Learning From Experience

Learning goals:

1) Typical learning problems when learning from experience. What you should be aware of when using experience-based evidence.
2) Better ability to design your own study.

ORGOL (ORGanizational OverLearning)

- A strong wish to learn from (e.g., painful) experience is not always connected with environments that enables learning
  - F. I. Steele: Organizational overlearning, Journal of Management Studies, 1971.

- **Exercise**: Sometimes the learning itself makes the learning less relevant. Why?

Theory-Loaded Observations

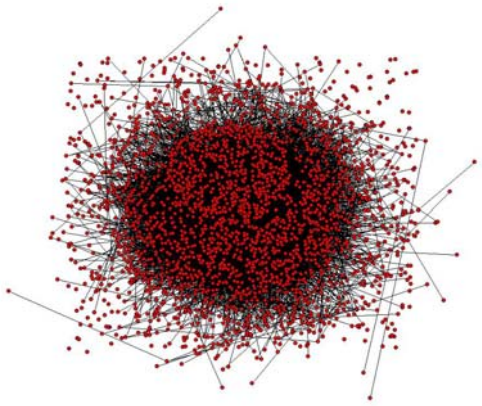
- We see what we expect to see.
- If a project fails, and we strongly believe in the method (e.g., agile methods), we emphasize the events that support our belief in the method.

“We won” - “they lost”

- Most of us sincerely believe that successes are mainly caused by of our own skill, and failure by external problems.
- In a study of IT-projects we found that software developers systematically provided reasons outside their own control (as bad luck or clients’ lack of competence) to explain failures, and events they controlled to explain success.

Complex World

- The isolation of simple cause-effects is frequently not meaningful.
- Those who are good at something will frequently not know why they are good at it.
- **Exercise**: Why not?



Surface Learning

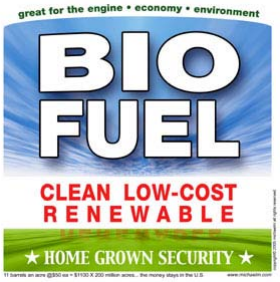
- In a study of reasons for estimation errors reported in experience reports we found that most people provided direct reason, and nothing else.
  - It was, for example, typical to state that ”unexpected events” were main reasons for effort overruns.
  - Unexpected events in IT-projects should however not be unexpected. To learn we need to look for deeper causes (systemic reasons), e.g., reasons why the organizations did not expect that something unexpected may have happened.
- We can learn much from children regarding learning. Why?

Poor ability to Identify Randomness

- HOT HAND?
  - "*Basketball players and fans alike tend to believe that a player's chance of hitting a shot are greater following a hit than following a miss on the previous shot. However, detailed analyses of the shooting records of [reference to several studies and a controlled shooting experiment] provided no evidence for a positive correlation between the outcomes of successive shots.*" (Gilovich, COGNITIVE PSYCHOLOGY 17, 295-314, 1985)
- When tossing a coin it must be about 70% probable to swich from head to tail (and vice versa) to make the sequence look random.
  - Clusters of failures, successes, same side of the coin, etc. are natural consequences of random processes. To know what is random and what is a system, is not easy.
- It is, for example, very unlikely that errors will be distributed equally on modules and classes, even if there are no underlying "system".

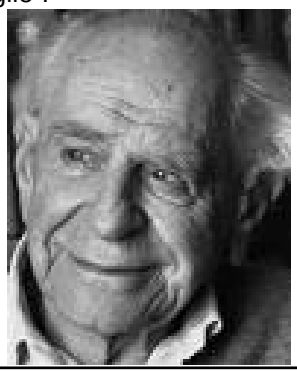
Hindsight Bias

- When we know that an IT-project has failed, will will be biased to think that "it had to end like this" and that we knew it all along.
  - We easily forget that we actually thought that the component could be used more "as-is".



Verification Bias

- We are not very good at falsifying our beliefs. Studies show that we have a strong confirmation bias, and that we are poor at identifying or searching for events and interpretations that weakens what we believe. This leads to a strong belief in incorrect interpretations.
- If we strongly believe that agile methods work, every positive event will strengthen this belief and every negative event will not be emphasized or explained as not real “agile”.



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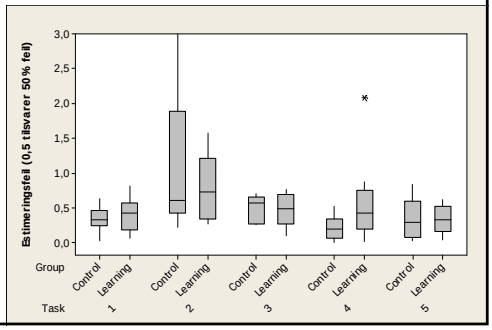
Learning About Learning

- Results from my own study:
  - 20 experienced software developers, randomly allocated a “Learning group” and a “Control group”. All of them estimated and executed the same five development tasks.
  - Those in the “Learning group”, but not those in the “Control group” were instructed to use at least 30 minutes to identify, analyze and summarize experience and learning after each task.
  - Surprisingly, those in the “Learning group” did worse than those in the “Control group” on estimation and uncertainty assessment.
  - **An example of over-learning?**



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Evaluating Learning From Experience

Control questions:

- How can the “expert” know?
- How learning friendly is the environment?
- Is the learning supported by evidence from other sources?
  - Hard data?
  - Other people?
- Would another perspective lead to other results
- How critical is the person to his/her own learning?
- How deep is the learning? Only direct causes?
- Is the interpretation dependent on the degree of success and failure?

Design your own study ...

- Pair programming-study