Design Thinking for App Dev Teams: Why and How

Billy Hollis
Agent Provocateur
Next Version Systems
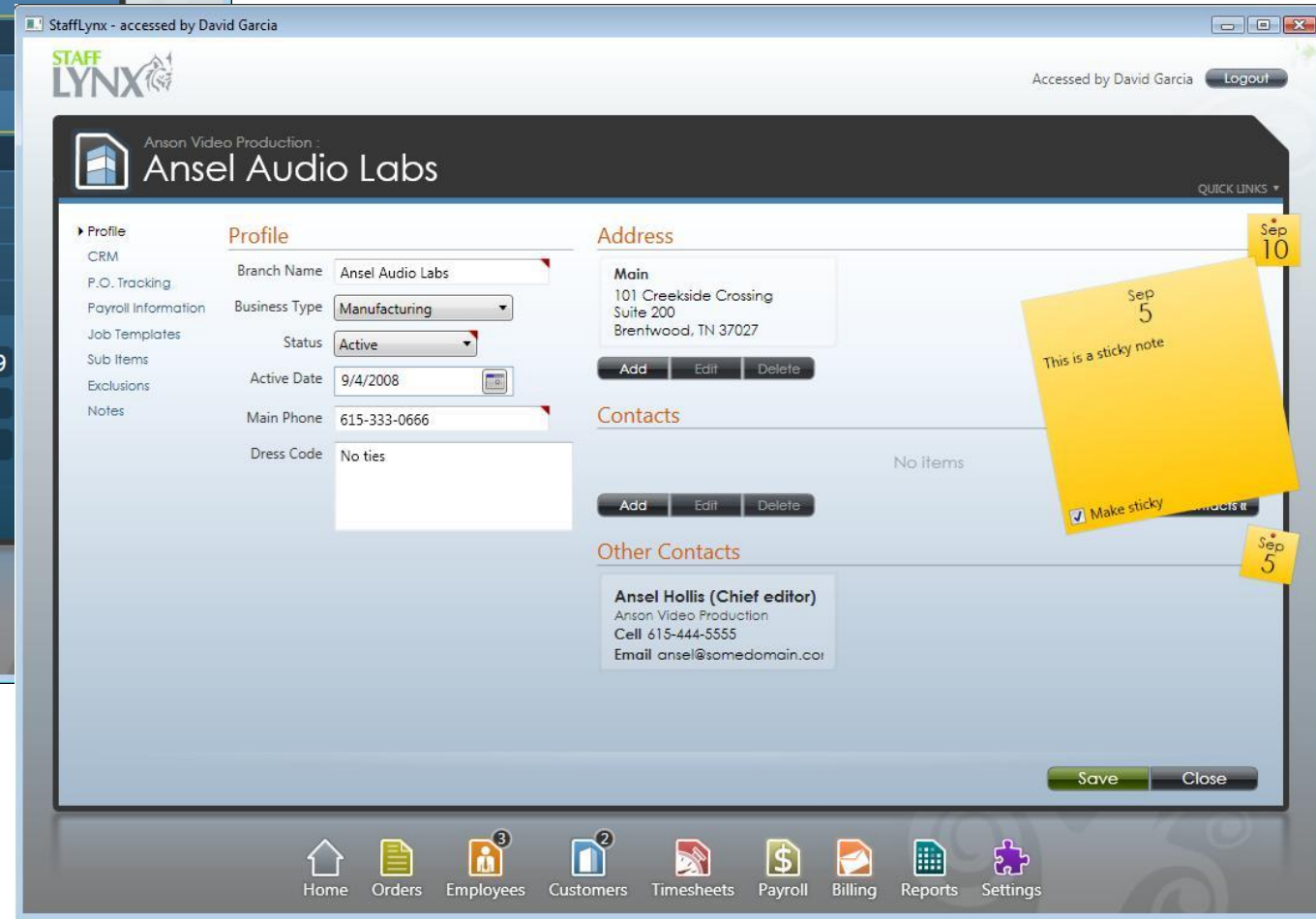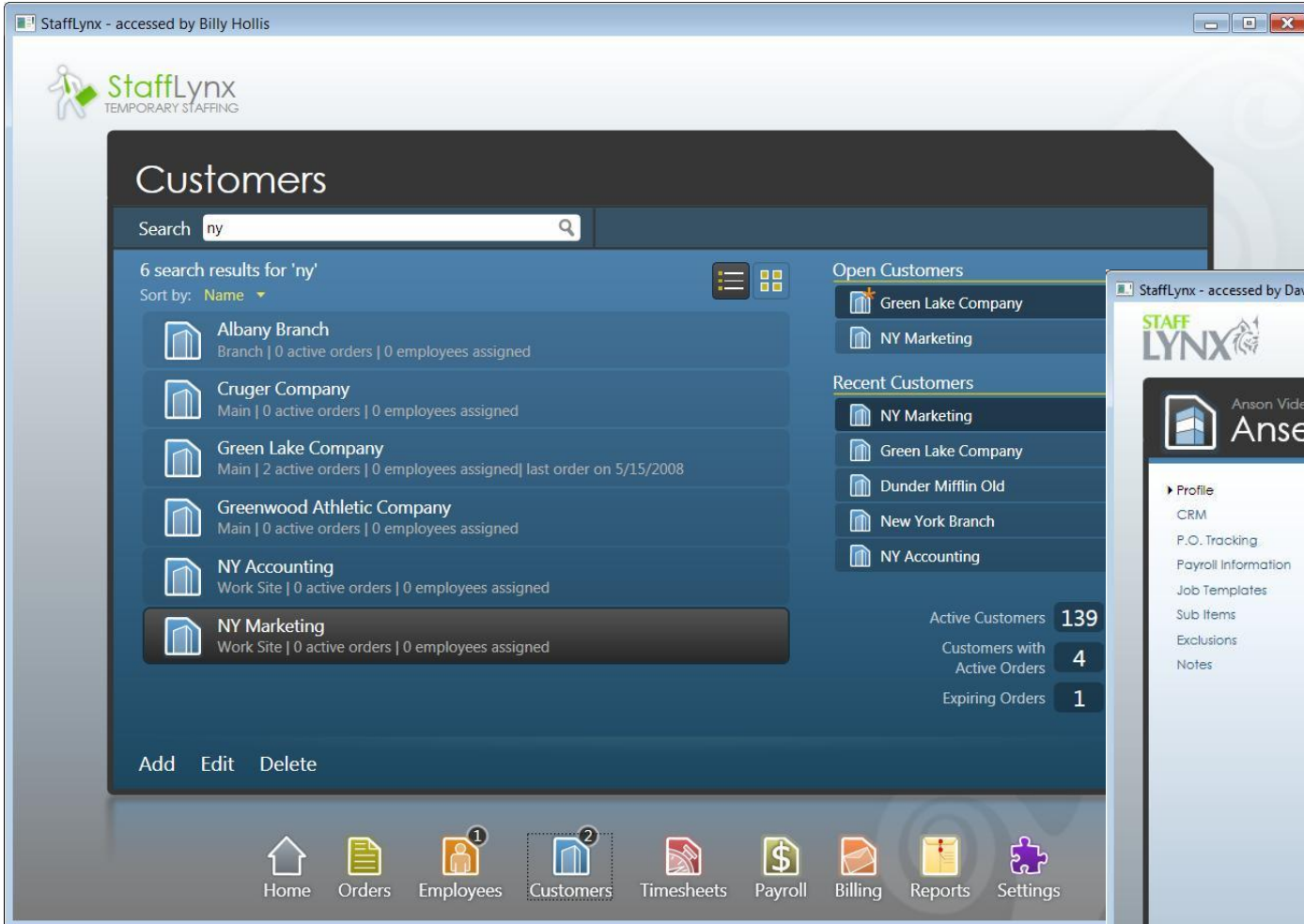**billy –at– nextver.com**

Level: Beginner, Intermediate.

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#VSLIVE

NO CODE LIMITS

Some background

2008

3M™ ChartScriptMD™ for Radiology

5 Monday
August 2013
09:51

Welcome,
Cynthia Hilliard

Search for reports

WORK LIST

0 Suspended Reports
Reports that have been started, but not completed.

1 Reports Pending Review   **1 overdue**
Reports that have been assigned to you for review.

0 Reports Sent To Transcription
Reports that have been sent out for transcription.

0 Reports Returned From Transcription
Reports that have been returned from transcription.

0 Reports Recently Completed
Reports that have been signed recently. Signing can
be undone for cases sitting in the outbox.

MESSAGING

MESSAGING (0)

MANAGEMENT ACTIONS

Text Inserts

User Preferences

Smith Sally
MRN: 600388

Female, 31Y
DOB: 05/15/1982

Job Number: 002066
CHEST 1 VIEW

RD - Basic Radiology Document type
Main Accession: 1048

INDICATION: cough

PROCEDURE: Chest radiograph single view.

COMPARISON: None

FINDINGS: The heart is normal in size. There is no hilar or mediastinal
adenopathy. The lungs are clear. The pleura is normal. Bones and soft tissues
are normal. The subdiaphragmatic area is unremarkable.

CONCLUSION: Normal single view chest radiograph.

MIC OFF

SIGN REPORT

B

I

U

CP

CC

100 %

Design is an investment.

Like any other investment, we expect a return. And that return can be huge.

But most decision makers don't anticipate that return. So they don't facilitate UX design.

Why don't they expect a return?

- Vague understanding, or misunderstanding, of what "design" even means
  - The term is overloaded, and the vagueness is sometimes leveraged by hucksters
- No exposure to examples of ROI for design
  - Those who leverage design well don't like to advertise their success to competitors
- Don't know what the starting point should be

To clarify what "design" means, we need a starting point

- I'm going to use desktop apps (in native or web technologies)
  - Many, many companies run on these
- Mobile and tablet also important, and there are parallel lessons for designing those types of apps

orders

		Order No.	Order Date	Shipped Date	status	comments	Customer No.
☐	+	10100	2003-01-06 00:00:00	2003-01-10 00:00:00	Shipped	foo	363
☐	−	10101	2003-01-18 00:00:00	2003-01-22 00:00:00	Shipped	Check on availability.	128

Item No. ▲	Product Code	Quantity	Unit Price
1	S18_2795	26	$167.06
2	S24_2022	46	$44.35
3	S24_1937	45	$32.53
4	S18_2325	25	$108.06

🔍 ↻   ‹ ‹ ‹ Page [1] of 1 › › ›   [20 ▼]   View 1 - 4 of 4

		Order No.	Order Date	Shipped Date	status	comments	Customer No.
☐	+	10102	2003-01-10 00:00:00	1946-04-10 00:00:00	Shipped		181
☐	−	10103	2003-01-29 00:00:00	2003-02-02 00:00:00	Shipped	fasdfasdfa asdfa	141

Item No. ▲	Product Code	Quantity	Unit Price
1	S24_2300	36	$107.34
2	S18_2432	22	$58.34
3	S32_1268	31	$92.46
4 [3]	S10_4962	42	$119.67
5	S18_4600	36	$98.07
6	S700_2824	42	$94.07
7	S32_3522	45	$63.35
8	S12_1666	27	$121.64

LIVE!

Whizbang Business App Circa 1995

Field	Value	Field	Value
Name	Sherlock Holmes	Master Header	1B-2B-3
Street	221B Baker St.	Override Auth	1-1A-2B
City, State, Zip	New London, CT 13161	Diff Splint	Stage 9
Region	Northeast	Fustamont	Bucksnort
Discount	7%	Oblate Diad	108.291702
Master Code	NCC-1701	Frenulum	Keep Left
Credit Limit	$100,000	Chiro Fistula	Thiotimiline
Debit Limit	$50,000	Overt Crang	Foramen Magnum
Account Type	Annual	Blastokink	Mitochondria
Overage Fee	$39.50	Parody Fee	$17.50
Sales Rep	Watson, J	Chaotic Orb	Hanal Nathrac
Prof Category	Charlatan	They Just	M41/M46
Route Output	Max donuts	Keep Cramming	Energy Sword
Histoform	Patella 2	More Data	Incineration Projector
Frengle Type	PinkFrengle	Into This	Spiker
Rampancy Slot	Sloane	Dense Form	BR85

Demographics | Fissure Table | Dingleplops | Raster possums

StopType	Arrived	StopETA	ArrivalTime	StopDescr
Warehouse	☑	8/22/2018 3:25:00 PM	8/22/2018 3:25:00 PM	Nashville
Office	☑	8/22/2018 5:40:00 PM	8/22/2018 5:40:00 PM	Tulsa ware
Residence	☐	8/23/2018 3:25:00 PM	8/22/2018 3:25:00 PM	Houston
Office	☑	8/25/2018 3:25:00 PM	8/23/2018 3:25:00 PM	Los Angel
	☐			

Indicators

Field	Value
Oh My Goodness	Scorpion
They're Still	Warthog
Cramming More	Hornet
Stuff in Here	Mongoose
Nobody needs	Pelican
Any of This	Wasp

Route #	Customer	Shipper	Stops	ETA	Cond	G/L Ref	Issues	Condition
Z47202905	Giant Goofy Gadgets	Crazy Chris Trucking	4	7/27/2019 5:37:22 PM	5	QX-307181	0	5
Z47200284	Last Mile Fuel	Last Mile Trucking	5	7/28/2019 5:37:22 PM	8	QX-306740	0	8
Z47204830	Krazy Krafts	Federal Worldwide	5	7/25/2019 5:37:22 PM	5	QX-308392	0	5
Z47202306	Instant Teleportation, Inc.	Hollis Worldwide	4	7/25/2019 5:37:22 PM	8	QX-306312	3	8
Z47202337	Instant Teleportation, Inc.	Hill Valley Transportation	5	7/23/2019 5:37:22 PM	2	QX-305717	0	2
Z47206046	Yosimite Sam Liquors	Across the Ocean Blue	4	7/24/2019 5:37:22 PM	4	QX-305860	0	4
Z47207193	Everywhere Transportation	Speedy Transit	5	7/28/2019 5:37:22 PM	4	QX-308276	0	4
Z47203833	Mistrel Auditorium	Instant Teleportation, Inc.	5	7/25/2019 5:37:22 PM	5	QX-306117	0	5
Z47201217	Instant Teleportation, Inc.	Speedy Transit	5	7/27/2019 5:37:22 PM	4	QX-307292	2	4
Z47202415	Hollis Enterprises	Last Mile Trucking	4	7/26/2019 5:37:22 PM	4	QX-309330	0	4
Z47205391	Hollywood Hotels	Bugs Bunny Expediters	5	7/28/2019 5:37:22 PM	3	QX-302140	0	3
Z47205847	Marvelous Marv	Everywhere Transportation	5	7/28/2019 5:37:22 PM	5	QX-307329	0	5
Z47202335	Yosimite Sam Liquors	Hollis Worldwide	4	7/27/2019 5:37:22 PM	4	QX-304621	0	4
Z47201380	Hollywood Hotels	Federal Worldwide	5	7/25/2019 5:37:22 PM	8	QX-306657	0	8

This is the last few square centimeters of open space, so we have to jam something in there. Screen real estate is valuable! Or something. Anyway, let's fill this right up to the bottom. Let no space go unused!
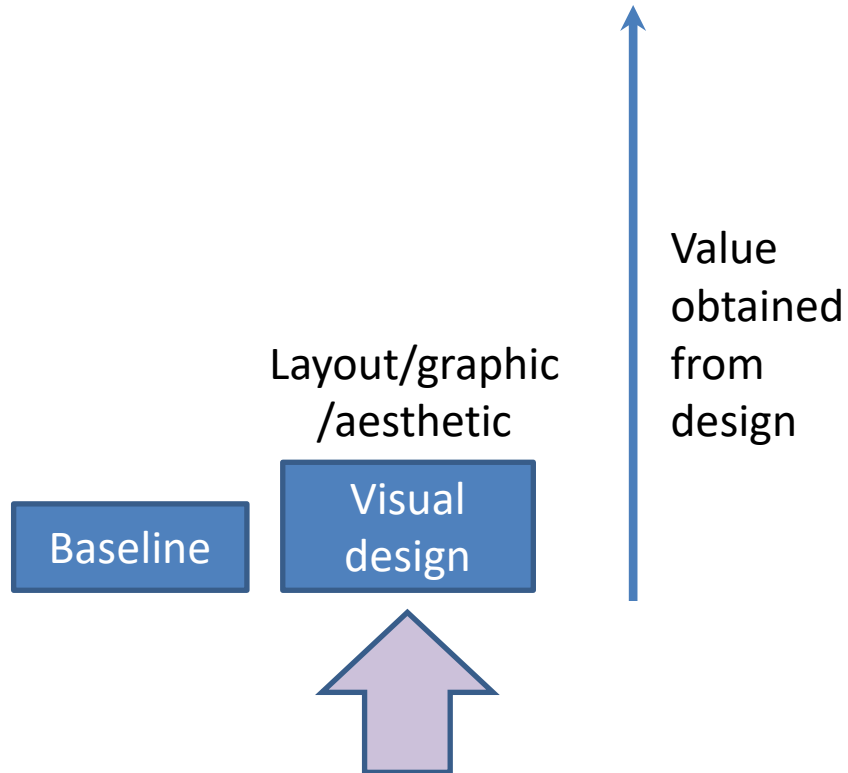
Save
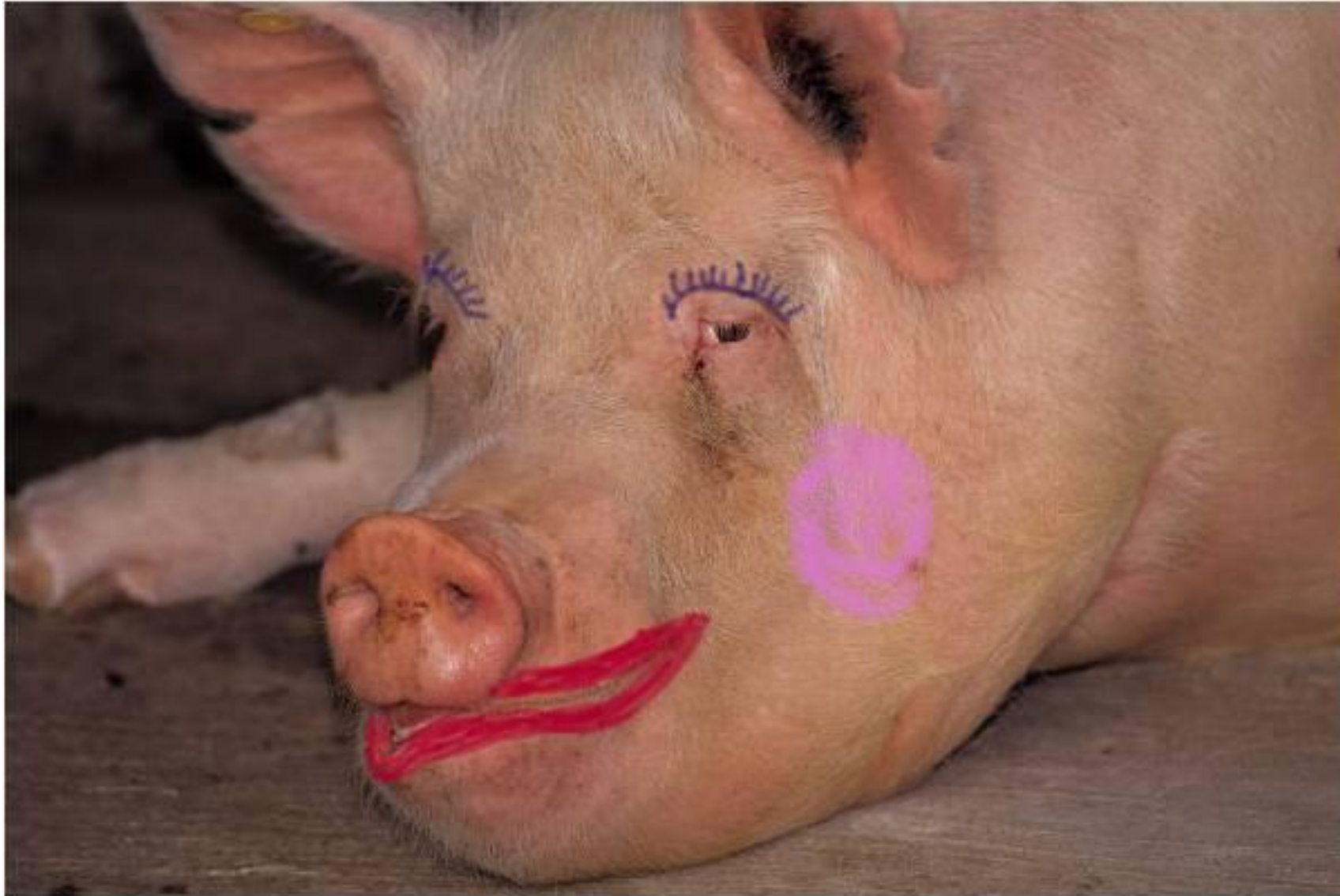Cancel
Defer
Reject
Procrastinate
Blastoff

For many decision makers, "design" means visual/aesthetic design

It's often the first type of design a software development team incorporates into their apps

Value obtained from design

Layout/graphic /aesthetic

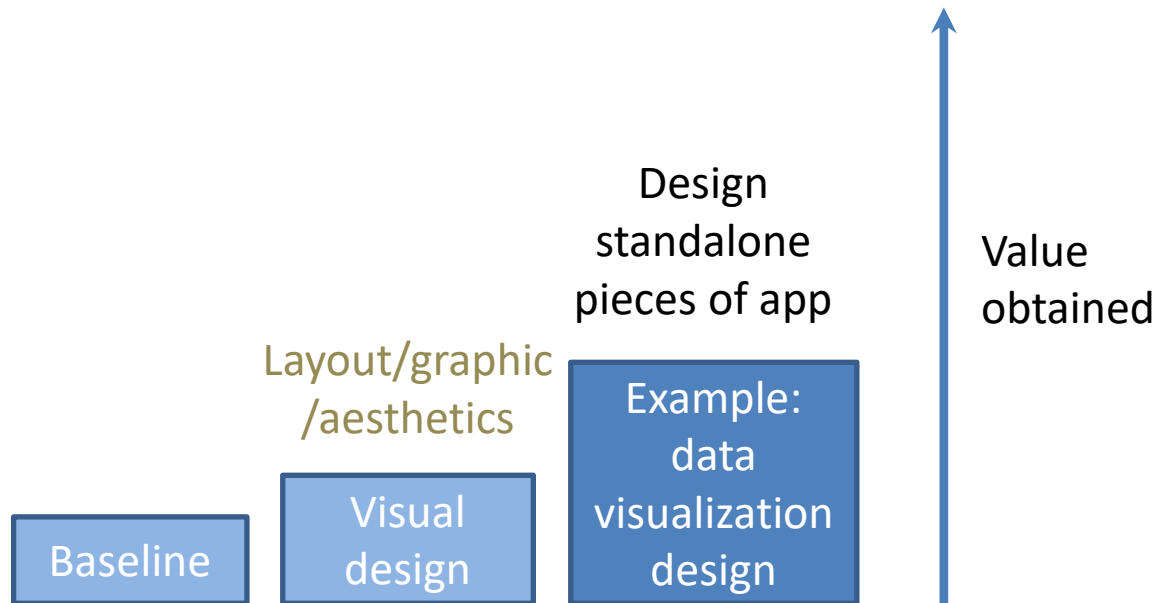| Baseline | Visual design |

Aesthetics are important, but have a value ceiling

Incremental design – redesign part(s) of an existing app

Commonly used view that is considered inadequate, data visualization to help consume information, etc.

Design standalone pieces of app

Value obtained

Layout/graphic /aesthetics

Example: data visualization design

Visual design

Baseline

Incremental design on existing app

- Find a view/page (or a small group of related ones) that need improvement
- Go through lightweight design process
  - Observe users at work to see where the flaws are, discuss inadequacies with them
  - Sketch out ideas for improvement, hopefully several of them
  - Get feedback on sketches from users
  - Repeat until design is good enough to start implementation
- Generally informal

Typical candidates for incremental design

- Inadequate or confusing search
- Data visualization for important data
- Streamlining a heavily used workflow

All of these can add value far in excess of the investment made

Preparation for incremental design

- Developers need some basic grounding in design principles
- This helps generate ideas, and provides guidance on good and bad designs
- Video courses can get them started
  - I have one on Pluralsight, one on LinkedIn
- Or bring in some design instruction

Next step up: application or module replacement

- Often because of platform change
- Replacing entire app, or at least a major module or two
- If the back end is adequate, the project is focused on replacing the front end

If you're re-creating anyway, applying UX design can make the replacement app far more valuable. (Why rewrite on a new platform and keep the same old, obsolete designs?)

Interaction design covers a larger app footprint, often an entire app

Designing navigation in the app is one major new design concern
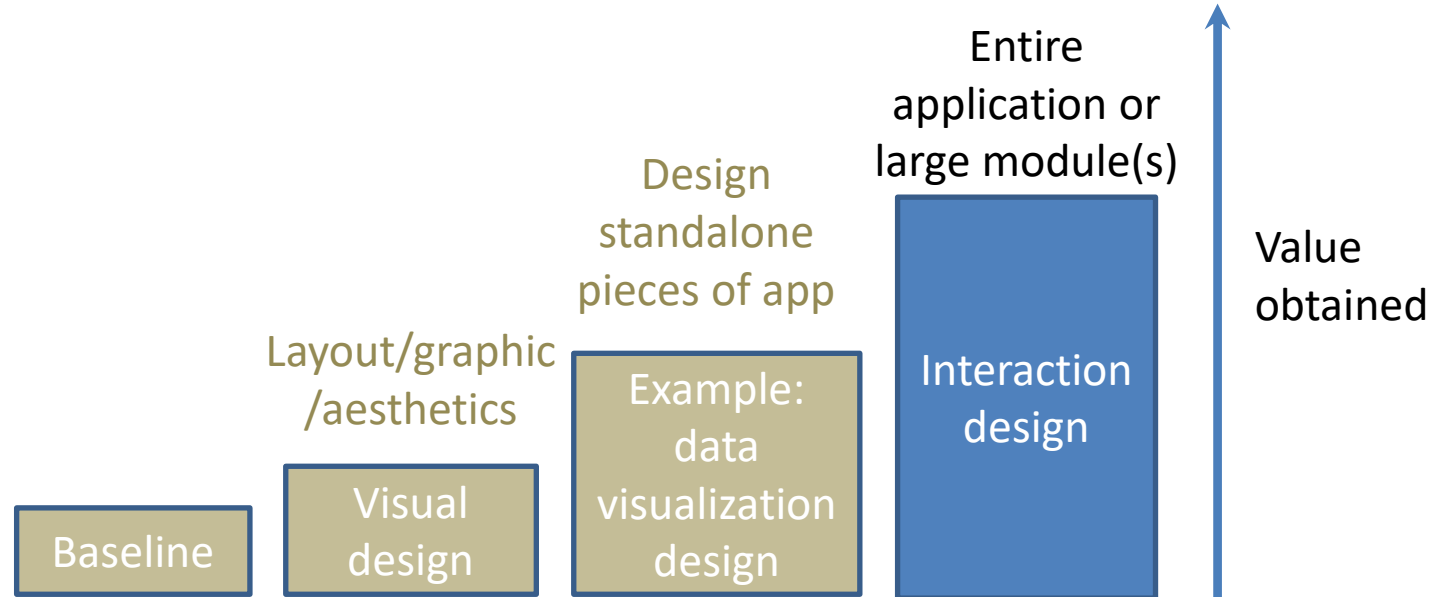
This type of design is usually called Interaction Design

- Term coined by Alan Cooper, "The Father of Visual Basic"
- It focuses on interactions rather than layout
    - Interactions within a view
    - Interactions among views
    - Navigation throughout the app
    - Dynamic UI (expansion, overlays, changing out panes)

- Most of my projects are in this territory

Potential for very large payback

- I have a spreadsheet to calculate returns on this kind of design

- It's for business apps in general

- It's at http://bit.ly/UXROIEstimator

  – Google Sheets version at https://bit.ly/UXROIGoogleSheets

- Let's do a couple of examples

Design Thinking across entire workflows

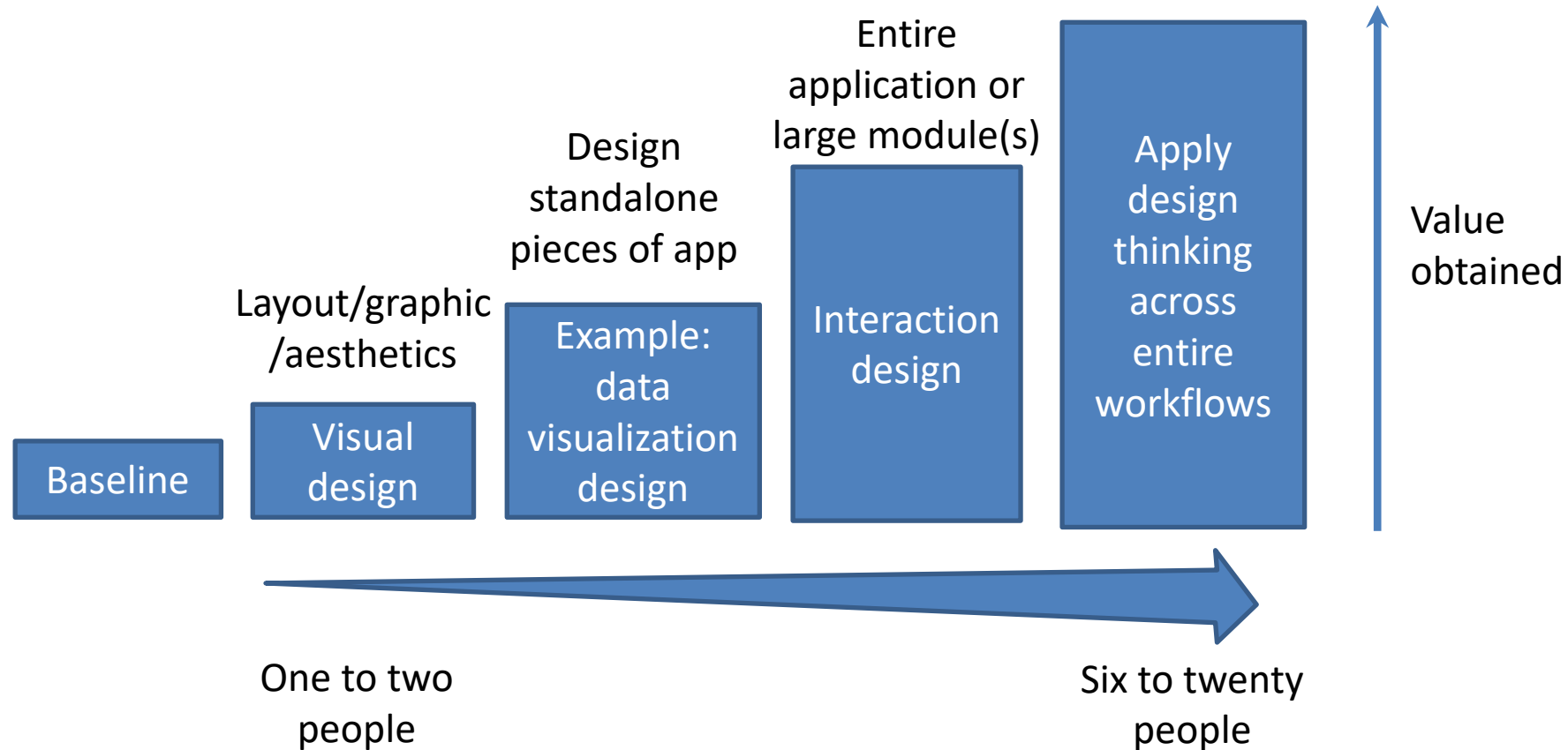## Typically involves multiple apps, and business process reengineering
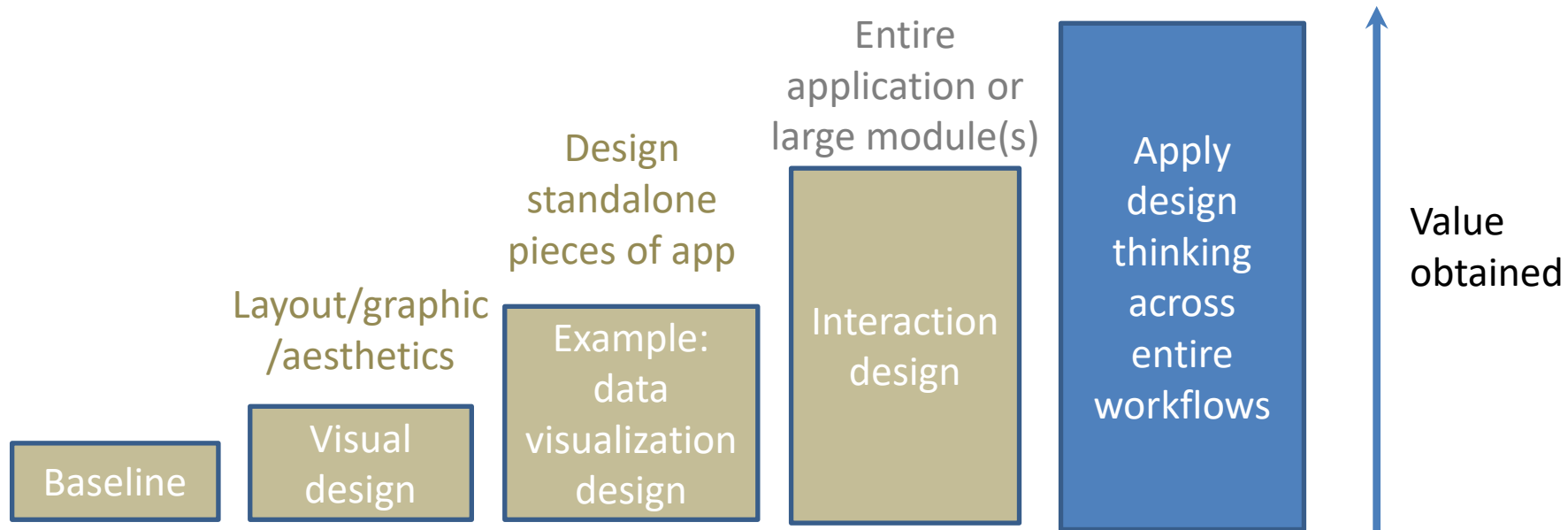
Time and investment vary with design ambition
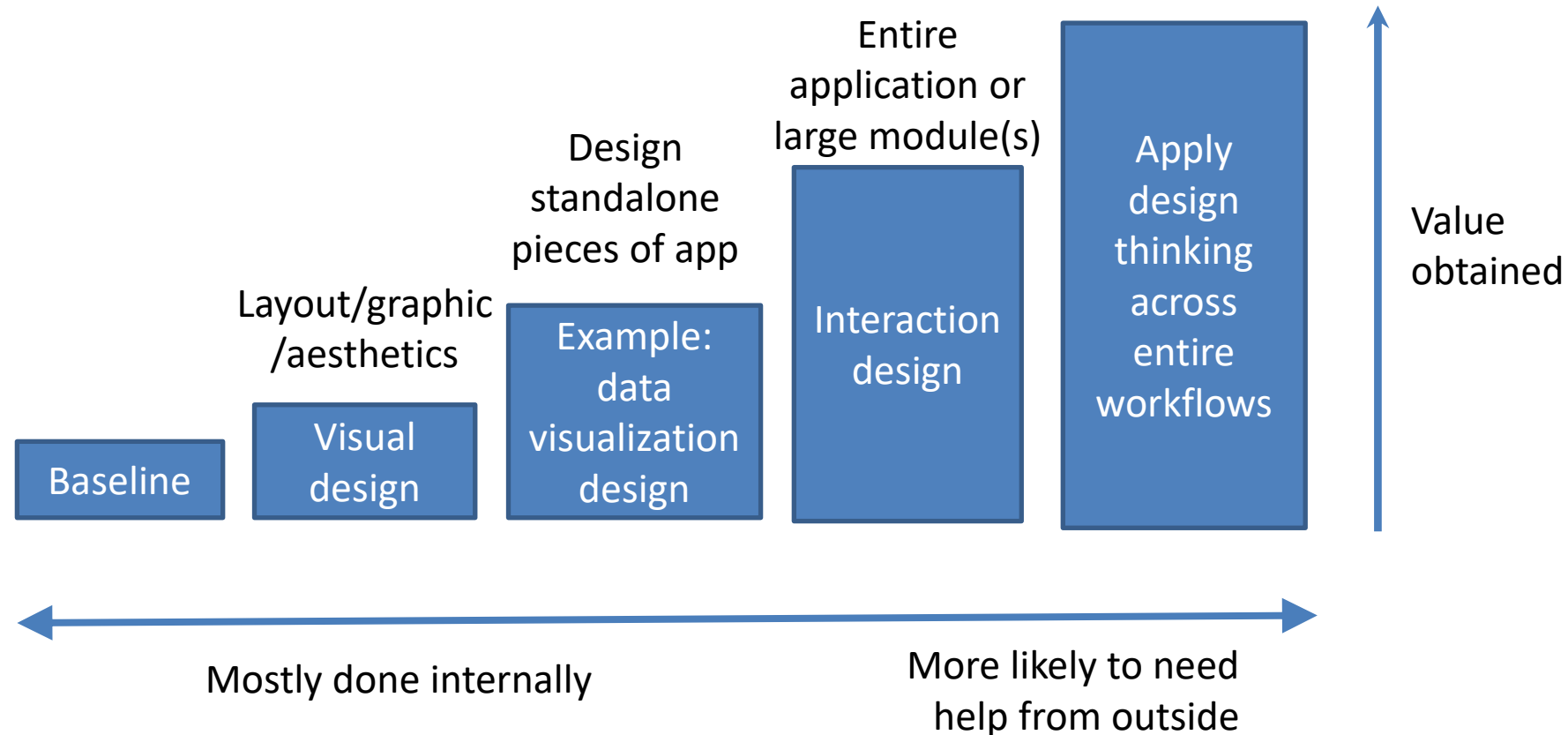
More value as you go to the right, but more investment too
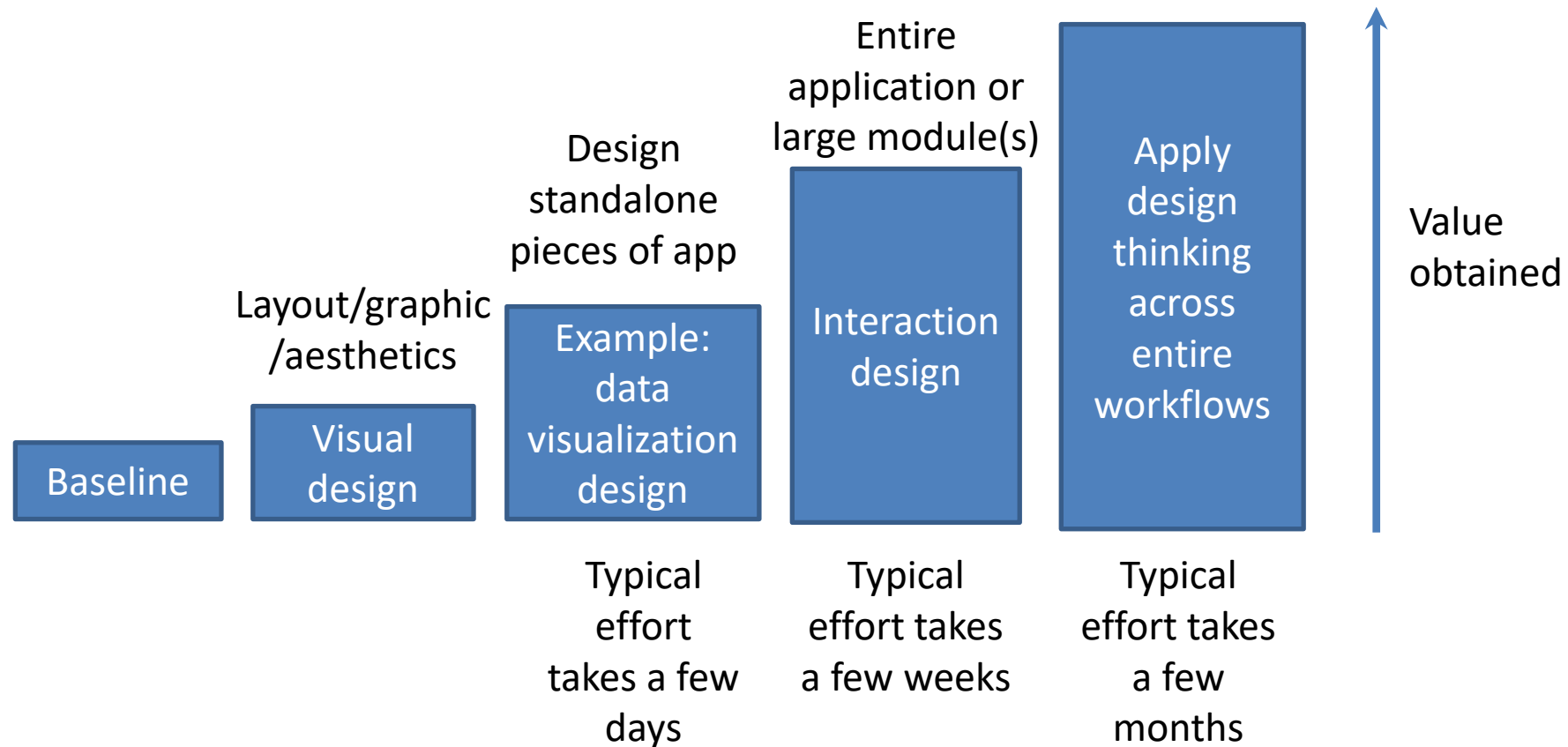
More people involved for higher value design

Active design teams are bigger for interaction design and workflow design

Entire application or large module(s)

Design standalone pieces of app

Layout/graphic /aesthetics

Apply design thinking across entire workflows

Interaction design

Example: data visualization design

Visual design

Baseline

Value obtained

One to two people

Six to twenty people

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Internal only vs. external involvement

The further right you go, the more likely you are to need help from outside your organization

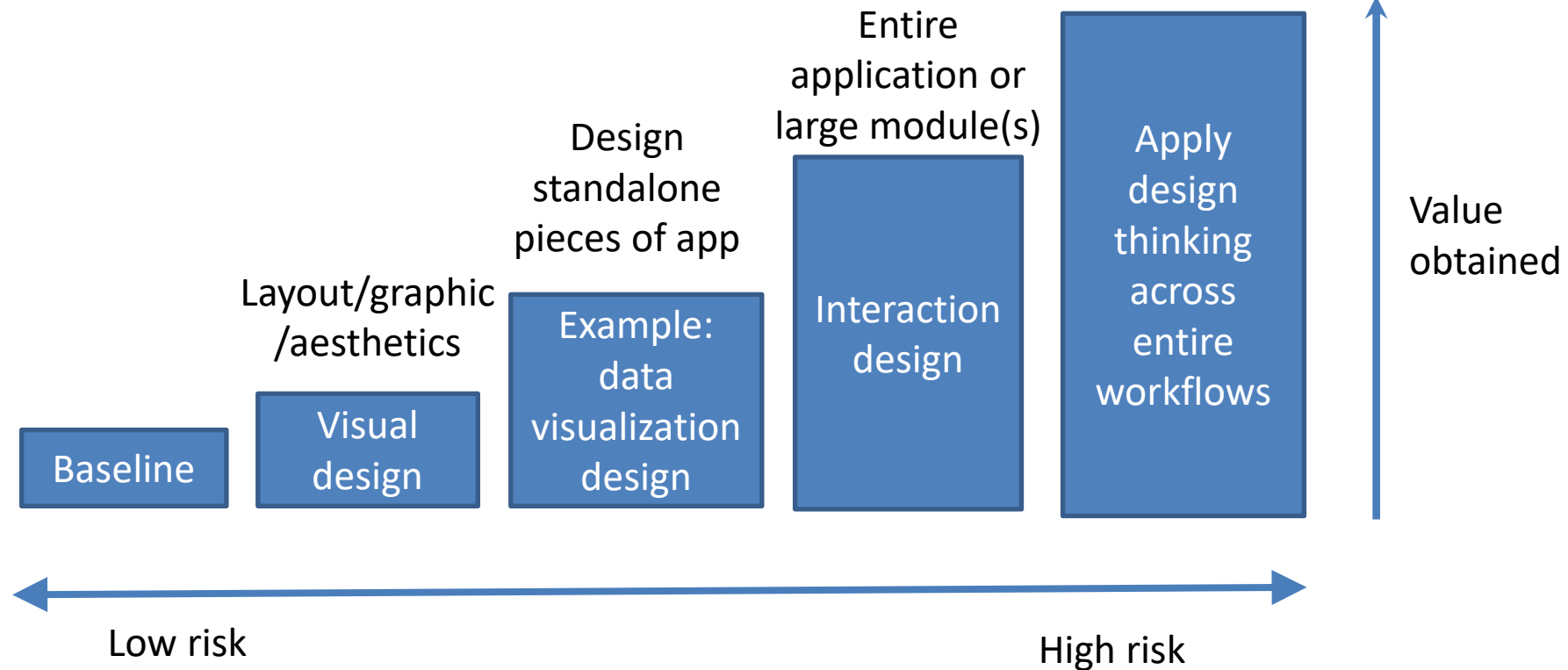Entire application or large module(s)

Design standalone pieces of app

Layout/graphic /aesthetics

Value obtained

| Baseline | Visual design | Example: data visualization design | Interaction design | Apply design thinking across entire workflows |

Mostly done internally

More likely to need help from outside

Sophisticated design is more analytical

Gathering data, measuring things, assessing design priorities more needed for interaction design and design thinking in workflows
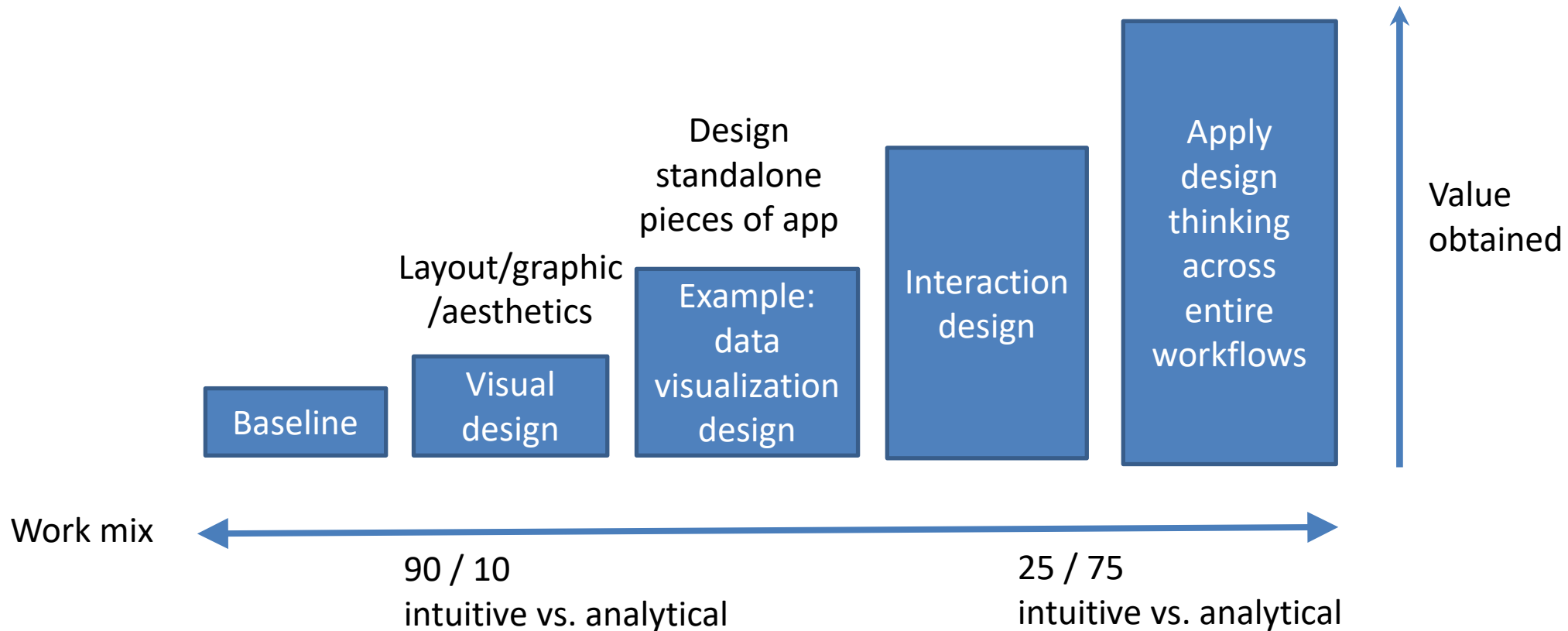
Sophisticated design is higher risk

The more you change, the more pitfalls you will encounter. But sometimes inaction is even riskier....

Entire application or large module(s)

Design standalone pieces of app

Layout/graphic /aesthetics

Apply design thinking across entire workflows

Interaction design

Example: data visualization design

Visual design

Baseline

Value obtained

Low risk

High risk

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Innovation easier and risk lower with external help

- Expertise in the design process
- Pool of design ideas from study and previous projects
- Facilitation and conflict resolution easier for someone from outside

- Most important – they help break the internal members of the design team loose from the past and embrace new thinking about old problems

Review: Where does design make or save money?

- For corporate applications, tangible, measurable savings from innovative interaction design
  - User productivity
  - Fewer errors
  - Less training
- Intangible benefits
  - Customer satisfaction
  - Employee satisfaction

- Advanced cases of design thinking: game changing innovation, leading to new revenues

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An advanced case

- American Healthways (now just called Healthways), from 2003-2004
  - Grew 10X in revenue in 5 years, added $2 billion to stock value
  - Key innovation – new, innovative, highly configurable call center app for managing disease and gathering healthcare information
  - Cut time to customize for new client from months to hours

HEALTHWAYS

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Different analysis for commercial software packages and SaaS

- Impact areas
  - Improved sales
  - Retention of customer base
  - Lower customer support costs

- In this realm, excellent, innovative design can save the company
  - http://bit.ly/RCCCIDemo
  - This is the president of the company explaining how design transformed their software development efforts

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Rural Gas Company, Inc. [10.01.00.10]

RURAL GAS COMPANY, INC.

Search menu

HOME

CUSTOMER HUB

$ SALES-CASH RECEIPTS

DELIVERY & SERVICE

FUEL

ACCOUNTS PAYABLE

GENERAL LEDGER

INVENTORY

FIXED ASSETS

PAYROLL

UTILITIES

SETTINGS

MESSAGES

OPEN ITEMS 2

USER
SystemAdmin

ABC Company · ABCCOM · 40

C.O.D.

Edit Details   More options...

Billing Address
79429 370th St
Olivia, MN 56277

Contacts
(320)231-3846 · Paul Johnson
Marge Peterson

11
active locations

17 days
since last delivery

47
open orders

$510.08
balance due

$9,353.99
actual balance w/disc

SUMMARY

LOCATIONS

ORDERS

FINANCIALS

CONTRACTS

FUEL ASSISTANCE

HISTORY

CUSTOM

EQUIPMENT

REMINDERS
1 active

CHECKLIST
0 of 11 completed

IMAGING

Locations

+ Add a Location

1 Home (DD) LBR1

(Jack's House)
Sec 27 Bird Island Townshi... ...

No Deliveries Scheduled
Runs out in 68 days

No SWO's Scheduled
Last SWO was 19 days ago

71%

500 gal

2 Shop (DD) LBC1

(Shop Acct)
Sec 15 BI Township ...

No Deliveries Scheduled
Runs out in 97 days

No SWO's Scheduled
Last SWO was 61 days ago

74%

1000 gal

3 Cdry

WC

250 gal

Recent History (last 10 transactions)

Note Options Include Notes ∨

Reference 91082

Location
2

Status
C

Inventory#

Description
Bad debt

Fuel Quantity
0.00

Unit Price
$0.00000

Amount
($179.80)

Thursday, November 29, 2018

Note Reference D0005026

Contact: test Route: 9.11
Driver: 1 User: KJE
Date Taken: 11/29/2018 Time
Taken: 1:41 PM

Thursday, November 29, 2018

Note Reference D0005024

need asap

Wednesday, November 28, 2018

Note Reference D0005024

Contact: bob Route: 9.11
Driver: 1 User: BES
Date Taken: 11/28/2018 Time
Taken: 9:43 AM

Wednesday, November 28, 2018

Note Reference W0010

Line runs from SW corner of
house to tank

Wednesday, November 28, 2018

9:33 AM
12/3/2018

Why isn't everybody doing this?

- Some apps don't have enough usage to get that kind of returns and results

- The industry has a shortage of "high design" expertise

- The inspiration to do great design is missing from our ecosystem

- Decision maker lack of understanding of design and its possibilities (including large potential paybacks) is a major factor

You probably don't know many of the best examples

- Organizations who come up with innovative design are not eager to share it with their competitors
  - Example: 3M Chartscript we saw earlier

- But you might be aware of the disasters…

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Poor design can cause catastrophic failure

"Avon halts its global rollout… after a Canadian pilot project prompts reps to quit in frustration."

A really expensive design catastrophe: Windows 8

Another blocking factor to leveraging design

- Developers and business analysts have the domain knowledge for design efforts, but…

- Developers often focused on code and technology
  - Design gets them out of their comfort zone
  - Taking to users, sketching designs, etc. not in their wheelhouse
  - Their "agile" focus on incremental development does not help
- Analysts think design isn't hard, and that they don't need professional design help to do it
  - They're usually wrong about that

ARCHITECTURE
TESTING
TALKING TO USERS
UX DESIGN

DEVELOPERS

WRITING CODE

imgflip.com

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Different analysis for software package and SaaS

- Impact areas
  - Improved sales
  - Retention of customer base
  - Lower customer support costs

- In this realm, excellent, innovative design can save the company

First level of disconnect: decision makers don't understand what you do

You might as well be stirring a cauldron and saying magic spells.

Second level of disconnect: decision makers understand even less about what designers do
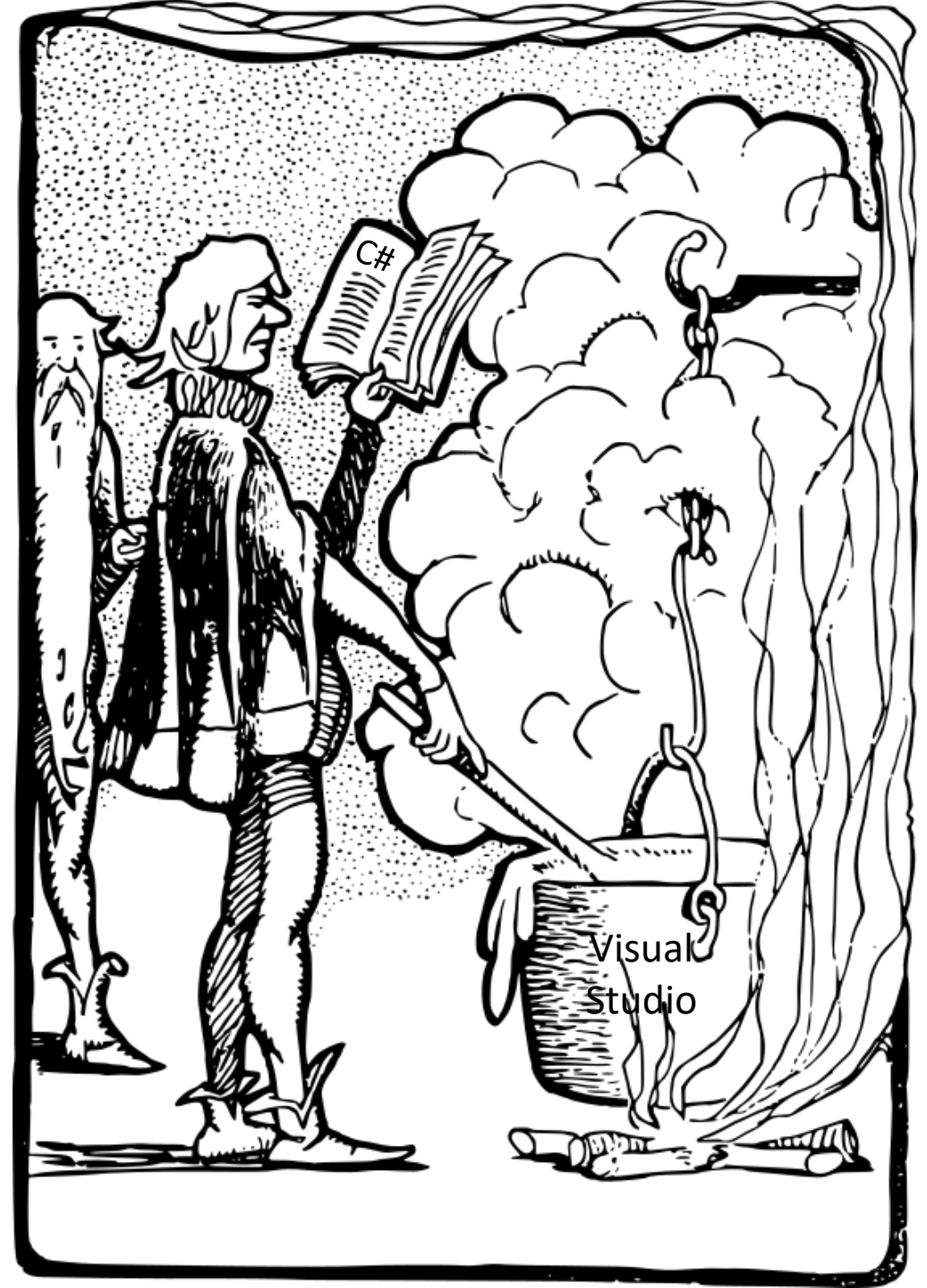
Designers

Non-designers
(Developers,
managers,
executives)

They think development is already too expensive.

The last thing they want is to spend more money on it.

Common side effect: they discourage talking to users

- "It will just bother them"
- "We already know what the system needs to do"
- "We have this binder that discusses the requirements – just design from that"
- "The users are not accessible to developers" (for security or logistical reasons)

- A decision maker who does not want you to talk to users is showing an almost total lack of understanding of what design encompasses

Gradual approach

- Don't worry much about the aesthetic level – get visual design assistance as needed
  - Don't lean on them past what they can do
  - They usually have intuitive process with limited investigation
- Take an isolated piece and do a simple design process
  - http://bit.ly/DesignProcV5 - my design process notes from my design class
  - Data visualization is a good example to try
- Larger design efforts for app replacement, major renovation, or platform change

Or jump to complex design if decision makers are onboard

- Structured design training
  - From interaction designer, not visual designer
- Ideally jump immediately into a real design effort
- You must have a design facilitator/lead
  - The more experience they have in deep design, the better
- Twin goals – get some good designs for the immediate project, plus learn design methods and principles for later projects

Typical steps in a UX design process

Understanding

- Business needs
- User observation in the field
- Analyzing user observations
- Creating work models
- Listing and prioritizing design tasks

Design

- Visioning
- Storyboarding
- Wireframing / Illustration / paper mock-up
- Interaction prototyping
- Design evaluation

Business needs

- A day or so, possibly with research assignments to various team members

- Establishes constraints, including technical and business related

- Establishes general expectations on timelines for app dev, scheduling of design milestones, metrics for success, etc.

User observation

- Two main phases
  - User observation in the field
  - Analyzing user observations
- Will need to be done mostly or entirely remotely via remote access and meeting technologies
- Real users doing real work
- Ideally supplemented by actual field observation
- My own process for analyzing user observations

Work models

- Basic work flows for 3-5 most important areas of functionality
  - For example, typical process for order entry
- Done collaboratively
- Can be done remotely using technology such as Collaboard (virtual whiteboards)
- Results should be validated by domain experts and savvy users

Listing and prioritizing design tasks

- Some of the candidates for this list are in the notes document I prepared

Iterative design phase for each task

- Ideation and brainstorming
- Sketching, production of multiple options
- Evaluation, then more sketching
- Various stakeholders involved
- Multiple viable options then go to wireframing

Wireframing

- Electronic tools to show what views will look like

- Not interactive

- Not detailed on aesthetics

Prototyping

- Shows interactions as well as layout

- Still not worried about aesthetics

- Best choice for showing stakeholders, helping them contribute to evaluation of designs

- Next step, if needed, is usability testing, but that is not in the scope of this project
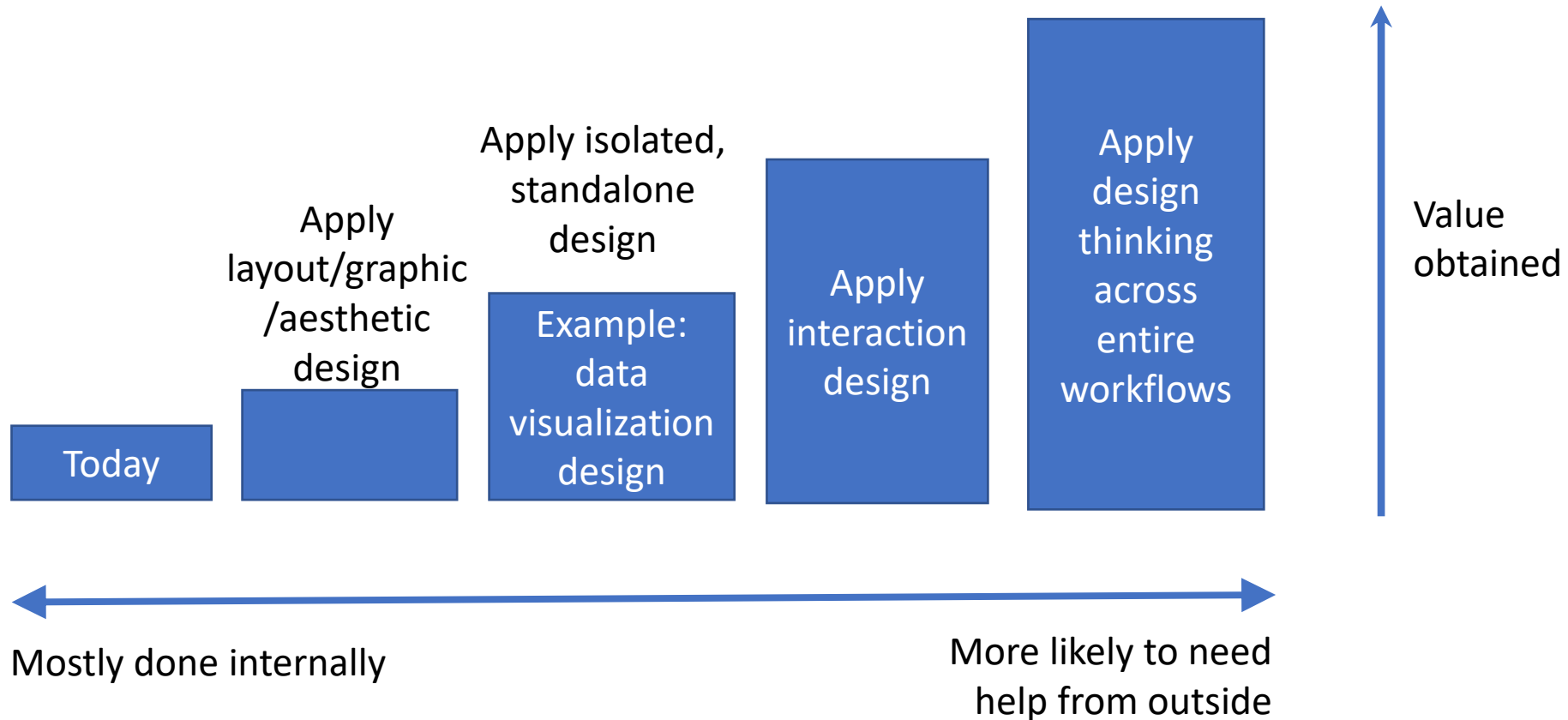
Smaller design efforts => some steps optional

- Visioning, for example, not typical for standalone design efforts
  - But could be if a new graphics/charting package offered new avenues for the designs needed

Platform change

- Opportunity for total rethink of the application
- Start with firm understanding of the users and their workflows
- Interaction design for sure
  - First interaction design task often to figure out navigation in the new version
- Possibly re-engineer some work flows to dramatically speed up users or offer major innovations for the business

The rightmost efforts benefit most from an outsider's viewpoint

It's hard to imagine new ways of doing things when you have years of experience with the old ways

Today

Apply layout/graphic /aesthetic design

Apply isolated, standalone design

Example: data visualization design

Apply interaction design

Apply design thinking across entire workflows

Value obtained

Mostly done internally

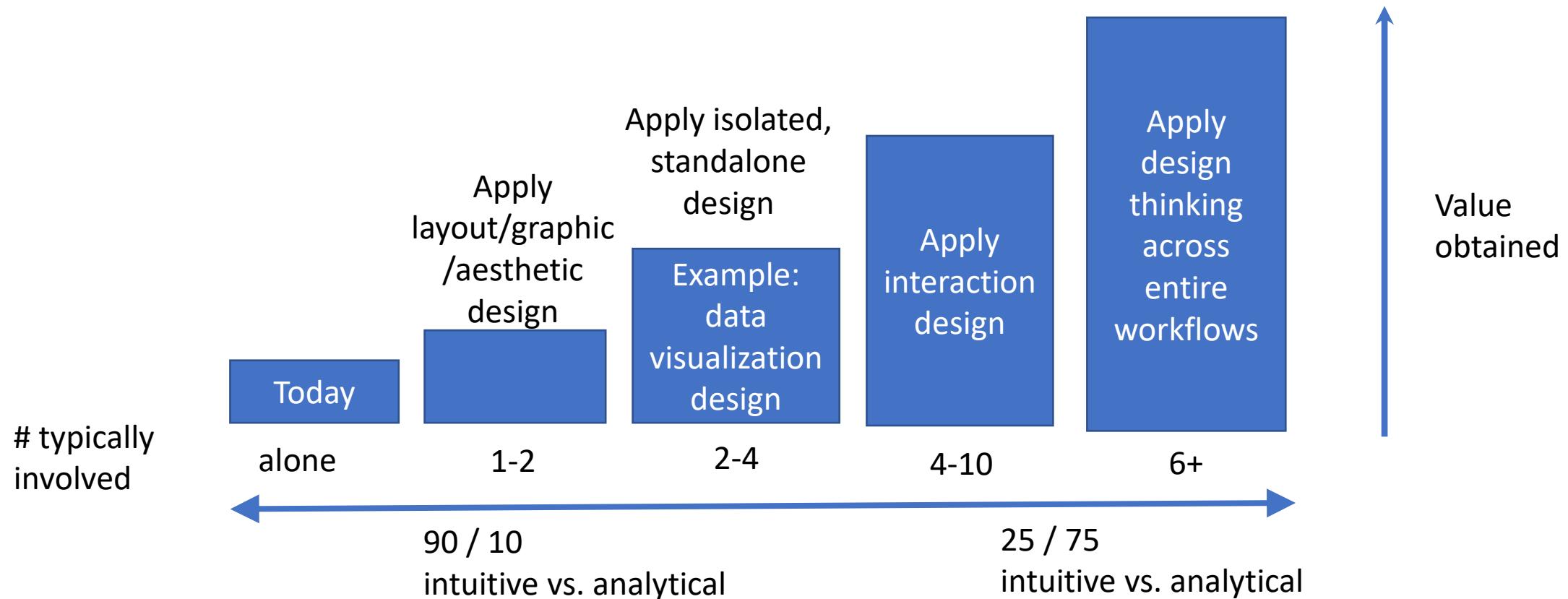More likely to need help from outside

Design teams can involve many roles

- The more complex the design challenge, the more multi-disciplinary the design team needs to be
  - Leader/facilitator
  - Project manager
  - Business analyst
  - Users or user proxies
  - Domain experts
  - Developers who will be implementing the designs
 - Other stakeholders

Size of team, balance of intuitive vs. analytical

Design efforts on the right side need larger teams and more analytical approaches

Apply isolated, standalone design

Apply layout/graphic /aesthetic design

Apply interaction design

Apply design thinking across entire workflows

Value obtained

Today

Example: data visualization design

typically involved

alone

1-2

2-4

4-10

6+

90 / 10
intuitive vs. analytical

25 / 75
intuitive vs. analytical

Measurement

- Early in the design effort, get your metric and the current value of it
  - Order per hour
  - Trouble tickets serviced per day
  - Revenue per week
- After implementation, measure again
  - Limited improvement -> suboptimal design
  - Major improvement -> haul out those spreadsheets
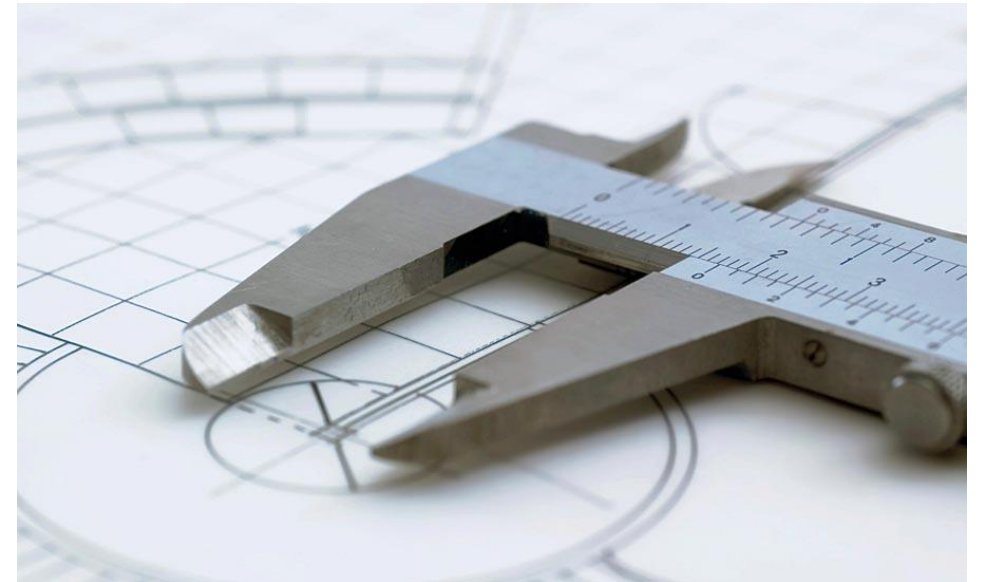
Blow your horn

- If tangible measurements show success, don't be shy about sharing that
- Otherwise, someone who did nothing but get in your way will jump in and take all the credit

- You don't have to share credit with outsiders unless you want to
  - We get our thrills from just doing the work… and making lots of money

Success is not assured

- Design is hard, and getting harder as things get more complex
- Not all teams make the transition to design thinking
- Even when they do, some individual design efforts fail

Resources: The role of creativity

- Out of our Minds: Learning to be Creative
  (Sir Kenneth Robinson)

- The Creative Habit
  (Twyla Tharp)

- Curious: The Desire to Know and Why Your Future Depends On It
  (Ian Leslie)

Most books have links on the page
http://billyhollis.com/designbooks/

Resources: the design process

- Sketching User Experiences: the Workbook
(Bill Buxton, et. al.)

- 101 Design Methods
(Vijay Kumar)

Resources: design principles

- Universal Principles of Design (Lidwell, et. al.)
- Designing with the Mind in Mind (Dr. Jeff Johnson)

Resources: design thinking for organizations

- How Design Makes the World
  (Scott Berkun)

- The Design Thinking Toolbox
  (Michael Lewrick, et. al.)

- Most important resource - commitment

Resources: more from me

- What do Users Really See? (NDC London, January 2020) Youtube - https://bit.ly/WhatUsersSeeLondon

- Pluralsight Course on design principles: http://bit.ly/CUXPluralsight

- LinkedIn course, UX Design for Developers: http://bit.ly/UXforDevsLiL

- Design process notes from my design class: http://bit.ly/DesignProcV5

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Billy Hollis

- User interface design, prototyping, and construction
- Design facilitation for task flow re-engineering
- Training on user experience design

- Set up a web meeting to discuss
  - Getting started with user experience design
  - Understanding return on investment of UX design
  - Evaluation of your current app: opportunities for UX improvement

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