

Project management method

The coursework specification was different in 2021-22 however the following examples should give you an idea of the standard that might be expected.

2021-22 coursework specification

Select a project methodology

You will be creating artefacts that once combined will provide a proposal for creating a web app that contains data visualisations and more traditional web app functionality such as a discussion forum or blog.

You should assume that the project team who will develop the proposed app is formed of yourself and peers from the course, that is developers who may have little or no experience in the use of software engineering or data science process models.

Consider your own skills and experience, and the nature of that project, and select a methodology, or combination of methodologies, that you think will be most suitable for managing the project throughout its lifecycle. For example, will you use a software development method (e.g. Scrum), a data science method (e.g. TDSP), a combination of methods, or even a meta method (e.g. Essence) that allows you to select different approaches for each activity in the project.

Justify your choice. For example, consider your selection criteria; relevant literature and your own experience (if you have any).

There is no 'correct' choice, what is important is that you demonstrate why what you have chosen is relevant to your project.

Good example

Comment

This was a good answer as the student clearly set their criteria for selection in the context of their project. They selected a range of methods that could be suitable and then carefully investigated these against their criteria. They selected based on the evidence they found and also pointed out any potential concerns with the choice they made (in respect to applying it in their project). They have appropriately referenced their sources.

Student's response

Selection of project methodology

The methodology that will be used for the project is the Team Data Science Process (TDSP) methodology by Microsoft

The main objective of the project is to develop a web application which provides data visualisations on tennis match durations with the addition of web app functionalities such as a discussion forum. Since the project involves a combination of both data science and software development, the project methodology selection started off with three options which include both software development and data science methods; Scrum, Crisp-DM and TDSP.

These three methodologies are then compared based on five different selection criteria listed below:

1. Ease of access to client or interaction with customer/management – minimal to no interaction
2. Expertise on software engineering and data science process methodologies – low to no experience
3. Level of complexity of the requirements – high complexity project, a combination of software development and data science
4. Schedule constraints on the production of the app – short timescale, fixed timeline
5. Level of volatility in the requirements – high, as there are many unknowns with minimal interaction with client

An evaluation of whether each project methodology is suitable for the given selection criteria can be seen on table 1 below. Based on the assessment of the three methodologies, it can be concluded that TDSP is the most suitable methodology for this project.

Criteria:	Methods:	Scrum [1]	Crisp-DM [2]	TDSP [3]
Ease of access to client/ interaction with customer or management – minimal to no interaction		Scrum relies on short, periodic blocks called sprints which requires feedback and reflection after completion. However as there will be minimal interaction with the client, it would be hard to obtain feedback.	As there will be minimal interaction with the client, feedback received would be less. Crisp-DM relies on the initial business understanding received prior to starting the project to evaluate the model before deployment. Therefore, constant feedback is not highly required.	TDSP starts with understanding the business need of the project. This gives a strong basis to the overall project objective. Therefore, constant feedback from the client is not essential for TDSP.
Expertise on software engineering and data science process methodologies – low to no experience		With low experience in using development methodologies, scrum would be a good option as it is lightweight and simple to learn. It is also widely used with many documentations and supports available online.	Crisp-DM is a good method to use for groups with less experience with development methodologies as it has been widely used for (cross industry standard) data mining projects with many available documentations. It is also easy to learn without extensive training needed.	TDSP is greatly similar to many common software practices such as git versioning and the planning of sprints making it easier to follow. It also has templates which are provided for free on Microsoft Azure GitHub repository. However, a minor issue is that some documentation from Microsoft regarding TDSP is inconsistent.
Level of complexity of the requirements – high complexity project and is also a combination of software development and data science		As client has not provided extensive description of what is wanted and required hence the project requirements are considered to be complex and far from known. This is why Scrum is a good option. However, the project involves both software development and data science. Therefore, Scrum might not be the right method to use.	Crisp-DM is a good method choice for complex data projects as it starts off with trying to understand the business need and the available data. It also involves preparing and cleaning the data which is crucial when working with large data sets. However, as Crisp-DM is a method that is primarily used for data science, it might not be a good option to use for this project which also largely involves software development.	TDSP is similar to that of a combination between scrum and crisp-dm, hence it is a good choice for the project. TDSP also employs specific roles to the team members; Group Manager, Team Lead, Project Lead and Project Individual Contributors. By assigning specific roles and tasks, there will be better cohesion in the team to complete projects with complex requirements. Each stage of TDSP also expects its own goals, method, and artifacts allowing for clarity.
Schedule constraints on the production of the app – short timescale (few months), fixed timeline		Scrum is a good choice for short projects as it is simple and flexible. As Scrum relies on short sprints, the length of each sprint can be adjusted to meet the short length of the project timeline.	Crisp-DM is a suitable option for small projects as it utilises a total of just 6 concise steps. Starting off with understanding the business need and data allows for a clear goal to base the project on. It also allows for flexible movement between stages such as going back to data preparation to correct any mistakes during the modelling stage	TDSP can be used for short timeline projects, however, it uses fixed length planning sprints which could be a disadvantage in terms of time flexibility.
Level of volatility in the requirements – high, as there are many unknowns with minimal interaction with client		Scrum is an agile method and it utilises short blocks (sprints) hence allowing changes to be made along the way. As the project has a high volatility in the requirements then Scrum would be a good method to employ.	Crisp-DM is an agile method which allows for flexible movement between stages, i.e., between business and data understanding or data preparation and modelling. The evaluation stage also allows for the model to be tested based on the initial business understanding.	TDSP is an agile method which relies on 5 lifecycle stages. TDSP also allows for movement between four lifecycle stages: business understanding, data acquisition and understanding, modelling and deployment. This makes the method flexible as for example models can be evaluated based on the initial business and data understanding and vice versa.

Table 1 Selection criteria against project methodologies

The Team Data Science Process project methodology is data science focused with important features such as data understanding and exploration as well as baseline modelling. It also allows for better cohesion and collaboration within the team as it assigns specific team roles and suggests how they can work together most effectively. TDSP has components such as infrastructure and resources recommendation for the data science aspects of the project and tools and utilities recommendation for the project execution side. All these makes TDSP such a well-rounded methodology with a greater emphasis on data science which essentially what this project is. If required, TDSP can also be utilised together with Scrum to accommodate for the larger software development aspect of the project. However, a drawback to this method could be despite having free pre-set templates, it is more difficult to learn in comparison to other methods due to its extensive structure. [4]

Weak example

Comment

This may at first appear a good example as there is a lot of text. However, if you read it you should see that rather than address the coursework the student instead spends a long time describing the method (gains no marks for this) and then gives some general statements about the method that don't actually address what they were asked to do. It's a reasonable summary the method but a poor answer to the question.

Students response

Methodology (or combination) selected

The methodology deployed in this project is Scrum. In recent years, agile software development methodology has become very popular. As a more effective way compared to the waterfall, it has become dominant in the software development industry. "Agile describes a set of value and principles for software development under which requirements and solutions evolve through the collaborative effort of self-organising & cross-function teams." (En.wikipedia.org, 2021). As a subset of agile, scrum is the management and control process that cuts through complexity to focus on building products that meet business needs (Scrum.org, 2021). In simple terms, scrum divided integrated/complicated projects into small pieces then let workers iteratively contribute to the project then deliver to clients.

There will be three types of consultants required to successfully complete the tasks: project manager, technical consultant and functional consultant.

In the chart beside, it shows the whole process of Scrum:

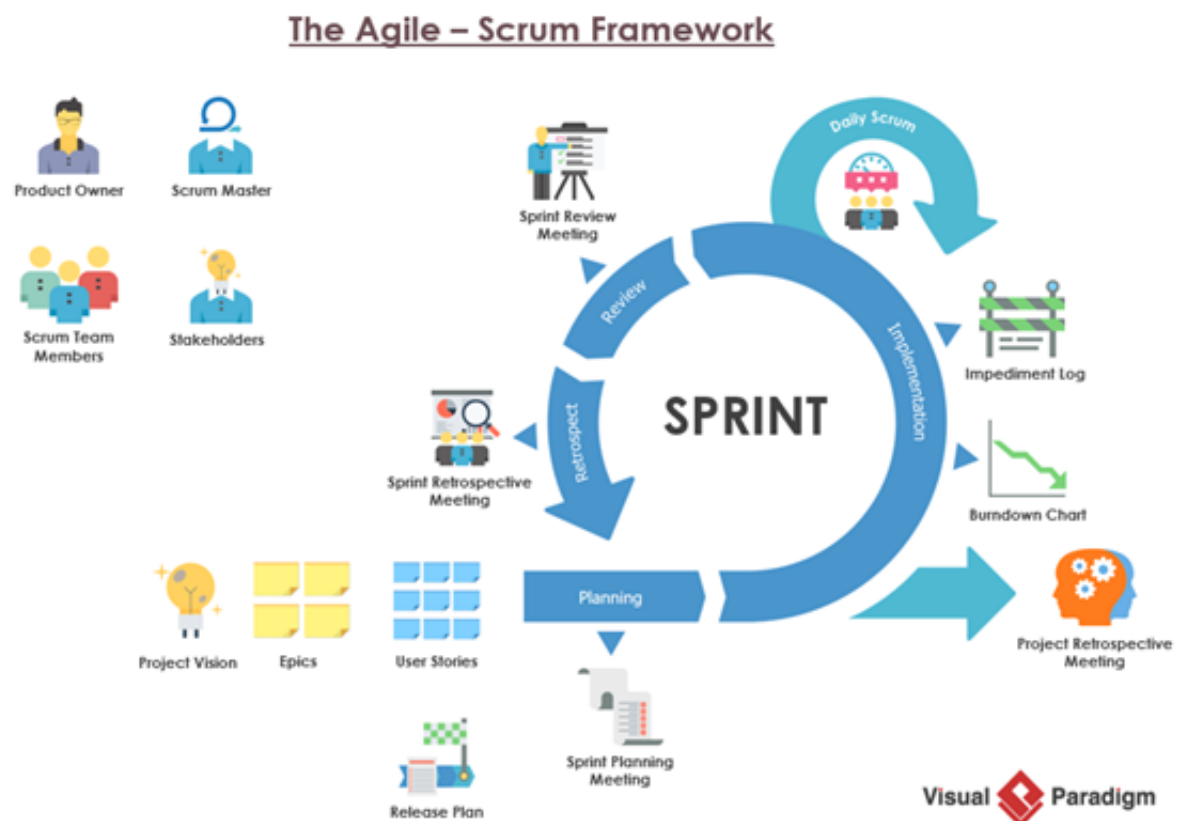


Figure 1. The Scrum Framework (What are Scrum Ceremonies?, 2021) There are few actors and ceremonies in the process. ScrumMaster is a person who is familiar with the technology and functional requirements because they need to estimate and allocate work to developers. This role also needs to know deeply about Scrum and coach the rest of the team. For some companies, this role was taken by the pure functional consultant or project managers that have 0 or few technical experiences. This will cause such problems: they just gathered new requirements from clients, and they assumed the task should take a developer 1 week to complete, for example. It actually takes the developer only 1 hour. But the developer committed at a one-week deadline and complete the task in 3 days (1-hour actual work, the rest work as a free rider) then returns. This developer still got a promotion because he can always complete the task in good quality and much earlier than deadlines. However, this may cause budget shortage issues: if the budget is unstinted, customers might not realise such problems but when they were comparing with competitor development companies, they might choose to terminate the partnerships due to the high expense. If the budget is running out or at the threshold level, customers may not want to add in more budgets then some features might be cut then the final outcome does not achieve anyone's expectations.

Product owners, acting as a representative of clients, always need to interact with customers and gather user requirements to make sure the team knows what the correct things are to do from a business perspective. Ranking priorities, refining user stories, working on product backlog are the main responsibilities for them.

The four ceremonies are sprint planning meeting, daily stand-up meeting, sprint review meeting and sprint retrospective meeting. At the beginning of the sprint, it is required for all actors to attend the sprint planning meeting to clarify tasks. It is suggested to book no more than 2 hours for this meeting, otherwise, attendees might lose attention.

The daily stand-up meeting should be short, probably 15 – 30 minutes for attendees. In this meeting, everyone needs to present "What I have done yesterday", "What am I going to do today" and the problems/barriers I encountered. The ScrumMaster might need to reallocate resources or contact clients/third parties to get the problems solved.

The sprint review meeting is always at the end of a sprint. All actors plus the stakeholders (normally clients) should all attend the meeting to review what has been completed as well as what should be added. Clients could have a chance to preview the demo and comment based on it. So, the following directions of change can be determined. Sprint retrospective meeting allows all developers to sit down and discuss both the positive aspects and the negative elements during the development so that in the next project those potential issues can be avoided.

Selection criteria and justification of selection

The reasons why choose this methodology are: Cost-effective. Different from the traditional waterfall methodology, Scrum usually divides the project into small pieces so developers/resources could be properly allocated to their best effective areas. Waterfall usually asks most developers to conquer tasks step by step. Although scrum is becoming dominant, it is not saying waterfall should be completely abandoned. But consider this project, the waterfall is not the greatest suit. Resources can be properly allocated, the communication between the team members is effective then the barriers can be removed immediately. Annual leave is one of the greatest factors that affect the progress of a project and this is always ignored by non-experienced project managers. Normally, workers have 25 days of annual leave per year and sometimes developers are suggested to delay their AL to

the end of the year to make sure the project is running smoothly. However, at the end of the year, there are no delay options available so there must be a replacement to pick up the tasks. Scrum methodology tracks the availability of each worker so even if the worker must take annual leave, a replacement could very quickly pick them up.

Clear workload allocation could prevent workers from being overloaded. There are always some seniors overloaded because they are cursed by knowledge. Because they know well how to interact with clients, so they have to gather requirements directly from them. Because they know well how to develop and code so they have to work independently. Such amazing/powerful seniors are always required by many projects. The Scrum framework defined the roles, responsibilities of each people. Although the senior still gets called, they are not obligated to respond so they can focus more on their own tasks. Quicker usable product to display for clients. Because Scrum prefers to run some tasks simultaneously, it is more straightforward and vivid for customers to view whether it satisfies their requirements. If yes, continue working like that and if no, changes can be made immediately. The impact of such changes will be much less than waterfall (imagine you are 85% completed but suddenly you are required to change the first 15% work, and it will make all your efforts collapse). When users are happy with all the products demo, they can then sign off the User Acceptance Testing (UAT) stage. When users have more involvement in the project, the possibility of not achieving expectations will be significantly low.

Be careful: There is nothing in the world 100% perfect, neither does Scrum. Too much communication might squeeze the actual development time. The meetings are all billable hours and clients will be charged based on them. For example, on Thursday, there are four meetings associated with the project – one is the client daily stand-up meeting, two is internal catchup meeting, three is a task related meeting and four is a warp up meeting. These have led to 4 hours billable hours for clients, 10 people getting involved in but there was nothing actually produced.

Developers rarely have direct interaction with clients. Sometimes, developers might need supporting materials from the client-side, this can be either datum, regulation, specifications, etc. The developers have to report to ScrumMaster or Product Owner, then they reflect clients. Clients did some internal investigation then come back to product owners then to developers. For example, adding a font into the production environment is only a 20-minute task. Contacting project manager then ask for credentials from customer side wasted 2 weeks.