

How to Avoid I Never Would Have Thought of That?

The Joys and Sorrows of Diverse Teams

Rebecca Parsons
Chief Technology Officer
ThoughtWorks

Hypothesis

- Software development, in that it is partially about problem solving, benefits from a diversity of perspectives on the development team.
- This diversity of perspective includes the following aspects:
 - Cultural
 - Gender
 - Intellectual
- Exploiting this diversity requires strategies for balancing the need for efficiency with the need for innovation and creativity.

STATING THE OBVIOUS

- I can't know really what things are like in situations I can not be in ...
 - Paraphrasing a male colleague "You have no idea how miserable all male teams can be".
 - How many Europeans in particular do not understand the racial dynamics in the US
 - How many Americans in particular do not understand the relationship between the English and the French
 - How many people in resource poor countries do not understand the notion of veterinary care for pets
 - How I will never know what it feels like to win an Olympic medal ... in anything, play in a world cup, etc. etc. ☺

- I can't solve a problem or resolve an issue with a tool, technique, or process that I don't know about or with a skill I don't have.
 - I have no idea how helpful, say, quantum mechanics might be to me
 - I might eventually be trained to get something useful out of pictures
 - I seriously doubt I can ever really learn to draw
- Unlike the previous list, I can potentially do something about these – I can learn.

- I can't understand someone who is talking in a language I don't understand.
 - How many definitions of “vector” can you list?
 - I can barely understand Spanish. I am hopeless in any other languages except perhaps English.
- Again, I can improve on this.

SOME EXAMPLES WE CAN LEARN FROM

The Structure of Scientific Revolutions

- A scientific discipline includes
 - A vocabulary
 - A view of what constitutes appropriate problems to explore
 - A set of tools, methods and approaches to problems in the discipline
- Paradigm shifts occur when a sufficient weight of data contradicting current theories accumulates
- Very often the new organizing theory comes from individuals outside the discipline or new to the discipline
- ... not surprising, since individuals in a given discipline are trained in the same vocabulary, tools, and approaches.
- Plate tectonics is a classic example (training in Astronomy and Biology).

What about assumptions?

- Disciplines have a set of accepted facts, but these can change across paradigms.
- Within a discipline, scientists may not realize the extent of the assumptions underlying their problem solving.
- While disciplines are forming or re-forming, problem solving reverts (close to) first principles. Everything must be described and defined because there is no shared base of assumptions.
- Stereotypes and analogies serve a similar purpose to assumptions.
- Justifying their use and documenting when the situation deviates from the stereotype can help mitigate the risks arising from improper assumptions.

Inter-disciplinary teams

- Computational chemistry, mathematical biology, computer animation
- All these draw from diverse intellectual traditions
- Becoming increasingly common
- There's much software developers can learn from these teams

And what about Genetic Algorithms and Programming?

- Genetic algorithms/programming
 - Characterize the desired outcome and then evolve the program
 - Evolution through selection, mutation and crossover operators
 - Careful design of the objective function can remove biases
 - Some evidence that pre-seeding answers has a negative impact
- Genetic algorithms/ programming examples
 - Wing design
 - Core quantum computations
- Both cases resulted in counter-intuitive solutions

ALL THESE APPLY TO TEAMS AS WELL

- We have different roles on teams for a reason.
 - Different activities require different skills – we get this part.
 - Even in the case of the more generalist Agile teams.
- We use different approaches for different problems.
 - Trying to reason with an adult is much more effective than trying to reason with a two year old.
- So how can we use these observations to improve productivity of software development teams?

Inter-disciplinary Research

- Inter-disciplinary research highlights the need for patience in resolving differences in vocabulary.
- True inter-disciplinary research is about advancing the scientific understanding of both disciplines through the collaboration, not just using computers to solve a biology problem.
- Conclusion: the different perspectives are peers in these collaborative teams.

Evolutionary Computation

- Genetic algorithms' and genetic programming's successes provide evidence that well-defined success criteria that do not imply implementations can result in novel solutions.
- Seeding the solution too early dramatically limits the search time but can also lead to local optima.
- The diversity of perspective and background of the team are analogous to the function the genetic operators play in genetic programming.
- Brainstorming and good team collaboration provides the equivalent of the environmental interaction.

Scientific Revolutions

- Scientific disciplines work because they have a shared context
- Innovation often results in the absence of too much shared context
- We must balance the efficiency of problem solving within a shared context with the creativity and inspiration arising from its lack
- The distance between the perspectives should not be too wide
- Conclusion: Team composition should reflect the problem dynamics

Hypothesis

- Software development, in that it is partially about problem solving, benefits from a diversity of perspectives on the development team.
- This diversity of perspective includes the following aspects:
 - Cultural
 - Gender
 - Intellectual
- Exploiting this diversity requires strategies for balancing the need for efficiency with the need for innovation and creativity.

Conclusion

- Characteristics to consider on teams:
 - Nature of problem to be solved
 - Degree of Innovation needed to solve the problem
 - Representation of diverse perspectives present
 - Past team history
- Resulting teams are fun places to be!

Questions?

<http://www.thoughtworks.com>

Click to edit Master text