Agile and Waterfall Project Management

580x Final Project

Introduction

- What is **project management**?
- A **project** is defined by timing, with specific deliverables to accomplish a larger goal
  - Important items: Scope, resources (people, instruments, programs, etc.)
- Management is a means to control the process and progress
  - Important items: Timing, communication, understanding
- **Project management is the combination of people and resources to deliver a project well and on time.**

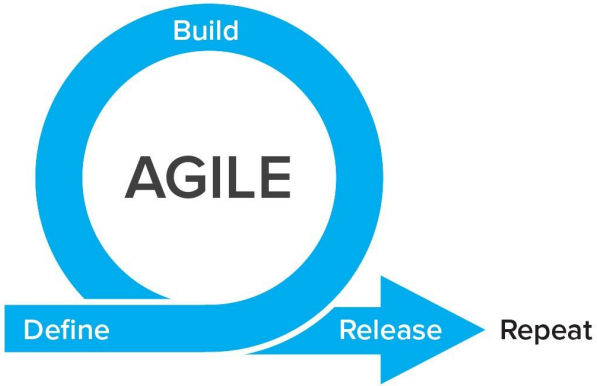
1. Initiating
2. Planning
3. Executing
4. Monitoring
5. Finish

Project Management Details

- Challenge: Deliver all specified criteria within relevant constraints
- Solution: Specific project management techniques for **project planning**, **resource allocation**, **time management**, and **performance monitoring**
  - Benefit: realistic objectives, strategy alignment, quality control, cost reduction
- Common project management styles
  - Agile
  - LEAN
  - Waterfall
  - WBS
  - GANTT chart
  - Critical path
  - Kanban
- Agile and waterfall techniques will be compared here as they highlight the importance of task timing/planning.

Agile Project Management

- Breaking down large projects into more manageable tasks, which are completed in parallel throughout the life cycle
    - Originally created for IT, but now used in many fields
    - Benefits: Work faster, adapt to changing project requirements, streamlined workflow, more opportunities to fail quickly with lesser consequence.
- **Key components:** work request, sprints (short task 1-3 weeks), daily meetings (short updates), progress board (like Kanban), backlog (future tasks to be added to sprints)
- **Team roles:** Scrum master (manage sprints, resolve issues, etc.), product owner (define the project goal, customer voice), team members (execute the sprint), stakeholders (provide feedback)



How to Apply Agile

1. Project planning
    a. What is the goal? What resources do we have?
2. Product roadmap
    a. What features does the final product need? What deliverables do we need to accomplish?
3. Release planning
    a. How to section sprint iterations? What is priority, and what is in the backlog?
4. Sprint planning
    a. Which team member will accomplish what?
5. Daily meeting
    a. What have we accomplished so far? What are our challenges?
6. Stakeholder discussion
    a. How did the sprints go? How did the team members work together?

Case Study

Making pasta dinner with a friend

1. **Project planning**
    a. Goal: Make dinner, Resources: Utensils, cookware, food, people, oven/stove/grill
2. **Product roadmap**
    a. Final product is cooked pasta dinner, to get there we need to prepare the utensils, cook the pasta, cut vegetables, make the sauce, serve, and clean up
3. **Release planning**
    a. Sprint 1: Prepare utensils, cut vegetables
    b. Sprint 2: Make the sauce, cook pasta, set the table
    c. Sprint 3: Clean dishes, clear table, refrigerate/dispose of extra food
4. **Sprint planning**
    a. Sprint 1: Friend A (utensils), Friend B (cut vegetables)
    b. Sprint 2: Friend A (make sauce and cook pasta), Friend B (set table)
    c. Sprint 3: Friend A (clean dishes), Friend B (clear table and handle extra food)
5. **Discussion**
    a. Discuss how to do better next time

Waterfall Project Management

- **Definition**: mapping out a project into distinct, sequential phases, with each new phase beginning only when the prior phase has been completed.
    - most traditional/straightforward method for managing a project
    - works best for projects with long, detailed plans that require one phase to be done before another can start (strong dependency)
- **Key components**: requirements, system design, implementation, testing, deployment, maintenance

How to Apply Waterfall

1. **Requirements**:
   - Analyze and gather all the requirements and documentation for the project.
2. **System design**:
   - Design the workflow model for the project.
3. **Implementation**:
   - The system is put into practice in this phase; this is the stage where things get built.
4. **Testing**:
   - Each element is tested to ensure they work as expected and fulfill the necessary requirements.
5. **Deployment** (in the case of a service) **or delivery** (in the case of a product):
   - The service or product is officially launched
6. **Maintenance**:
   - The team performs upkeep and maintenance on the resulting product or service.

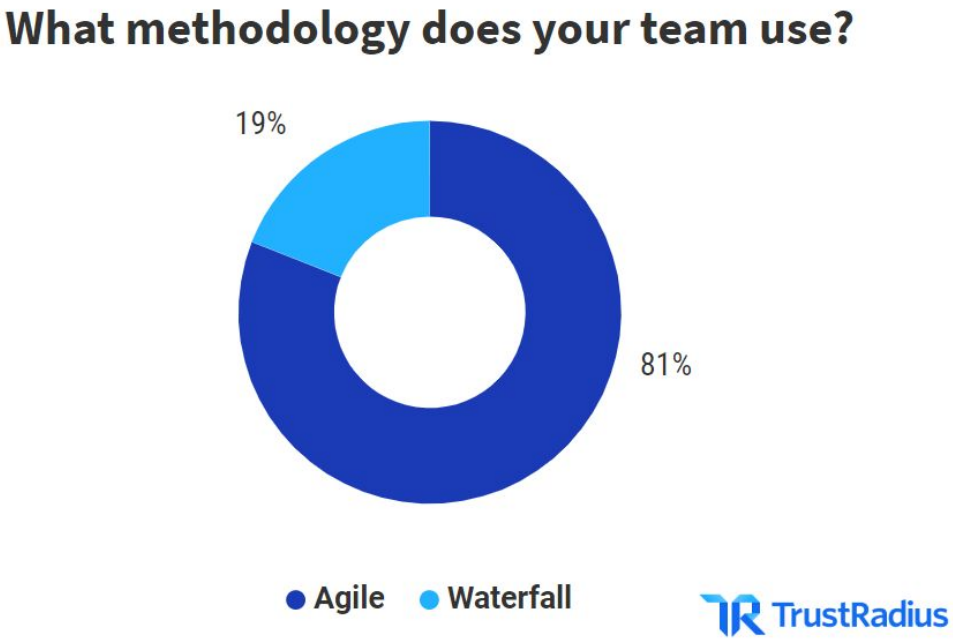
Case Study

Making pasta dinner with a friend

1. **Requirements**:
   - Goal: pasta dinner. Utensils, cookware, food, people, oven/stove/grill
2. **System design**:
   - Select a pasta recipe.
3. **Implementation**:
   - 1. Cut vegetables; 2. Make sauce; 3. Cook pasta; 4. Set the table;
4. **Testing**:
   - Taste food sample before taking the pasta to the table
5. **Deployment**:
   - 1. Have dinner; 2. Clean dishes; 3. Clear table; 4. refrigerate/dispose of extra food.
6. **Maintenance**:
   - Discuss how to do better next time

Agile vs Waterfall

2019 poll on TrustRadius.com:



Agile vs Waterfall

Agile	Waterfall
linear sequential model	continuous iteration
known for its flexibility	structured methodology
test after each iteration	Test after implementation
allows changes in project development requirement	no change once the project development starts

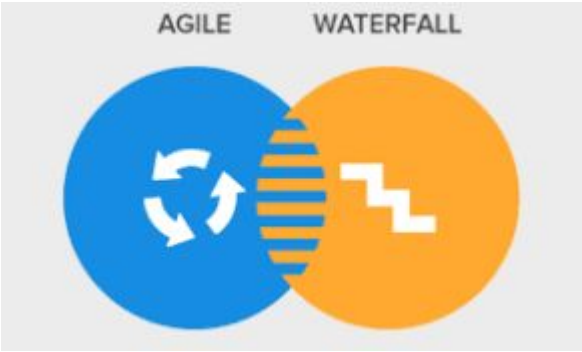
Choose Agile or Waterfall?

Agile

- when the client is uncertain about requirements
- when the client wants to be closely involved in the development process,
- if timelines are short and they want rapid delivery.
- when dependencies are minimal

Waterfall

- if there are complex dependencies



Try it out!

Discuss in small breakout rooms, how you would use agile or waterfall project management to plant a **new garden**?

- The garden should have new plantings, potted plants, and a brick wall
- Tools: New plants, soil, water, watering can, bricks, shovel, pots
- There are three friends planting the garden

Half of the groups use waterfall, and half use agile

Conclusion

- Two project management methods:
  - Waterfall is a linear sequential model
  - Agile is a continuous iteration of development
- Agile is more efficient, where applicable
- Waterfall is better when there are strong dependencies amongst tasks
- In our thesis work, a combination of the techniques can be used (project dependent)
- Consider how you might use these project management styles in your own work