SYMBIOTIC RELATIONSHIPS BETWEEN TESTING AND ANALYTICS

KEYNOTE @NORDIC TESTING DAYS CONFERENCE 06 JUNE 2013

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SYMBIOSIS

A relationship between multiple entities

3 main types of symbiosis

1. Parasitism: one \textit{benefits}, the other \textit{suffers}

2. Commensalism: one \textit{benefits}, the other is \textit{unaffected}

3. Mutualism: \textit{both benefit}

The Zebra has good eyesight and Wildebeest a good sense of smell

Between them they detect predators early and protect one another
SOURCES OF FEEDBACK

• For our software
• For our testing
• For the development

When do we get the feedback?
And how good is it?
SYMBOIOTIC RELATIONSHIPS BETWEEN TESTING AND ANALYTICS

ANALYTICS
WHAT IS ANALYTICS?

Statistics + Computer Science + Operational Research, leads to: actionable insights

http://www.google.com/analytics/
ANALYTICS


• Developers add code to send extra data over the network
• Third-parties often provide the libraries
• May impact privacy
• May include crash-reporting

[1] http://www.wired.co.uk/magazine/archive/2012/01/features/test-test-test
THIRD PARTIES

What does the user get from this equation?

Reporting for us

Data to unknown third-parties

Revenue for the Analytics provider
Overview of Mobile Analytics
Each step may be delayed
TYPES OF EVENTS

Mobile app ➜ Analytics Library ➜ Analytics Collector

Internet connection

1:1 App-initiated event

m:1 App-initiated event

Library-initiated event

E ➜ E ➜ E ➜ E

E^1 ... E^4 ➜ E^a ➜ E^a

L ➜ L

Analytics Database
Often linked to experiments, e.g.

- A/B Testing[1][3]
- Multivariate Testing[2]

Similar to:

[1] One Factor at A Time (OFAT)
ANATOMY OF A CONTROLLED EXPERIMENT

Control: Existing System

Treatment: Existing System with Feature X

Users interactions instrumented, analyzed & compared

Analyze at the end of the experiment

Diagram courtesy of Keith Stobie
A/B TEST

Visitors Randomly Distributed

Version A (Control)

Type Title

Signup Here

Version B (Treatment)

Title of Page

Signup Here

Click Thru Rate

CTR

1.2% of users with a Page View clicked on Signup

User interactions instrumented, analyzed and compared

Is the observed difference statistically significant?

YES

Version B is better than Version A

Figure courtesy of Seth Elliot from his SASQAG (Seattle Area Software Quality Assurance Group) April 2011 Talk Testing in Production - Your Key to Engaging Customers

Testing in Production -- Keith Stobie

http://www.pnsqc.org/past-conferences/
WHAT SHOULD WE MEASURE?

- **Performance**
  - Time taken
  - Resource consumption?

- **Reliability**
  - Mean Time Between Failure (MTBF)
  - Probability of Failure On Demand (POFOD)

- **Usability**
  - Task completion rate
  - Was the task completed successfully?
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CALIBRATION
CALIBRATING

• The tools
• Our understanding
• Our practices
IMPLEMENTATION OPTIONS

MOBILE & DESKTOP

Our app

Library lives inside our app
First party
• equal rights

WEB CONTENT

Web Page

JavaScript / 1 pixel image
Third-party
• permission-based

Has an independent life
WHAT’S INSIDE?

What about?

- Offline behaviour
- Access to sensitive data – increases the potential for harm…
- Consumption of resources
- Ease of control
- Ease of implementation
- Explaining to users what’s happening…

What does the analytics library do?
What else does it do?
How much should we trust & rely on it?

Quis custodiet ipsos custodes?
VALIDATION & VERIFICATION

Validation: is it useful to us? And to all concerned?

Verification: does it do what it claims to do?

• Inaccuracies & precision
• Performance testing
  • Latency
  • Accuracy
  • Volumes
• Triangulation: with other libraries
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POTENTIAL PITFALLS
POTENTIAL PITFALLS

No one shall be subjected to arbitrary interference with his privacy, family, home or correspondence, nor to attacks upon his honour and reputation. Everyone has the right to the protection of the law against such interference or attacks.

Article 12 The Universal Declaration of Human Rights

Why KISSmetrics?
Our actionable metrics tell you more than what happened. They also tell you *who* and *why*.

1. **We help you get to know your people.**

   The basic unit in KISSmetrics is a person. When you view your KISSmetrics reports they show you people, not just aggregate data.

   - Have a big customer that came to your site and is using your product? KISSmetrics will help you see everything they did *before* and *after* they signed up. Use this knowledge to give them the best service and learn how to get more people like them.

   - Get engineering, product, sales, marketing and customer support working together to improve the metrics that matter for the life blood of your business: your people.

http://www.kissmetrics.com/why
POTENTIAL PITFALLS

Fidelity

• Correlation
• Consistency
• Reliability
POTENTIAL PITFALLS

Messy separations

• Who owns the data & can you get it in a usable form?

• Changing the yardstick

A traditional tale tells the story of Henry I (1100-1135) who decreed that the yard should be "the distance from the tip of the King's nose to the end of his outstretched thumb".

http://www.npl.co.uk/educate-explore/posters/history-of-length-measurement/
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APPLYING THE CONCEPTS
GETTING STARTED

Start by designing the events

Design → Implement → Measure → Assess

Iterate…

Design → Implement → Measure → Assess

Iterate…

Design → Implement → Measure → Assess
### POSSIBLE ASSESSMENT CRITERIA

<table>
<thead>
<tr>
<th>Colour</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow</td>
<td>Benefits of using Analytics</td>
</tr>
<tr>
<td>White</td>
<td>Safety rating</td>
</tr>
<tr>
<td>Purple</td>
<td>Fidelity</td>
</tr>
<tr>
<td>Red</td>
<td>Feelings of the stakeholders</td>
</tr>
<tr>
<td>White</td>
<td>Safety / Trust rating</td>
</tr>
<tr>
<td>Green</td>
<td>Eco-rating</td>
</tr>
<tr>
<td>Black</td>
<td>Problems, Privacy, Risks</td>
</tr>
</tbody>
</table>

c.f. Six Thinking Hats – six directions of thinking
ANALYTICAL QUESTIONS

Trends, Defect Reports

Engineering Activity, Benchmarking, Testing

Extrapolation

Past

Engineer Activity

Present

Past

Future

Information

Insight

What’s Happened? (Reporting)

What's Happened? (Alerts)

What will Happen? (Forecasting)

How and why did it happen? (Factor analysis)

What is the next best action? (Recommendation)

What’s the best / worst that can happen? (Modeling / Simulation)

Software quality models, bottleneck analysis

Specification refinement, asset reallocation

Failure prediction models

IMPROVE OUR APP WORKFLOW

Mobile App

Mobile Analytics Client

Manual Testing Results

Refine Our Testing

Improve And Fix The App

Analytical Data

(Potential Problems)

(Patterns of Usage)

V (x+1)
REFINE OUR TESTING

Crashes
• Bugs we didn’t find c.f. Defect Detection Percentage (DDP)[1]

Usage patterns
• Personas
• Navigation and other functional test cases
• Localization Testing

Testing in production
• Greater use of experiments

[1] D. Graham, Measuring the effectiveness of testing using DDP
Quis custodiet ipsos custodes?

- Can we trust the Analytics software and reports?
- Who tests them?

Once we have confidence in the tools we can use Analytics to:
- Better understand our apps and how they are used
- Find problems sooner; and predict problems & their impact
- Better understand and improve our testing
CONCLUSIONS

“The truth, the whole truth and nothing but the truth, so help me God” [1]

Test and evaluate the libraries, the performance, the obligations, the ownership

If you are going to use Analytics, use them well, & to improve the quality

Consider the benefits for every stakeholder

“Quality is value to some person(s)” Gerald Weinberg

If you want to know more about software quality & mobile analytics, get in contact:

julianharty@gmail.com

Q&A ?