



EXPERIMENTING YOUR WAY TO SUCCESS

APPLYING LEAN STARTUP PRINCIPLES
TO PRODUCT DEVELOPMENT AT IMVU

JAMES BIRCHLER
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GDC, SAN FRANCISCO, MARCH 3, 2011

#IMVUGDC

@JAMESBIRCHLER

1. EXPERIMENTS

2. PRODUCT FEATURES

3. PRODUCT DEVELOPMENT

THE

SCIENTIFIC METHOD

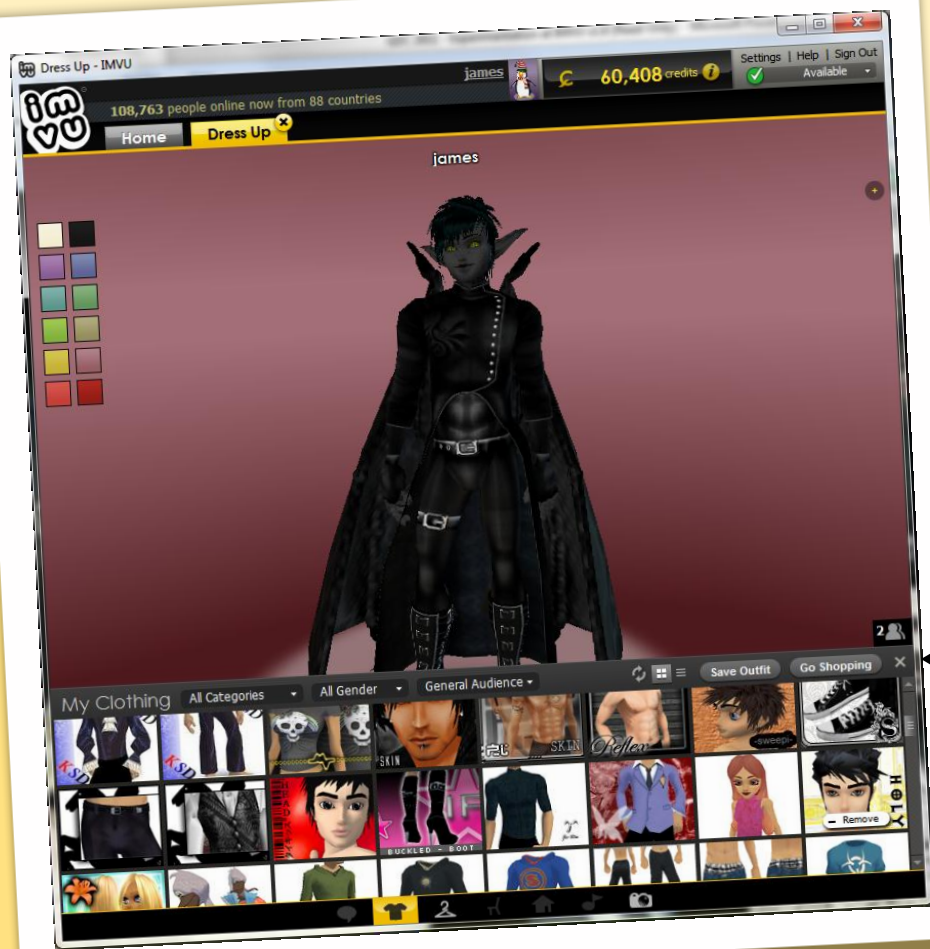
IS

BASED

ON



EXPERIMENTATION



Inventory UI



**Renaissance
Astronomer**

Heliocentrism

**Experimental
observation**



@COPERNICUS

**Renaissance
Astronomer**

Heliocentrism

**Experimental
observation**



#INQUISITION

**Renaissance
Astronomer**

Heliocentrism

**Experimental
observation**



@COPERNICUS

Afraid to
publish
until on
deathbed

“Copernicus FTW!”



@GIORDANO_BRUNO

Persecuted

Prosecuted

Burned at
the stake

“Father of Modern science”

“Experimentation FTW!”



@GALILEO

Persecuted

Accused of
heresy

House arrest
until his
death

Improvement
over Bruno.

Question: Why was it so hard for these guys to share their data and findings?

Answer: It's complicated, but I think we can all agree that the folks in charge didn't support hearing "bad news."

Experiments FTW!

Share results freely!

**Rapid iteration
and learning!**



@JAMESBIRCHLER

Promoted to
Director

GDC Speaker GIG

Profitable

>\$40M annualized revenue run rate

World's largest virtual goods catalog >6M items

2M active users in the last 30 days

Experiments may help your company succeed!

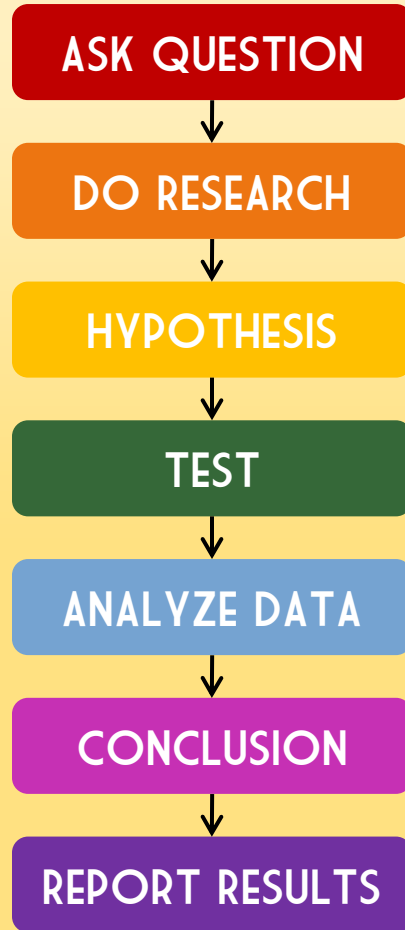


IMVU REVENUE GROWTH

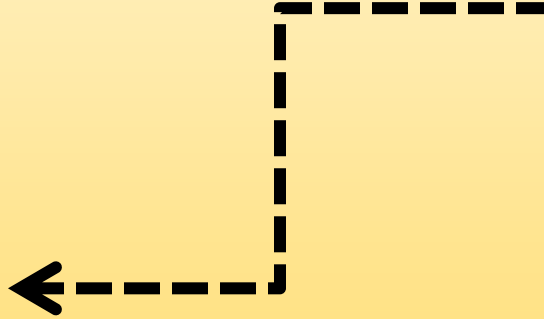
Qtr Q1'06 Q2'06 Q3'06 Q4'06 Q1'07 Q2'07 Q3'07 Q4'07 Q1'08 Q2'08 Q3'08 Q4'08 Q1'09 Q2'09 Q3'09 Q4'09



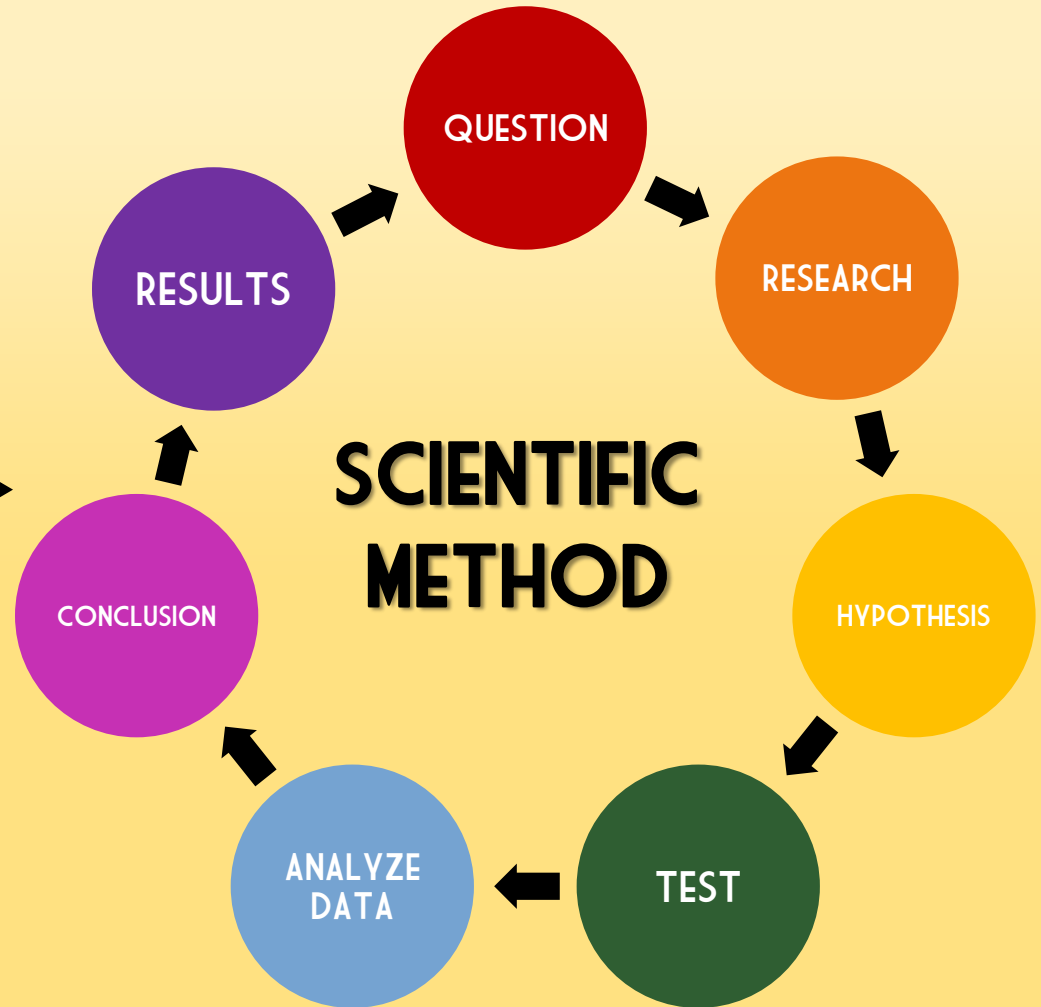
**EXPERIMENTATION
IS GOOD**



**GOT
SCIENCE?**



**Rapid
iteration =
Rapid
learning**



“Lean Startup”



LEARN

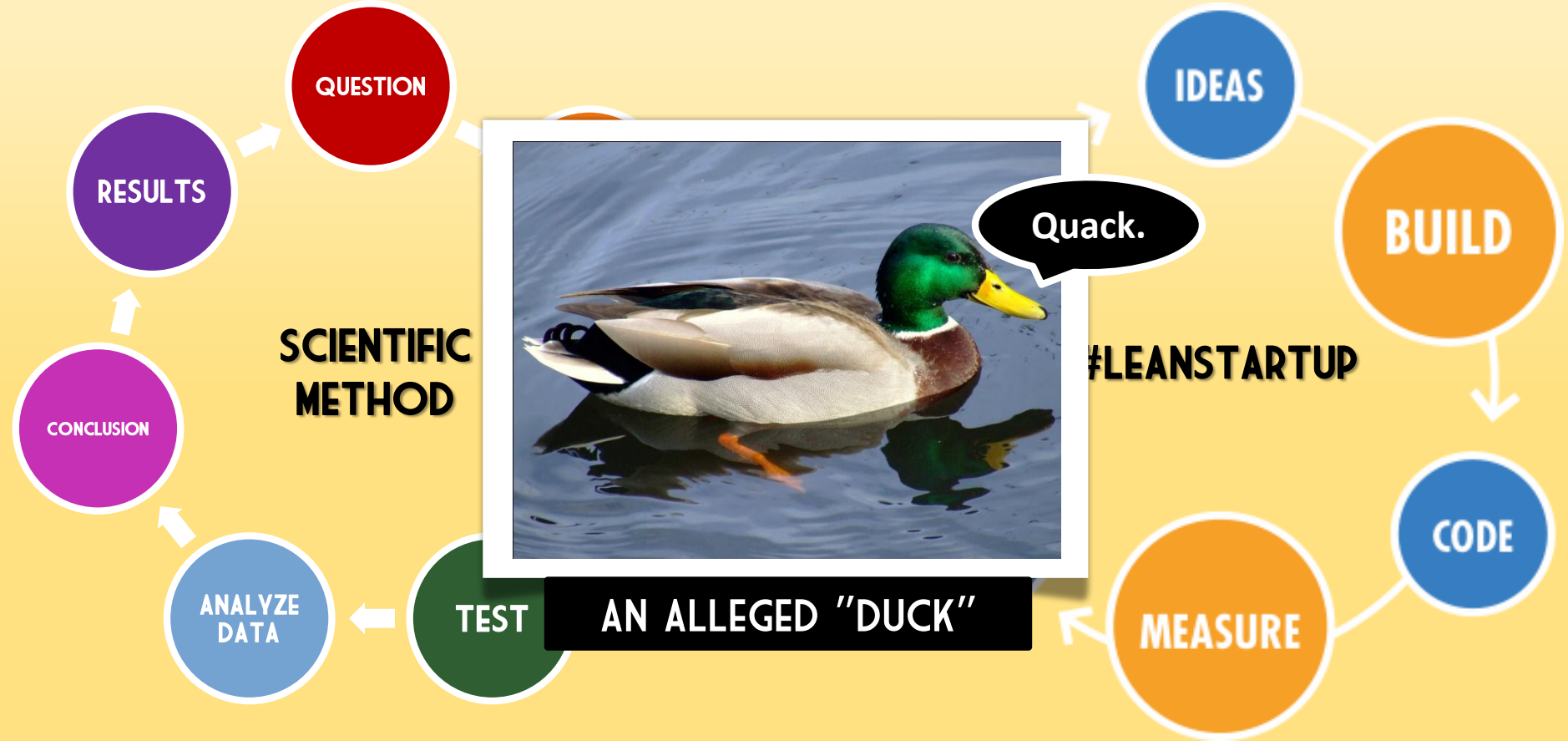
IDEAS

BUILD

CODE

MEASURE

DATA





CULTURE OF EXPERIMENTATION

Okay, I'll run an experiment!

Okay, I'll run an experiment!

Okay, I'll run an experiment!

Okay, I'll run an experiment!

Okay, I'll run an experiment!

Okay, I'll run an experiment!

Let's keep this simple!

Prove your idea is the best!

Okay, I'll run an experiment!



FOR AGES OVER 3 — Contains Small Parts



TOO GROSS!

MONSTER HYPODERMIC NEEDLE WITH Disappearing Blood

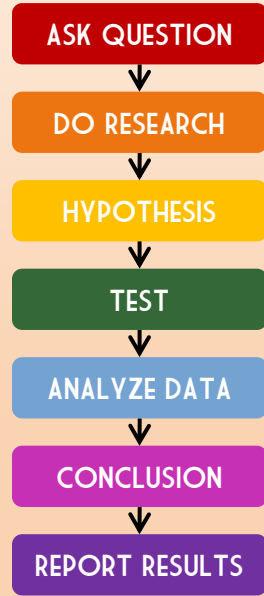
IMVU

SCIENTIST™

DRESS-UP PLAYSET



RUNNING EXPERIMENTS IS FUN!



IMVU Feature Experiment “How-To”


1. Form hypothesis to test
2. Write code, test on dev machine
3. Test in production as QA/admin
4. Roll out to a % of customers
5. Results, conclusion
6. Share learning

LOOKS A LOT LIKE THE SCIENTIFIC METHOD (IT IS!)



**KEEP IT
SIMPLE**


```
if( setup_experiment(...) == "control" ) {  
  
    // do it the old way  
  
} else {  
  
    // do it the new way  
  
}
```



SIMPLE
TO CODE

This is Production Server

james@

Filter Experiment List By

clear

Live Filter ☒

- Experiments
-
-
-
-
- Manage Features
- Manage
- Manage
- Manage
- Manage
- Manage
-
-

CX:GalleryRedesign	<div>To Users</div> <div>QA and Admin only</div>	<div>Closed On</div> <div>Open / Active</div> <div>Submit ▶</div>
FIRE:	<div>To Users</div> <div>100%</div>	<div>Closed On</div> <div>active</div> <div>Submit ▶</div>
FIRE:	<div>To Users</div> <div>100%</div>	<div>Closed On</div> <div>new_messaging</div> <div>Submit ▶</div>
FIRE:	<div>To Users</div> <div>50%</div>	<div>Closed On</div> <div>Open / Active</div> <div>Submit ▶</div>
FIRE:	<div>To Users</div> <div>QA and Admin only</div>	<div>Closed On</div> <div>Open / Active</div> <div>Submit ▶</div>
FIRE:	<div>To Users</div> <div>100%</div>	<div>Closed On</div> <div>zipcode_chall</div> <div>Submit ▶</div>

SIMPLE
TO MANAGE

Numbers

		All accounts that logged into client	singleton
User Count		310868	4196
	%	17.60	19.07
	%	25.40	26.98
female	%	72.67	66.18
	%	0.72	1.10
	%	1.00	3.03
	%	0.16	0.55
	%	0.83	1.60
	%	34.79	26.85
	%	30.86	33.38
	%	24.61	22.40
	%	1.23	1.55
	%	4.72	3.72
	%	3.78	12.11
	%	79.48	100
	%	12.87	28.88
		23.54	24.95
		0.24	0.76
		115.89	123.38
		20.16	20.00

Uh-oh.

Cool
Stats
Porn

	Control	Treatment
Samples	16114 / 130698	292 / 18838
Mean	0.01233	0.01550
Variance	0.01218	0.01526
P-value:	0.000460	
Significance:	99.9540%	
Chance of occurring randomly:	0.0460%	

SIMPLE
TO SHARE



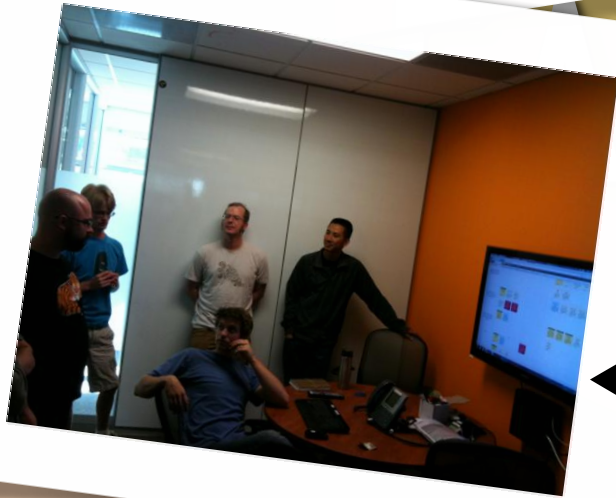
**EMBRACE
FAILURE**

Suits →



↑
Company

←
Teams



Practical Guide to Controlled Experiments on the Web: Listen to Your Customers not to the HiPPO

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ABSTRACT

The web provides an unprecedented opportunity to evaluate ideas quickly using controlled experiments, also called randomized experiments (single-factor or factorial designs), A/B tests (and their generalizations), split tests, Control/Treatment tests, and parallel flights. Controlled experiments embody the best scientific design for establishing a causal relationship between changes and their influence on user-observable behavior. We provide a practical guide to conducting online experiments, where end-users can help guide the development of features. Our experience indicates that significant learning and return-on-investment (ROI) are seen when development teams listen to their customers, not to the Highest Paid Person's Opinion (HiPPO). We provide several examples of controlled experiments with surprising results. We review the important ingredients of running controlled experiments, and discuss their limitations (both technical and organizational). We focus on several areas that are critical to experimentation, including statistical power, sample size, and techniques for variance reduction. We describe common architectures for experimentation systems and analyze their advantages and disadvantages. We evaluate randomization techniques, which we show are not as simple in size and hashing techniques. Controlled experiments typically generate large amounts of data, which can be analyzed using data mining techniques to gain deeper understanding of the factors influencing the outcome of interest, leading to new hypotheses and creating a virtuous cycle of improvements. Organizations that embrace controlled experiments with clear evaluation criteria can enhance their systems with automated optimizations and real-time analytics. Based on our extensive practical experience with multiple systems and organizations, we share key lessons that will help practitioners in running trustworthy controlled experiments.

Categories and Subject Descriptors

G.3 Probability and Statistics: Experimental Design: controlled experiments, randomized experiments, A/B testing
I.2.6 Learning: real-time, adaptation, causality

General Terms

Management, Measurement, Design, Experimentation, Human Factors

Keywords

Controlled experiments, A/B testing, e-commerce.

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1. INTRODUCTION

*One accurate measurement is worth more
than a thousand expert opinions.*
— Admiral Grace Hopper

In the 1700s, a British ship's captain observed the lack of scurvy among sailors serving on the naval ships of Mediterranean countries, where citrus fruit was part of their rations. He then gave half his crew limes (the Treatment group) while the other half (the Control group) continued with their regular diet. Despite much grumbling among the crew in the Treatment group, the experiment was a success, showing that consuming limes prevented scurvy. While the captain did not realize that scurvy is a consequence of vitamin C deficiency, and that limes are rich in vitamin C, the intervention worked. British sailors eventually were compelled to consume citrus fruit regularly, a practice that gave rise to the still-popular label *limes* (3).

Some 300 years later, Greg Linden at Amazon created a prototype to show personalized recommendations based on items in the shopping cart (2). You add an item, recommendations show up, add another item, different recommendations show up. Linden notes that while the prototype looked promising, "a marketing senior vice-president was dead set against it," claiming it will distract people from checking out. Greg was "forbidden to work on this any further." Nonetheless, Greg ran a controlled experiment, and the "feature won by such a wide margin that not having it live was costing Amazon a noticeable chunk of change. With new urgency, shopping cart recommendations launched."

Since then, multiple sites have copied cart recommendation.

The authors of this paper were involved in many experiments at Amazon, Microsoft, Depont, and NASA. The culture of experimentation at Amazon, where data trumps intuition (3), and a system that made running experiments easy, allowed Amazon to innovate quickly and effectively. At Microsoft, there are multiple systems for running controlled experiments. We describe several architectures in this paper with their advantages and disadvantages. A unifying theme is that controlled experiments have great return-on-investment (ROI) and that building the appropriate infrastructure can accelerate innovation. Stefan Thomke's book title is well suited here: *Experimentation Matters* (4).

The web provides an unprecedented opportunity to evaluate ideas quickly using controlled experiments, also called randomized experiments (single-factor or factorial designs), A/B tests (and their generalizations), split tests, Control/Treatment, and parallel flights. In the simplest manifestation of such experiments, live

The "highest paid person's opinion" (HiPPO) is not assumed to be correct.

**“Embrace failure as
an opportunity to
learn.”**



HOW YOU RESPOND TO FAILURE SAYS A LOT ABOUT YOUR CULTURE

Recap:
Culture is key.



The background of the image features a red binder ring at the top, partially visible. Below it is a stack of papers, with the top sheet showing some text and a circular logo. The text "EXPERIMENT WITH PROCESS" is overlaid in a large, bold, red font with a slight shadow effect.

EXPERIMENT WITH PROCESS



BUILD



2-3 week sprints

Adjust process each sprint

Agile and XP methods

Aha moment...

Agile & XP Methods

1. Embrace change (and try to make it painless)
2. Prefer flexibility to perfection
3. Iterate, improve continuously
4. Feed data and insights back into the process

**"Change, flexibility, iteration,
continuous improvement..."**

5. Continuous deployment (CD)
6. Use defects to drive improvements
7. Rapid, continuous code integration and deployment
8. Software cluster immune system: prevent defects
9. Pair Programming
10. Just-in-time scalability
11. Refactoring
- 12.

Scientific Method

ASK QUESTION

DO RESEARCH

HYPOTHESIS

Learning:

CONCLUSION

**Agile and XP support
experimentation.**



MEASURE



Projects / stories completed

Time spent on tasks

Story points delivered

Unplanned vs. planned work completed

How productive and happy do we feel?

Value delivered to customers





LEARN



Project postmortems

Sprint retrospectives

5 Whys root cause analysis

Support open communication...

Engineering project managers
Matrix management
Scrum of Scrums
Team swaps
Open floor plan
Place value on communication



**OH YEAH! PROMOTE &
SUPPORT LEARNING
EVERY DAY**

Postmortems & Retrospectives:

- 1. Meeting roles**
- 2. Metrics**
- 3. Action items**

**Let's see it
in action!**



← Appoint a skilled facilitator.



← Foster communication
and engagement.

C4 2010 S14 Retrospective

Story Points

Days	Project	Story Points
5 + 12	Interrupts + Pulled Builders	0/0
1	P1 & P1 Followup	0/0
1	Farmandia	2/2
0	FTUX 1	0/0
3	FTUX 2	1/1
20	Pulse Phase 2	5/5
5	Pulse 2 Spam Features	5/5
3	Bugs	3/3
1	Backyard Monsters	2/2
2	2nd FTUX Experiment	2/2
10	Project Follow-up	0/0
	Total Days is 53, taking out for days already accounted for in planning	20

Misc

- Loaned Jinsuck to Loco Team for 4 days
- Added work mid-sprint (Pulse)
- BB better starting mid-sprint
- Postmortems: Pulse Phase 2



**METRICS: PROJECTS,
DAYS, STORY
POINTS, MISC...**

Misc.

Ubuntu was blocking
in client until yesterday

"What's a ?"

Keep

- Time tracking accurate

- PMR Process

- Working in priority order

- Kudos to Michael for self-managing,
+ to Brian for helping

Kudos to Rosco as Tech Lead

- Kudos to Mike!

- Great job as a new team going 1st sprint

- Kudos to Rosco!

- Kudos to Harry.

- "Successful sprint", gaining

Kudos to Sol

Stop

- Being optimistic re: how much time
work will take in client

- Not completing projects + forcing
handoffs to new team

- Tech Lead not acting on team
(to consider next sprint)

Start

- Try to ensure projects are not
skilled by transitions / re-args,

etc.

- If a project is nearly done,
push to keep the same team
until done.

- Communicate sprint changes
more clearly to entire team

- Start on time

- Add disabled tests to scrum board
in real time

Rosco talk to mitch re: client disabled tests

- Spin up new team numbers when
transitioning a project

name of "Smoke test" to Project Room

Action Items

5 WHYS

Y1: Why were logins failing?

A1: The database has too many connections.

Y2: Why did the Database have too many connections?

A2: A new feature had slow-running queries.

Y3: Why were there slow queries?

A3: They were implemented with a cache time of zero.

Y4: Why was cache time set to zero?

A4: James didn't know that slow queries must be cached.


Y5: Why didn't James know about caching slow queries?

A5: He's new, and we didn't cover that in our training.

**ROOT CAUSE:
FIX THIS!**



A couple notes
about action items:



- 1. Fix root causes.**
- 2. Make the size of the fix commensurate with the size of the problem.**

Recap:
Learning is key.



A close-up photograph of a laboratory procedure. A hand is holding a white plastic beaker and pouring a clear liquid into a petri dish. The petri dish contains a red agar medium. The background is blurred, showing a blue surface.

PROCESS EXPERIMENTS




IN PROGRESS

COMPLETED

Scrum: A project management methodology, works well with Agile/XP.

This GDC Online 2010
talk focused on how
IMVU uses Scrum and
Agile/XP.



SCALING PRODUCT DEVELOPMENT

AT A **LEAN** STARTUP

JAMES BIRCHLER (@JAMESBIRCHLER)
ENGINEERING DIRECTOR, IMVU
GDC ONLINE, OCT. 5-8, 2010

**AGILE
@IMVU**

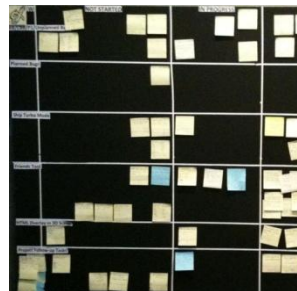
IMVU SCRUM V1.0

1.

Team org, short sprints, daily standups FTW!

2.

Stay flexible, don't be dogmatic.



Story Points vs. Ideal Days



USED TO MEASURE PROGRESS AND
VALUE DELIVERED TO CUSTOMERS





Story Points at IMVU

have an interesting history. Things that worked for us included that they gave team members a reason to engage and discuss projects and tasks, and planning meetings got shorter after an initial period of calibration.

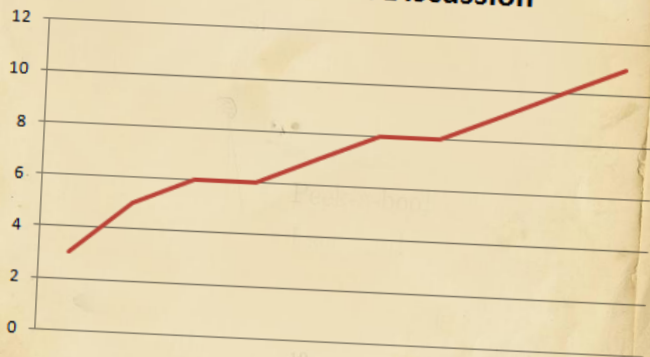
Some things didn't work: it was hard to get team buy-in for what story points mean, swapping team members means recalibrating, and the focus on points can be distracting.

Overall, though, a success.

Time spent in meetings



Engagement and Discussion



1.

Agree on a definition.

Story Points at IMVU

have an interesting history. One of the things that worked for us included that they gave team members a reason to engage and discuss projects and tasks, and planning meetings got shorter after an initial period of calibration.

2.

Shorter planning meetings.

One of the things that worked for us included that they gave team members a reason to engage and discuss projects and tasks, and planning meetings got shorter after an initial period of calibration.

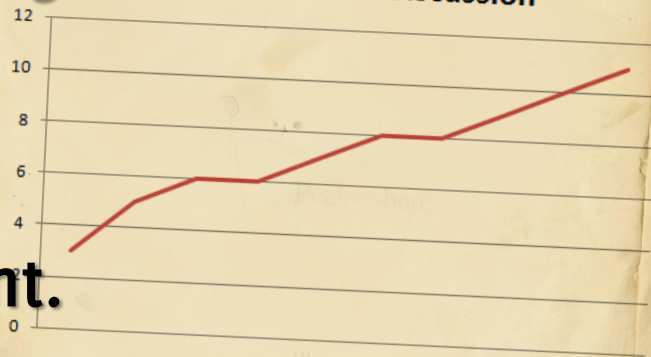
3.

Big win for engagement.

Time spent in meetings



Engagement and Discussion





IDEAL
DAYS

1.

Easy to understand.

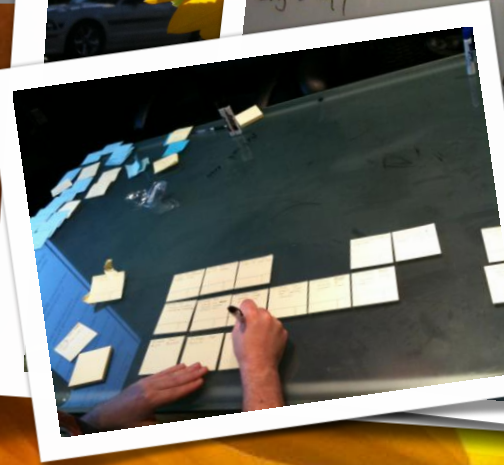
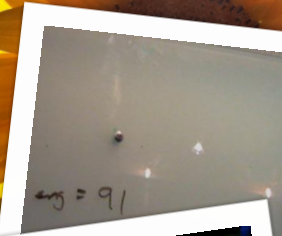
2.

Accurate.

3.

Caution: Technical debt.

IDEAL DAYS



Both Ideal Days and Story Points foster engagement and discussion, and that's the real win.



1.

Focus on work, not time.

2.

Short planning meetings.

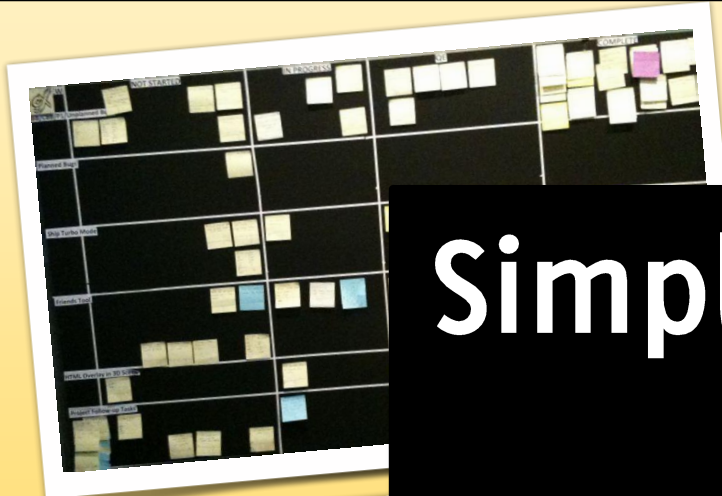
3.

Caution: Reduced ability to predict progress.



SCRUM TECHNOLOGY

Simple + Flexible
beats
Complex + Rigid



SUB-TEAMS

1.

4 engineers = sweet spot

2.

Don't share infrastructure



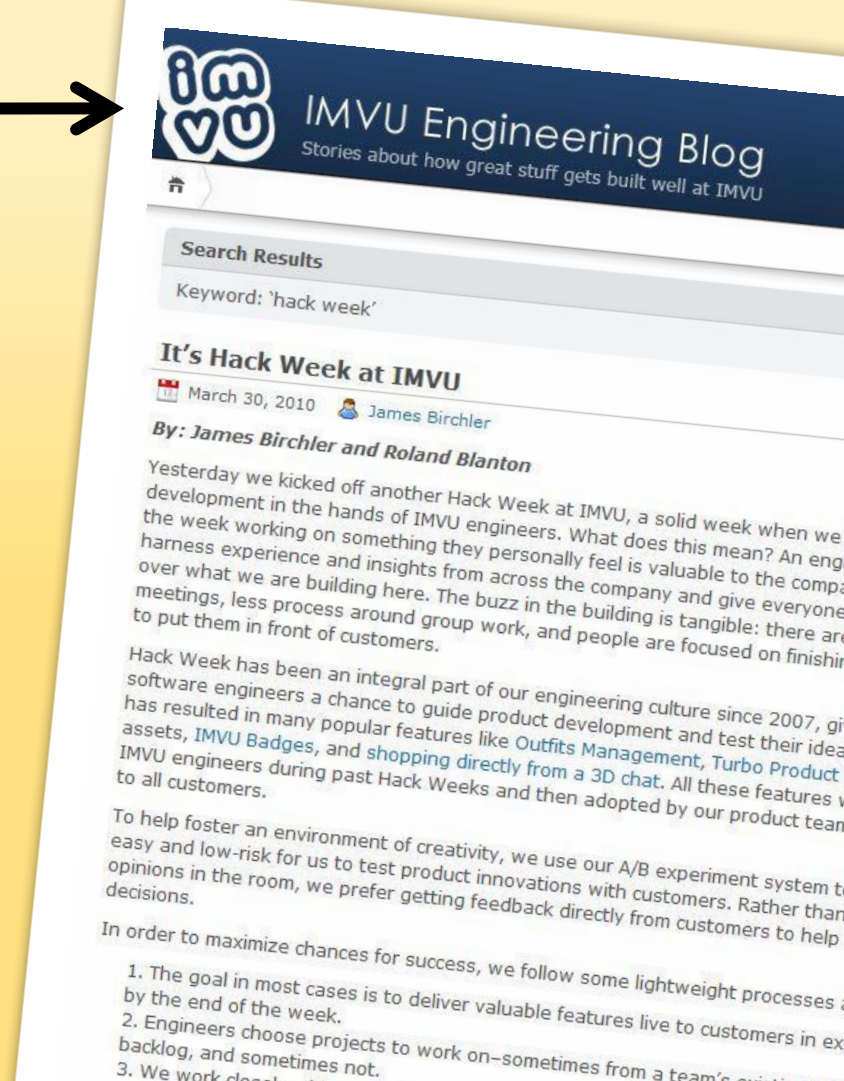
HACK WEEK @IMVU

This blog was a
Hack Week project.

100% self-directed.

100% supported.

100% awesome.



TOP SECRET: INVU GARAGE

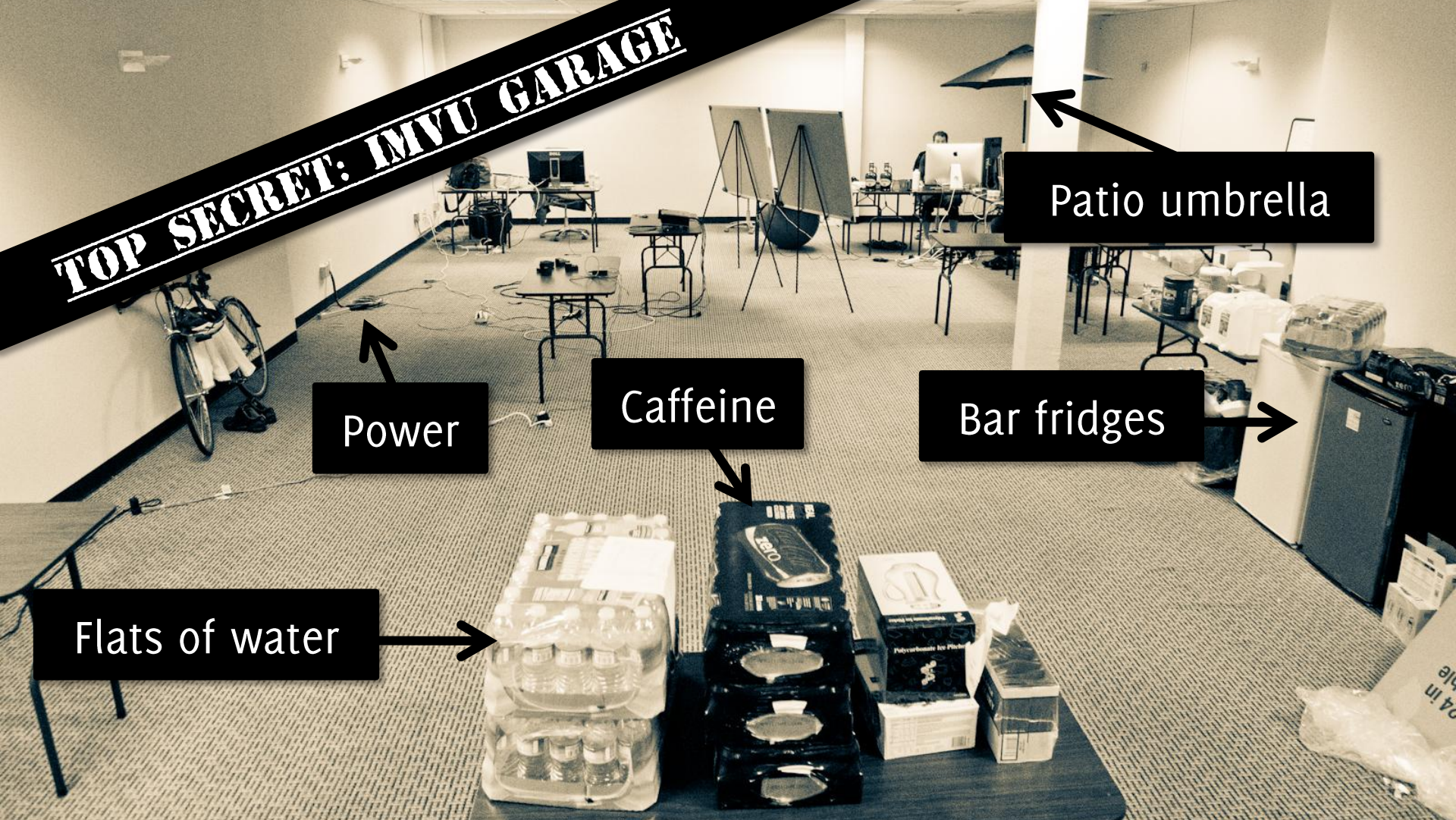
Patio umbrella

Power

Caffeine

Bar fridges

Flats of water



RECAP

1.

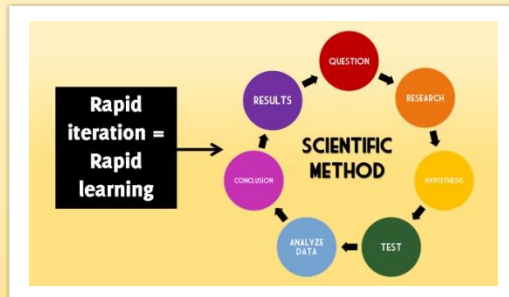
Experimentation works.

2.

Culture is key.

3.

Learning is key.



WE'RE HIRING!

WWW.IMVU.COM/JOB



CREDITS

1. flickr/The Chemistry of Inversion/[f]oxymoron
2. flickr/Mouths/The Wandering Angel
3. flickr/Culture Tubes/Hey Paul
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16. flickr.com/books/rodrigo galindez
17. flickr.com/cowboys/anyjazz65
18. slideshare.net/jamesbirchler Scaling Product Development at a Lean Startup: Agile at IMVU
19. flickr.com/neanderthal/hamed saber
20. flickr.com/Clock/Jörg Weingrill
21. flickr.com/Open Tattered Book/playingwithbrushes
22. Practical Guide to Controlled Experiments on the Web: Listen to Your Customers not to the HiPPO, by Ron Kohavi, Randal M. Henne, and Dan Sommerfield, @Microsoft, KDD 2007.

THANKS

Jesse Imbach and Josh Adlin provided excellent advice, ideas, laughs, and gourmet food while I was preparing this talk—thanks you guys!

Matt Danzig made paper float--awesome graphic design skillZ, Matt! Brett Durrett, Chad Austin, Steven Peterson, and Roland Blanton were kind enough to provide helpful comments and feedback.

Finally, thanks to all of my colleagues and friends at IMVU who make all this possible—you rock!

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