

Staying Cutting Edge Without Bleeding

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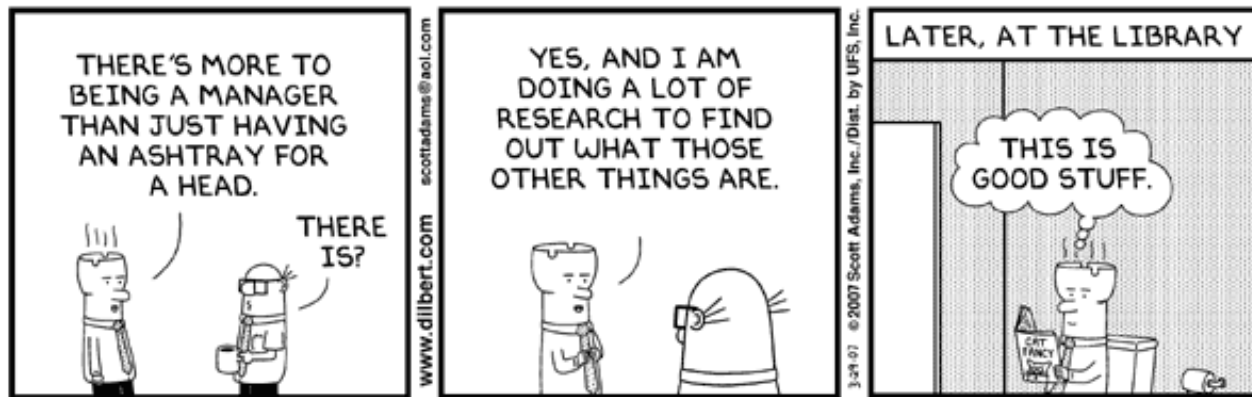


Agenda Review

- Three Stages of Technology Adoption
 - Strategies for dealing with each phase
 - Representative HMS cases
- Embedding Technology Research into the SDLC
- The Human Element



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The Three Stages for Adopting New Technologies

- **Awareness**
 - Hear about a new technology for the first time
 - Make decision to explore deeper
- **Exploration**
 - Validate using functional prototypes
 - Determine potential risks and potential ROI
- **Implementation**
 - Rollout through full development cycle



Ask Introspective Questions

- Where does my organization fit on the technology adoption curve
 - Innovator, Early Adapter, Early Mainstream, Late Mainstream, Laggard?
 - What risk am I comfortable with?
 - How self-supporting am I comfortable being?
- How will my team handle new technology?
 - What are my teams strengths and weaknesses?
 - How much time can I budget for research and implementation of new ideas?
- Where is the future of my organization?
 - Where does are CEO see the company going?
 - Where are my competitors going?
 - Where are my vendors going?



Ask Specific Questions of a Technology

- Is the technology evolutionary or revolutionary?
- Is this a fad or a trend?
- Are there competitive technologies?
- Is there a community around it?
 - Is the community diverse?
 - Would I fit in the community?
- What do I hope to learn from diving deeper?
 - Will it lead to a better way to solve a current problem?
 - Will it allow me to start delivering new solutions?



Answering these Questions at HMS

- **Introspective questions**
 - Early Adopter willing to deal with choppiness from technology to gain a competitive advantage
 - Talented Java developers, weaker in dynamic languages and relational databases
 - Moving from batch to real-time, from small to medium size organization
- **Ruby on Rails**
 - Purported speed in development potentially revolutionary
 - Decided it was worth prototyping
- **Java 5.0**
 - Mostly evolutionary improvements, with some very interesting implications
 - Clearly the forward direction of the industry
- **Kettle (Open Source ETL) from Pentaho**
 - Replacement over current transformation libraries
 - Evolutionary improvements, large switching cost, small community
 - Decided against prototyping



Techniques for Improving Awareness

- **Personal Awareness**
 - Budget time for looking at new technologies
 - Keep an inventory of interesting ideas
 - RSS feed aggregators are great
 - Do not be afraid to revisit old ideas
- **Team Awareness**
 - Make it a point of continuous learning during evaluations
 - Listen to where the employee may have an interest
 - Suggest resources that may be interesting
 - Foster communication
 - Technology mailing list for circulating interesting discoveries
 - Internal development wiki and blog



Defining Success for a Research Project

- Research Success is different the Development Success
 - Research Success = We learned something
 - Development Success = We shipped
 - Sometimes the best lesson is that we should NOT use a technology
- Always remember to debrief after a research prototype
 - Presentations to the team
 - Documentation of the effort and results



Techniques for a Successful Research Project

- **Select personnel for implementation**
 - Should have a clear interest in learning the technology
 - Must understand that this is research and not regular development
- **Define the goals of the prototype**
 - Create goals that can prove benefits and highlight risk
 - Define tasks around a short (1-2 week) iterative development effort
- **Modification of the goals is fine, but fear scope creep**
- **Review the findings**
 - Discuss proven benefits of the technology and potential implementation strategies
 - Encourage honest assessments
 - Lunch and Learns help educate the whole team and allow for recognition for the contributors



Some Recent Research Efforts at HMS

- **Ruby On Rails**
 - Built internal web-based tool using the framework
 - Found technology interesting but did not pursue further
- **JBoss Seam**
 - Reimplemented GUI for existing application
 - Decided not to use Seam, but did take advantage of EJB3
- **Maven 2.0**
 - Migrated one project to Maven 2.0
 - Decided to incrementally transition other projects



Best Practices for Implementation

- Define, Communicate, and Evaluate Risk
 - Inform stakeholders of the risks and rewards
 - Determine strategies for mitigating risk as early as possible
- Develop with a safety net
 - Do not depend on a single developer to understand the technology
 - Have a fallback plan if the technology fails
- Adhere to the “one new technology at a time” rule
- Budget for the learning curve in the development plan
- Be prepared to provide additional support time
- Develop next steps at conclusion
 - Honest debriefing
 - Determine how technology be applied to other projects



HMS Implementation Examples

- **Java 5.0**
 - Began using compiler on one project
 - Extended to use Java 5.0 features
 - Branched common libraries
 - Migrated all applications to Java 5.0
- **MapReduce distribution framework**
 - Focused on one project
 - Successful prototyping
 - Clear tests and bailout points



Technology Research in the Development Process

- Lessons From Peopleware (DeMarco & Lister)
 - *Constructive reintroduction of small amounts of disorder*
 - “...pilot projects, projects that try out any modified approach, tend toward higher-than-average net productivity”.
 - “Don’t experiment with more than one aspect of development technology for any one given project”
- Research not restricted to software libraries
 - New Software Development Processes
 - Hardware/Infrastructure enhancements
 - Tools and languages
- Involve the entire team
 - Software Developers
 - System Administrators and DBAs
 - Project Managers and Business Analysts
 - QA



How HMS Technology Stays Cutting Edge

- Senior management makes basic research a part of the technology teams objectives
- Ideas come from all over the organization
 - Executives
 - Technology
 - Sales & Marketing
 - Operations
- Every member of the team will get a chance to work on a research project
- The software team believes that every release should add a new tool to the HMS toolbox



Best Practices for Managing Research Personnel

- Try to match new technology with people who are passionate
- Rotate employees between research and development projects
 - Reduces conflict
 - Enhances knowledge transfer
- Create well-defined timelines and goals for all research projects
- Let the researcher be creative in the solution
- Give credit where it is due



Some Common Political Challenges

- New technology threatens the status quo
 - People may feel their job or area of expertise is at risk
 - Mitigation Strategies
 - Be inclusive; make research a core part of everyone's job
 - Communication of intent and results to stakeholders
- Staff feels left out of “fun” technology
 - Mitigation
 - Make sure people rotate through
 - Always have one “fun” thing ready for each employee
- Executive Management does not see ROI on “failed” research projects
 - Mitigation
 - Fail fast
 - Celebrate success
 - Make clear that research is an essential part of the SDLC



Conclusions

- Integrating new technology into the SDLC produces better teams and better products
- Remember that research and development have different success criteria
- Add a tool to the toolbox on every project

