**Experiment 1 :  Mapping Agile Development approach with Software Development.**

**Theory:**

**Agile refers to a set of principles and values in software development that emphasize adaptability, collaboration, flexibility, and iterative progress. The Agile methodology prioritizes delivering working software in small, frequent increments, enabling teams to respond effectively to changing requirements and customer feedback.**

**At its core**,**Agile is based on the Agile Manifesto, which outlines four key values and twelve principles that guide Agile development:**

**Agile Values:**

1. **Individuals and Interactions over Processes and Tools: Emphasizes the importance of teamwork, communication, and collaboration among team members rather than solely relying on tools or processes.**
2. **Working Software over Comprehensive Documentation: Prioritizes delivering functioning software that meets the customer's needs over extensive documentation.**
3. **Customer Collaboration over Contract Negotiation: Encourages continuous collaboration with customers throughout the development process to ensure the delivered product meets their requirements.**
4. **Responding to Change over Following a Plan: Embraces changes in requirements and priorities, allowing teams to adapt and respond to evolving needs.**

**Agile Principles:**

**The Agile Manifesto also includes twelve principles that guide Agile development, including:**

* **Welcoming changing requirements, even late in development.**
* **Delivering working software frequently, in short iterations.**
* **Business and development teams working together daily throughout the project.**
* **Building projects around motivated individuals and giving them the environment and support they need.**
* **Reflecting regularly on how to become more effective, then adjusting behavior accordingly.**

**Various Agile methodologies (such as Scrum, Kanban, XP, Lean, etc.) have evolved based on these Agile principles, offering specific frameworks, practices, and techniques to implement Agile principles effectively.**

**Agile methodologies promote adaptive planning, continuous improvement, collaboration, and customer involvement, enabling teams to deliver high-quality software products that meet customer needs while remaining responsive to changes in the development process.**

**What is Agile Methodology?**

**AGILE methodology is a practice that promotes continuous iteration of development and testing throughout the software development lifecycle of the project. Both development and testing activities are concurrent unlike the Waterfall model.**

**What agile development really is?**

**It is a collection of software development methodology which works on an iterative and incremental method building the software from the very initiation of the project development instead of building all the software at once. Agile discovers what the customer and how to build the codeand change things along the way.Agile works by breaking down the project into smaller chunks and then continuously delivering them in short two weeks cycles called iterations.**

**In an agile development process, solutions are obtained by self-organizing teams which collaborate, discuss, and constantly strive to improve their working process and become more effective in what they do.**

**Agile model believes that every project needs to be handled differently and the existing methodsneed to be tailored to best suit the project requirements. In Agile, the tasks are divided to timeboxes (small time frames) to deliver specific features for a release.**

**Iterative approach is taken and working software build is delivered after each iteration. Each buildis incremental in terms of features; the final build holds all the features required by the customer.**

**Here is a graphical illustration of the Agile Model −**

**The Agile thought process had started early in the software development and started becomingpopular with time due to its flexibility and adaptability.**

**What is Waterfall Methodology Project Management?**

**This is a sequential project management approach that includes some phases each covering a separate part of product development. As it is a sequential approach, so a new phase cannot be started before completing the previous phase, and due to this it is really hard to implement any changes after the phase has been completed so it is not suitable for complex projects.**

**Agile Methodology vs Waterfall Methodology in Project Management:**

| **Agile Project Management** | **Waterfall Project Management** |
| --- | --- |
| **Client input is required throughout the product development.** | **Client input is required only after completing each phase.** |
| **Changes can be made at any stage.** | **Changes cannot be made after the completion of a phase.** |
| **Coordination among project teams is required to ensure correctness.** | **Coordination is not needed as one team starts the work after the finish of another team.** |
| **It is really useful in large and complex projects.** | **It is mainly used for small project development.** |
| **The testing part can be started before the development of the entire product.** | **Testing can only be performed when the complete product is ready.** |
| **A Small team is sufficient for Agile project management.** | **It requires a large team.** |
| **The cost of development is less.** | **The cost of development is high.** |
| **It completes the project in comparatively less time.** | **It takes more time compared to Agile.** |
| **The Agile Method is known for its flexibility.** | **The waterfall Method is a structured software development methodology so it is quite rigid.** |
| **After each sprint/cycle test plan is discussed.** | **Hardly any test plan is discussed during a cycle.** |

**Conclusion:**

**Choosing between Agile and Waterfall methodologies depends on various factors such as project requirements, scope, customer involvement, and the level of flexibility needed:**

* **For Predictability and Stability: Waterfall may be suitable for projects with well-defined, stable requirements and clear project scope.**
* **For Flexibility and Adaptability: Agile is preferable for projects where requirements are likely to evolve, and rapid adaptation to change is crucial. It is especially effective in dynamic and uncertain environments.**

**In practice, many organizations adopt a hybrid or tailored approach that combines elements from both methodologies to leverage the strengths of each while mitigating their weaknesses. Ultimately, the choice between Agile and Waterfall depends on the specific needs, context, and objectives of the project or organization.**