Chapter 18

Exploratory Testing

Exploratory Testing

- Explore: to investigate the unknown
- "The opposite of scripted testing"—James Bach
- More than *ad hoc* testing
- Shares some pros and cons with Special Value Testing
- Depends on the abilities of the exploratory tester
  - Curiosity
  - Ingenuity
  - Time and tools
- A discovery process
- A learning process in which the results of one test suggest additional tests
- We will explore Exploratory Testing with an example.

James Bach's Exploration Mindset

"I run a test.

I MAKE AN OBSERVATION...

- I experience surprise associated with a pattern within an observation.

That triggers REFLECTION about PLAUSIBILITY...

- The pattern seems implausible relative to my current model of the phenomenon.

That triggers REFLECTION about RISK...

- I can bring to mind a risk associated with that pattern.

That triggers REFLECTION on MAGNITUDE OF RISK...

- The risk seems important.

That triggers TEST REDESIGN... "

Exploratory Testing Dynamics

Created by James and Jonathan Bach v1.2

Chartering. Making your own decisions about what you will work on and how you will work.

Manipulating. Making and managing contact with the object of your study; configuring and interacting with it. Designing experiments and establishing lab procedures.

Observing. Gathering empirical data about the object of your study; collecting different kinds of data, or data about different aspects of the object. Designing experiments and establishing lab procedures.

Modeling. Composing, describing, and working with mental models of the things you are exploring. Identifying relevant dimensions, variables, and dynamics. A good mental model may manifest itself as having a "feel" for the product; intuitively grasping how it works.

Conjecturing. Considering possibilities and probabilities. Considering multiple, incompatible explanations that account for the same facts.

Exploratory Testing Dynamics

Created by James and Jonathan Bach v1.2

Questioning. Identifying missing information, conceiving of questions, and asking questions in a way that elicits the information that you seek.

Recording. Preserving information about your process, progress, and findings.

Reporting. Making a credible, professional report of your work to your clients in oral and written form.

Pairing. Working and thinking with another person on the same problem.

Resourcing. Obtaining tools and information to support your effort. Exploring sources of such tools and information. Getting people to help you.

Refocusing. Managing the scope and depth of your attention. Looking at different things, looking for different things, in different ways.

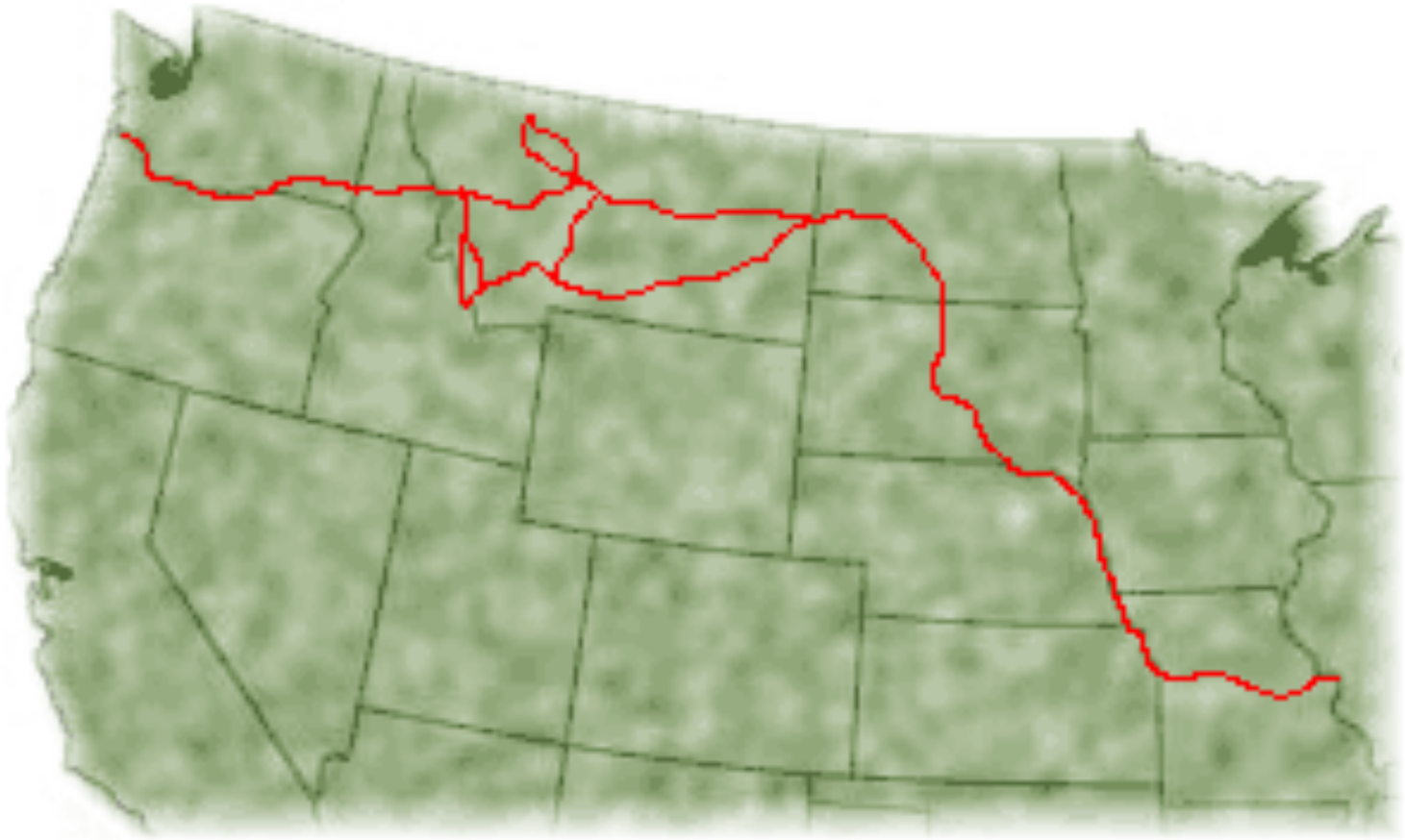
Branching/Backtracking. Allowing yourself to be productively distracted from one course of action in order to explore an unanticipated new idea.

Generating/Elaborating. Working quickly in a manner good enough for the circumstances. Revisiting the solution later to extend, refine, refactor or correct it.

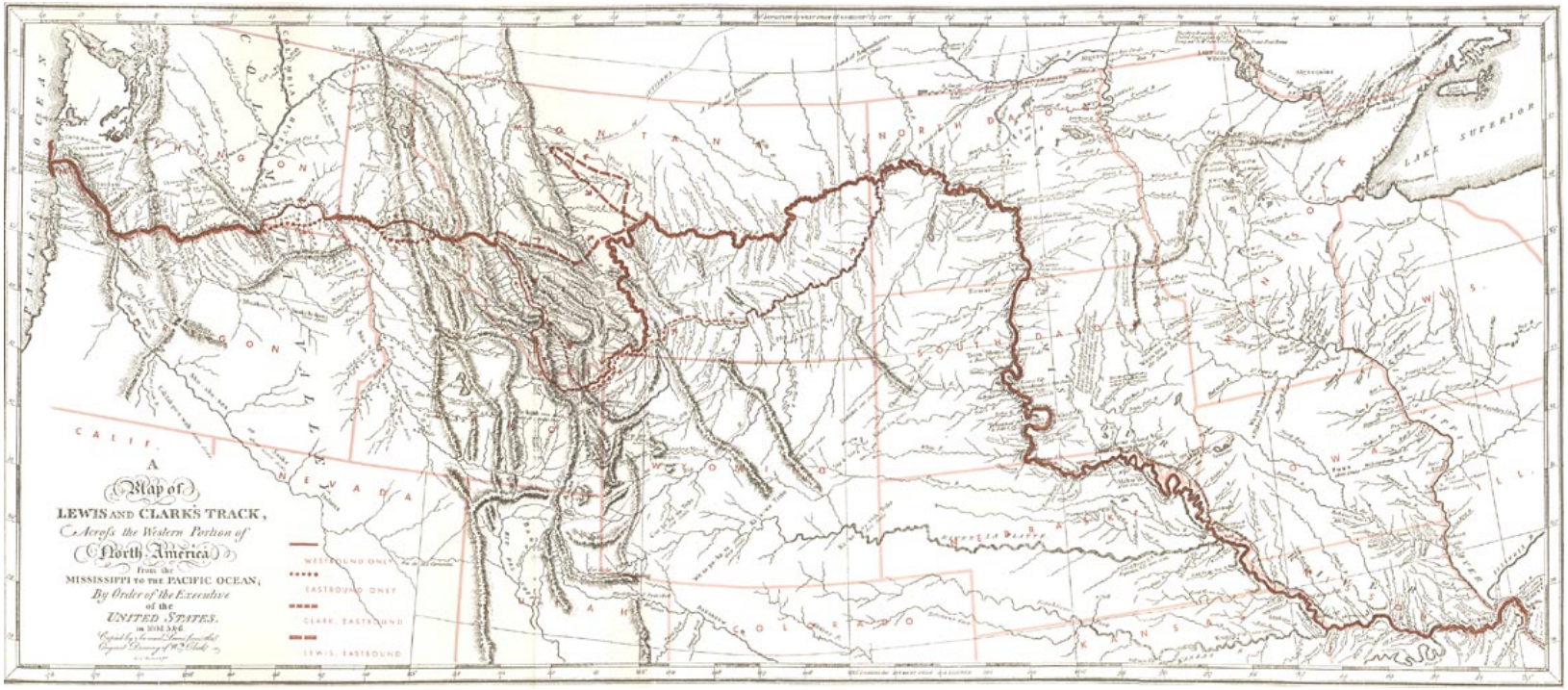
Alternating. Switching among different activities or perspectives to create or relieve productive tension and make faster progress.

Lewis and Clark Expedition

Lewis and Clark Expedition



Lewis and Clark Expedition



Exploration

- Clear goal/purpose
- Necessary equipment
- Necessary talent
- Curiosity
- Discipline.
- Flexibility
- Determination

Exploring the Commission Problem
Lock, Stock, and Barrel

In the Commission Problem, a rifle salesman in the old American West sells rifles, either as a whole, or in the three parts, the lock, the stock, and the barrel. Prices are:

Locks:	$45
Stocks:	$30
Barrels:	$25
Complete Rifle:	$100

The salesman's commission is computed on a sliding scale:

10% on the first $1000 of total sales
15% on sales from $1001 to $1800
20% on sales over $1800

Recognition of a Fault

- In the first few months, the salesperson never exceeds $1000 in sales, and the commission is correct. When sales finally reach the 15% level, however, the salesperson's commission is less than expected. And one month, when sales reached $1900, the commission was slightly more than expected.
- If the salesman had a spreadsheet, he might have tried out some possible sales…

- exploreCommission.xls

The First Exploration

case #	locks	stocks	barrels	sales	Expected commission	Computed commission	Pass ?	Expected less Computed
1	1	1	1	$100	$10	$10	pass	$0
2	8	8	8	$800	$80	$80	pass	$0
3	10	10	10	$1,000	$100	$100	pass	$0
4	11	11	11	$1,100	$115	$100	fail	$15
5	17	17	17	$1,700	$205	$190	fail	$15
6	18	18	18	$1,800	$220	$205	fail	$15
7	19	19	19	$1,900	$240	$260	fail	($20)

The Exploration Begins

- The rifle salesman knows the computation involves four business rules:

  sales = $45*locks + $30*stocks + $25*barrels
  commission = 0.10*sales (for $0 <= sales <= $1000)
  commission = $100 + 0.15*(sales - $1000)
  (for $1000 < sales <= $1800)
  commission = $220 + 0.20*(sales - $1800)
  (for sales > $1800)

- The sales calculation is correct, but could there be offsetting errors in the coefficients?

The Second Exploration

Try calculating with one variable at a time.

case #	locks	stocks	barrels	sales	Expected commission	Computed commission	Pass Fail?	Expected less Computed
8	10	0	0	$450.00	$45.00	$45.00	pass	$0.00
9	0	10	0	$300.00	$30.00	$30.00	pass	$0.00
10	0	0	10	$250.00	$25.00	$25.00	pass	$0.00

Looks OK. No problem with the coefficients, so Equation (1) is being computed correctly. The salesman already knows that equation (2) is also being computed correctly. Time to explore equation (3).

The Third Exploration

case #	locks	stocks	barrels	sales	Expected commission	Computed commission	Pass/ Fail?	Expected less Computed
11	21	0	2	$995.	$99.50	$99.50	pass	$0.00
12	21	1	1	$1,000.	$100.00	$100.00	pass	$0.00
13	21	2	0	$1,005.	$100.75	$85.75	fail	$15.00

Aha! the only thing wrong with equation (3) must be the amount subtracted from sales. Solving equation (3) with the computed and expected commission:

(3 expected) $100.75 = $100 + 0.15($1005 - $1000)

(3 computed) $85.25 = $100 + 0.15($1005 – x),

x = $1100

Not Finished Yet

There is a remaining fault. Look at test case 7, in which the salesman receives too much commission. You can try exploratory testing with the exploreCommission.xls spreadsheet.

A Lawyer Explores…

(supposedly an excerpt from an actual trial)

- In a murder trial, the defense attorney was cross-examining the coroner:
- Attorney: Before you signed the death certificate, had you taken the pulse?
- Coroner: No.
- Attorney: Did you listen to the heart?
- Coroner: No.
- Attorney: Did you check for breathing?
- Coroner: No.
- Attorney: So, when you signed the death certificate, you weren't sure the man was dead, were you?
- Coroner: Well, let me put it this way. The man's brain was sitting in a jar on my desk. But I guess it's possible he could be out there practicing law somewhere.

Observations and Conclusions

- Exploratory testing requires discipline
- Not an *ad hoc* activity
- Documentation, especially of intermediate results, is valued
- Allows a tester to focus on “deep” faults
- Can be extremely effective
- Can be extremely efficient
- Very dependent on the tester

Good Enough Testing

"I want to distinguish the Good Enough approach from the approach that says that we should keep testing until Management pries the product from my cold, dead fingers."

--James Bach

"Good Enough testing is the process of developing a sufficient assessment of quality, at a reasonable cost, to enable wise and timely decisions to be made concerning the product."

Bach's Principles of Good Enough Testing

- Assess product quality
  - How accurate/complete is the testing?
- Evaluate the cost of testing
  - Within budget?
  - Any redundancy? Unnecessary testing?
- Determine whether testing supports necessary decision making
  - Risk?
- Are testing results timely?
  - Point of diminishing returns.