

Alex Livingston

Product and Experience Design



Improving Excel Online

Presented here:

Data Validation redesign

Other work:

Sort & Filter redesign

MS Forms & Excel integration

Cut Copy Paste animations

Excel start page redesign



Data Validation

Controlling and checking spreadsheet inputs to avoid mistakes



Excel online

Bringing Excel on the web to the forefront

Contextual issues:

People don't know Excel is on web – Lack of awareness for existing & potential users

Confusion about Office – Perpetual license VS O365 paid VS free web version

Google Sheets competition conundrum – Catch up or innovate?

*** Excel Online feature holes – port over from desktop, or improve?





Data Validation

The design mission
report card

Business goal:

Bring the Data Validation
feature to Excel Online for
parity with desktop



Port it over **as is**



Port it over with its
current functionality
and a **visual redesign**



Opportunity to **redesign its
functionality** and interface



Data Validation

One of the most used features in Excel

Generally

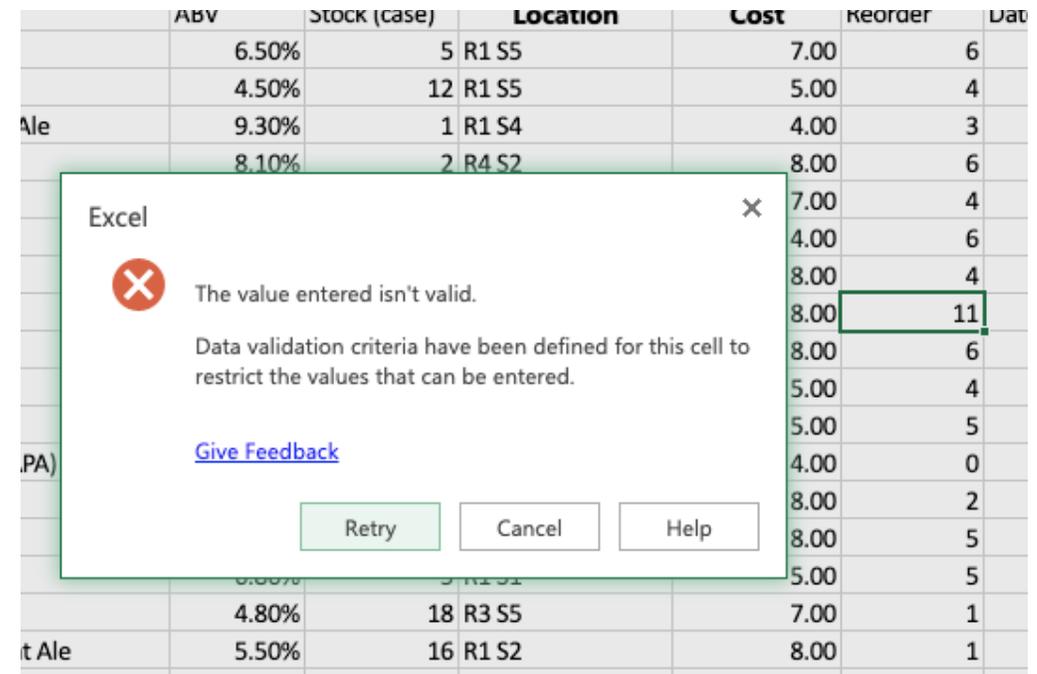
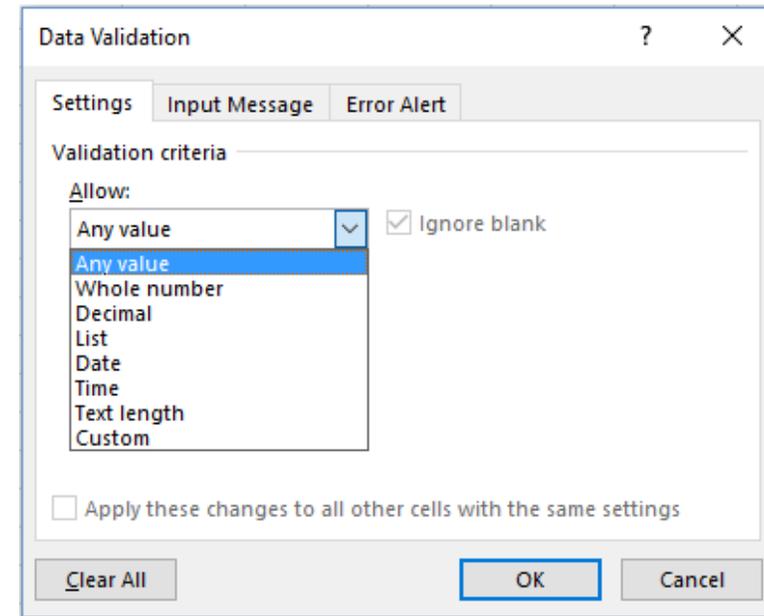
Data validation is a feature used to control what a user can enter into a cell

It's about limiting or checking the accuracy and quality of data

1. DV users care about control *"will my data will be safe from human error?"*

Therefore:

2. Any lack of clarity around creating a rule or its effect is a failure of the feature and its design





Data Validation

First, a thorough audit of the feature today

I did a super-thorough audit of the UI today, for experience, effort, affordance, comprehension, heuristics, visual design, and brand.

The image shows a screenshot of the Microsoft Excel interface with four Data Validation dialog boxes and three error message boxes overlaid on a spreadsheet. The ribbon is visible at the top, showing the 'Data' tab and the 'Data Validation' button. The dialog boxes are arranged in a row, each showing a different 'Error Alert' style: 'Stop' (red X), 'Warning' (yellow triangle), 'Information' (blue circle), and 'Information' (blue circle) with the 'Show error alert after invalid data is entered' checkbox unchecked. Below each dialog box is a corresponding error message box. The error message boxes are: 1. 'Microsoft Excel' with a red X icon and the message 'This value doesn't match the data validation restrictions defined for this cell.' with 'Retry', 'Cancel', and 'Help' buttons. 2. 'Microsoft Excel' with a yellow triangle icon and the message 'This value doesn't match the data validation restrictions defined for this cell. Continue?' with 'Yes', 'No', 'Cancel', and 'Help' buttons. 3. 'Microsoft Excel' with a blue circle icon and the message 'This value doesn't match the data validation restrictions defined for this cell.' with 'OK', 'Cancel', and 'Help' buttons. 4. 'Microsoft Excel' with a blue circle icon and the message 'This value doesn't match the data validation restrictions defined for this cell.' with 'OK', 'Cancel', and 'Help' buttons.

BLOCKS BAD INPUT

ALLOWS BAD INPUT, USER CAN'T SEE BAD DV UNTIL "CIRCLE INVALID" CHECKED, IN RIBBON

ALLOWS BAD INPUT, USER CAN'T SEE BAD DV UNTIL "CIRCLE INVALID" CHECKED, IN RIBBON

ALLOWS BAD INPUT, WITH NO WARNING USER CAN'T SEE BAD DV UNTIL "CIRCLE INVALID" CHECKED, IN RIBBON



Data Validation

UX values to re-introduce (and improve) the legacy feature

Simplicity of design

Removal of cognitive noise

Human language

Consolidation of mental modals

Clarity of predictable effects



Hydration Mechanisms (external)

Control Inputs Incident Communication Warnings Signals

Input settings

Unit Do not detect intermittence

Boolean Operator

Condition 1

Condition 2

Condition 3

Binary system console override

Reset all OK Cancel



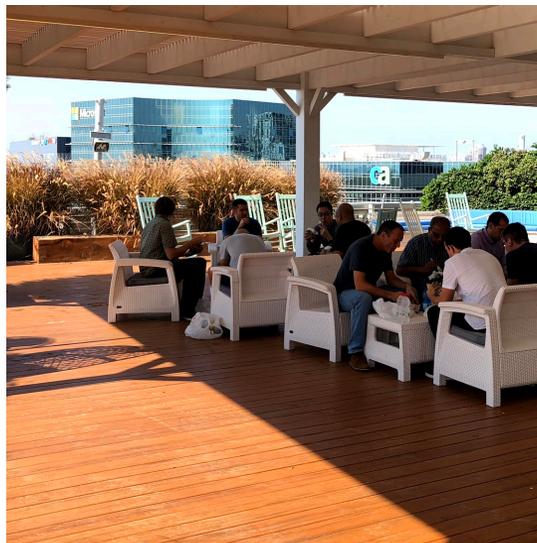
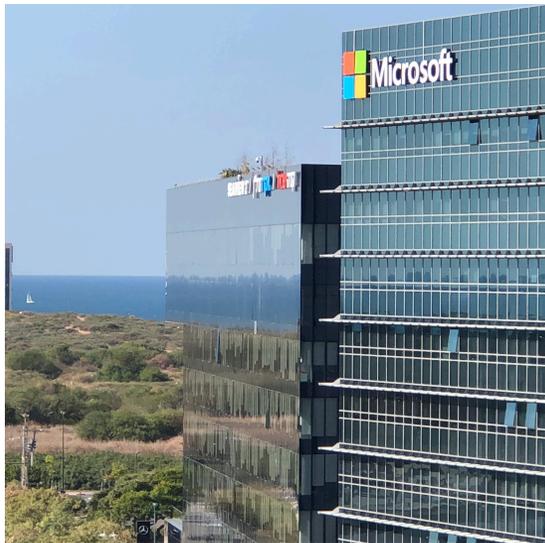


Data Validation

Better communication with a remote team

To bolster the buy-in from leadership, gain great cooperation of PM and ENG on the team, and design together with more clarity and speed, I lobbied to spend time with the web Excel core team in Tel Aviv, Israel.

I was able to get a sense of their working style & culture, gain trust on my design process and decisions, and leave with a sense moving forward how best to refine products together.





Tweaks and twinkles

Small, motivated improvements that can make for better UX



Dialogue makeover

First open

Nix redundancy of headers

Nix unhelpful null controls

Desktop

Overall - update visual style, spacing, font and sizing, border and drop shadow to align with brand

Simplify tabs to two (i.e. cause & effect)

Human language

Retain dialogue space for expanding settings to reduce visual jumps

Keep helpful null hints

Lock dialogue size (remove drag resize option)

Web



Dialogue makeover

Creating a validation rule

The desktop version of the Data Validation dialog box features a classic Windows-style window with a title bar containing a question mark and a close button. It has three tabs: 'Settings', 'Input Message', and 'Error Alert'. The 'Settings' tab is active, showing 'Validation criteria' with an 'Allow:' dropdown set to 'Whole number' and a checked 'ignore blank' checkbox. Below, the 'Data:' dropdown is set to 'between', with 'Minimum:' and 'Maximum:' input fields, each with an upward arrow icon. At the bottom, there is a checkbox for 'Apply these changes to all other cells with the same settings' and three buttons: 'Clear All', 'OK', and 'Cancel'.

Desktop

Add interaction [*]
to guide necessary
fields while creating
rule

The web version of the Data Validation dialog box has a modern, clean design with a title bar containing a close button. It features two tabs: 'Criteria' (active) and 'Messages'. The 'Criteria' tab shows a list of settings: 'Allow' (Whole number), 'That is' (between), 'Minimum' (50), and 'Maximum *' (Type or select). Each setting has a corresponding input field with a grid icon for reference editing. There is a checked 'Ignore blank' checkbox. At the bottom, there are three buttons: 'Clear All', 'OK', and 'Cancel'.

Web

Design more
intuitive Ref Edit
button

Provide ghosted
helper instruction

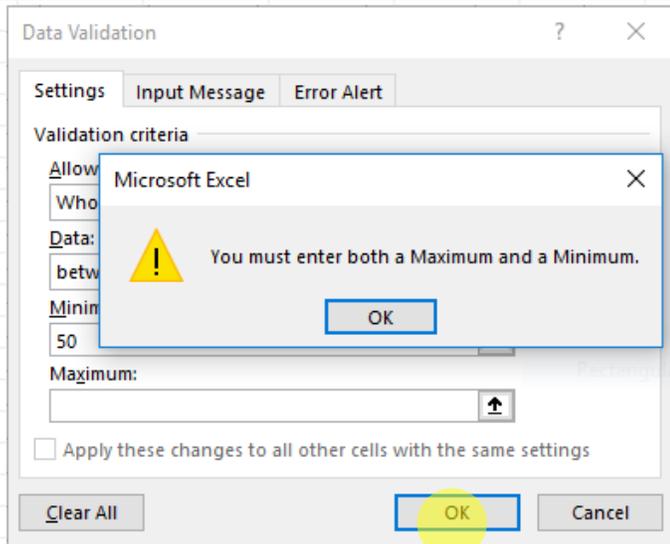
Resurface valid options



Dialogue makeover

Hints... like validation for validation

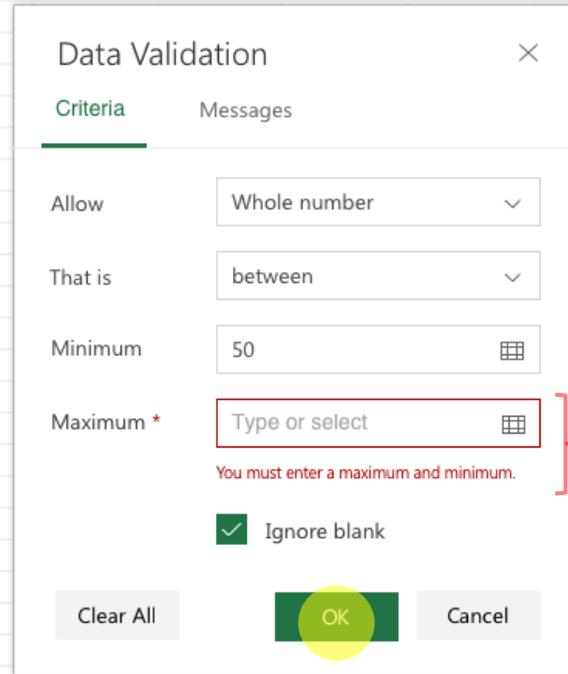
Trying to commit an invalid rule [hits "OK"]



Stop the dialogue on dialogue crime!

Desktop

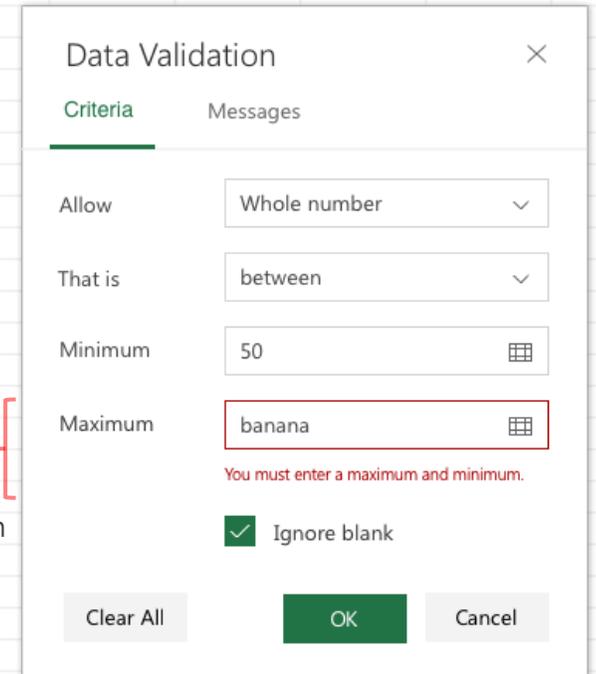
During rule creation



Upon rule commit, expose stronger guidance of missing fields with styling, weight, and verbal hint

Real-time detection of invalid entries exposes guidance

Web





Dialogue makeover

A complete rule

The desktop version of the Data Validation dialog box is titled "Data Validation" and has a standard Windows window appearance with a title bar, help icon, and close button. It features three tabs: "Settings", "Input Message", and "Error Alert", with "Settings" selected. The "Validation criteria" section includes a label "Allow:" with a dropdown menu set to "Whole number" and a checked checkbox for "ignore blank". Below this is a "Data:" section with a dropdown menu set to "between". The "Minimum:" field contains the value "50" and the "Maximum:" field contains "100", both with up arrow icons. At the bottom, there is an unchecked checkbox for "Apply these changes to all other cells with the same settings" and three buttons: "Clear All", "OK", and "Cancel".

Desktop

Clean and well behaved

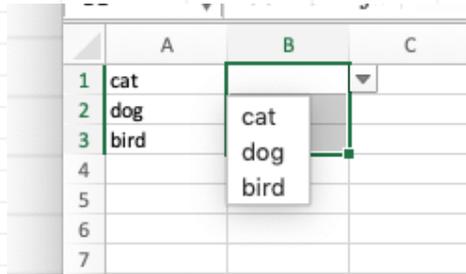
The web version of the Data Validation dialog box is titled "Data Validation" and has a clean, modern design. It features two tabs: "Criteria" (selected) and "Messages". The "Criteria" section includes a label "Allow:" with a dropdown menu set to "Whole number", a label "That is:" with a dropdown menu set to "between", a "Minimum:" field with the value "50", and a "Maximum:" field with the value "100". Below these fields is a checked checkbox for "Ignore blank". At the bottom, there are three buttons: "Clear All", "OK", and "Cancel".

Web



Dialogue makeover

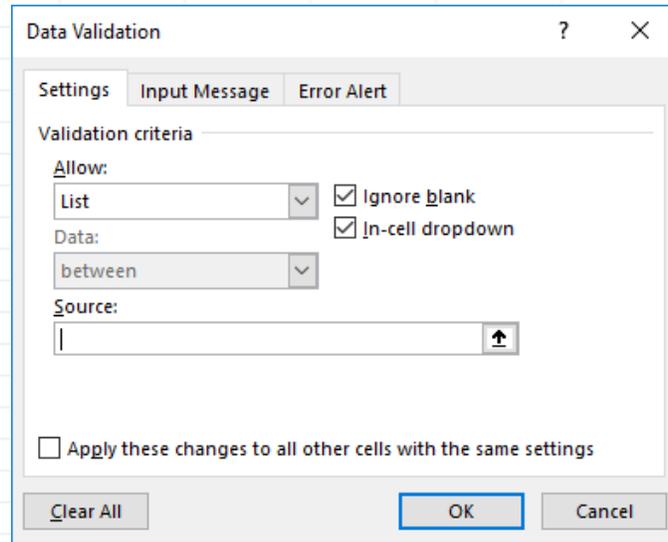
A seamless, dedicated teaching hint



=A1:A3

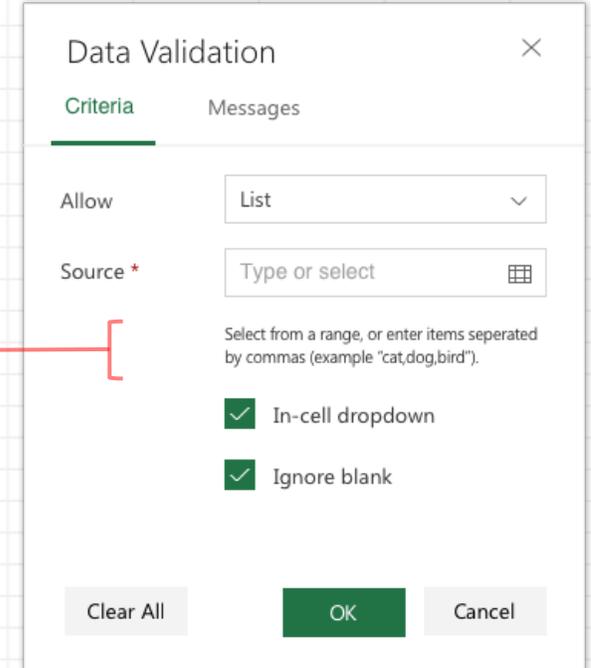
=cat, dog, bird

Two of the ways to create a Dropdown List rule



Many users *do not* know there are multiple ways create a List rule, and there is no UI hinting that it accepts items direction into the field

Desktop



Hint text

Small dedicated teaching text informs more users on ways to use the feature, helping casually demystify Excel

Web



Low hanging A.I.

How can we leverage info users already input to make their task easier?



Intelligent nudges

Smart help to get started

Whole number

With a ranging containing whole numbers - criteria and values are filled from data in the range using the highest and lowest numbers as max and min limits.

Those numbers are color highlighted in the range to easily show the user the source and logic.

The screenshot shows the Microsoft Excel interface with the 'Data' tab selected. A 'Data Validation' dialog box is open, showing the 'Criteria' tab. The 'Allow' dropdown is set to 'Whole number', and the 'That is' dropdown is set to 'between'. The 'Minimum' value is 12,550 and the 'Maximum' value is 35,080. The 'Ignore blank' checkbox is checked. The background shows a spreadsheet with a 'Sales' column containing values for various vendors, with the minimum and maximum values highlighted in red.

Vendor	Sales
Tom's Towels	12,550
Laundretto	33,090
Suds & Co.	16,000
Lyllie's Laundo	20,102
Scrubs	35,080
Frenchies	28,001



Intelligent nudges

Smart help to get started

Decimal

With a ranging containing **only numbers with any decimals, criteria and values are filled from range data**, allowing any decimal and again using the highest and lowest numbers limits.

Again, the max and min are highlighted in the range for the user to see the source.

The screenshot shows the Microsoft Excel interface with the Data tab selected. A table is visible in the background with columns labeled Company, Product, and Markup X. The Markup X column contains values 3.4, 3.2, 4.1, and 5. A red dashed box highlights the range of these values. A Data Validation dialog box is open in the foreground, showing the Criteria tab. The dialog is configured to allow decimal values between 3.2 and 5. The 'Ignore blank' checkbox is checked. Red arrows point from the 'Minimum' and 'Maximum' input fields in the dialog to the corresponding values in the table.

Company	Product	Markup X
Contoso	Craft beer	3.4
Bob's	Beer	3.2
Brewz	Wines	4.1
Winetown	Spirits	5

Data Validation dialog box configuration:

- Allow: Decimal
- That is: between
- Minimum: 3.2
- Maximum: 5
- Ignore blank:



Intelligent nudges

Smart help to get started

Today

Filling out criteria and creating DV rules is **completely manual.**

Next

Excel detects data from the selected range, and upon opening Data Validation, criteria are pre-selected and populated based on range data.

This benefits most users out-of-the-box, and also adds a seamless teaching element that shows how they can use it later.

List

With a range containing **only text strings** - List criteria is pre-chosen and **values filled from text in the range**. The user can edit or overwrite as they wish.

The screenshot shows the Microsoft Excel interface with the 'Data' tab selected in the ribbon. The 'Data Validation' button is highlighted in yellow. Below the ribbon, the 'Refresh Selected Connections' and 'Refresh All' buttons are visible. The main workspace shows a spreadsheet with column A containing a list of vendors: Vendor, Tom's Towels, Laundretto, Suds & Co., Lyllie's Laundo Scrubs, and Frenchies. A red arrow points from the 'Source' field in the 'Data Validation' dialog box to the selected range of cells in column A. The dialog box is titled 'Data Validation' and has two tabs: 'Criteria' and 'Messages'. The 'Criteria' tab is active, showing 'Allow' set to 'List' and 'Source' set to 'Tom's Towels,Laundretto, [grid icon]'. Below the source field, there is a note: 'Select from a range, or enter items separated by commas (example 'cat,dog,bird')'. There are two checked options: 'In-cell dropdown' and 'Ignore blank'. At the bottom of the dialog box, there are three buttons: 'Clear All', 'OK', and 'Cancel'. The spreadsheet at the bottom shows 'Sheet1' as the active sheet.

OK, so what can I type in there?

Microsoft Excel



This value doesn't match the data validation restrictions defined for this cell.

Retry

Cancel

Help



Intelligent messages

Problem today: Extra effort

Today

Rule error messages default to generalized text that offer no hint as to what limits the cell has on it.

Users must manually customize error messages to offer direction on what can be input into the cell.

Default

The 'Data Validation' dialog box is shown with the 'Error Alert' tab selected. The 'Show error alert after invalid data is entered' checkbox is checked. The 'Style' dropdown is set to 'Stop'. The 'Title' field is empty. The 'Error message' field is empty. The 'Clear All', 'OK', and 'Cancel' buttons are visible at the bottom.

"Edge of tl	\$ 60,000	20%	\$ 48,00
cci "Cumb	\$ 300,000	20%	\$ 36,00

A standard Microsoft Excel error dialog box with a red 'X' icon. The text reads: "This value doesn't match the data validation restrictions defined for this cell." The 'Retry', 'Cancel', and 'Help' buttons are at the bottom.

Entered manually

The 'Data Validation' dialog box is shown with the 'Error Alert' tab selected. The 'Show error alert after invalid data is entered' checkbox is checked. The 'Style' dropdown is set to 'Stop'. The 'Title' field contains 'Fix list prices'. The 'Error message' field contains 'For 2019 List Prices are 10K-200K only'. The 'Clear All', 'OK', and 'Cancel' buttons are visible at the bottom.

"Edge of tl	\$ 60,000	20%	\$ 48,00
cci "Cumb	\$ 300,000	20%	\$ 36,00

A customized error dialog box titled 'Fix list prices' with a red 'X' icon. The text reads: "For 2019 List Prices are 10k-200k only". The 'Retry', 'Cancel', and 'Help' buttons are at the bottom.



Intelligent messages

Solution: Reduce (effort) and reuse (inputs)

Data Validation

Criteria Messages

Allow: Whole number

That is: between

Minimum: 10,000

Maximum: 200,000

Ignore blank

Clear All OK Cancel

Data Validation

Criteria Messages

Error alerts:

Type: Blocking Warning

Title: Invalid data

Message: You must enter a whole number between 10,000 and 200,000

Input message:

Clear All OK Cancel

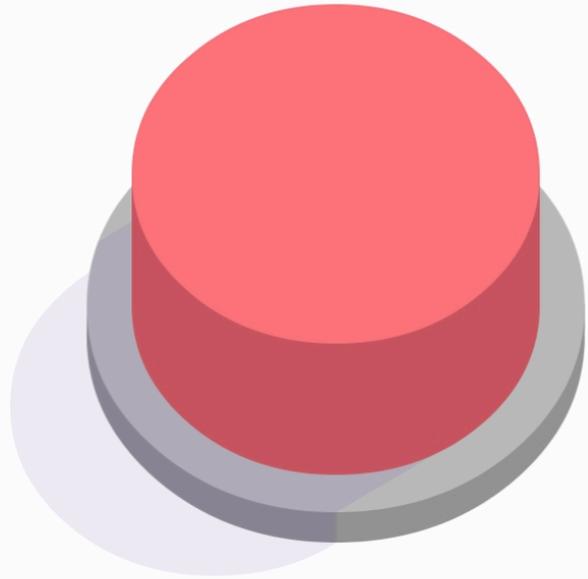
"Edge of tl	\$ 60,000	20%	\$ 48,000	Pa
cci "Cumb	\$ 300,000	20%	\$ 36,000	Pa

Invalid input

Data Validation rule in B6:B1500

You must enter a whole number between 10,000 and 200,000

Retry Cancel



What we shipped

[try it in Excel at Office.com]



This just in...

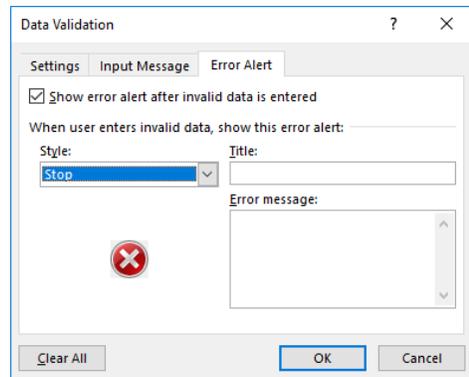
What shipped

I left Microsoft as features like Data Validation were being built in Excel online. Without being there to oversee implementation the released version differs in various ways.

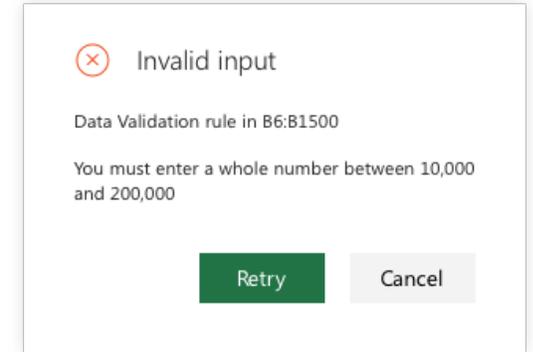
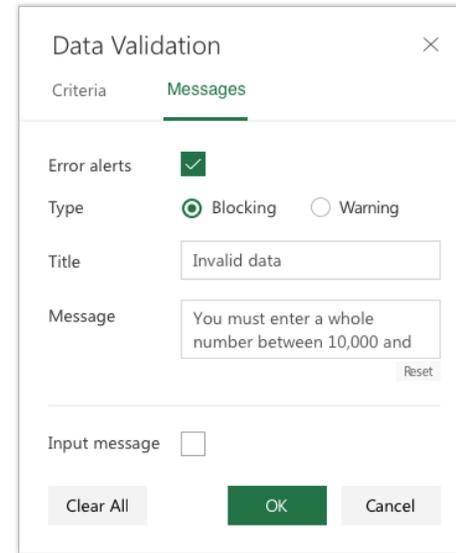
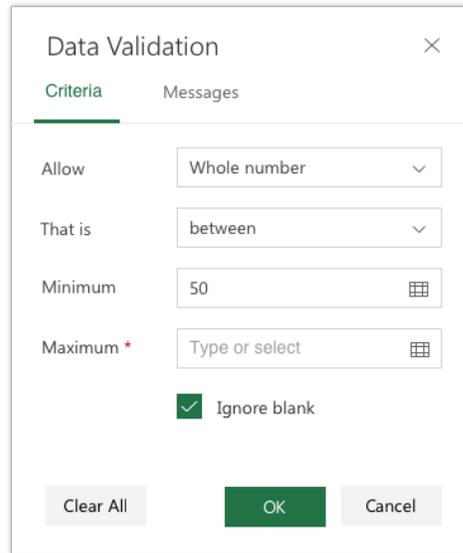
Overall, the much of the intended design and direction made it into the new build.

The differences are a great reminder of the cohesion, communication, and follow-through needed by the whole team to retain the integrity of the design, even as resources and timelines change.

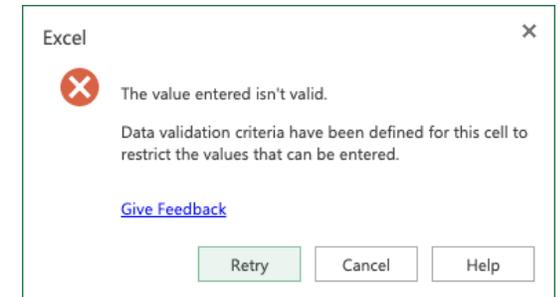
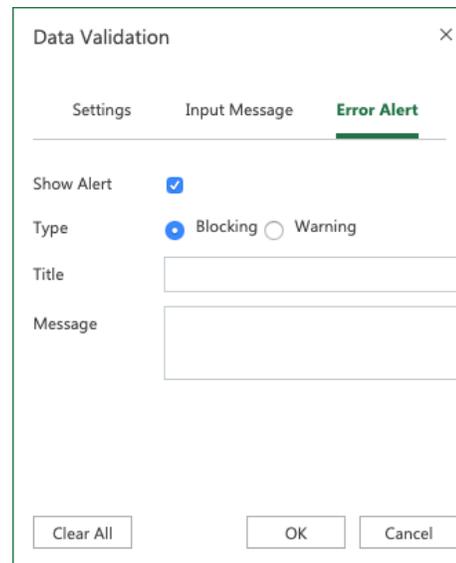
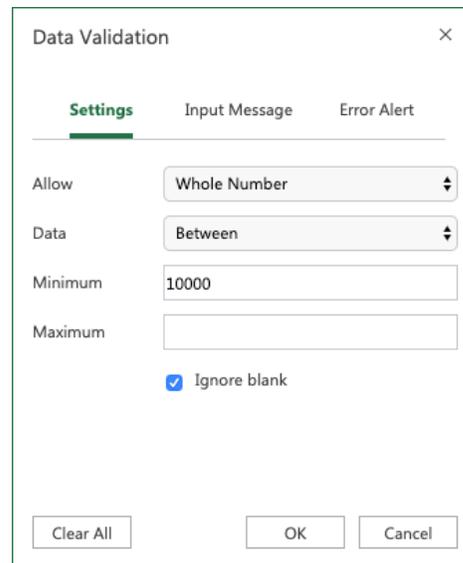
Desktop



Designed



In code





This just in... What shipped

Creating a new rule on an existing data range now flags outliers with no extra steps taken

The error message UI is coupled into the cell/formula error flag on the upper left

	A	B	C
1	Artwork Sales Tracker		
2	Artwork Name	List Price	Discount
3	Gloria Miller Allen "	\$ 24,000	20%
4	Steve Baird "Edge of	\$ 60,000	20%
5	Thomas Bucci "Cumt	\$ 45,000	20%
6	Kristen Doty "Volum	\$ 65,000	0%
7	Catherine Anderson	\$ 45,000	20%
8	Judi Betts "Memorie	\$ 160,000	10%
9	Connie Clutter "Cen	\$ 9,000	20%
10	Kathie Dworak "Coil	\$ 45,000	15%
11	Tony Armendariz "Ci	\$ 77,000	20%

	A	B	C
1	Artwork Sales Tracker		
2	Artwork Name	List Price	Discount
3	Gloria Miller Allen "	\$ 24,000	20%
4	Steve Baird "Edge of	\$ 60,000	20%
5	Thomas Bucci "Cumt	\$ 45,000	20%
6	Kristen Doty "Volum	\$ 65,000	0%
7	Catherine Anderson	\$ 45,000	20%
8	Judi Betts "Memorie	\$ 160,000	10%
9	Connie Clutter "Cen	\$ 9,000	20%
10	Kathie Dworak "Coil	\$ 45,000	15%
11	Tony Armendariz "Ci	\$ 77,000	20%

	A	B	C	D	E	F
1	Artwork Sales Tracker					
2	Artwork Name	List Price	Discount	Sell Price	Paid	Produ
3	Gloria Miller Allen "	\$ 24,000	20%	\$ 19,200	Paid	YES
4	Steve Baird "Edge of	\$ 60,000	20%	\$ 48,000	Paid	YES
5	Thomas Bucci "Cumt	\$ 45,000	20%	\$ 36,000	Paid	YES
6	Kristen Doty "Volum	\$ 65,000				
7	Catherine Anderson	\$ 45,000				
8	Judi Betts "Memorie	\$ 160,000				
9	Connie Clutter "Cen	\$ 9,000				
10	Kathie Dworak "Coil	\$ 45,000				
11	Tony Armendariz "Ci	\$ 77,000				

Field Type Information

B9

Data Type: Whole number

Restriction:
Value must be a Whole number between 10000 and 200000.

Blanks will be ignored and are automatically valid.

OK



Value of a redesign

Value of a redesign

Just plain easier comprehension for all users

A smooth, UX focused experience means **new DV users** will use it (love it) more

A modern visual look shows that Microsoft is continuing to update with the times

Functionality hints that act as in app teaching enables Excel users more power to get things done

All of this funnels into retaining Excel loyalists and gaining/retaining new users, bolstering Office's business value

Data Validation

Settings Input Message Error Alert

Validation criteria

Allow: Whole number Ignore blank

Data: between

Minimum: 50

Maximum: 100

Apply these changes to all other cells with the same settings

Clear All OK Cancel

Data Validation

Criteria Messages

Allow Whole number

That is between

Minimum 50

Maximum 100

Ignore blank

Clear All OK Cancel



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thelivingston@gmail.com

5	Apparel and Leather ProductsAll Total	9,154		
2	PaperAll Total Asset Sizes	21,955		
8	Printing and Related Support Activities	30,852		
0	Petroleum and Coal ProductsAll Total	17,198	Basic C	
		141,540		
	Basic Chemicals, Resins, and Synthetic	55,223		
0	Pharmaceuticals and MedicinesAll Tot	98,940		
5	All Other ChemicalsAll Total Asset Size	56,175		
7	Plastics and Rubber ProductsAll Total	49,357		
		683,222		
9	All Durable ManufacturingAll Total Asset Sizes		Printa	
9	Wood ProductsAll Total Asset Sizes			
5	Nonmetallic Mineral ProductsAll Total Asset Sizes			
0	Primary MetalsAll Total Asset Sizes			
0	Iron, Steel, and FerroalloysAll Total Asset Sizes 1			
6	Nonferrous MetalsAll Total Asset Sizes 1			
4	FoundriesAll Total Asset Sizes 1			
9	Fabricated Metal ProductsAll Total Asset Sizes			
9	MachineryAll Total Asset Sizes		Text	
3	Computer and Electronic ProductsAll Total Asset Sizes			
4	Computer and Peripheral EquipmentAll Total Asset Sizes			
3	Communications EquipmentAll Total Asset Sizes 1			
6	All Other Electronic ProductsAll Total Asset Sizes 1			
2	finHead	T01_0-2016Q2	T01_1-2016Q2	T02_0-2



If I were to design the next thing...

Office 365 Excel City Data - Saved

File Home Insert Data Review View Tell me what you want to do Edit in App

Refresh Selected Connections Refresh All Calculate Workbook Sort Ascending Sort Descending Flash Fill Data Validation

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1																
2		City	Pop.	Income	Status	Date										
3		Seattle	684,451	\$50,733	High											
4		Portland	10,000	\$46,090												
5		Vancouver	603,500	\$67,090												
6		San Franci	864,816	\$63,024	High											
7		Los Angeli	3,971,883	\$45,903	Extreme											
8		San Berna	213,708	no data												
9		San Diego	1,394,928	\$47,067												
10		Oakland	406,253	no data	Low											
11		Sacramen	479,686	\$46,106	Medium											
12		Phoenix														
13		Las Vegas														
14		Boise														
15		San Jose														
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																

Data Validation

Apply to range: C3:C15

Criteria: 123 Whole Number

Messages: Time, .123 Decimal, abc Text, List, Custom, Date

Between: [Dropdown]

Minimum: 50,000

Maximum: 3,971,883

Ignore blank

Block input Show warning

Clear Rule Manage

Sheet1

HELP IMPROVE OFFICE



If I were to design the next thing...

Office 365 Excel City Data - Saved

File Home Insert Data Review View Tell me what you want to do Edit in App

Refresh Selected Connections Refresh All Calculate Workbook Sort Ascending Sort Descending Flash Fill Data Validation

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1													Low			
2		City	Pop.	Income	Status	Date							Medium			
3		Seattle	684,451	\$50,733	High								High			
4		Portland	10,000	\$46,090									Extreme			
5		Vancouver	603,500	\$67,090												
6		San Franci	864,816	\$63,024	High											
7		Los Angel	3,971,883	\$45,903	Extreme											
8		San Berna	213,708	no data												
9		San Diego	1,394,928	\$47,067												
10		Oakland	406,253	no data	Low											
11		Sacramen	479,686	\$46,106	Medium											
12		Phoenix														
13		Las Vegas														
14		Boise														
15		San Jose														
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																

fx

Data Validation

- List E18:F19
- Custom A21:L22

Clear All Rules + Add

HELP IMPROVE OFFICE



New Data Types

The problem

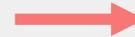
Cleaning data is painful and prone to error

Even as part of the toolkit of Information Workers, getting and cleaning data is a chore and source of mistakes

[IW Research Interview]



A	B	C	D	E	F	G	H
L. David Smith, Jr.	Head of Marketing	East Lake Branch	West Palm Beach	Florida			
Jack Lambert	President and CEO	Mountain Brook Branch	Los Angeles	California			
Beverly Johnson MacBride	Branch Manager	5th Avenue Branch	Hollywood	California			
Charlotte Elaine Cantrell Carter	Manager	Seaside Branch	Destin	Florida			
Robert Lewis Stevenson	Director of Internal Affairs	Diamond Peak Branch	North Lake				
Betsy Garner	Director of Public Relations	Intermountain Branch	Park City	Utah			
Benjamin Burke	COO of Operations	North Cove Branch	San Diego	California			
Nathaniel P. Andrews	Branch Manager	Lake Shore Branch	Boston	Massachusetts			
Michael J Alexander, Jr.	President and CEO	Fisherman's Wharf Branch	San Francisco				
William Wallace III	Marketing and Advertising Manager	North Pacific Coast Branch					
C.J. "Corky" Martinelli, PhD	CFO Business and Finance	Arbour Lake Branch	Calgary	Alberta			



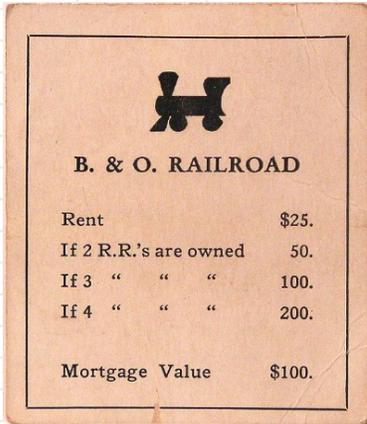
=CONCATENATE(C5," ",D5," ",E5," ",F5," ",G5," ",H5," ",I5," ",J5," ",K5)								
H	I	J	K	L	M	N	O	P
Branch				COO of Operations	North Cove Branch			
Mountai	Branch			Director of Public Relations	Inter Mountain Branch			
Branch				Senior Manager	5th Avenue Branch			
Finance	Arbour	Lake	Branch	CFO Business and Finance	Arbour Lake Branch			
Branch				Manager	Seaside Shore Branch			
Branch				President and CEO	Mountain Brook Branch			
East	Lake	Branch		Head of Marketing	East Lake Branch			
Fisherm	Wharf	Branch		President and CEO	Fisherman's Wharf Branch			
Sciences	Makonik	Beach	Branch	CTO of Information Sciences	Makonikey Beach Branch			
Branch				Senior Manager	Lake Shore Branch			
Diamond	Peak	Branch		Director of Internal Affairs	Diamond Peak Branch			
North	Pacific	Coast	Branch	Marketing and Advertising Manager	North Pacific Co			



New Data Types

Mental model: A row of delineated information

The most common structure in Excel of an entity, object, or thing, is a row of information, usually with a title identifier and subsequent data in columns



Property name	Status	Owner	Mortgage value	Rent	Rent (2 RR's)	Rent (3 RR's)	Rent (4 RR's)	Category	Similar Properties
B & O Railroad	On market	Kevin	\$ 100	\$ 25	\$ 50	\$ 100	\$ 200	Transportation	Pennsylvania Railroad



MICKEY MANTLE N. Y. Yankees, of

HT: 6'0" WT: 200 BATS: BOTH THROWS: RIGHT
 BORN: OCTOBER 20, 1931 HOME: DALLAS, TEX.

hampered by several serious injuries in '63. The sensational center fielder won the A.L. batting crown in '56. He has hit 15 World Series home runs.

LEAGUE MAJOR AND MINOR LEAGUE BATTING RECORD

TEAM	LEA.	G	AB	R	H	2B	3B	HR	RBI	AVG.	
dep.	K. O. M.	80	323	54	101	15	7	7	63	.313	
plin	W. A.	137	519	141	199	30	12	26	136	.283	
ew York	A. L.	96	341	61	91	11	5	13	65	.267	
ansas City	A. A.	40	166	32	60	3	3	11	50	.361	
ew York	A. L.	142	549	94	171	37	7	23	87	.311	
ew York	A. L.	127	461	105	136	24	3	21	92	.295	
ew York	A. L.	146	543	129	163	17	12	27	102	.300	
ew York	A. L.	147	517	121	158	25	11	37	99	.306	
ew York	A. L.	150	533	132	188	22	5	52	130	.353	
ew York	A. L.	144	474	121	173	28	6	34	94	.365	
ew York	A. L.	150	519	127	158	21	1	42	97	.304	
ew York	A. L.	144	541	104	154	23	4	31	75	.285	
ew York	A. L.	153	527	119	145	17	8	40	94	.275	
1961	New York	A. L.	153	514	132	163	16	6	54	128	.317
1962	New York	A. L.	123	377	96	121	15	1	30	89	.321
1963	New York	A. L.	65	172	40	54	5	0	15	35	.314
Major League Totals		13 Yrs.	1740	6068	1381	1875	264	67	419	1187	.309

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A challenge

Designing schemas both generic and specific

Generic



Specific

In addition to north-star, future scenarios with strong data types, I needed to design a “universal container” that would accept any returned data.

This was to design parameters and rules that would handle any data, any form, language, size, and order, in order to stress test the container, given the unknowns of the data we’d get back from Bing at the time.

This also showed extreme case scenarios that helped negotiate with the Bing team on getting certain schema rules in place.

Food

ham

Athlete

Russell Wilson

Football or
futbol athletes?

Russell Wilson
Lionel Messi

Element

Boron

Local business

Famous Original Ray's NYC

Full address

9618 North Front Street, Seattle WA 98122

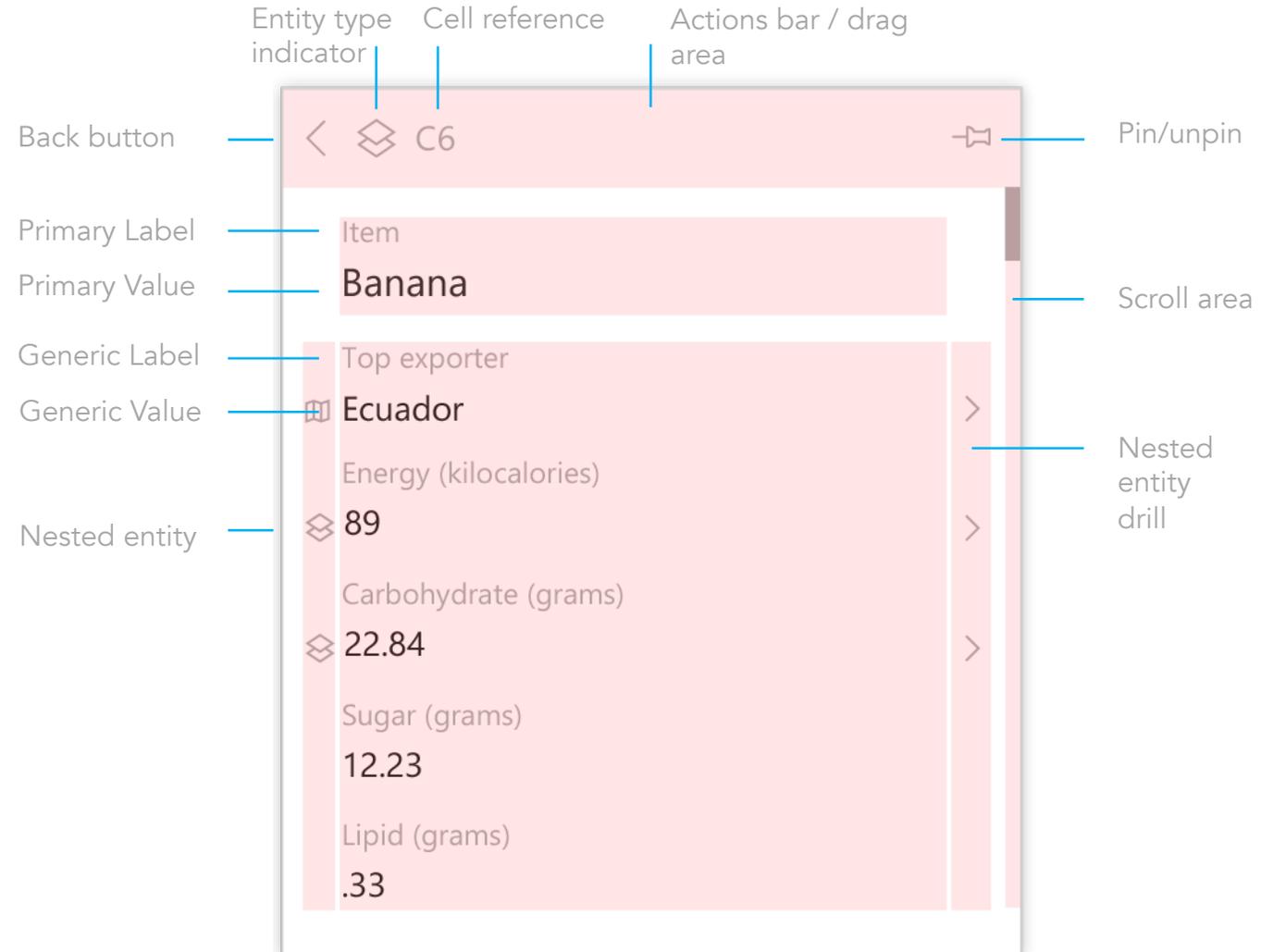
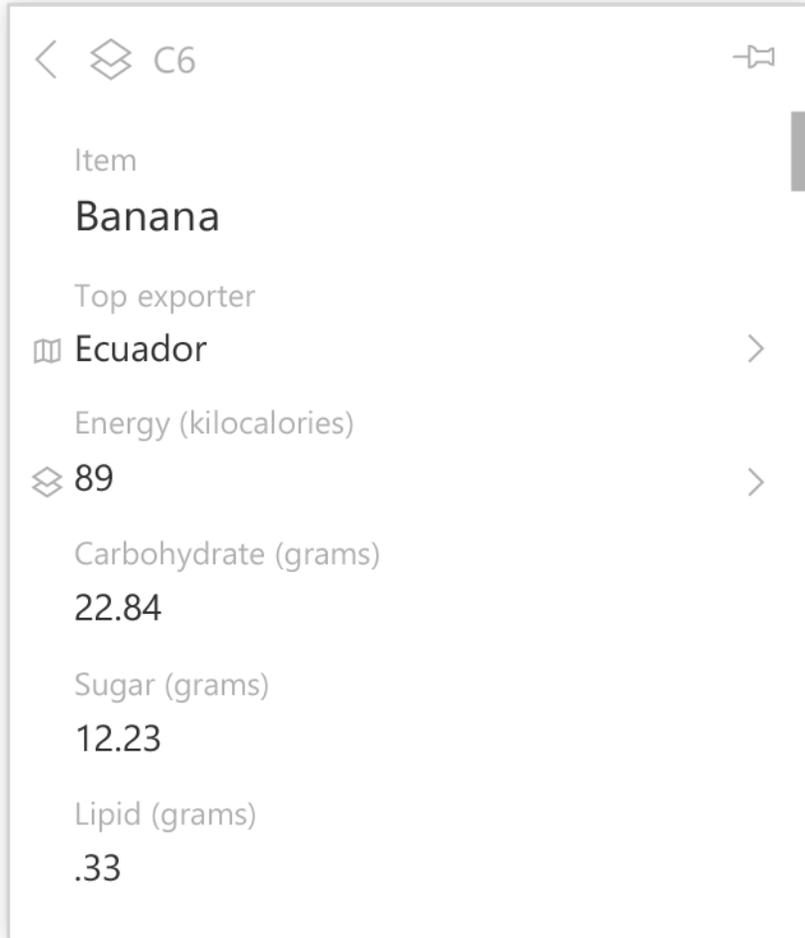
Internal colleague

Gary Mitchell



New Data Types

MVP generic layout





New Data Types

MVP generic layout



Portland

Description

Portland is a seaport and the largest city in the U.S. state of Oregon and the seat of Multnomah County. It is in the...

State

Oregon

Area (square km)

380

Population (2015)

632,309



Portland

Description

Portland is a seaport and the largest city in the U.S. state of Oregon and the seat of Multnomah County. It is in the...

State

Oregon

Area (square km)

380

Population (2015)

632,309

Time Zone (UTC)

8

County

Multnomah County

Contained By

United States of America

Leader

Ted Wheeler

Title

Mayor

Latitude (N)

45:31:12

Longitude (W)

122:40:55



New Data Types

Integration with current Excel features

Considerations

City
Seattle
Portland
Vancouver
San Francisco
Los Angeles
San Bernadino
San Diego
Oakland
Sacramento

User comprehension

Cell placement

Color

Readability & noise

Discoverability

Interaction

Cell decorations

#DIV/0!
Contoso
3.99
10
3
444
Contoso
Longnamings

Errors

Comments

Alignment

Cell formatting

Truncation



New Data Types

IXD sketch: Show more, show less

C6
📌

Item

Ecuadorian super-sweet dessert banana

About

The banana is an edible fruit – botanically a berry – produced by several kinds of large herbaceous flowering plants in the genus **+**

Energy (kilocalories)

89

Carbohydrate (grams)

22.84

Sugar (grams)

12.23

Lipid (grams)

.33



C6
📌

Item

Ecuadorian super-sweet dessert banana

About

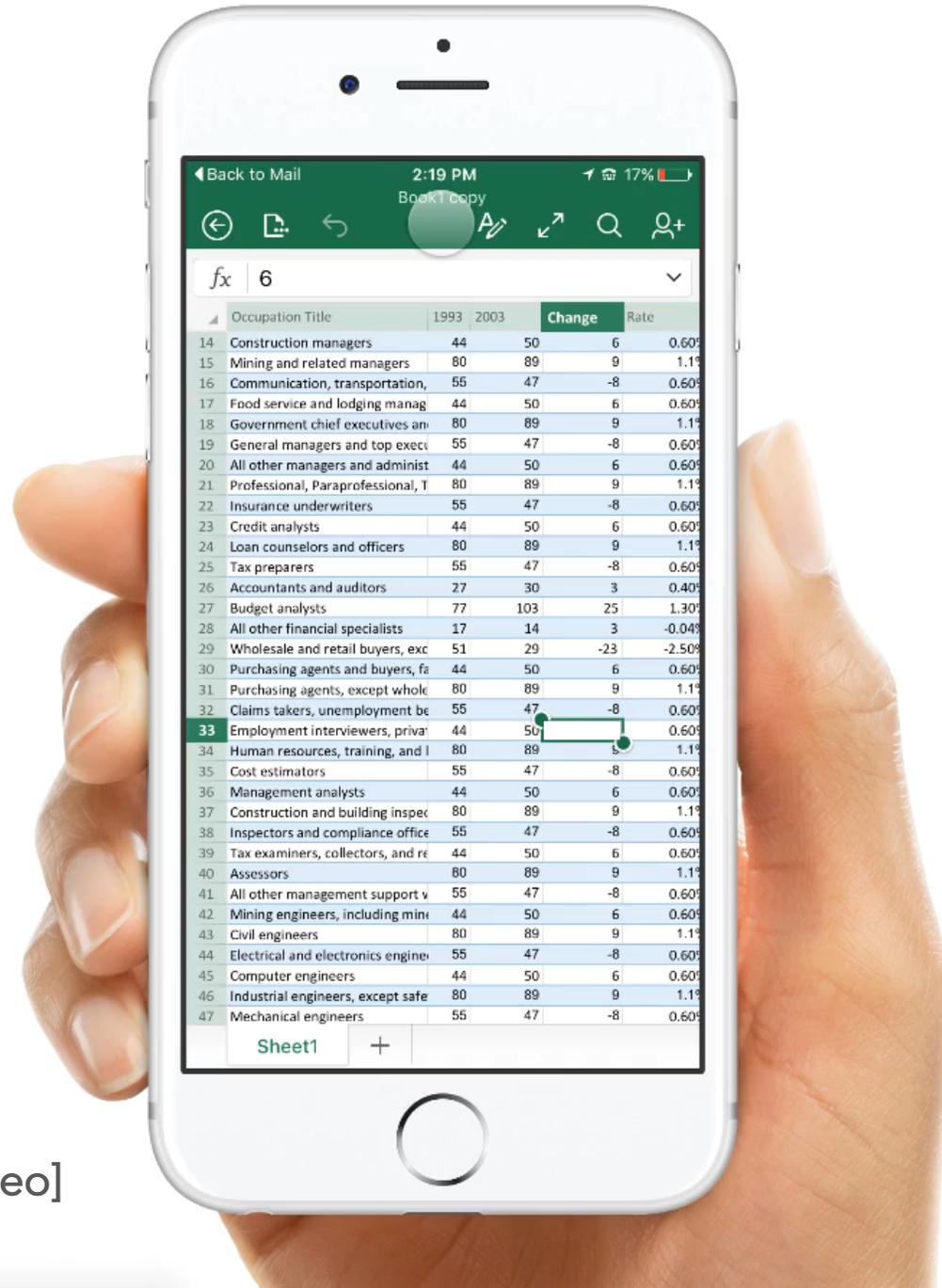
The banana is an edible fruit – botanically a berry – produced by several kinds of large herbaceous flowering plants in the genus Musa. In some countries, bananas used for cooking may be called plantains, in contrast to dessert bananas. The fruit is variable in size, color and firmness, but is usually elongated and curved, with soft flesh rich in starch covered with a rind which may be green, yellow, red, purple, or brown when ripe. The fruits grow in clusters hanging from the top of the plant. Almost all modern edible parthenocarpic bananas come from two wild species – Musa acuminata and Musa balbisiana. The scientific names of most cultivated bananas are Musa acuminata, Musa balbisiana, and Musa paradisiaca for the hybrid Musa acuminata M. balbisiana, depending on their genomic constitution.



	A	B	C	D	E	F	G	H
A2					=RANDBETWEEN(1,20)			
1	Ord To Date	ID CAT	Item	Price	Bushel	Similar Energy	Similar Carb	
2	19	558	Apple	\$15.00	\$290.00	Juniper berry	Pomegranate	
3	11	435	Apricot	\$13.00	\$65.00	Kiwi	Pomelo	
4	1	160	Avocado	\$7.00	\$167.00	Kumquat	Purple mangosteen	
5	12	119	Banana	\$13.00	\$164.00	Lemon	Quince	
6	5	305	Bilberry	\$6.00	\$248.00	Lime	Raspberry	
7	19	426	Blackberry	\$19.00	\$206.00	Loquat	Salmonberry	
8	15	387	Blackcurrant	\$7.00	\$232.00	Longan	Rambutan	
9	10	480	Blueberry	\$15.00	\$312.00	Lychee	Redcurrant	
10	10	289	Boysenberry	\$13.00	\$135.00	Mango	Salal berry	
11	20	416	Currant	\$5.00	\$159.00	Marionberry	Salak	
12	18	331	Cherry	\$10.00	\$135.00	Melon	Satsuma	
13	7	516	Cherimoya	\$6.00	\$232.00	Cantaloupe	Star fruit	
14	2	177	Cloudberry	\$5.00	\$190.00	Honeydew	Solanum quitoense	
15	12	641	Coconut	\$8.00	\$245.00	Watermelon	Strawberry	
16	17	219	Cranberry	\$6.00	\$161.00	Miracle fruit	Tamarillo	
17	19	600	Cucumber	\$5.00	\$83.00	Mulberry	Tamarind	
18	14	384	Custard apple	\$7.00	\$63.00	Nectarine	Ugli fruit	
19	14	208	Damson	\$9.00	\$150.00	Nance	Yuzu	
20	19	545	Date	\$9.00	\$158.00	Olive	Tamarillo	
21	19	680	Dragonfruit	\$19.00	\$111.00	Orange	Marionberry	
22	12	442	Durian	\$10.00	\$79.00	Blood orange	Melon	
23	10	628	Elderberry	\$7.00	\$258.00	Clementine	Cantaloupe	
24	15	440	Feijoa	\$17.00	\$75.00	Mandarine	Honeydew	
25	3	673	Fig	\$14.00	\$249.00	Tangerine	Watermelon	
26	19	654	Goji berry	\$8.00	\$103.00	Papaya	Miracle fruit	
27	12	198	Gooseberry	\$7.00	\$275.00	Passionfruit	Mulberry	
28	4	223	Grape	\$19.00	\$104.00	Peach	Nectarine	
29	2	438	Raisin	\$7.00	\$137.00	Pear	Nance	
30	9	149	Grapefruit	\$5.00	\$67.00	Persimmon	Olive	
31	12	294	Guava	\$8.00	\$153.00	Physalis	Orange	
32	11	675	Honeyberry	\$4.00	\$309.00	Plantain	Blood orange	
33	12	297	Huckleberry	\$10.00	\$306.00	Plum	Redcurrant	
34	10	139	Jabuticaba	\$5.00	\$212.00	Prune (dried plum)	Salal berry	
35	3	433	Jackfruit	\$18.00	\$314.00	Pineapple	Salak	
36	7	191	Jambul	\$19.00	\$293.00	Plumcot (or Pluot)	Satsuma	

Grid-to-card transition animation

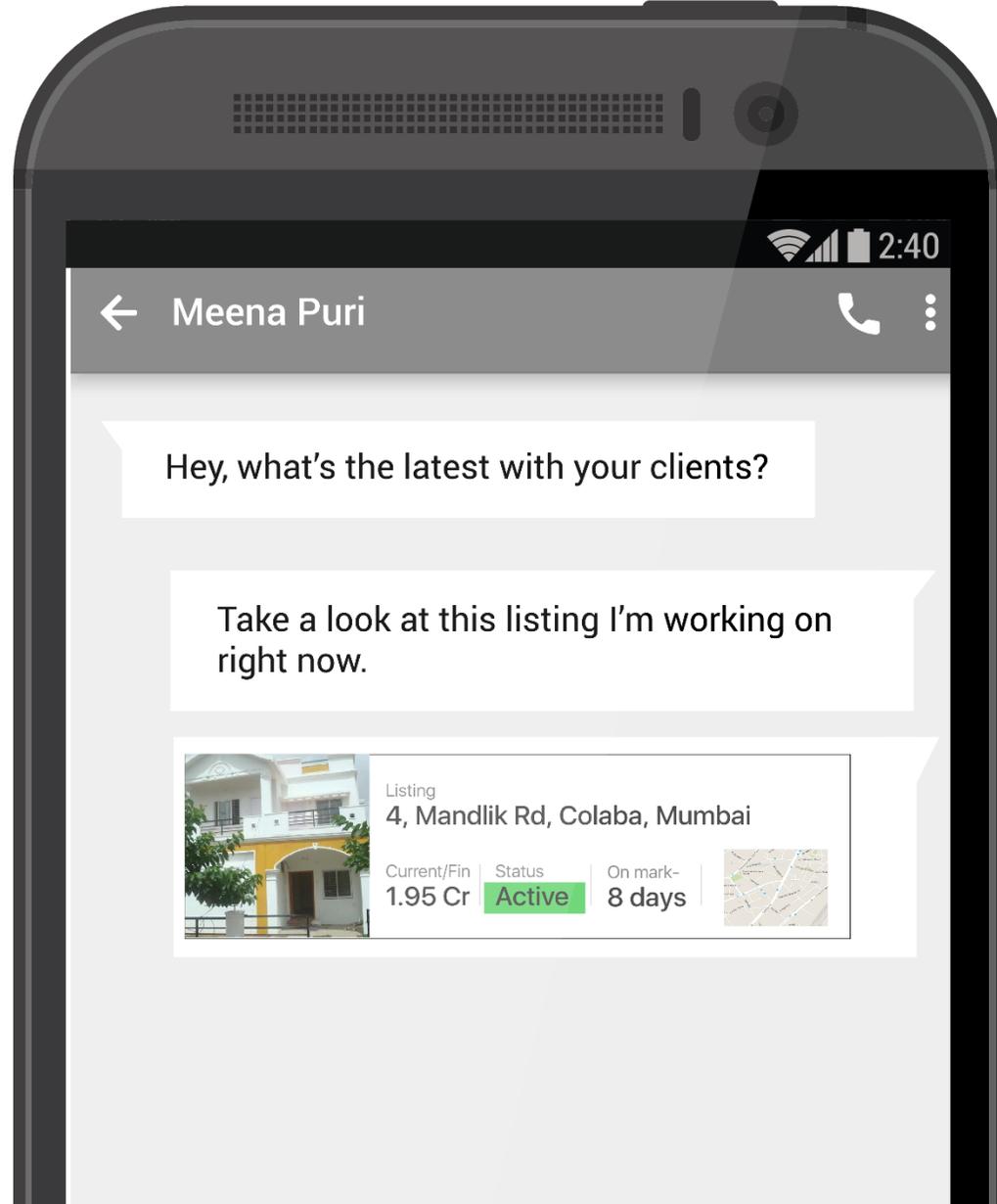
Showing users a grid-to-card animation to ensure they understand the representation of the same data



[video]



WhatsApp





WhatsApp

