement.
- **Order management:** After order confirmation, a summary report of customer orders along with billing information will be provided to the customer. The admin is able to view customer wise order placements.
- **Order history:** The customer is able to view the details of their past transactions.
- **Expiry discounts:** The admin is able to set discounts on cakes along with the expiry date of the discount

The complete source code along with the workflow is available at <https://github.com/BijuAle/STW302CEM>

Scrum methodology was employed to deliver iteratively and incrementally the features of our web application. The reasons for doing so is expounded in the later sections. The sections below details the implications of following an agile methodology such as Scrum in mitigating and understanding psychological and communication dimensions in our team.

Team Psychology

Importance of understanding Team Psychology in Agile

Without a self-organized, motivated, and a coordinated team it is next to impossible to employ Agile methodology and expect its boons. Teamwork is generally understood as the willingness of people to work together to achieve a common goal. In the agile space, a team is a performance unit. A performance unit is an encapsulated body and its mission is to transform backlog into a valuable product. Team psychology has a great role to play to determine its velocity (Goodpasture 2010: 189). Also, the mental character of the group plays a vital role to meet and fulfil all the values and principles of the agile manifesto.

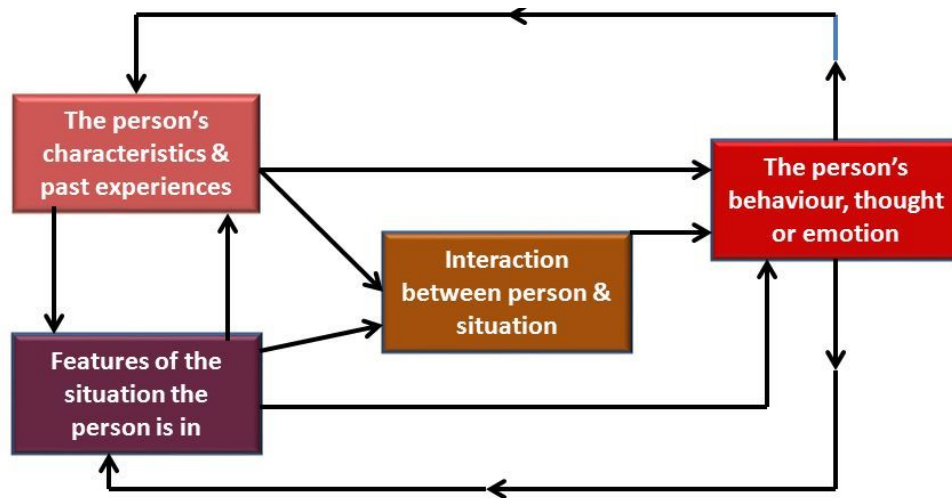


Fig: 1 A simplified structure of the psychological theory. (Coon 2017: 93)

Team psychology enables to examine the crucial factors in the growth and development of an effective team. It introduces organisational concepts offering evidence-based intervention to enhance the performance of a whole team. Team psychology has been determined based on the theory of team psychology in work. A theory in psychology is an organized collection of ideas that serve to describe, explain or predict what a person thinks, feels or do (Arnold, Randall, and Patterson 2010: 78). To be successful it needs to specify the five elements given below.

1. The particular behaviour, thoughts or emotion of an individual.
2. Any differences between people in a degree to which they characteristically exhibit the thoughts, behaviour and emotions.
3. Situational factors that might influence thoughts, behaviour and emotions.
4. Any consequences of the interaction between given theory 2 and 3 for the thoughts, behaviour and emotions.
5. The occurrence of particular thoughts, behaviour or emotions that might feedback to produce a change in 2 and 3 and have a positive impact on a team.

Based on the foundational understanding of what team psychology is, we were able to see, predict and solve issues such as

- communication gaps,
- misunderstandings,
- punctuality issues for scrum rituals
- or occasional lethargy among team members.

We initially predicted that the relevant individual characteristics might include the degree of a person's work satisfaction and stable traits like the extent to which a team to be well organized. Relevant past experience, for example, informed the penalty model for failure to maintain punctuality. Situational features included distance, simplicity and complexity to travel from home to the meeting area, weather and traffic congestions. These situations had a direct impact on a person's actual incidence of arriving late.

On the other hand, we put thought on the interaction between person and situation. For example, a well-organized person may have no trouble or difficulty making complex travel. So, here the issue was the lack of well organizational skill of a person. It's likely that person and situation influence each other but organization and time management played vital mitigation roles.

Analyzing the performance of team members and looking at the big five personality traits (explained in the later section) we found the evidence for the importance of many individual differences determining team effectiveness. These include factors such as conscientiousness, openness to experience, neuroticism, agreeableness and the average level of cognitive ability within the team. Initially, it was difficult to bridge the gaps between the uncommon traits among the members. Practices of module leader in facilitating discussion, empathizing with each other, gradually improved the adaptive environment.

Approaches employed to enhance work motivation

Motivation and how to constantly manage it is the measure of concern while accomplishing any goal. To complete this agile project, we looked at the concept of motivation, explored some of its implications and implemented some of the theories in practice namely: need theories, Expectancy theory, Goal-setting theory, intrinsic motivation, extrinsic motivation and self-determined theory.

Need theory

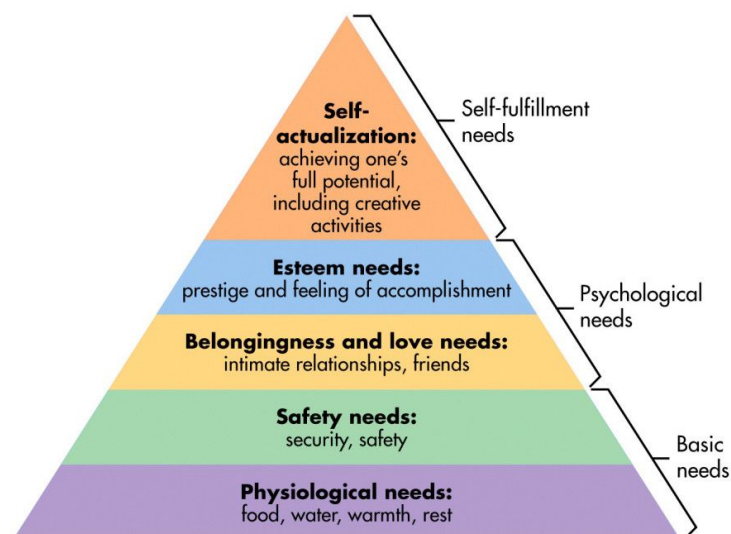


Figure: 2 Maslow's hierarchy of a person's needs

This theory is based on the idea that there are psychological needs probably of biological origin. In case our needs are unmet, we experience disequilibrium after which we try to put right. Examining this theory with practices we found that the notion of need reflects the content of motivation. In general psychology, the notion of need has a long history. The best known of this theory is Abraham Maslow. He was a humanistically oriented psychologist and later offered a general theory of human functioning. Later, he refined and proposed five classes of human needs which are shown in the hierarchy (Coon 2017: 119).

Thus we made sure that the team member's faux pas or greater blunders were discussed not hurt the self-esteem and no to compromise the competency of each member. Rather encouraging each other we focused on collective ownership of individual problems and collaborative solution.

Expectancy Theory with Visual Radiator

Story	To Do		In Process	To Verify	Done
As a user, I... 8 points	Code the... 9	Test the... 8	Code the... DC 4	Test the... SC 6	Code the... DC 8
	Code the... 2	Code the... 8	Test the... SC 8		Test the... SC 8
	Test the... 8	Test the... 4			Test the... SC 6
As a user, I... 5 points	Code the... 8	Test the... 8	Code the... DC 8		Test the... SC 8
	Code the... 4	Code the... 6			Test the... SC 6

Initially, a bit of confusion stroked on who will take the responsibility of which task in a sprint. After going through this theory the choice process was seen as cognitive analysis. Based on this theory and the following three factors we chose possible courses of action we would pursue. Three factors include expectancy, instrumentality and valence.

Expectancy: *If I tried, would I be able to perform the task which I'm considering?*

Instrumentality: *Would performing the task lead to identifiable outcomes?*

Valence: *How much do I value outcomes?*

The theory was implemented in conjunction with a **Visual Radiator**. Team members instead of speaking out the task preference for the day, wrote down in a sticky note (as shown below) the user stories left for execution, and volunteered to pull the task that they realized they could accomplish. The questions in expectancy theory were used to guide their volition.

Goal-setting theory

Expectancy, instrumentality and valence were not enough in order to accomplish the task. The first phase was knowing the one's capacity and worth of the task. As Locke et al define, 'Goal is what an individual trying to accomplish; it is an aim of an action. (Locke et al. 1981: 128)' And goal setting is like a bridge to bring ideas or aim into action. We followed the goal-setting cycle and essential elements to keep ourselves motivated which is shown below.

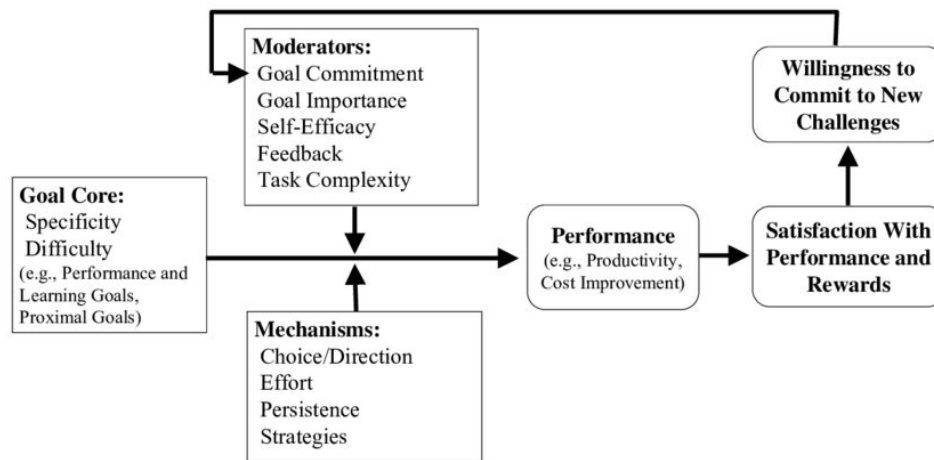
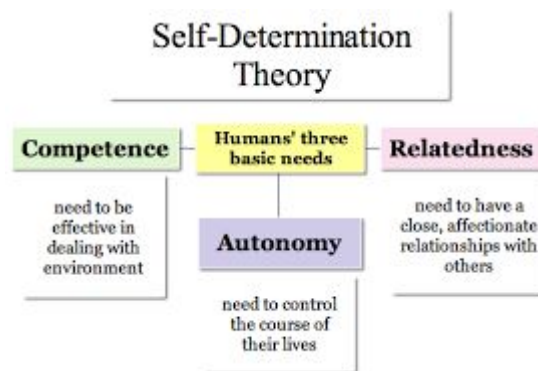


Figure 3: Essential Elements of the goal-setting cycle. (Locke et al. 1981)

Self-determined theory

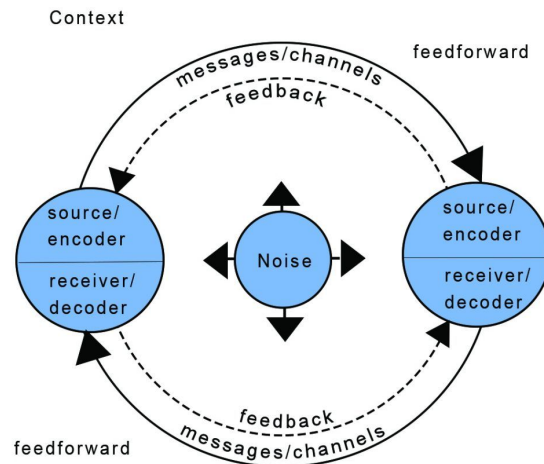
At the initial phase of the project, we noticed the task not been fully accomplished at the first sprint. In the processes of trying to figure out that one of the factors was due to the lack of intrinsic motivation. Deci and Ryan (2008) explain, ‘intrinsic motivation is a doing of an activity for its inherent satisfaction’. Whereas, ‘extrinsic motivation pertains that an activity is done in order to obtain some separable outcomes’. We first gave priority to extrinsic motivation but later on, we found missing intrinsic one. In one research, Herzberg argued that intrinsic motivation is more powerful and reliable than extrinsic motivation as a way of influencing behaviour at work (Grigaliunas and Herzberg 1971). Along with extrinsic, we followed the intrinsic motivation and self-determined theory.



Team Communication

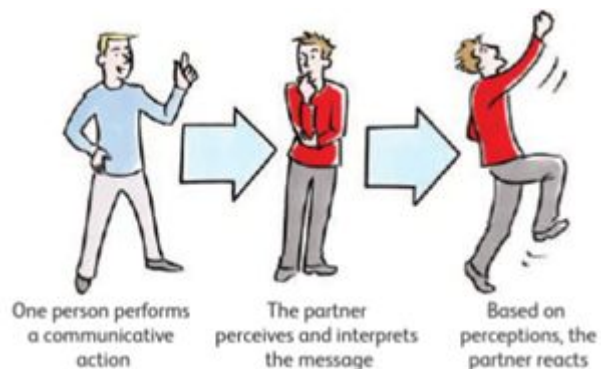
Building a great team requires strong communication skills. Communication, in general, is the use of symbols in order to represent ideas so that meanings can be shared. Symbols include movement, gesture, sound or image. Interpersonal communication skills are critically important in group or teamwork or in every facet of life.

Interpersonal communication has consequences which produce outcomes but it's not always expected to be perfect. For example, In the process of the stand-up meeting, we noticed that thought of one team member was never completely communicated to another member. At that time different interpretation was noticeable and frustrating at the initial phase. But that was a positive slippage between the ideas and the meaning.



Issue Resolution of our Team

Different people have a different level of understanding. We conducted meetings with our supervisor to resolve this issue. Finally, he figured out that it was occurring due to the misunderstandings of intentions due to ambiguity of spoken language and differences in personality trait among the members. Our supervisor analyzed the behaviour of team members at the stand-up meeting. It was discovered that we weren't following the rules of the effective stand-up meeting and the gap in performance efficiency was seen. Also, only the active members were sharing high-level information as concisely as possible while others remained silent.



Knowledge Performance Indicator and Visual Radiators

The Expectancy Theory, as expounded above (in the Team Psychology section) was implemented in conjunction with a Visual Radiator. Team members instead of speaking out the task preference for the day, wrote down in a sticky note (as shown below) the user stories left for execution, and volunteered to pull the task that they realized they could accomplish. The questions in expectancy theory was used to guide their volition.

To divide the task in the same manner and interval the module leader gave an idea of choosing task as per an individual capacity and record finished the task in key performance indicator to demonstrate how effectively an individual is performing a task. The more person completes the task the more he/she would get value. Which also acted as extrinsic motivation to accomplish the task.

Finally, the issue got resolved. Through theory and practice interpersonal communication becoming more transparent and comprehensive and crystalline among teams. The issue was not merely an issue rather it opened a door to analyze it properly and increase problem-solving skills. As we got to know that everyone brings own unique viewpoints and perspectives.

Also, our personal traits influence on what we take away and what our communication partners might think about us. At the root of it cognition, perception, and expectancy theory are seen to make a difference.

Agile Processes

Agile software development refers to a variety of software development methods that promotes continuous iteration of development and is based on iterative development throughout the software development lifecycle (Goodpasture 2010). Requirements and solutions are found using collaboration between the members of the teams. It helps to assist the team to respond to the unpredictability while developing software. It applies incremental and iterative progression segments that are for example known as sprints in Scrum methodology.

Traditional project management or “**Waterfall**” is a very linear approach; one phase falls under the next, and the next and the next and so on until a project is completed. We tend to have a very lengthy process to actually produce a product. We do a lot of design and architecture work and coming up with the requirements and then eventually, once we get that approved, we move into building the product. However, the customer really doesn’t get to see the product until it is “finished” and the project is complete.

Benefits of Agile over Waterfall

The main benefit is the ability to change dynamically to the customers’ wants and needs. A focus on the features that are the highest value to the customer. A short-fixed timeline that allows for immediate feedback from the customer and the ability to move deliverables into production.

It also is very beneficial for the teams who will be using it. Agile works well with small dedicated team members and lets the team load balance workloads. For example, you may need a developer and a designer for a particular project and if a person has the right experience they could be doing either type of work on an Agile team.

Because Agile has more frequent check-ins and demonstrations with the business, this allows for changes to be made at a much faster pace, which is good news for smaller teams--letting them get feedback faster and making it easier for them to adjust to the wants and needs of the customer.

Team Formation

Scrum team comprises of 7+/-2 members. There is no definite team leader to assign tasks or decide how to solve a problem, as the team members are self-organized. Our team layout is tabulated below:

Member	Role	Responsibility
<ul style="list-style-type: none">• Romisha Thapa	<ul style="list-style-type: none">• Product Owner• Scrum Master	<ul style="list-style-type: none">• Managing scrum process in Agile methodology, with the coordination of scrum team.• Removing the impediments for the scrum team.• Arranging daily stand-up meetings, scheduled meetings, demo, facilitate meetings and decision-making processes in order to ensure quick inspection and proper use of adaptation process.• To make product backlog in good shape and make it ready for the next sprint.• Conduct retrospective meeting.• Organizing and facilitating the sprint planning meeting.• Determining the release date and contents.• Managing and developing the product backlog.
<ul style="list-style-type: none">• Biju Ale	<ul style="list-style-type: none">• Development Team(Developer)	<ul style="list-style-type: none">• Delivering a potentially releasable Increment of "Done" product at the end of each Sprint.• Tasking and providing the estimates.• Designing front-end and developing back-end of the product• Attending daily stand-up meetings and other meetings
<ul style="list-style-type: none">• Netra Dahal• Sushan Tha Shrestha	<ul style="list-style-type: none">• Development Team(Tester)	<ul style="list-style-type: none">• Delivering a potentially releasable Increment of "Done" product at the end of each Sprint.• Tasking and providing the estimates.• Doing unit testing and functional testing• Attending daily stand-up meetings and other meetings

Why Scrum Methodology?

Parameters	Scrum	DSDM	Crystal	ASD	XP
Process type	Several releases	Not specified	Incremental paces/iteration	Incremental paces/iteration	Several releases/iterative
Process period	30 days term/release	Not specified	Not specified	Not specified	Two weeks term/iterative
Focus	Self organization of team members and prioritize the requirement	Higher acceptance probability of changes Use 80:20 roles	People has the most influence on software quality It looks to adjust for every project separately	Address issues such as social, cultural and team skills	Communication Simplicity Courage Feedback
Development speed	Fast	Very fast	Fast	Fast	Very fast
Type of projects	Short-terms	Small/medium	Not specified	Large/complex	Small/large/complex Short/long term
Special feature	15 min daily meeting	Dynamic development Involve prototyping method	It allows agile team to select the most suitable method	Human collaboration Team self organization	It is suitable for a small team's workforce (5 to 15) team members) Maximizing communication which leads to enhancing team-work Pair programming
Additional features	Flexible, Adaptable, Empirical	Flexible, fast, collaborative	Fast, collaborative	Rapid, iterative	Flexible, using coding standard, simple design, planning game

Figure 8: Comparison Agile Project management methodology (1 of 2) (Qumer and Henderson-Sellers 2008)

Software process	XP	Scrum	FDD	ASD	DSDM	Crystal
Development process	Short releases Metaphor Simple Testing Refactoring Pair programming Collective ownership Continuous integration On-site customer Coding standard	Scrum teams Product backlog Sprint Sprint review	Domain object modeling Developing by feature Individual class ownership Feature teams Inspection Regular builds	The project mission Developing by components Collaborative teams Joint application development Customer focus group reviews Software inspection	Active user involvement Empowered teams Frequent product delivery Fitness for business purpose Iterative and incremental development Reversible changes Requirements are Baselined at high level Integrated testing Collaboration and cooperation among stakeholders	Staging Holistic diversity and strategy Parallelism and flux User viewings Revision and review
Project management process	The planning game	Scrum master Sprint lanning meeting Daily serum meeting	Reporting/visibility of results	Adaptive cycle planning Adaptive management model	Not specified	Monitoring of a progress
Software configuration control process/ support process	Not specified	Not specified	Configuration management	Not specified	Not specified	Not specified
Process management process	Not specified	Not specified	Not specified	Project postmortem	Not specified	Reflection workshops methodology tuning

Figure 8: Comparison Agile Project management methodology (2 of 2) (Qumer and Henderson-Sellers 2008)

We applied the scrum methodology to our project. It is an agile project management framework which is especially used for software development. It follows the values and principles from agile but involves further specifics, particularly regarding certain software development, practises (Rubin 2012). Following are the reasons for selecting Scrum over other methodologies:

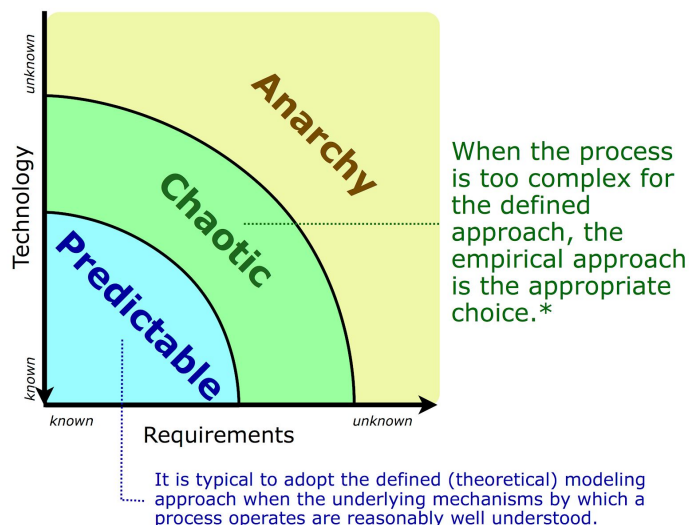


Figure: Project Complexity and methodology choice.(James and Walter 2017)

Scrum, an empirical framework, is appropriate for work with uncertain requirements and/or uncertain technology issues. (Ogunnaike and Ray 1994; Larman 2004; Stacey 2011)

The scrum framework itself is simple. The rules, artefacts, events, and roles are easy to understand. Its semi-prescriptive approach actually helps remove the ambiguities in the

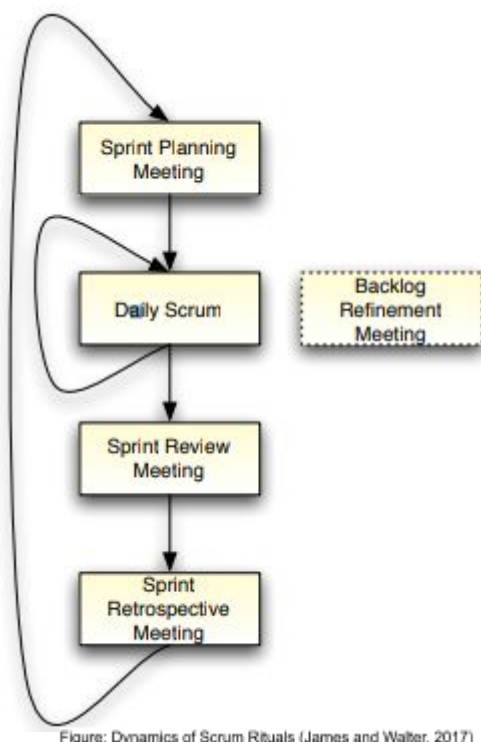
development process, while giving sufficient space for companies to introduce their individual flavour to it.

The organization of complex tasks into manageable user stories makes it ideal for difficult projects. Also, the clear demarcation of roles and planned events ensure that there is transparency and collective ownership throughout the development cycle. Quick releases keep the team motivated and the users happy as they can see progress in a short amount of time.

However, Scrum could take time to master, especially if the development team is acclimatized to a typical waterfall model. The concepts of smaller iterations, daily scrum meetings, sprint reviews, and identifying a scrum master could be a challenging cultural shift for a new team.

But, the long-term benefits far outweigh the initial learning curve. Scrum's success in developing complex hardware and software products across diverse industries and verticals makes it a compelling framework

Scrum Rituals



Sprint planning

A sprint is a time period during which a specified amount of work is done and prepared for review. Our sprints lasted a week with five working days and slack time of two days. Saturday and Sunday were left for slack and other five days as working days.

Sprint planning is the meeting done to determine which product backlog story will be delivered in that sprint. We conducted sprint planning every Monday when the sprint ended or after the sprint reviews and retrospectives from the previous sprint. Scrum master facilitated to make sure the discussion is effective and appropriate product backlog items are included in the sprint backlog.

The Daily Stand-up meeting

It is a short meeting for communication between members not more than 15 minutes where every member covers the development since the last meeting. Planning work and impediments are discussed that may be blocking the development of a member in the daily stand-up meeting (Cohn 2009: 72.). Most of our stand up lasted only for about 15-20 minutes and done in the exact time of 10 AM every day.

The sprint review

It is the event to demonstrate and present the work of the team done during the sprint. Product owner checks if the work done meets the acceptance criteria and either accept it or reject it. The stakeholders reviews the work and give feedback to ensure the development meets the requirements.

The sprint review was done at the end of the sprint every monday and reviewed by our teacher.

The retrospective

It is the final meeting at the end of every sprint to discuss and find what went well and didn't go well or how it can be improved in another sprint. It was held after the sprint review. We were supposed to identify elements of the process that did or did not work during a sprint. We facilitated this meeting by asking the following questions (Derby and Larsen 2006).

- What went well?
- What would we like to change ?
- How can we improve our process, tool choice, interactions?

Scrum Artifacts

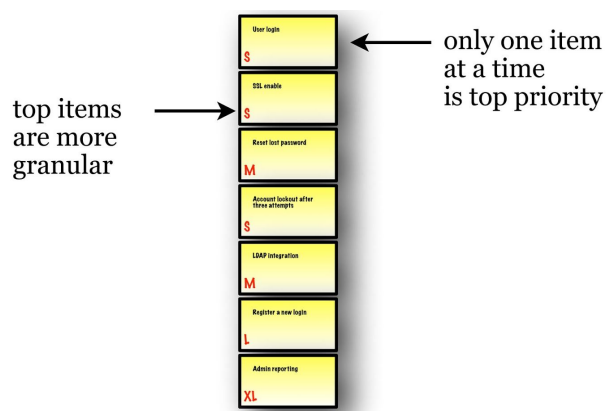


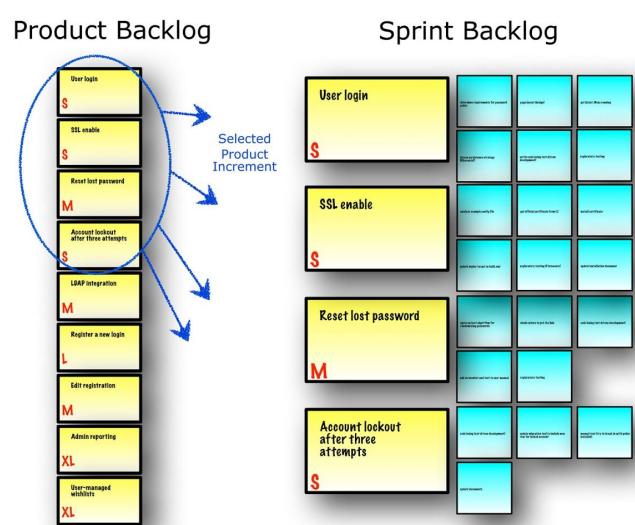
Figure: A Sample of Product Backlog (James and Walter 2017)

Product Backlog

It is a document or list that outlines everything that is needed in the product to complete or it can also be explained as requirements for the product (Schwaber 2007: 58).

The backlog is managed by the Product Owner accordingly in terms of their value proposition by the product owner. While creating product backlog we focused on two foundations which is road map and requirements. Roadmap initiatives

got breakdown into several epics with each epic having several user stories and requirements. All working items like user stories, customer requests, design changes were included in the product backlog



Sprint Backlog

It is a specific list of product backlog items which are to be finished in that certain sprint.

As shown in the figure to the left, during the sprint planning meeting we selected some number of product backlog items in order to identify the necessary task to be accomplished.

Figure: Backlog to Sprint (James and Walter 2017)

Burndown chart

- Summation of total team work remaining within one Sprint
- Updated daily
- May go up before going down
- Intended to facilitate team self-organization
- Sprint Burndown Chart (optional)

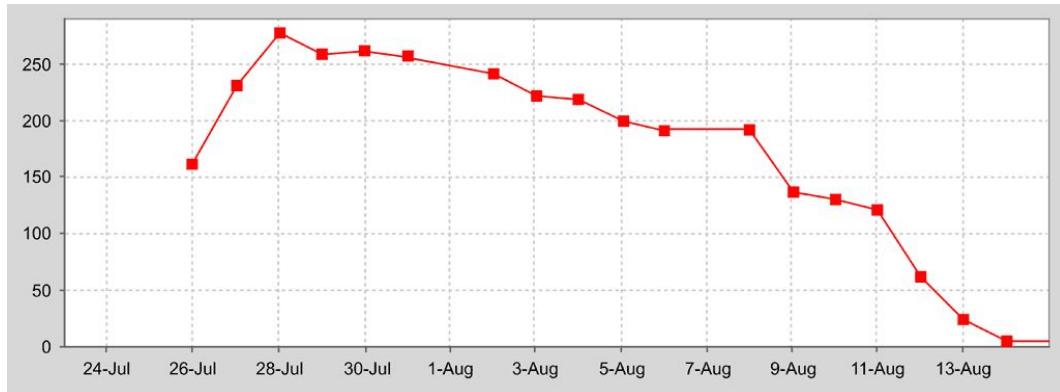


Figure: Sample burndown chart (James and Walter 2017)

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