"In Defense of Waterfall: Deconstructing the Agile Manifesto"

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In Defense of Waterfall
Deconstructing the Agile Manifesto

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Topics

• How did we get to agile?
• Critical analysis of the Agile Manifesto.
• Improving waterfall, using agile techniques.
How Did We Get To Agile?

• Once upon a time, software development processes were ad hoc ("cowboy coding").

Why Cowboy Coding Worked

• Simple.
• No overhead.
• Business user (product owner) communicated directly with the developer.
Why Cowboy Coding Failed

- No economy of scale.
- No coordination between requirements.
- Overwhelmed by complexity.
- Requirements were not correctly understood by the programmer.
- Devolved into code-and-fix.

Waterfall

- Structured and logical.
- A proven process for engineering projects such as construction that were thought to be analogous to software development.
- Promised predictability and control.
- Used the division of labor and specialization.
The Classic Waterfall Process

Waterfall: What Went Wrong

- The use of waterfall led to a series of expensive software development project failures.
- Several thought leaders in the field of software development identified fundamental flaws with waterfall.
Ken Schwaber

- Software development is too complex for defined process control.
- It requires empirical process control based on visibility, inspection and adaption.

Johanna Rothman

- It is impossible to forecast everything you need to know about the future.
- Serial life cycles predict the future, without having sufficient data to check that the future can be accomplished based on current work.
Mike Cohn

- Uncertainty is inherent and inevitable in software projects and processes.
- Planning by activity doesn’t work well.
  - Activities don’t finish early.
  - Lateness is passed down the schedule.
  - Activities are not independent.

Craig Larman

- We want the requirements to be stable, but they aren’t.
- The waterfall aggravates complexity overload and analysis paralysis.
- Predictive planning is only suitable for low change, low complexity projects.
Michele Sliger and Stacia Broderick

- The tasks involved with building software, day to day, cannot be predicted and certainly are not repeatable.
- Attempting to predict task-level detail in such mayhem is waste, and formulating a date off of this flawed prediction is setting up a project team for failure.

Agile: The Solution

- A consensus emerged that waterfall methods for software development were fundamentally flawed.
- Agile (incremental, iterative) methods emerged.
- The Agile Manifesto brought together many leading thinkers and advocates.
The Agile Manifesto

• We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value:
  – Individuals and interactions over processes and tools.
  – Working software over comprehensive documentation.
  – Customer collaboration over contract negotiation.
  – Responding to change over following a plan.
• That is, while there is value in the items on the right, we value the items on the left more.

Reality Didn’t Match Theory

• I managed a series of projects using waterfall that were successful.
  – The notable failure had an ill-conceived business case and unrelated to methodology.
• I managed a project using agile and it was not particularly successful.
• What could explain these results?
Let Me Ask You

• In your experience, what are the root causes of successes and failures:
  • Using cowboy coding?
  • Using waterfall methodologies?
  • Using agile methodologies?

The First Explanation

• I’m an old school project manager too tied to my PMI/PMBOK®/PMP® view of the world.
• I don’t think so.
  – I was and remain an advocate for the adoption of agile in my organization.
  – Michele Sliger and Stacia Broderick have shown that there is no contradiction between PMI/PMBOK®/PMP® and agile.
  – This would explain the failure of the agile project but not the success of the waterfall projects.
Agile Manifesto vs. Reality

• Principle behind the Agile Manifesto: Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.

• Reality
  • Commitments often are made without the input of the project team.
  • Changing requirements mean that commitments cannot be kept.

Agile Manifesto vs. Reality

• Principle behind the Agile Manifesto: Business people and developers must work together daily throughout the project.

• Reality
  – The top priority of business people is their “day jobs”.
  – Their contact with the project team is sporadic.
Agile Manifesto vs. Reality

• Principle behind the Agile Manifesto: Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.
• Reality:
  – Most project team members are multi-tasked (sad but true!).
  – Shared services have long lead times to service requests.

Agile Manifesto vs. Reality

• Principle behind the Agile Manifesto: The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
• Reality
  – Virtual teams preclude routine face-to-face conversation.
  – Technology does not provide the full benefits of face-to-face communications.
Agile Manifesto vs. Reality

• InfoWorld columnist Bob Lewis claims that agile methods and offshore development are incompatible.
  • Sensory limitations.
  • Interface distractions.
  • Time zones.

Agile Manifesto vs. Reality

• Principle behind the Agile Manifesto: The best architectures, requirements, and designs emerge from self-organizing teams.

• Reality
  – Project team members are assigned, not chosen by the project manager.
  – Project teams must work with who they have, not who they want.
  – Some people can’t or won’t self-organize.
The Waterfall Manifesto 😊

• No software development methodology is an panacea.
• All methodologies are based on certain underlying premises that are not necessarily correct in all circumstances.
• Waterfall is appropriate for certain projects, and can be improved with concepts from agile.

When May Waterfall Be Appropriate?

• Firm commitments exist to deliver specified scope by a specified date.
• The requirements are well-defined and stable.
• The solution is well-defined and has low risk.
• Organizational issues:
  – 50% of people are below average.
  – Geographically-distributed project team.
  – Multi-tasked (time-sliced) project team members.
  – Extensive external dependencies.
The Benefits of Waterfall

- The project team calculates what it needs to meet imposed commitments.
- Business people know when they must participate in the project and what is the effect if they do not participate when scheduled.
- Multi-tasked team members can plan their participation in ways that allow them to meet their multiple commitments.
- Reduced dependence on face-to-face communications.
- It gives specific tasks that must be completed by specific dates to people who are not self-starters.

Devising a Better Waterfall

- That the principles underlying the Agile Manifesto are not always valid does not mean that the critiques of waterfall are invalid.
- The tools of agile can be selectively applied to improve waterfall.
#1 Develop in Iterations

- Break projects into smaller iterations (preferably 1-3 months duration).
- The sum of the iterations is the total scope of the project.
- Smaller iterations are easier to estimate, plan and understand.
- Smaller iterations reduce risk.
- Each of the smaller iterations can be a waterfall.

#2 Rolling Wave Planning

- Also known as progressive elaboration.
- Near-term project activities are planned in great detail.
- Farther out in time, tasks are only defined in at high level.
- Rolling wave planning is a natural complement to developing in short iterations.
#3 15 Minute Daily Meeting

- Identical to the Daily Scrum.
- Agenda:
  - What have you done since last meeting?
  - What do you plan on doing between now and the next meeting?
  - What impediments to progress are you facing?
- Conducted as a conference call for geographically distributed teams.
- Particularly useful for geographically distributed teams which cannot benefit from informal “over-the-cubicle” communications throughout the work day.

#4 Customer Involvement

- Full-time involvement by what Scrum calls a Product Owner is desirable but often is not going to happen.
- Even so, the more customer involvement the better.
- Develop requirements with customers in a face-to-face meeting that has both customers and the project team.
- User Stories in combination with user interface mockups are a much better way to obtain customer input to requirements than traditional “the system/application shall ...”.
- Set up an extended project team that includes customers. Keep them in the loop and consult them when required.
Face-To-Face Communications

• For distributed teams, face-to-face communications implies costly (in time and expenses) travel.
• Face-to-face meetings are still the best way to conduct highly interactive communications.
• Have one face-to-face meeting per iteration, focusing on requirements, conceptual design and project planning.

Collaborative Planning

• Top-down “command and control” project management is not a characteristic of waterfall, it is a characteristic of bad project management.
  – … the involvement of all team members in project planning and decision making can be beneficial.
  – Early involvement and participation of team members adds their expertise during the planning process and strengthens their commitment to the project.
Collaborative Planning

• When planning a project, a project manager’s primary roles are facilitator and integrator.
• A project plan created without the input (and therefore the expertise and buy-in) of the people who will execute the plan is likely to fail.

What Works for You?

• Are there any other techniques that you have successfully used to improve waterfall?
• Place stickers on the chart to vote for the techniques that you think are most important.
  – 5 stickers per participant.
  – Place 0-5 on each technique (total of five).
  – After the stickers are placed, they will be counted.
Pick The Right Tool for the Job

• The problems with waterfall are real. For most projects, agile is a better methodology.
• Agile is valuable but not a panacea. The necessary conditions for the application of agile are not always present.
• Waterfall can be a viable alternative to agile in some circumstances.
• Waterfall can be improved by the use of certain techniques usually associated with agile.

Thank You For Coming

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Resources