Lab 1

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1. Difference between agile software development model and waterfall model.

Waterfall Model

Waterfall Model followed in the sequential order, and so project development team only moves to next phase of development or testing if the previous step completed successfully.

1. The method is ideal for projects which have definite requirements and changes not at all expected.
2. In this methodology, the "Testing" phase comes after the "Build" phase
3. This model shows a project mindset and places its focus completely on accomplishing the project.

Agile Model

Agile methodology is a practice that helps continuous iteration of development and testing in the software development process. In this model, development and testing activities are concurrent, unlike the Waterfall model. This process allows more communication between customers, developers, managers, and testers

1. Agile development is a process in which the requirements are expected to change and evolve.
2. In Agile methodology, testing is performed concurrently with software development.
3. Agile introduces a product mindset where the software product satisfies needs of its end customers and changes itself as per the customer's demands.

Major differences:

- Waterfall is a Liner Sequential Life Cycle Model whereas Agile is a continuous iteration of development and testing in the software development process.
- In Agile vs Waterfall difference, the Agile methodology is known for its flexibility whereas Waterfall is a structured software development methodology.

- Comparing the Waterfall methodology vs Agile which follows an incremental approach whereas the Waterfall is a sequential design process.
- Agile performs testing concurrently with software development whereas in Waterfall methodology testing comes after the “Build” phase.
- Agile allows changes in project development requirement whereas Waterfall has no scope of changing the requirements once the project development starts.
- The Waterfall model can be regarded as a stringently sequential process, however, the Agile methodology is a highly collaborative software development process, thereby leading to better team input and faster problem solving
- The Waterfall model is best suited for projects which have clearly defined requirements and in which change is not expected at all, while Agile development supports a process in which the requirements are expected to change and evolve. Thus, if you are planning to develop a software that would require frequent overhauls and has to keep up with the technology landscape and customer requirements, Agile is the best approach to follow
- The Waterfall model exhibits a project mindset and lays its focus strictly on the completion of project development, while Agile introduces a product mindset that focuses on ensuring that the developed product satisfies its end customers, and changes itself as the requisites of customers change

2. Why Agile is better?

Agile Model provides following features:

- It is focused client process. So, it makes sure that the client is continuously involved during every stage.
- Agile teams are extremely motivated and self-organized so it likely to provide a better result from the development projects.
- Agile software development method assures that quality of the development is maintained
- The process is completely based on the incremental progress. Therefore, the client and team know exactly what is complete and what is not. This reduces risk in the development process.

- Agile methdology works exceptionally well with Time & Materials or non-fixed funding. It may increase stress in fixed-price scenarios.
- Prefers small but dedicated teams with a high degree of coordination and synchronization.
- Products owner with team prepares requirements just about every day during a project.

- Test team can take part in the requirements change without problems.
- Description of project details can be altered anytime during the SDLC process.
- The Agile Team members are interchangeable, as a result, they work faster. There is also no need for project managers because the projects are managed by the entire team

- Understanding the Agile Manifesto
- Discussing Important Characteristics that make agile approach best suited for Software Development.

3. Understanding the Agile Manifesto

Agile manifesto consists of 4 values and 12 principles. These 4 values and these are:

1 Individuals and Interactions over Processes and Tools

Individuals and interactions are preferred over processes and tools because it makes the process more responsive. If the individuals are aligned and once they understand each other, then the team can resolve any issues with the tools or processes.

Allowing individuals to contribute on their own also allows them to showcase freely as what they can bring to the table. When these team interactions are directed towards solving a common problem, the results can be quite powerful.

2 Working Software over Comprehensive Documentation

The kind of documentation created for these projects was very detailed and so many documents were created that many of them were not even referred to during the project progress. This was an unnecessary evil with which the project teams used to live with.

This doesn't imply that the documentation is not necessary. It just means that a working product is any day a better indicator of alignment to the customer needs and expectations than a document created months ago. It also implies that the teams are responsive and ready to adapt to change as and when required while showing the working software to the client when the sprint ends..

3. Customer Collaboration Over Contract Negotiation

Not a one-time thing. What this does is, it gives a two-fold advantage – while it helps the team to do a course correction if required at an earlier stage, it helps the client to also refine their vision and redefine their requirements if required during the course of the project.

The other aspect is that while traditional software development models involve the customer before the development begins during the documentation and negotiation phase, and they are not as involved during the project development.

Once the requirements have been frozen, they get to see the product only, once the product is ready. Agile breaks through this barrier as well by allowing for customer involvement over the whole lifecycle.

This helps the agile teams align better to the customer needs. One of the ways to achieve this is through a dedicated and involved product owner who can help the team in real time for clarifications and aligning the work with the customer priorities

4. Responding to Change Over Following a Plan.

Agile allows us to do this transition. What agile thinks is that change is not an expense, it is a welcome feedback which helps to improve the project. It is not to be avoided but instead, it adds value.

With the short sprints proposed by agile, the teams can get a quick feedback and shift priorities at a short notice. New features can be added from iteration to iteration.

Agile also plans, but it also follows the just in time approach where planning is done just enough when needed. And the plans are always open to change as the sprints progress.

Also we have 12 agile principles which are:

1 Our highest priority is to satisfy the customer through the early and continuous delivery of a valuable software.

2 Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.

3 Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.

4 Business people and developers must work together daily throughout the project.

5 Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.

6 The most efficient and effective method of conveying information to and within the development team is a face-to-face conversation.

7 Working software is the primary measure of progress.

8 Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.

9 Continuous attention to technical excellence and good design enhances agility.

10 Simplicity — the art of maximizing the amount of work not done is much essential.

11 The best architectures, requirements, and designs emerge from self-organizing teams.

12 At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.

4. Discussing Important Characteristics that make agile approach best suited for Software Development.

Important characteristics that make agile approach best suited for software development are as follows:

Agile methodology suits perfectly for these companies that are looking to transform the way in which projects are managed and the way they operate as a whole. Benefits of agile software development include:

1. **Focuses on Users.** Agile uses user stories with business-focused acceptance criteria to determine product features, each of them delivers value. Also, this provides the opportunity to beta test software after each Sprint and the ability to make changes as needed.
2. **Focuses on Business Value.** The team can deliver features, which provide the most business value based on understanding what is most important to the customer's business.
3. **Improves Quality.** The team focuses on high-quality development, testing, and collaboration by dividing the project into manageable units. By producing frequent builds and conducting testing and reviews during each iteration, quality is improved by finding and fixing bugs quickly and identifying expectation mismatches in the early stages of development.

4. **Transparency.** A unique opportunity for customers to be involved throughout the project process and monitor that the evolution is adopted at any phase of the process: from prioritizing features to iteration planning; from review sessions to frequent software builds within new features. On the other side, this requires customers to understand that they are seeing a work in progress in exchange for this added benefit of transparency.
5. **Early and Predictable Delivery.** A service, product or new features is delivered at a higher frequency with a strong level of predictability by using time-boxed and fixed schedule Sprints. This provides the opportunity to beta test the software earlier than it was scheduled if there is sufficient business value.
6. **Predictable Costs and Schedule.** The cost is limited regarding the amount of work team perform in fixed-schedule time because each Sprint is a fixed duration. Plus, the customer can more readily understand the approximate cost of each feature, in turn, it improves decision making about the priority of features and the importance of additional iterations.
7. **Allows for Change.** An opportunity to continuously improve and reprioritize the overall product backlog. Teams make changes in order to improve the effectiveness and efficiency of work. New or changed items of the backlog can be planned for the next iteration within the opportunity to introduce changes.
8. **Stakeholder Engagement.** Stakeholders and developers work closely every day. All stakeholders and team members must remain motivated in order to achieve optimal project results. As a matter of fact, for stakeholder and team engagement Agile provides multiple opportunities before, during and after each Sprint. That is why there exists a high degree of collaboration between the customer and the whole project team, which provides more opportunities for the team to fully understand the customer's vision.