

THE DATA DETECTIVE: DATA ANALYTICS FOR ALL!





Elizabeth McDowell, CPA, CIA
Founder, Audit Forward

and Audie the
Internal Otteror!



Meet Elizabeth



- »» 2023 Internal Audit Beacon Award Winner!
- »» 20 years audit experience + CPA + CIA
- »» Passionate about internal audit advocacy and changing industry perception of auditors!
- »» From Tuscaloosa, AL  and live in Denver, CO 
- »» Dog mom to Finn and Orion



P.S. Artificial Intelligence is Always Improving!



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Meet Audie the Internal Otteror!



Elizabeth and Audie help companies *Audit Smarter, not Harder* – do more with the tools you already have!

- *Internal audit consulting and co-sourced audits*
- *Quality Assurance Reviews (QARs)*
- *Training for Boards and Committees*
- *Optimize your GRC system*
- *Smarter and digitized branch audits (financial institutions)*
- *Automate employee account monitoring (financial institutions)*



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Today's Agenda



Data
Analytics
Overview

5 Steps of
Data
Analytics



Analytics for
Each Phase
of the Audit

PowerQuery
& PowerBI
& PowerApps!

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Defining Data Analytics

- Data analytics is a broad term that encompasses **many diverse types of data analyses**.
- Data analytics allows you to review **complete sets of data**
- Various types of data analytics include **descriptive analytics** (looking at what happened), **diagnostic analytics** (why something happened), **predictive analytics** (what is going to happen), and **prescriptive analytics** (what should be done next).
- **Data analytics can take your small audit shop to the next level** by making 'full population testing' and subsequent 'exception testing' the norm.

 <h2>What Data Analytics Is</h2>	<h2>What Data Analytics Isn't</h2>
<ul style="list-style-type: none"> • An effective technique for audit testing • A cost-effective way to streamline risk identification and risk analysis • A way to beautifully visualize testing and audit conclusions • A way to Audit Smarter, not Harder! <p>AUDIT  FORWARD</p>	<ul style="list-style-type: none"> • A specific tool or program • A “quick fix” for all testing situations • A complicated process (usually!) • One-size fits all solution <p style="text-align: right;">7</p>

Data Analytics: An Overview

1. **Define Your Objectives:** Understand areas of risk, expected analytics outcomes, and what could go wrong
2. **Find the Data:** Determine the best source, validate data obtained, and combine data from multiple sources (if necessary)
3. **Prepping the Data:** Preparing the data reviews the quality of information obtained, normalizing data eliminates redundancies, and cleansing the data reviews for inaccurate data.
4. **Analyze the Data:** Run your tests, interpret results, and draw conclusions
5. **Report Results:** Know your audience and create reporting that will be properly understood and interpreted

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Step 1: Define Your Objectives

Understand areas of risk, expected analytics outcomes, and what could go wrong

- ✓ **Understand the data** and what risks that might exist with the data
- ✓ **Discuss the data and analytics goals** with management
- ✓ **Analyze what could go wrong with the analytics** and how results could be misinterpreted
- ✓ **Determine what tools are available** to us through company resources



Step 2: Find the Data

- **Determine what data is available** and from which systems data can safely be extracted
- Does the same or similar data need to be combined from multiple sources?
- **Work with IT, business analytics, and management** to determine what pre-made reports exist and what reports we might need built
- **Assess what fields are available** (this will drive what testing you can accomplish analytically)

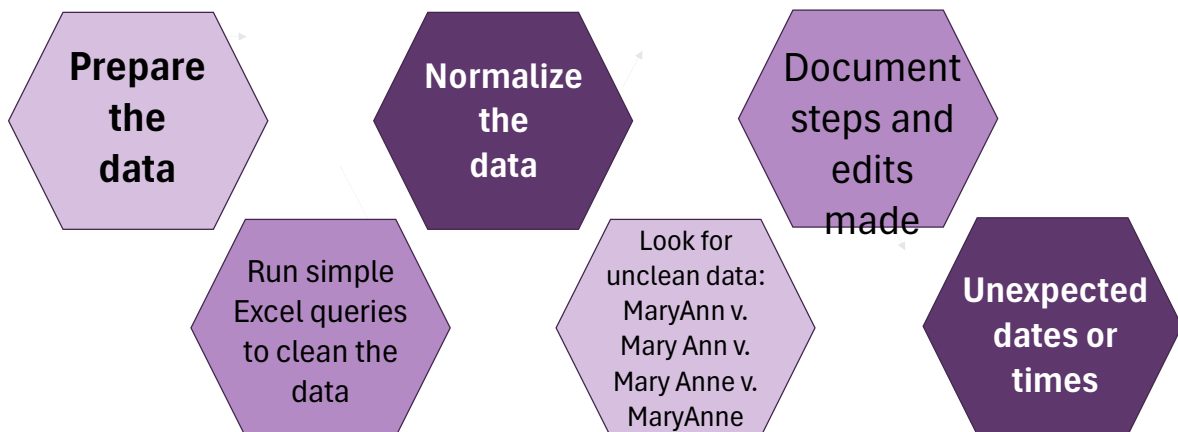


Find the Data | Potential Tools

- ❖ Excel
- ❖ PowerBI
- ❖ TeamMate Analytics
- ❖ Tableau



Step 3: Prepping the Data



Step 4: Analyze the Data – First Steps

- **Review data set** for unusual trends
- **Visualize data** to identify outliers
- **Set expectations based on policy and procedure** and compare to what data set is showing you
- **Establishing what tests can be performed** in each audit phase

Tool Overview: PivotTable (Excel)

A PivotTable is a powerful tool within Microsoft Excel used to calculate, summarize, and analyze data that lets you see comparisons, patterns, and trends in your data.

- Use clean, tabular data for best results.
- Organize your data in columns, not rows.
- Make sure all columns have headers, with a single row of unique, non-blank labels for each column. Avoid double rows of headers or merged cells.

Did you know? Pivot tables have built in functions that can show values as many different percentage types!



Analyze the Data | Planning Example #1

Audit: New Accounts

Analytic: Review for unusual trends in a population (unexpected business units / fluctuations in production)

Test: Pivot table showing new accounts opened by month by channel (location or type)

Count of	4	5	6	7	8	9	10	11	12	1	2
2	22	22	26	2	1	7	3	1	5	2	2
18	44	88	107	94	57	84	79	97	77	80	58
2	27	23	31	48	30	22	15	3	26	22	
11	11	27	35	37	25	42	25	35	33	21	21
		1		65	15	4	3		4	10	
9	18	55	57	43	47	38	46	44	39	46	53
		1	1								
12	8	15	9	20	18	12	18	19	19	21	21
6	12	24	26	21	22	24	17	17	22	17	22
6	15	51	43	27	34	27	28	27	20	33	23
7	40	66	67	60	61	54	43	60	63	51	54
		2	1	2	2	1	3	1			
8	31	68	81	99	76	78	60	57	74	64	72
19	51	96	109	60	101	83	72	77	74	91	116
											1
2	16	32	40	41	37	32	19	43	35	30	26
9	36	93	56	61	60	77	45	44	46	50	56
545	541	595	701	860	492	409	375	400	381	356	391
	3		1	1		2				1	2
35	39	47	41	53	36	30	44	20	24	19	53
Grand Total	691	914	1,306	1,434	1,621	1,147	1,050	907	971	937	1,032

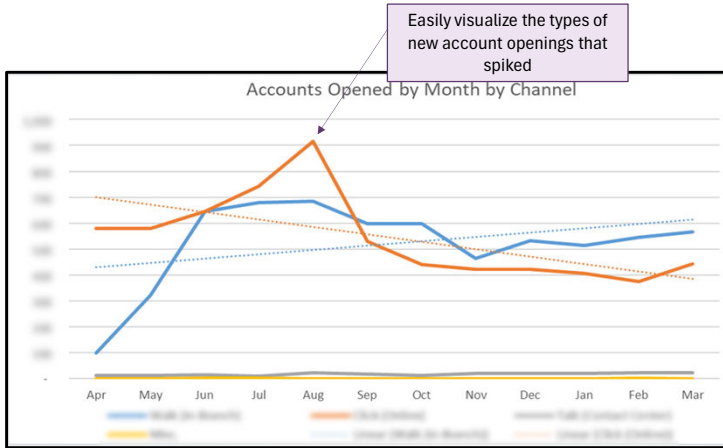
Is this spike in new accounts expected?

Tool Overview: PowerBI

PowerBI is a data visualization tool within the Microsoft suite used to turn multiple sources of data into interactive graphical representations of the data.

- A data visualization displays data from reports and models in a highly interactive way – you can slice, filter, highlight, change, and even drill into visualizations.
- Easily create dashboards – a single screen with tiles of interactive visuals, text, and graphics.

Analyze the Data | Planning Example #2



Audit: New Accounts

Analytic: Review for unusual trends in a population (unexpected business units / fluctuations in production)

Test: Power BI dashboard showing accounts opened in a different visualization



Analyze the Data | Fieldwork Example #1

Audit: Nearly All!

Analytic: Review entire population to verify active employee status

Test: Pivot table combined with vLookup to verify active status

Email	First Name	Last Name	IA Added	IA ECU Title	Last Login	Role	VLOOKUP - Emp. termed/active
				Regional Branch Mgr		FSR	Active
				Assoc FSG	03/17/2022 12:04 PM	FSR	Active
				Contact Center Specialist	03/04/2022 10:34 AM	CU Manager	Active
				Sr App Syst Eng	03/21/2022 7:40 PM	CU Admin with IP Security	Active
				Sr Financial Sol Guide	01/31/2022 3:53 PM	FSR	Active
				Assoc FSG		FSR	Active
				Teller Mgr	12/17/2018 12:39 PM	FSR	Active
				Branch Mgr	09/16/2021 12:12 PM	FSR	Active
				Loss Mitigation Spec II		QC - Read Only	Active
				Sr Price Ana	07/15/2019 6:47 AM	CU Manager	Active
				Cons Landing Prog Mgr	04/08/2022 1:57 PM	CU Admin with IP Security	Active
				Assoc FSG		FSR	Active
				Sr Cons Loan UW	04/08/2022 9:59 AM	Underwriting	Active
				IT Syst Ana	04/04/2019 11:18 AM	CU Admin with IP Security	Active
				Lending Serv Ops Spec I	01/27/2022 1:06 PM	Funder	Active
				Lending Services Proc Mgr	03/22/2022 3:46 PM	CU Admin with IP Security	Active
				Sr Financial Sol Guide	03/16/2022 3:34 PM	FSR	Active
				Brand Dir	03/16/2022 10:44 AM	Marketing	Active
				Sr Financial Sol Guide	04/04/2022 2:51 PM	FSR	Active
				Lending Services Spec II	04/08/2022 12:04 PM	CU Admin with IP Security	Active
				Assoc FSG		FSR	Active
				Member Sol Guide		FSR	Active
				Financial Sol Guide	04/07/2022 1:35 PM	FSR	Active
				Sr Financial Sol Guide CC	04/04/2022 10:28 AM	FSR	Active
				Quality Control Spec II	03/17/2022 9:36 AM	QC - Read Only	Active
				Assoc Bus Intnl Ana	04/01/2022 1:43 PM	CU Manager	Active
				Financial Sol Guide	03/18/2022 3:34 PM	FSR	Active
				Sr Financial Sol Guide CC	04/08/2022 10:08 AM	FSR	Active
				Cons Loan Underwriter	04/08/2022 9:37 AM	Underwriting	Active
				Quality Control Mgr	07/14/2020 3:15 PM	QC - Read Only	Active
				Sr Financial Sol Guide	04/08/2022 1:56 PM	FSR	Active

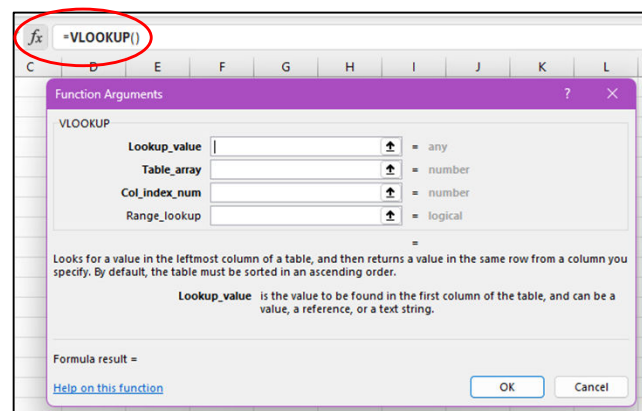
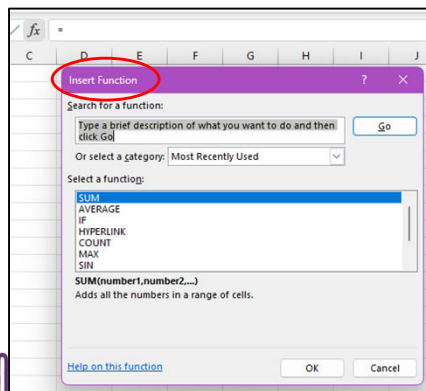
Tool Overview: vLookup (Excel)

vLookup (“vertical lookup”) is a built-in Excel function that helps you look for a specified value by searching for it vertically across the sheet.

- **The formula:** =VLOOKUP(What you want to look up, where you want to look for it, the column number in the range containing the value to return, return an Approximate or Exact match – indicated as 1/TRUE, or 0/FALSE).
- **Example:** =VLOOKUP(B2,C:E,1,0)

Audie’s Pro Tip – Not Sure Where to Start?

Excel can help with formulas – from plain English!



Audie's Pro Tip: ChatGPT + Excel

ChatGPT can use your "plain English" request to provide the Excel formula you need when testing. Here's a simple example:

Use ChatGPT for Excel formula help!



write an excel formula that will compare two columns to see if a second date equals a first date plus 30 days and if they do, return "P" and if not equal return "T"

You can use:

```
excel Copy Edit
=IF(B2=A2+30,"P","T")
```

How it works:

- A2+30 → Adds 30 days to the first date in column A
- Compares that to the second date in column B
- If they match exactly → returns "P"
- If not → returns "T"

If you also want to make sure it only works when both cells have dates, you could use:

```
excel Copy Edit
=IF(AND(ISNUMBER(A2),ISNUMBER(B2),B2=A2+30),"P","T")
```



Analyze the Data | Fieldwork Example #2

Sample Information from Tab 1 - Approvers with Unusual Titles

IA #	Approver Name	Full Name	Title	Approver Limit Title	Policy Limit	Approver Type	Limit Currency	Approval Limit in Concur	Limit Agrees to Title	Limit is Higher or Lower	1	2	3
			#N/A	Unknown	-	Expense Report	US, Dollar		Wrong	Higher	⊗	⊗	⊗
			IT Systems Analyst	Unknown	-	Expense Report	US, Dollar		Wrong	Higher	⊗	⊗	⊗
			Board Member	Unknown	-	Expense Report	US, Dollar		Wrong	Higher	⊗	⊗	⊗
			Support Services Coordinator	Unknown	-	Expense Report	US, Dollar		Wrong	Higher	⊗	⊗	⊗
			Property Management Specialist	Unknown	-	Expense Report	US, Dollar		Wrong	Higher	⊗	⊗	⊗
			Board Member	Unknown	-	Expense Report	US, Dollar		Wrong	Higher	✓	✓	✓
			Board Member	Unknown	-	Expense Report	US, Dollar		Wrong	Higher	✓	✓	✓
			Senior Copy Writer	Unknown	-	Expense Report	US, Dollar		Wrong	Higher	⊗	⊗	⊗
			ATM Technician	Unknown	-	Expense Report	US, Dollar		Wrong	Higher	⊗	⊗	⊗
			Marketing Coordinator	Unknown	-	Expense Report	US, Dollar		Wrong	Higher	✓	✓	✓

Audit: Expense Reports

Analytic: Review expense report approvers who have titles not expected to be reviewers

Test: vLookup comparing approval limits in system to policy

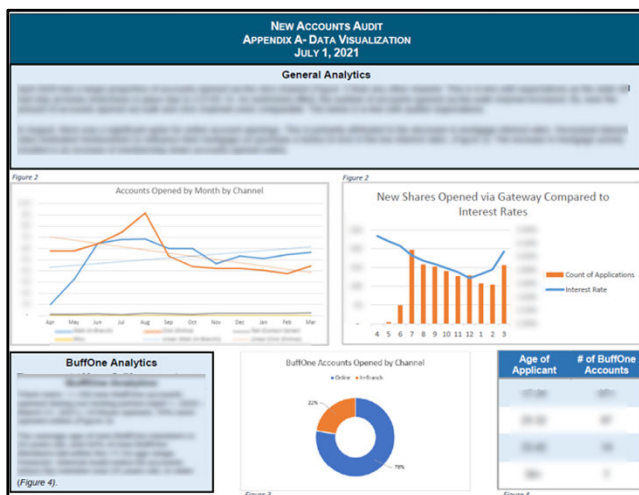


Step 5: Report the Results

Know your target audience – what types of analytics will be the most impactful for them?

- Management might love the minute detail, but the Board likely wants the bigger, thematic picture.
- How can you use the analytics and reporting to achieve the end-goal you're after?
- If you need to include more data, do it as an appendix like on the next slide.

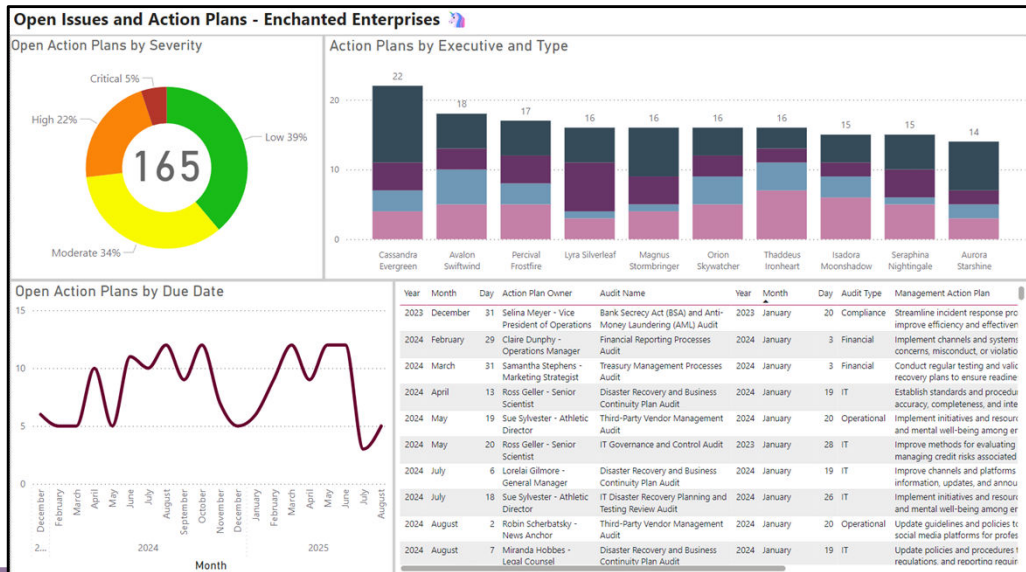
Report Results | Reporting Example #1



- In reporting, it's all about **showing results and conclusions clearly and concisely**
- **Data visualization** is often most important
- Use analytics from testing to **support audit issues and conclusions**

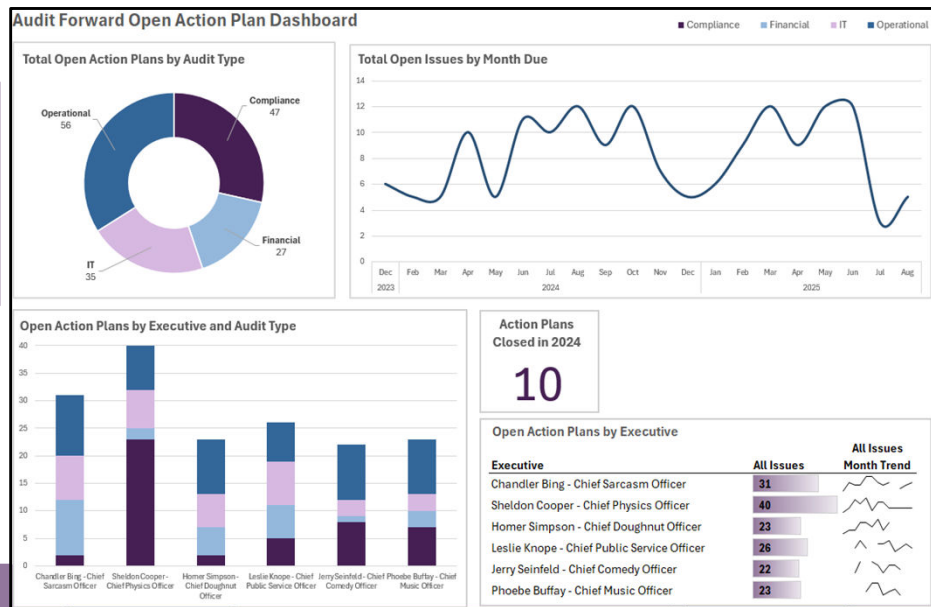
Report Results | Reporting Example #2

This PowerBI dashboard provides an executive-level view of open and closed audit action plans.



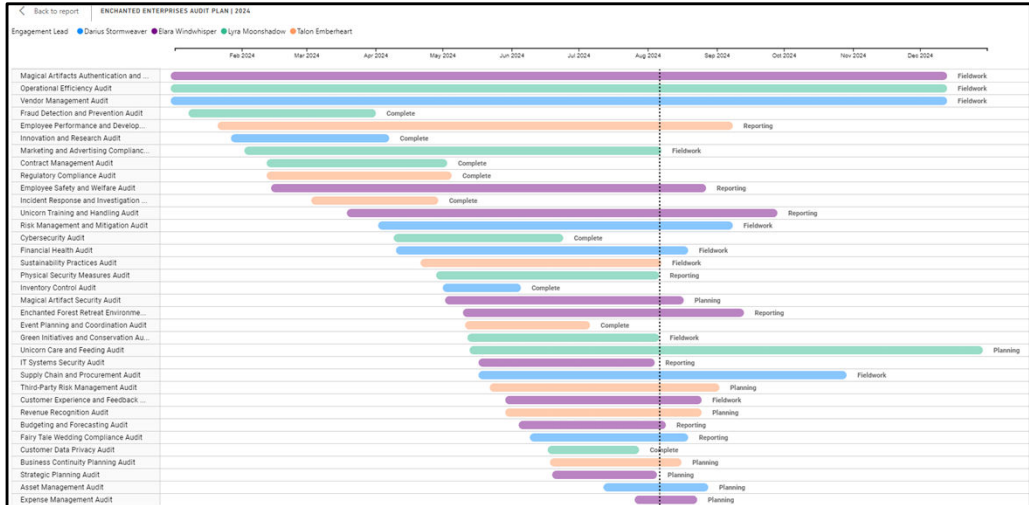
Report Results | Reporting Example #2½

Take 2: This EXCEL dashboard provides an executive-level view of open and closed audit action plans.



Report Results | Reporting Example #3

Use PowerBI to improve client relationships by being completely transparent about the audit plan progress and timing.



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Level Up! 🎮 A PowerQuery Primer

Power Query is a business intelligence tool within Excel.

- **Transform Data:** Once 'taught,' PowerQuery can perform repetitive tasks to transform your data
- **Repeatable Steps:** PowerQuery can repeat and refresh the 'transform data' steps over and over
- **Incredible Efficiencies:** You will save time and money but still have a beautiful spreadsheet or report without spending hours importing data and formatting by hand.
- **It's Free:** If you have Microsoft Excel, you already have access to Microsoft Power Query - it's built-in!



Level Up | PowerQuery Example

Audit: Employee Account Monitoring

Analytic: Multiple!!

Test: PowerQuery used to clean, combine, and format data each month

Employee Account Monitoring
January 2022 Testing Workpaper
Created by IA

Purpose:
To document the monitoring procedures and testing results for the 2022 January Employee Account Monitoring engagement.

Background:
Elevations Credit Union offers multiple account options and benefits to employees who become members of the credit union. Current practice gives employees read-only access to their accounts to restrict them from making any changes. The Employee Handbook states the credit union "expect[s] that employees maintain their accounts properly and at all times in good standing to avoid situations that create an actual or perceived conflict of interest. For purposes of this Code of Conduct, the following are considered to be 'not in good standing': (a) a loan delinquency or overdraft account with the Credit Union that continues to exist for sixty (60) days or more, (b) excessive NSF or Courtesy Pay transactions, or (c) the misuse or manipulation of any Credit Union product or service. Under no circumstances should an employee utilize any internal system or their own network login credentials to directly or indirectly transact or conduct business on one's own account."

To implement this control, the account is coded in EpiSys as an employee account, and the employee's account number is added to the employee's restricted list, preventing them from making changes to their own account. Employees are also expected to maintain their accounts in the same manner as non-employed members, including avoiding excessive courtesy pay fees and requesting inappropriate fee refunds. Further, employees shouldn't transfer money to or from their own account to a general ledger ("GL") account. Our continuous monitoring in 2021 included account access, account coding of current and terminated employees, executives, and board members; courtesy pay usage and refunds; and general ledger transactions involving employee accounts.

Testing Objectives:

1. Assess whether employees have inappropriate access to their account.
2. Determine whether employees are receiving excess or inappropriate credits to their account (for example, reversal of courtesy pay fees).
3. Analyze employee courtesy pay fee usage. Employees with an excess of \$1,000 or \$3,000 fees in a rolling twelve month period are referred to Credit Risk Management and Loss Mitigation.
4. Ensure employee accounts are properly coded when employees are onboarded.
5. Ensure employee accounts are properly coded when employees are offboarded.
6. Review general ledger transactions into and out of employee accounts to monitor for potentially fraudulent transactions; and
7. Test whether credit union leaders and board members accounts are coded properly to restrict access by lower ranking employees.

Note:
See specific testing procedures for each of the above testing objectives documented on each applicable tab as well as specific testing conclusion.

Testing Conclusion:

1. No exceptions noted. IA will continue to monitor for inappropriate employee changes in the following months.
2. No exceptions noted. Further testing N/CN.
3. One new employee noted. Loss Mitigation was alerted. See supporting emailed added as a workpaper in AuditBoard.
4. No exceptions noted. Further testing N/CN.
5. No exceptions noted. All accounts currently coded as a non-current employee account associated with a current temporary employee. Further testing N/CN.
6. No unusual transactions identified indicating fraud or other inappropriate activity by employees. IA will pass further testing.
7. No leaders or board member accounts identified requiring recoding. Further testing N/CN.

0. Testing Summary | 1. Employee Access | 2. Excess Refunds Testing | 3. Excess CP Usage Testing | 4. Employee Acct Coding | 5. Offboarded Emp Coding | 6. GL

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Employee Acct Monitoring: PowerQuery

ring > 02 - Testing > 03. January 2022

Name

- 00. January 2022 EAM Testing Workpaper
- 01. January User Changes to Employee Accounts
- 02. January Employee Fee Reversals
- 03. January Excessive Courtesy Pay Usage
- 04. January Employee Account Coding
- 05. February Internal Audit Termed Active Listing
- 05. January Non Current Employee Account Coding Detail
- 06. January GL Transfers Testing Detail
- 07.a. January New Hires
- 07.b. January Offboards
- 07.c. January Transfer or Promotions
- 07.d. January Dept Cleanup

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PowerQuery Example

Steps:

1. Update Source Link
2. PowerQuery applies all formatting and testing steps
3. Repeat for all testing tabs! ⚡

Zooming In!

Bonus Round! 🎮 PowerApps!

Anyone can build an app with Microsoft PowerApps!

- **Quickly create apps** — without writing code — using AI-powered Copilot in Power Apps, prebuilt templates, and drag-and-drop functionality
- **Connect to your own data** (*hint: Sharepoint is great!*)
- Help management digitize processes so that Internal Audit can use and analyze that data!

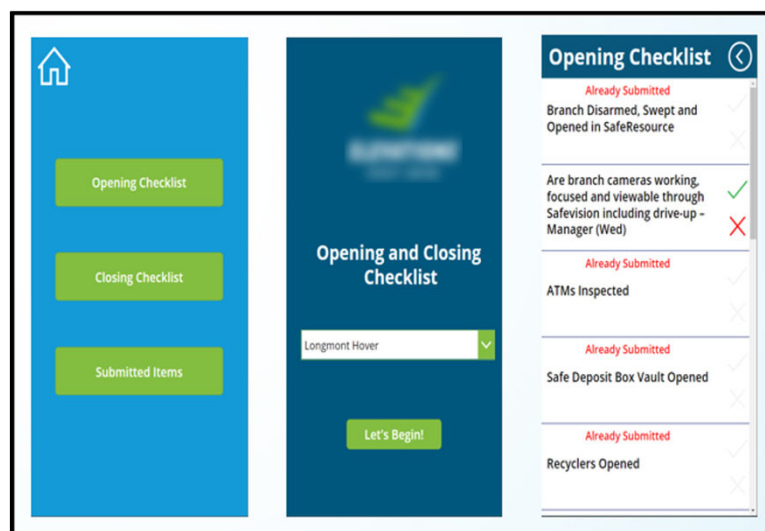


Bonus Round | Build an App with PowerApps

Audit: Bank Branch Audits

Analytic: Multiple!!

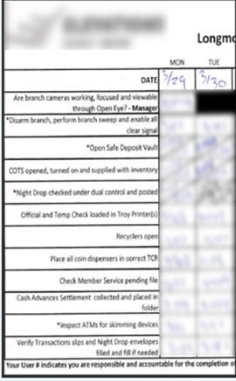
Test: PowerApps used to collect data via SharePoint, then analyzed by Audit



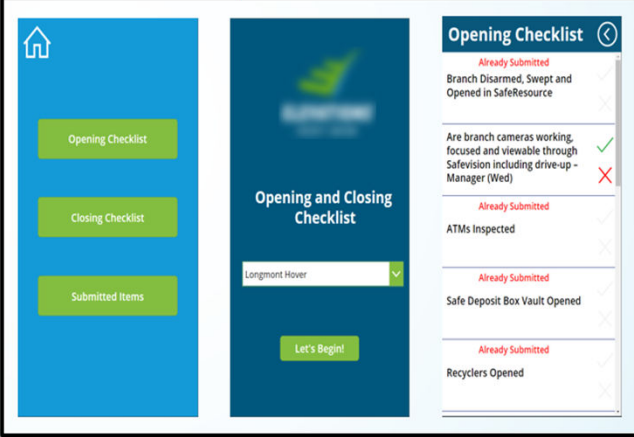
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Bonus Round | Simple Automations

↓ From this ↓



↓ To this! ↓

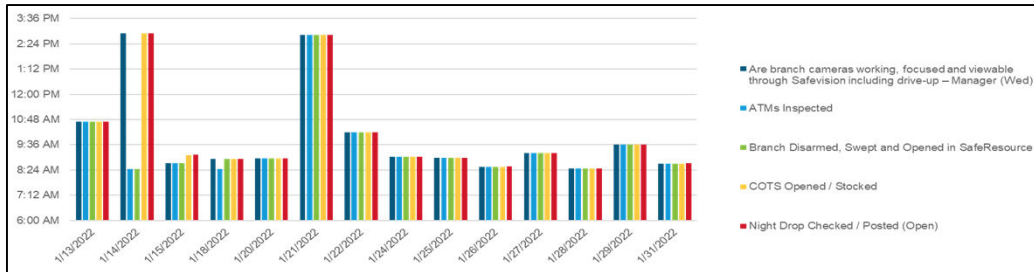


The image shows a transition from a paper checklist to a mobile application. The paper checklist on the left lists various tasks for opening a branch, such as checking cameras, clearing signs, opening COTS, and inspecting ATMs. The mobile app on the right features a home screen with buttons for 'Opening Checklist', 'Closing Checklist', and 'Submitted Items'. It also shows a detailed view of the 'Opening Checklist' with a 'Let's Begin' button and a list of tasks with completion status (e.g., 'Already Submitted', 'X', '✓').

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Bonus Round | Simple Automations

Title	User Name	Timing	Task	Completed	Date In	Lo	Date Submitted	Time Submitted	Completed?	Not Comp
Boulder Diagonal		Opening	Branch Disarmed, Swept and Opened in SafeResource		1/3/2022		1/3/2022	08:19:00	Yes	
Boulder Diagonal		Opening	Are branch cameras working, focused and viewable through Safesision including drive-up -		1/3/2022		1/3/2022	08:19:00	Yes	
Boulder Diagonal		Opening	ATMs Inspected		1/3/2022		1/3/2022	08:19:00	Yes	
Boulder Diagonal		Opening	Recylcers Opened		1/3/2022		1/3/2022	08:20:00	Yes	
Boulder Diagonal		Opening	Recyler Coin Dispensers Loaded		1/3/2022		1/3/2022	08:20:00	Yes	
Boulder Diagonal		Opening	Official /Temp Checks Stocked		1/3/2022		1/3/2022	08:20:00	Yes	
Boulder Diagonal		Opening	COTS Opened / Stocke		1/3/2022		1/3/2022	08:20:00	Yes	
Boulder Diagonal		Opening	Coin Machine Turned On		1/3/2022		1/3/2022	08:20:00	Yes	



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Audie's Pro Tip: Really Cool Hacks!

Did you know?!

- When you highlight cells to sum, average, etc., if you click the number that appears at the bottom of the screen, it's automatically copied to the clipboard.
- Under "Sort & Filter" you can "Go to Special" and find blanks, notes, formulas, and more.
- To easily duplicate/copy a tab, hold down control and drag the tab to the left or right to copy it.
- Always use keyboard shortcuts for things like copy, paste, and cut!

I don't think there's a person on Earth who knows ALL the Excel tips!



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Stay in Touch!



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