CPA Evolution licensure model / New CPA Exam (January 2024)

= CPA
New licensure model: Core and Disciplines

- Strong core with accounting, auditing, and taxation along with a recognition of the impact of technology
- Deeper knowledge in three primary disciplines
- Reflects reality of practice
- Adaptive and flexible
- One CPA license
- Enhances public protection

What might the Exam look like?

What we expect would stay the same:

- Designed for 1 – 2-year level
- No more than a 16-hour Exam
- No new experience requirements to sit for the Exam
- Candidates pass 4 sections
- Exam sections can be taken in any order
- No separate time limits to pass core and discipline
How may the Exam change?

Navigating the core + disciplines:
Candidates pass the three core sections and one discipline section (max = 4 sections)
Candidates don’t have the option to pass additional disciplines
All sections cover discrete content and a range of skills (including higher order)
Discipline passed will not differentiate the license granted

What is a Practice Analysis?

- Foundation of the validity and legal defensibility of a licensure examination
- A research project to define the knowledge and skills required by newly licensed CPAs
- Ensures a direct link between the knowledge and skills assessed on the CPA Exam and the important aspects of newly licensed CPA (nICPA) practice
CPA Exam practice analysis timeline

**December 2020** – Kicked off 12 to 18-month practice analysis

**July 2021** – Survey stakeholders on CPA Exam Core + Discipline content

**July 2022** – Expose draft CPA Exam Blueprint for public comment

**January 2023** – Finalize Blueprint/Announce new CPA Exam

**January 2024** – Launch new CPA Exam
Susan K. Wolcott, Ph.D., CPA, CMA
Educational Consultant
WolcottLynch

Susan is an educational consultant and independent scholar. She integrates cognitive development, neuroscience, and other education literatures to create practical approaches for the teaching, learning, and assessment of critical thinking, professional judgment, ethical reasoning, and similar skills. She is author of the AICPA faculty guide, *How to Help Your Students Become Better Critical Thinkers*. Susan is a frequent speaker at education conferences and has consulted with more than 80 universities and professional organizations. She currently teaches part-time at Indian School of Business (Mohali and Hyderabad), coauthors a cost accounting textbook, and serves on the IMA-Greater Seattle Chapter Board of Directors.

Guido L. Geerts, Ph.D.
Professor of Accounting and EY Faculty Scholar
University of Delaware

Guido is a professor of accounting and EY Faculty Scholar at the Lerner College of Business, University of Delaware, where he teaches accounting information systems and data analytics. He received a Ph.D. in accounting information systems from the Free University of Brussels, Belgium in 1993. Guido has published more than twenty articles in accounting and information systems journals. He has received numerous teaching, research, and service awards, including the 2015 University of Delaware’s Excellence in Teaching Award and the 2018 American Accounting Association Outstanding Service Award. Guido is the former chair of the Technology Task Force for the Pathways Commission Recommendation 4 (Curriculum and Pedagogy) and currently serves as a Trustee on the AICPA Foundation Board.
AGENDA

- CPA Evolution Update
- Learning Objectives:
  - Identify major data analytics skills for accountants
  - Describe the relationships between data analytics and critical thinking
  - Design data analytic assignments that challenge students, but do not overwhelm them
  - Generate ideas for effectively integrating data analytics in various accounting courses

- Resources
- Feedback

Data Analytics Skills vs. Critical Thinking

Some Parts of Data Analytics Are Well-Defined Such As:
- Use software to correctly extract, profile, clean, restructure, and integrate data
- Correctly explain and apply a specific data structure
- Correctly create a specified data report
- Use a data report to correctly answer well-defined questions

Other Parts of Data Analytics Require Critical Thinking Such As:
- Determine whether data are sufficiently relevant and/or credible
- Use cost-benefit analysis to choose methods/approaches to data cleaning
- Use priorities to choose a data structure and/or report format for the situation
- Interpret data reports to gain insights, improve predictions, make decisions, etc.
1. Susan’s Critical Thinking Guide
   Click [here](#) to download Susan’s Faculty Guide

2. Susan’s AICPA seminars on critical thinking
   Click [here](#) to view Susan’s previous AICPA’s webinars

3. Textbook on Data Analytics with a Strong Focus on Critical Thinking
   Forthcoming | Wiley
   
   Dzuranin, Ann. Guido Geerts, Margarita Lenk. Data and Analytics in Accounting: An Integrated Approach
   Forthcoming | Wiley
   Consider volunteering as Reviewer
   Click [here](#) for more information (includes some exercises you can integrate in your class)

4. Textbook on Power BI
   Forthcoming Wiley
   
   Guido Geerts
   Introduction to Power BI
   geerts@udel.edu

5. Data Process Chain

6. AICPA Evolution Model Curriculum
   [https://thiswaytocpa.com/program/modelCPAcurriculum](https://thiswaytocpa.com/program/modelCPAcurriculum)

   *Show Me the Numbers: Designing Tables and Graphs to Enlighten.* Analytics Press, El Dorado Hills, CA, USA.

   Big data in practice: how 45 successful companies used big data analytics to deliver extraordinary results. John Wiley & Sons.
Click here for some real-world examples of misleading graphs.

NASDAX: Being an Accountant for a Day.
Contact Nadia Schwartz: nadiaschwartz@augustana.edu

Click here to visit Bill McCarthy’s website or drop him an email at mccarthy@broad.msu.edu

Integrating Data Analytics Into the Accounting Curriculum
DATA ANALYTICS AS A PROCESS

DATA PROCESS CHAIN | CPA EVOLUTION
**SKILLS**

![Diagram showing skills and technologies/tools]

**TECHNOLOGIES/TOOLS**

*They are all amazing tools*
POWER BI

Excel++
Easy transition for accounting students and accounting professionals

Fully Integrated
ETL | Extract-Transform-Load
Information Modeling
Data Visualizations | Analytics

You can download it for free and start today (the best business model 😊)!

PROCESS ~~ TECHNOLOGIES/TOOLS

From Data To Insights

DATA PROCESS CHAIN

DATA DISCOVERY
DATA SOURCES
DATA PREPARATION
WELL-STRUCTURED, CLEAN DATA
INFORMATION MODEL BUILDING
ENRICHED DATA
ANALYTICS
INSIGHTS
PROBLEM SOLVING
SOLUTION

PROCESS

TECHNOLOGY / TOOLS

GET DATA
TRANSFORM DATA
(Query Editor)
MODELLING
DATA VIEW
DAX

REPORT VIEW

Power BI
CURRICULUM DESIGN

Where in the Curriculum Should Students Learn Data Analytics?

FINANCIAL ACCOUNTING  AUDITING   TAX   COST ....

ACCOUNTING APPLICATIONS

DATA ANALYTICS TECHNOLOGIES

DATA ANALYTICS TECHNOLOGIES

AIS

YOU DON'T HAVE TO DO THIS ALONE

TEACHING DATA ANALYTICS (1)

DATA DISCOVERY
DATA SOURCES
DATA PREPARATION
WELL-STRUCTURED, CLEAN DATA
INFORMATION MODEL BUILDING
ENRICHED DATA
ANALYTICS
INSIGHTS
PROBLEM SOLVING
SOLUTION

UNDERSTAND WHAT DATA IS AVAILABLE AND RELEVANT
EXTRACT, PROFILE, CLEAN, RESTRUCTURE AND INTEGRATE DATA (ETL)
PREPARE FOR ANALYSIS BY BUILDING POWERFUL INFORMATION MODELS
CREATE POWERFUL INTERACTIVE DREPORTS FOR EXPLORATION PURPOSES
MAKE DECISIONS INTERPRETATION
TEACHING DATA ANALYTICS (2)

DATA ANALYTICS ~ VALUE CREATION CASE (1)

Source: Marr (2016)
DATA ANALYTICS ~ VALUE CREATION
CASE (2)

Development of Critical Thinking
Stages of Development

Stage 1
Little/No Critical Thinking
“The Confused Fact-Finder”

Stage 2
Partial Critical Thinking
“The Biased Jumper”

Stage 3
Emergent Critical Thinking
“The Perpetual Analyzer”

Stage 4
Competent Critical Thinking
“The Pragmatic Performer”

Stage 5
Expert Critical Thinking
“The Strategic Revisioner”

Beyond Entry-Level

See details in AICPA faculty guide.
Based on definitions, data, and concepts from King & Kitchener’s reflective judgment model.
The five stages shown in the diagram correspond to reflective judgment stages 3, 4, 5, 6, and 7
and omit pre-adult performance.

Scaffolding: Stage 1 ➔ Stage 2

Stage 1:
All Problems Are Well-Defined, With Single Correct Answers

Uncertainties Exist

Some Problems Are Open-Ended and Have Multiple Valid Solutions

Stage 2:
Must Form Own Opinion and Justify It

KEY
Uncertainty Question Examples

- **Intro Fin**
  - Is the allowance for bad debts “accurate”?
  - Does a financial ratio have only one meaning?

- **Intro Mgmt**
  - Is the cost function “accurate”?
  - Which costs are relevant for a decision?

- **Tax**
  - Will tax laws change (i.e., are future tax estimates “accurate”)?
  - Will a tax strategy be challenged under audit?

- **Assurance**
  - Can audit risk be assessed “accurately”?
  - Are a client’s verbal statements “truthful”?

At Stage 1: Students believe that all information is accurate/inaaccurate, right/wrong, good/bad, true/false, etc.

Students who have moved to Stage 2 in one course might revert to Stage 1 in a new course.

Scaffolding: Stage 2 ➔ Stage 3

- **Stage 2:**
  - It is sufficient to generate arguments to support one’s own position
  - Delay judgment to thoroughly explore pros and cons

- **Stage 3:**
  - Develop a thorough, objective understanding before reaching a conclusion
  - Must identify and control biases to objectively consider different viewpoints

**KEY**
Scaffolding: Stage 3 ➔ Stage 4

**Stage 3:**
Supporting One Conclusion Denies the Legitimacy of Other Viewpoints

- Identify / Define Priorities
- Let Go of Unimportant Details by Focusing on Priorities That Are Important to the Situation

**Stage 4:**
Generate Well-Founded, Pragmatic Conclusions

---

Examples of Data Analytics Questions

- **Stage 1 ➔ 2 Uncertainties**
  - Are all data relevant and credible?
  - Is there only one way to extract, profile, clean, restructure, and integrate data?
  - Is only one data structure “correct”?  
  - Is only one data report format “correct”?  

- **Stage 2 ➔ 3 Pros and Cons**
  - Discuss arguments for/against the relevance and credibility of data
  - Evaluate the costs and benefits of different methods/approaches to data cleaning
  - Discuss strengths and weaknesses of a data model and/or data report format
  - Provide alternative interpretations of data

- **Stage 3 ➔ 4 Situational Priorities**
  - Determine whether data is sufficiently relevant and/or credible
  - Use cost-benefit analysis to choose methods/approaches to data cleaning
  - Use situational priorities to choose a data model and/or report format
  - Draw conclusions from interpretations of data

**Stage 2:** Progress to Stage 3 is slow and unstable, with many reversions ➔ Most students graduate at Stage 2

**Stage 3:** Progress to Stage 4 is fast when students learn to use priorities
Integrating Data Analytics Into the Accounting Curriculum

Scenarios 1 & 2: Analytics | Interpretation

**SCENARIO 1 | OVERVIEW**

**ANALYTICS | INTERPRETATION
DASHBOARD LITERACY**

- TECHNOLOGY POWER BI
- NAVIGATE WEB SITE
- NAVIGATE POWER BI DASHBOARD
- DATA ANALYTICS
- INTERPRETATION DASHBOARDS
- UNDERSTAND DATA RELATIONSHIPS
- ACCOUNTING
- DEPRECIATION

A visualization is a specific way of representing data.

A dashboard consists of one or more visualizations that can interact with one another.
DASHBOARD / VISUALIZATION

Source

DATA RELATIONSHIPS

<table>
<thead>
<tr>
<th>Relationship</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Comparison</td>
<td>Describes a set of discrete quantitative values that can be used for comparison purposes.</td>
<td>How many customers are there per state?</td>
</tr>
<tr>
<td>Distribution</td>
<td>Describes how quantitative values are distributed across an entire range.</td>
<td>How are salaries distributed among our employees?</td>
</tr>
<tr>
<td>Deviation</td>
<td>Describes how one or more sets of quantitative values differ from a reference set of values.</td>
<td>How much do the actual expenses for each department vary from the budgeted expenses?</td>
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<tr>
<td>Ranking</td>
<td>Describes how a set of quantitative values relate to each other sequentially.</td>
<td>What are the best-selling products?</td>
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<tr>
<td>Part-to-whole</td>
<td>Describes composition. How can a number (the whole) be divided into smaller parts, how do the parts relate to each other, and how do the parts relate to the whole?</td>
<td>How much does each region (part) contribute to the company’s (whole) total revenue?</td>
</tr>
<tr>
<td>Correlation</td>
<td>Describes whether and to what extent two paired sets of quantitative values relate to one another.</td>
<td>Is there a negative relationship between an employee’s years of experience and the number of mistakes that the employee makes?</td>
</tr>
<tr>
<td>Time Series</td>
<td>Describes how something changes over time, helping to identify patterns of change, rise, increases, fluctuations, growth, decline, and decrease.</td>
<td>What has happened to our sales since the beginning of the year – steady growth, sharp, seasonal fluctuations, etc.?</td>
</tr>
<tr>
<td>Geospatial</td>
<td>Assigns numerical values to locations.</td>
<td>What is the total revenue generated by U.S. states (location)</td>
</tr>
</tbody>
</table>

A data relationship describes how data elements (or values) relate to each other.

Exhibit 1
Data Relationships

Stephen Few. 2012
1. COGNITIVE TOOL (1)

DEPRECIATION EXPENSES COMPARISON

WEB SITE | CLICK HERE

1. COGNITIVE TOOL (2)

DOUBLE DECLINING BALANCE DEPRECIATION EXPENSES

WEB SITE | CLICK HERE
INTERPRETATION / CONTEXT

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Units Sold

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</tr>
<tr>
<td>5</td>
<td>2020</td>
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</table>

WEB SITE | CLICK HERE

INTERPRETATION / STRENGTH AND WEAKNESSES
WHAT DOES THE VISUALIZATION TELL YOU | DATA RELATIONSHIPS
WHAT DOES THE VISUALIZATION TELL YOU | BUSINESS CONCEPTS

INTERPRETATION

TOTAL UNITS SOLD 2016-2020

WEB SITE | CLICK HERE

INTERPRETATION / STRENGTH AND WEAKNESSES
WHAT DOES THE VISUALIZATION TELL YOU | DATA RELATIONSHIPS
WHAT DOES THE VISUALIZATION TELL YOU | BUSINESS CONCEPTS

WEB SITE | CLICK HERE

WEB SITE | CLICK HERE

WEB SITE | CLICK HERE
INTERPRETATION / DECEPTION (1)

TOTAL UNITS SOLD 2016-2020: 9,547,737

INTERPRETATION / DECEPTION (2)

TOTAL UNITS SOLD 2016-2020: 9,547,737
EXPLORATION / CONTEXT

NASDAX CASE: FRAUD ANALYTICS

Q1 – IDENTIFY (ANALYZE) “SMALL” PURCHASES FROM “LOCAL” “DINING PLACES.”
SMALL = <= $8
LOCAL = EAST PEORIA, PEKIN, PEORIA, PEORIA HEIGHTS
DINING PLACES = “FAST FOOD RESTAURANTS”, “EATING PLACES”
DETERMINE EMPLOYEES WITH A LARGE NUMBER OF SUCH PURCHASES

Q2 – IDENTIFY SPLIT TRANSACTION. ANALYZE SPLIT TRANSACTIONS PER EMPLOYEE.

Q3 – DETERMINE ALL MERCHANTS THAT HAVE SOLD TO ONE CARDHOLDER ONLY
(FICTITIOUS VENDORS):

Q4 – IDENTIFY THE VENDORS (MERCHANTS) WE SHOULD NEGOTIATE WITH

EXPLORATION

TRANSACTION SELECTION

DRILL DOWN

Identify relevant question

Identify relevant information (set of transactions)

Which employees should be investigated further?
2

SCENARIO 2 | OVERVIEW

ANALYTICS | INTERPRETATION
DASHBOARD LITERACY

TECHNOLOGY POWER BI
DATA ANALYTICS
ACCOUNTING
NAVIGATE POWER BI WORKSPACE
INTERPRETATION DASHBOARDS
NAVIGATE POWER BI DESKTOP DASHBOARD
UNDERSTAND DATA RELATIONSHIPS

2

BREAKEVEN ANALYSIS

POWER BI FILE | CLICK HERE

PRICE / UNIT  VARIABLE COST / UNIT  FIXED COST
11.00  8.00  1,200.00

BREAKEVEN
400.00  1,200.00  6,000.00

47

48
Scenarios 1 & 2: Analytics | Interpretation
Critical Thinking Opportunities

Linking Data Reports to the Business Context

Who Should Use the Report, and What Should They Use It For?
Integrating Data Analytics Into the Accounting Curriculum

Scenario 3: Analytics | Exploration

SCENARIO 3 | OVERVIEW

ANALYTICS DASHBOARD CREATION/EXPLORATION/INTERPRETATION

- TECHNOLOGY POWER BI
- CREATE A VISUALIZATION
- CREATE A DASHBOARD
- DEFINE A FILTER (BASIC BOOLEAN LOGIC)
- DATA ANALYTICS
- SELECT RELEVANT DATA
- IDENTIFY DATA RELATIONSHIPS
- SELECT VISUALIZATIONS
- IDENTIFY INSIGHTS
- ACCOUNTING
- PRODUCT MIX ANALYSIS
ANALYTICS | DATA PROCESS CHAIN

TECHNOLOGY
CREATING VISUALIZATIONS / DASHBOARDS

Click HERE to download a complete assignment
THREE-STEP PROCESS FOR CREATING VISUALIZATIONS

1. SELECT AND CREATE VISUALIZATION
2. ADD DATA
3. FORMAT DATA

Exhibit 9
Three-Step Process for Defining Visuals

DATA EXPLORATION

a. Trucks are growing faster in the US than in Canada.
b. In 2020, the Ridgeline was the least popular model.
c. The CR-V is the most popular model in both the US and Canada.
d. The Ridgeline is the only model with continuous growth since 2016.

For 2017, rank the models based on their relative importance (%) in the total units sold.

Analyze HNA’s growth during the 2016-2020 period.

What do the data tell you?
### IDENTIFY DATA RELATIONSHIPS

#### HNDA

#### UNITS SOLD

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#### Deviation

**Units Sold**

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<td>4</td>
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</tr>
<tr>
<td>5</td>
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</tr>
</tbody>
</table>

Analyze HNA's growth during the 2016-2020 period.

#### DECISIONS TO BE MADE

**QUESTION**

**WHAT DATA RELATIONSHIP**

**WHAT VISUALS**

**IDENTIFY INSIGHTS INTERPRETATION**

OVERALL GROWTH?

GROWTH BY:

COUNTRY

MODEL TYPE
OVERALL TREND

TOTAL UNITS SOLD 2016-2020

9,547,737

TREND BY COUNTRY

TOTAL UNITS SOLD 2016-2020

9,547,737
Scenario 3: Analytics | Exploration
Critical Thinking Opportunities
Conference Presentation Polling Data

Poll 3: The biggest weakness in our planning, forecasting and reporting data flow is around...

<table>
<thead>
<tr>
<th>Option</th>
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<tbody>
<tr>
<td>a. ERP/General ledger</td>
<td>21.3%</td>
</tr>
<tr>
<td>b. HCM or payroll</td>
<td>11.3%</td>
</tr>
<tr>
<td>c. CRM</td>
<td>15.9%</td>
</tr>
<tr>
<td>d. Data warehouse / other operational data</td>
<td>31.2%</td>
</tr>
<tr>
<td>e. Reporting (last mile to packs)</td>
<td>20.4%</td>
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Source: IMA Conference, June 15, 2021

Integrating Data Analytics Into the Accounting Curriculum

Scenario 4: Information Modeling
SCENARIO 4 | OVERVIEW

INFORMATION MODELING
Create Information Models
Questions “about” Information

- Technology (Power BI)
- Implement Algorithms
- How to Code: DAX

ACCOUNTING
- Calculate Performance Indicators
- Financial Analysis
- Business Process Analysis

INFORMATION

- Total Number of Transactions (4)
- Total Sales Amount
- Total Number of “Large Amount” Transactions (1)

DATA

<table>
<thead>
<tr>
<th>#</th>
<th>DATE</th>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6/1/2021</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>6/2/2021</td>
<td>1200</td>
</tr>
<tr>
<td>3</td>
<td>6/2/2021</td>
<td>50</td>
</tr>
<tr>
<td>4</td>
<td>6/3/2021</td>
<td>150</td>
</tr>
</tbody>
</table>
CODING (1)

#4
Determine the number of transactions that meet the following criteria:
- The transaction amount is less than $200.
- Only include purchases made from "Fast food restaurants" in Ohio or "Eating Places, Restaurants" in Delaware

Note: You must use the COUNTIF function.

<table>
<thead>
<tr>
<th>NUMBER OF TRANSACTIONS WITH SPECIFIC CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
</tr>
</tbody>
</table>

COUNTIF

1. NUMBER OF TRANSACTIONS WITH CRITERIA =
2. COUNTIF(PCARD[TRANSACTION NUMBER TM]),
3. FILTER(0,
4. (PCARD[AMOUNT] < 200) &&
5. {
6. (PCARD[CATEGORY] = "FAST FOOD RESTAURANTS" && PCARD[STATE] = "OH")
7. ||
8. (PCARD[CATEGORY] = "EATING PLACES, RESTAURANTS" && PCARD[STATE] = "DE")
9. )
10. PCARD[AMOUNT] + PCARD[TAX]
11. )

CODING (2)

#1
Determine the total $ amount spent on PLUMBING AND HEATING EQUIPMENT; make sure to include the taxes paid.

An extra challenge for this problem is that you don’t know the answer.

You must use an ITERATOR.

<table>
<thead>
<tr>
<th>TOTALS AMOUNT PLUMBING AND HEATING EQUIPMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>?</td>
</tr>
</tbody>
</table>

1. TOTAL $AMOUNT PLUMBING AND HEATING EQUIPMENT =
2. SUM(0,
3. FILTER(0,
4. PCARD,
5. (PCARD[CATEGORY] = "PLUMBING AND HEATING EQUIPMENT"),
6. PCARD[AMOUNT] + PCARD[TAX]
7. )
8. )

• INTRODUCING UNCERTAINTY
• METHODS TO VALIDATE THE RESULT
IDENTIFY MEASURES / DIMENSIONS

<table>
<thead>
<tr>
<th>ANALYSIS</th>
<th>HOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHAT</td>
<td></td>
</tr>
<tr>
<td>What is our profit growth</td>
<td>?</td>
</tr>
<tr>
<td>What is our employee churn?</td>
<td>?</td>
</tr>
<tr>
<td>What is our customer churn?</td>
<td>?</td>
</tr>
<tr>
<td>What is our relative market share?</td>
<td>?</td>
</tr>
<tr>
<td>What is our growth in terms of revenue?</td>
<td>?</td>
</tr>
</tbody>
</table>

DIMENSIONAL / REA MODELING (1)

- EMPLOYEE
- MERCHANDISE
- CUSTOMER
- SALE
- CALENDAR
- DIMENSION
- FACT
- DIMENSION

1 1

1 1

* * *
DIMENSIONAL / REA MODELING (2)

- EMPLOYEE
  - PARTICIPATES
  - STOCK-FLOW

- CUSTOMER
  - Country
  - State
  - City

- SALE
  - Total Profit
  - Category Type

- MERCHANDISE
  - Category Type

- CALENDAR
  - When

DIMENSIONAL / REA MODELING (3)

TOTAL PROFIT CROSS-TAB

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>Country</th>
<th>Electronics</th>
<th>Alarm Clock</th>
<th>Floor Lamp</th>
<th>Hair Dryer</th>
<th>Printer</th>
<th>Garden Hose</th>
<th>Herbicide</th>
<th>Mulch</th>
<th>Spreader</th>
<th>Total</th>
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<tr>
<td>CA</td>
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<td>1448</td>
<td>1082</td>
<td>1201</td>
<td>984</td>
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<td>393</td>
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<tr>
<td>AB</td>
<td></td>
<td>36</td>
<td>105</td>
<td>36</td>
<td>177</td>
<td>990</td>
<td>990</td>
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<td>36</td>
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<td>990</td>
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<td></td>
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</tr>
<tr>
<td>Grande Prairie</td>
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<td></td>
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<td>701</td>
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<td>ON</td>
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<td>550</td>
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<td>550</td>
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<tr>
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<td>7993</td>
<td>651</td>
<td>2621</td>
<td>4678</td>
<td>321</td>
<td>8271</td>
</tr>
</tbody>
</table>

DIMENSION

FACT

DIMENSION

71

72
### Scenario 4: Information Modeling
### Critical Thinking
### Opportunities

#### Wells Fargo Scandal

<table>
<thead>
<tr>
<th>Year</th>
<th>Event Description</th>
</tr>
</thead>
</table>
| 2002-2005| • First fake accounts created  
• Employees first attempted to "blow the whistle" |
| 2013    | • LA Times story about high pressure and fake accounts |
| 2016    | • Company acknowledged creation of fake accounts  
• Company launched internal investigation  
• Fines totalling $185 million from the various regulators  
• 5,300 employees fired (1,780 were later rehired after being cleared of wrongdoing)  
• Created new code of conduct  
• CEO resigned and forfeited $41 million in stock award bonuses |
| 2017    | • Independent directors issued special report  
• Estimated 3.5 million fake accounts  
• $5.4 million awarded to former employee for whistleblower retaliation  
• Accrued $3.25 billion for legal costs and settlements  
• New performance management and rewards plan |
| 2018-2020| • Agreed to pay $3 billion fine to settle civil and criminal charges for the fake account scandal (excluding customer refunds)  
• Federal regulators placed restrictions on the bank’s growth  
• Estimates $2.4 billion cumulatively in refunds and lawsuit payments to customers  
• John Stumpf (former CEO) was fined $17.5 million  
• Chief internal auditor and chief administrative officer suspended for oversight failures at the request of regulators  
• Issued “Business Standards Report” describing restructuring activities |
Critical Success Factors ➔ Performance Measures (KPIs)

Organization
Goal: Cross-Sell Services to Existing Customers

Division-Level
CSF: Open New Accounts for Existing Customers
KPI: # of New Accounts

Bank Branch-Level
CSF: Open New Accounts for Existing Customers
KPI: # of New Accounts

Bank Cashiers
CSF: Open New Accounts for Existing Customers
KPI: # of New Accounts

Does this make any sense?
Are all new accounts by existing customers equally desirable?
Is the number of new accounts the best way to measure and motivate the strategic goal?
What was the purpose of the strategic goal?

Integrating Data Analytics Into the Accounting Curriculum
Scenario 5: Data Preparation
SCENARIO 5 | OVERVIEW

DATA PREPARATION
Create integrated, well-structured data set.
Questions “about” the data

TECHNOLOGY
(Power BI)

DATA ANALYTICS
ACCOUNTING

PROFILING
(DETECTION)

CLEANING,
TRANSFORMATION
(CORRECTION)

COST-BENEFIT
ANALYSIS OF DATA
PREPARATION

REPLICATE DATA TRANSFORMATION (1)

YOU HAVE EXTRACTED DATA FROM EXCEL. IN EXCEL, HEADERS ARE TYPICALLY THE FIRST ROW

“HOW TO” HOW TO TRANSFORM THE FIRST ROW INTO A HEADER IN POWER BI.

“TRANSFORMED TABLE"
REPLICATE DATA TRANSFORMATION (2a)

**STARTING POINT**

FILE: Grades.xlsx

Excel file with two worksheets: “StudentGrade” and “Course”

**ASSIGNMENT**

Determine the Average Grade per student, course, area (e.g. ACCT), and state.

---

REPLICATE DATA TRANSFORMATION (2b)

---
A PATTERNS APPROACH TO DATA PREPARATION

5

Dzuranin, Geerts, Lenk (Forthcoming). WILEY.
FROM DATA TO INSIGHTS

Click here to see one of my Fall 2019 student projects

<table>
<thead>
<tr>
<th>QUESTION</th>
<th>IMPLEMENTATION (POWER BI)</th>
<th>INSIGHTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Q2</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Q3</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Q4</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Q5</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

Grade Sheet Project

STUDENT PROJECT: QUESTION

What percentage of incidents have involved males? What percentage of incidents have involved females? Also, what percentage of incidents have involved children, teens, and adults?
STUDENT PROJECT: IMPLEMENTATION (POWER BI)

Number of incidents that involved a male: 87.85%
Number of incidents that involved a female: 12.15%
Number of Children Involved: 1.67%
Number of Teens Involved: 9.21%
Number of Adults Involved: 83.82%

STUDENT PROJECT: INSIGHTS/DISCUSSIONS

From this data you can see that significantly more males are involved and either killed or injured in these gun incidents than females. This leads to a few questions regarding gender and gun violence. For instance, whether men are targeted more frequently than women. If women are more aware of the dangers of guns and more observant during these occurrences? Or if it has been purely situations of co incidence.

Also, the second main part of the dashboard is the information regarding age groups and how frequently each of these age groups have been involved in gun violence incidents. After coming up with the data you can see that children are least involved in these incidents. Adults, by far, are most involved at 83.82%.
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Email: mahrens@stlcc.edu

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Thank You

Questions: academics@aicpa.org

Appendix
### APPENDIX
DATA PROCESS CHAIN
CPA EVOLUTION | MODEL CURRICULUM

#### Topic 2: Advanced logical thinking

<table>
<thead>
<tr>
<th>Summary</th>
<th>Estimated Hours</th>
<th>Suggested course(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrate ability to apply logical thinking to interpret and create conditional statements and apply relational concepts.</td>
<td>4-7</td>
<td>ADA, AMDA</td>
</tr>
</tbody>
</table>

**Learning objective(s):**
1. Apply relational logic concepts to answer questions.
2. Interpret conditional logic statements.
3. Create a condition statement.
4. Understand alternative accounting information system models, such as the resources, events, and agents (REA) model, and create the appropriate models.
5. Apply relational concepts.
6. Create program code using proper syntax.

#### Topic 3: Advanced data concepts

<table>
<thead>
<tr>
<th>Summary</th>
<th>Estimated Hours</th>
<th>Suggested course(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrate ability to extract, transform, and load data.</td>
<td>3-5</td>
<td>ADA, AMDA</td>
</tr>
</tbody>
</table>

**Learning objective(s):**
1. Apply appropriate joins to analyze data.
2. Explain and apply principles of Extract, Transform, and Load (ETL).
3. Design and implement controls used to ensure completeness, accuracy, and validity of data.
5. Construct a data set.
6. Apply data cleaning techniques.
7. Apply data transformation techniques.
8. Describe and evaluate relational, dimensional, and big data models.
9. Explain and implement data loading processes.
10. Identify the capabilities needed in tools that support data modeling and analysis.
APPENDIX
DATA PROCESS CHAIN
CPA EVOLUTION | MODEL CURRICULUM

Topic 4: Advanced data mining

<table>
<thead>
<tr>
<th>Summary</th>
<th>Estimated Hours</th>
<th>Suggested course(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apply data mining techniques.</td>
<td>0.5-1</td>
<td>ADA, AMDA</td>
</tr>
</tbody>
</table>

Learning objective(s):
1. Apply data mining techniques to a data set.  
   INFORMATION MODELING ANALYTICS

Topic 5: Advanced data analysis

<table>
<thead>
<tr>
<th>Summary</th>
<th>Estimated Hours</th>
<th>Suggested course(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determine and interpret appropriate predictive and prescriptive analysis.</td>
<td>3-5</td>
<td>ADA; AMDA</td>
</tr>
</tbody>
</table>

Learning objective(s):
1. Determine/interpret appropriate predictive analysis, (e.g., regression, time series, forecasting).  
   INFORMATION MODELING ANALYTICS
2. Determine/interpret appropriate prescriptive, (e.g., optimization modeling, Monte Carlo simulation).  
   INFORMATION MODELING ANALYTICS

Topic 6: Advanced data visualization

<table>
<thead>
<tr>
<th>Summary</th>
<th>Estimated Hours</th>
<th>Suggested course(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain and apply data visualization methods.</td>
<td>4-7</td>
<td>ADA; AMDA</td>
</tr>
</tbody>
</table>

Learning objective(s):
1. Compare and contrast data visualization methods.  
   ANALYTICS
2. Apply data visualization methods to specific data sets and circumstances.  
   ANALYTICS
3. Create appropriate dashboards and scorecards.  
   ANALYTICS
## APPENDIX
### DATA PROCESS CHAIN
#### CPA EVOLUTION | MODEL CURRICULUM

<table>
<thead>
<tr>
<th>Topic 7: Communicating results on advanced data analytics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Summary</strong></td>
</tr>
<tr>
<td>Design and interpret the results of a Key Performance Indicators (KPI) dashboard.</td>
</tr>
</tbody>
</table>

**Learning objective(s):**

1. Design a KPI dashboard based on business user roles.  
2. Interpret the results of a KPI and provide recommended response.  
3. Apply what-if analysis to assumptions.  
4. Design analytic with built in controls for completeness, accuracy, and validity.

---

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- Cybersecurity Fundamentals and Beyond the Fundamentals
- Blockchain Fundamentals for Accounting and Finance Professionals
- Retirement Planning
- COSO Internal Control

### Certificate Program Hours

<table>
<thead>
<tr>
<th>Certificate Program</th>
<th>Hours</th>
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<tbody>
<tr>
<td>Application of Data Analytics Essentials</td>
<td>14</td>
</tr>
<tr>
<td>Blockchain Fundamentals for Accounting and Finance Professionals</td>
<td>15</td>
</tr>
<tr>
<td>Core Forensic Accounting</td>
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<tr>
<td>Cybersecurity Advisory Services</td>
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<tr>
<td>Cybersecurity Fundamentals for Finance and Accounting Professionals</td>
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<td>Data Analyst Certificates Bundle</td>
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<td>Data Analyst Fundamentals</td>
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<td>Data Analytics Modeling</td>
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<td>Data Visualization</td>
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<td>Forecasting and Predictive Analytics</td>
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<td>Not-for-Profit I</td>
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<td>Robotic Process Automation Fundamentals for Accounting and Finance Professionals</td>
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</tr>
<tr>
<td>Specialized Forensic Accounting</td>
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</tr>
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</table>

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- The importance of cybersecurity and developing a security mindset
- Your role and what it takes to have a security mindset to be a trusted advisor and key contributor toward cybersecurity risk management
- Bitcoin and blockchain characteristics
- Review of the fundamental attributes and properties of money
- Review of the evolution of blockchain, from pre-cryptocurrency to digital crypto assets
- Robotic process automation
- Business value of RPA
- RPA recognition
- RPA's transformation of business
- Capabilities you need to grow your data-driven strategy
- Challenges in implementing successful change initiatives.
- Recall how a data strategy will affect your executive team, technology, people and processes, as well as what new capabilities you need to grow your data-driven strategy
- Differences between AI, ML, and DL
- Benefits of artificial intelligence (AI)
- Basic concepts related to AI
- AI’s importance

Source: www.ThisWayToCPA.com/program/CriticalThinking

Critical Thinking Resources

Content will be added periodically. Available now:
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- Reference Guide
- Articles
- Webcasts
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