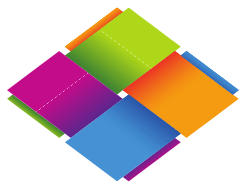Accounting *IS* Big Data Webinars

The Analytics Mindset

June 7, 2017
2 EDT-1 CDT-Noon MDT-11 PDT
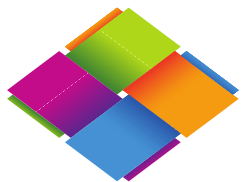
**Centers for
Advancing
Accounting**

CPE

June 7, 2017

To receive CPE Credit, be sure to *respond to all of the polling questions* during the session and *fill out the CPE Verification Form* at the end of the session.

The CPE Form will appear as you click off the webinar

Your responses, along with your attendance, will comprise the criteria for Continuing Professional Education credit, as regulated by NASBA. Attendees at this presentation who meet the criteria will be awarded 1.2 CPE Credit Hour in the NASBA Field of Study category, "Specialized Knowledge and Application"

NOTE: The American Accounting Association is registered with the National Association of State Boards of Accountancy (NASBA) as a sponsor of continuing professional education on the National Registry of CPE Sponsors. State boards of accountancy have final authority on the acceptance of individual courses for CPE credit. Complaints regarding registered sponsors may be addressed to the National Registry of CPE Sponsors through its Web site: http://www.learningmarket.org

Centers for Advancing Accounting

Ernst & Young
FOUND▲TION™

Academic Resource Center

The analytics mindset

Margaret Christ

University of Georgia, Assistant Professor of Accounting

EY Academic Resource Center faculty member

Catherine Banks

Director, Ernst & Young Foundation

Director, EY Academic Resource Center

What is the analytics mindset?

The analytics mindset is the ability to:

► Ask the right questions;

► Extract, transform and load relevant data (i.e., the ETL process);

► Apply appropriate data analytic techniques; and

► Interpret and share the results with stakeholders

Where are you on your journey to teaching analytics?

1. I am just starting to learn more so I can try to do something soon.

2. I have begun to talk with my students about the importance of analytics in the accounting profession.

3. I am developing or currently offering at least one analytics learning project/requirement integrated into my course.

4. I am developing or currently offering a full course integrating analytics.

5. I am in denial or hoping to retire soon!

Analytics mindset competency framework

Ask the right questions		
Understand and define the objective of the relevant stakeholders		
Understand the business context and the problem if one does, or could, exist		
Develop an expectation of what you expect to see before analyzing your data, if appropriate		
Recognize that questions are iterative and answers may lead to more questions, and judgment is needed to determine if deeper analysis is warranted		
Extract, transform and load relevant data (i.e., the ETL process)		
Understand data characteristics and their relevance	►	Variety – financial, customer, social media, video, voice, text, machine data, and other structured and unstructured
	►	Volume – general size parameters and implications
	►	Velocity – frequency of data updates and implications
	►	Veracity – trustworthiness of sources
Understand the flow of data in accounting information systems	►	Types of accounting information systems – Size – Real-world application
	►	Modules – Purpose – Relationships between modules
	►	Capabilities and limitations
	►	Routine and non-routine flow
	►	Who generates and oversees the data and in what capacity
Capture data	►	Extractions – What to ask for – How to ask – In what format ► AICPA data standards
	►	Transformation (data cleansing) – before and after loading
	►	Loading, including knowing which tool the data should be loaded into for the most efficient and effective analysis
	►	Maintaining data integrity (data validation)
	►	Automation

Analytics mindset competency framework

Apply appropriate data analytics techniques						
Understand the purpose of different types of data analytics techniques and how to determine which techniques are most appropriate for the objectives of your analysis (objectives might include a need to prove or disprove an expectation, if one was developed)	►	Master – Ratio – Sorting – Aggregation – Trends – Comparison – Forecasting – Basic descriptive statistics (mean, standard deviation, maximum and minimum, quartiles) – Querying	►	Working knowledge – Cluster analysis – Inferential statistics (T-statistics, P-values) – Correlation analysis – Regression	►	Awareness – Artificial intelligence – Machine learning – Cognitive computing – Neural networks – Data mining – Other emerging technologies

Gain familiarity with analytics tools	►	Master
		– Excel
		– Basic database (Access)
		– Visualization (Tableau, Spotfire, Qlik, Microsoft BI)
			►	Working knowledge
				– Querying languages (SQL)
				– Career-path specific
				  ► Audit – ACL, IDEA, TeamMate
				  ► Tax
				  ► Managerial
				  ► Forensic
					►	Awareness
						– Programming languages (VBA, Python, Pearl, Java, PHP)
						– Statistics (R, SAS, SPSS)
						– Database tools (SAP, Oracle, Microsoft)
						– SSIS packages

Interpret and share the results with stakeholders						
Interpret results of your analysis appropriately, based on your question and expectations, if appropriate						
Summarize results from your analysis in a manner conducive to and compelling for your stakeholder						
Apply appropriate visualization design techniques						

► **Master level** – This is the ability to understand and apply the subject matter at a relatively in-depth level. The student should be confident in their abilities and need minimal support. The student should not have to spend additional time learning when given an assignment.

► **Working knowledge level** – This is the ability to understand and apply the subject matter at a moderate level. The student should be confident in their ability to figure out the answer, possibly with some support (either from additional personal study or from another person). The student may need additional time for research or to learn (often to refresh) skill sets to complete assignments.

► **Awareness level** – This is the ability to understand the subject matter at a basic level, but with a limited ability to apply this understanding to an assignment. The student should know the possibilities of the subject matter in order to engage in a broad discussion with a specialist.

EYARC analytics mindset curriculum resources

Introduction to the analytics mindset:

► Lecture and slides

► Competency framework

Introduction to data visualization: *(coming soon)*

► Lecture and slides

EYARC Colloquium presentations

EY Thought leadership

Case studies:

► User guide, case, solutions, data sets, analytic workbooks,
   how to videos

► All cases focus on the development of the analytics mindset,
   but to different degrees and emphasis on detailed
   competencies

► Many ways to modify the cases to shorten or focus on select
   learning objectives

Ernst & Young
FOUND**A**TION™
Academic Resource Center

Case study guide

Course/competency *Optional **Variable based on topic/student choice	Big Deals	DuPont	TechWear	Gamification	PCard	Viz-a-thon	Timp Health	IntegrateCo	Tech Explorer	Peach State University Hotel
Introduction to accounting	■	■				**				
Cost/management accounting	■			■		**	■		**	
Intermediate financial accounting		■	I&II			**			**	
Accounting information systems		■						■	**	
Auditing (including both external and internal audit)			■			**			**	■
Tax						**			**	
Fraud			IV		VII	**			**	■
Data analytics	■	■	■	■					**	
Business statistics							■			

Cases highlighted in blue will be coming soon to the EYARC website
Relevant case parts are listed as roman numerals for specific reference, if appropriate

Ernst & Young
FOUND▲TION™
Academic Resource Center

Case study guide – Extract, transform and load relevant data

Course/competency *Optional **Variable based on topic/student choice	Big Deals	DuPont	TechWear	Gamification	PCard	Viz-a-thon	Timp Health	IntegrateCo	Tech Explorer	Peach State University Hotel
Extract, transform and load relevant data (i.e., the ETL process)										
Understand data characteristics and their relevance	*	II	I		II			I		▓
Understand the flow of data in accounting information systems			I							▓
Capture data – extractions; AICPA data standards			III		III				▓	
Capture data – transformation (data cleansing)			I&IV		III			II		
Capture data – loading	*	II			III		▓	II		
Capture data – maintain data integrity (data validation)		II			II, III			III		
Capture data – automation										

Case study guide – apply appropriate analytic techniques
Master level

Course/competency *Optional **Variable based on topic/student choice	Big Deals	DuPont	TechWear	Gamification	PCard	Viz-a-thon	Timp Health	IntegrateCo	Tech Explorer	Peach State University Hotel
Apply appropriate data analytics techniques										
Analytic techniques – ratio		III	II, III			**				
Analytic techniques – sorting		III	II, III, V			**				
Analytic techniques – aggregation		III	II, III, V			**				
Analytic techniques – trends		III	II, V			**				
Analytic techniques – comparison		III	II, V			**				
Analytic techniques – forecasting		III				**				
Analytic techniques – descriptive statistics (mean, standard deviation, maximum and minimum, quartiles)		III				**				

Case study guide – apply appropriate analytic techniques
Master level

Course/competency *Optional **Variable based on topic/student choice	Big Deals	DuPont	TechWear	Gamification	PCard	Viz-a-thon	Timp Health	IntegrateCo	Tech Explorer	Peach State University Hotel
Apply appropriate data analytics techniques										
Analytic tools – Excel			I&II		II, III			II, III, IV		
Analytic tools – Basic database (Access)					III, IV, V			II, III, IV		
Analytic tools – Visualization (Tableau; Power BI, etc.)			III, IV, V			**				

Case study guide – apply appropriate analytic techniques
Working knowledge level

Course/competency *Optional **Variable based on topic/student choice	Big Deals	DuPont	TechWear	Gamification	PCard	Viz-a-thon	Timp Health	IntegrateCo	Tech Explorer	Peach State University Hotel
Apply appropriate data analytics techniques										
Analytic techniques – querying					IV, V, VI, VII			II, III, IV		
Analytic techniques – cluster analysis										
Analytic techniques – inferential statistics (T-statistics; P-values)										
Analytic techniques – correlation analysis										
Analytic techniques – regression										

Case study guide – apply appropriate analytic techniques
Working knowledge level

Course/competency *Optional **Variable based on topic/student choice	Big Deals	DuPont	TechWear	Gamification	PCard	Viz-a-thon	Timp Health	IntegrateCo	Tech Explorer	Peach State University Hotel
Apply appropriate data analytics techniques										
Analytic tools – Querying languages (SQL)										
Analytic tools – career-path specific (audit)										
Analytic tools – career-path specific (tax)										

Case study guide – apply appropriate analytic techniques
Awareness level

Course/competency *Optional **Variable based on topic/student choice	Big Deals	DuPont	TechWear	Gamification	PCard	Viz-a-thon	Timp Health	IntegrateCo	Tech Explorer	Peach State University Hotel
Apply appropriate data analytics techniques										
Analytic techniques – artificial intelligence										
Analytic techniques – machine learning										
Analytic techniques – cognitive computing										
Analytic techniques – neural networks										
Analytic techniques – data mining										
Analytic techniques – other emerging technologies										

Case study guide – apply appropriate analytic techniques
Awareness level

Course/competency *Optional **Variable based on topic/student choice	Big Deals	DuPont	TechWear	Gamification	PCard	Viz-a-thon	Timp Health	IntegrateCo	Tech Explorer	Peach State University Hotel
Apply appropriate data analytics techniques										
Analytic tools – programming languages (VBA, Python, Pearl, Java, PHP)										
Analytic tools – Statistics (R, SAS, SPSS)							▮			
Analytic tools – Database tools (SAP, Oracle, Microsoft)										
Analytic tools – SSIS packages										

Ernst & Young
FOUNDATION™
Academic Resource Center

Which analytics mindset competency do you think will be the most challenging to develop with your students?

1. Ask the right questions (ARQ)
2. Extract, transform and load relevant data (ETL)
3. Apply appropriate data analytic techniques (AAAT)
4. Interpret and share the results with stakeholders (ISR)

Big Deals

► Courses: introductory financial accounting class, cost/managerial accounting, data analytics

► Data: three years of financial and product data for 24 countries

► Overview: Two-part case

   ► A global big box retailer, Big Deals, sells computer, audio and visual products and needs help with optimizing their product line and revenue stream.

   ► Simple ARQ: to understand and identify business and strategy issues

     ►Simple ETL: ETL already complete (data in three Excel files)

     ►Simple AAATs: Can provide the analytics output and visualization to students directly (solution shown in Tableau). Alternatively, you can make this a requirement.

     ►Simple ISR: recommend business and product strategy answering specific questions

DuPont

► Courses: introductory financial accounting class, intermediate financial accounting, accounting information systems, data analytics

► Data: three years of balance sheet and income statement data for 174 companies in six industries

► Overview: Four-part case

  ► Students learn about the DuPont Method to evaluate company performance and make a recommendation of which companies to invest in.

  ► Moderate ARQ: learn DuPont model

  ► Simple ETL: extract and transform already complete (data in Exel file); focus on loading. How to videos provided.

  ► Moderate AAAT: create the analytics based on the DuPont model and a visualization (solution shown in Tableau). How to videos provided.

  ► Moderate ISR: effective use of dashboards

TechWear

- ► Courses: intermediate financial accounting (Parts I&II), accounting information systems, auditing, fraud (Part IV), data analytics
- ► Data: three fiscal years of transaction level data for the order-to-cash cycle
- ► Overview:
  - ► Students assume the role as auditor for TechWear, a start-up company that manufacturers and sells high-tech sportwear, and assigned to audit the order-to-cash cycle.
  - ► Robust ARQ: understanding order-to-cash cycle and audit risk assessment
  - ► Robust ETL: required to do all aspects of ETL; students also complete an audit data-planning analysis template; can provide completed ETL as well (data in Excel); How to videos provided
  - ► Robust AAAT: students fully develop the analytics and visualization (Excel and Tableau); How to videos provided
  - ► Robust ISR: board presentation of audit findings (fictitious sales, cutoff issues, valuation)

Gamification

► Courses: cost/management accounting class, accounting information systems, data analytics

► Data: two sets of survey data

► Overview: Two-part case

    ► Students assume the role of a Chief Technology Officer and decide whether the IT compliance training for their organization should be changed to a "gamified" training model.

    ► Moderate ARQ: understand issues for learning strategy

    ► Simple ETL: understand data; data provided in Excel

    ► Robust AAT: option between simple to more advanced (Tabeleau); How to videos provided

    ► Moderate ISR: create a story for management presentation

PCard

► Courses: accounting information systems, auditing, fraud (Part VII) data analytics

► Data: two sets of survey data

► Overview: Seven-part case

   ► Students are asked to assume the role of an internal auditor and perform various audit procedures on purchasing card transactions for Oklahoma State University.

   ► Robust ARQ: understand policies and risks

   ► Robust ETL: focus on understanding data characteristics; AICPA audit data standards; full ETL process requirements; data provided in Excel;

   ► Robust AAT: develop queries to assess data for policy compliance and fraudulent transactions (Access; data files too large for Excel analysis); How to videos provided

   ► Simple ISR: Interpretation is based on querying results and there is no overall requirement to compile findings.

Viz-a-thon

► Courses: this case can be used in virtually all accounting courses based on the topic chosen for their visualization

► Data: Open-students are expected to find their own data; we offer select resources

► Overview: Two-part case

  ► Students must generate their own question, find and ETL data, develop their own visualization and present their findings to the class. It is structured to be delivered as a competition at a student or group level.

  ► Robust ARQ: students must identify a relevant question to research within a larger question: *Where is the best place in the world to do business*?

  ► Robust ETL: Data is not provided; however, you could do this for the students

  ► Robust AAT: Tableau

  ► Robust ISR: heavy focus on the class presentation for judging; we provide select visualization presentations as an example

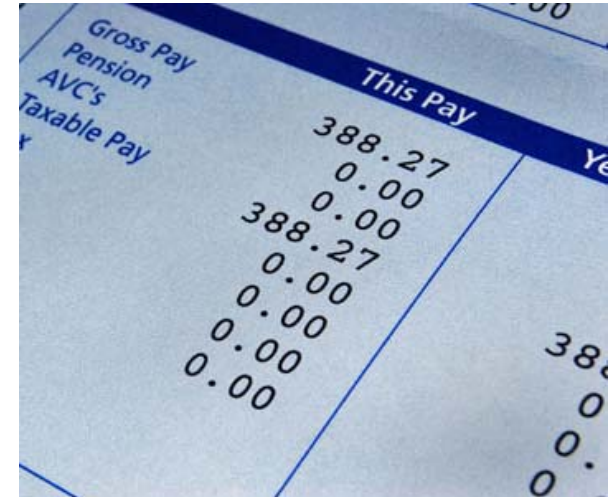# Timp Health *(coming soon)*

► Courses: cost/management accounting, data analytics, business statistics

► Data: Text files of seven months of drug costs and other relevant data

► Overview: Four-part case

  ► Students assume the role of an analyst at Timp Health, a pharmacy benefit management (PBM) company, and analyze drivers of gross drug costs and ultimately develop a model to best predict future gross drug costs.

  ► Moderate ARQ: understanding PBMs and understand important elements to predicting drug costs through review of provided models

  ► Moderate ETL: focus on understanding and loading data; Text files are provided

  ► Robust AAT: Forecasting, descriptive statistics, interpretive statistics, correlation, regression; Performed in statistical program R

  ► Moderate ISR: heavy focus on the class presentation for judging; we provide select visualization presentations as an example

IntegrateCo *(coming soon)*

► Courses: cost/management accounting, accounting information systems, auditing, data analytics

► Data: Two years of payroll data

► Overview: Three-part case

  ► Students assume the role of an analyst for IntegrateCo, a company that installs and services integrated building management systems, and are asked to review payroll between two years and analyze variances

  ► Moderate ARQ: Develop questions to perform payroll variance analysis

  ► Robust ETL: entire ETL process; Data comes from multiple systems so this adds complexity; Excel files are provided

  ► Robust AAT: Develop analysis to analyze payroll; Full solutions in Access and Excel

 ► Moderate ISR: a report for management on findings and recommendations

Tech Explorer *(coming soon)*

► Courses: this case can be used in virtually all accounting courses

► Data: N/A

► Overview: One-part case

  ► The case asks student groups to research emerging data and technology topics, prepare and present a presentation to the class on the topic and to write a memo about the topic.

  ► The case is designed to help students achieve the awareness level competency for emerging developments in data (and better facilitation of ETL) and analytic techniques and tools.

  ► We provide some resources that you can share with students to aid with research or you can require them to do exclusively on their own.

  ► A grading rubric is provided.
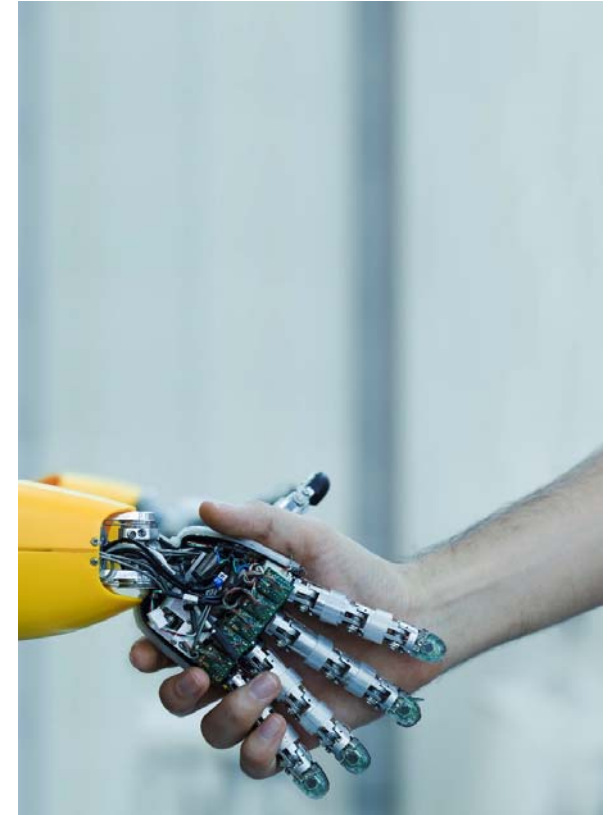
Peach State University Hotel *(coming soon)*

► The most exciting feature of this case is that it offers students the ability to use more real-world (although simplified) auditing analyses and tools based on EY's audit analytics platform, *EY Helix*.

► This is a very robust case for all aspects of the analytics mindset that has students simulate the role of the auditor for Peach State University Hotel.

► Please plan to attend our Analytics mindset session at the AAA annual conference or the Accounting is Big Data conference to learn more!

Ernst & Young
FOUND TION™
Academic Resource Center
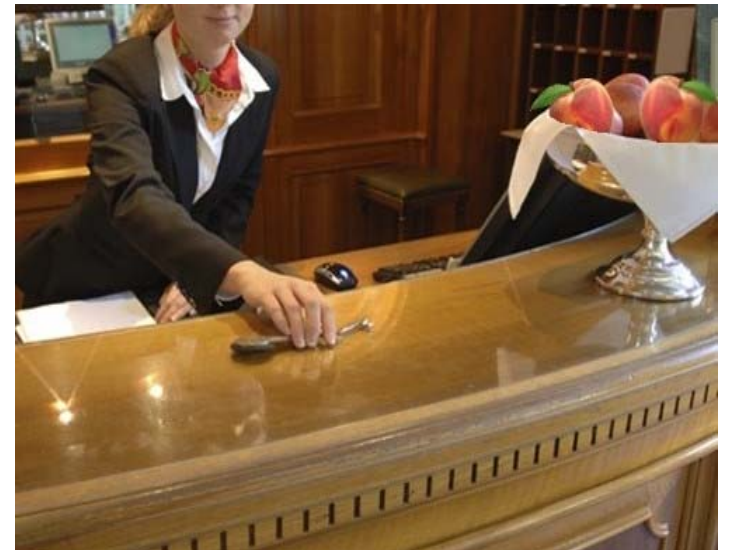
Do you think that there is at least one piece of curriculum content that will help you at this point?

1. Yes
2. No

Next steps

► Good luck with the journey forward as you help your students develop their analytics mindset!

► To access EYARC curriculum and the EYARC private website, you need an EYARC account. Contact Catherine Banks at catherine.banks@ey.com.

► Send any ideas for additional cases to Catherine. We would also be glad to develop cases around any existing data sets that you have available.

Ernst & Young
FOUNDATION™
Academic Resource Center

EY | Assurance | Tax | Transactions | Advisory

About EY

EY is a global leader in assurance, tax, transaction and advisory services. The insights and quality services we deliver help build trust and confidence in the capital markets and in economies the world over. We develop outstanding leaders who team to deliver on our promises to all of our stakeholders. In so doing, we play a critical role in building a better working world for our people, for our clients and for our communities.

EY refers to the global organization, and may refer to one or more, of the member firms of Ernst & Young Global Limited, each of which is a separate legal entity. Ernst & Young Global Limited, a UK company limited by guarantee, does not provide services to clients. For more information about our organization, please visit ey.com.

About the Ernst & Young Academic Resource Center

The Ernst & Young Academic Resource Center (EYARC) is an innovative collaboration between faculty and professionals to support higher education. The EYARC develops and provides free curriculum resources and other educational support to address leading-edge issues impacting the accounting profession. The EYARC is yet another example of the commitment of the global EY organization and the Ernst & Young Foundation to the academic community. The Ernst & Young Foundation is a 501(c)(3) tax exempt corporation associated with Ernst & Young LLP, which funds the Foundation, together with its present and former partners, principals and staff.

www.ey.com/us/arc
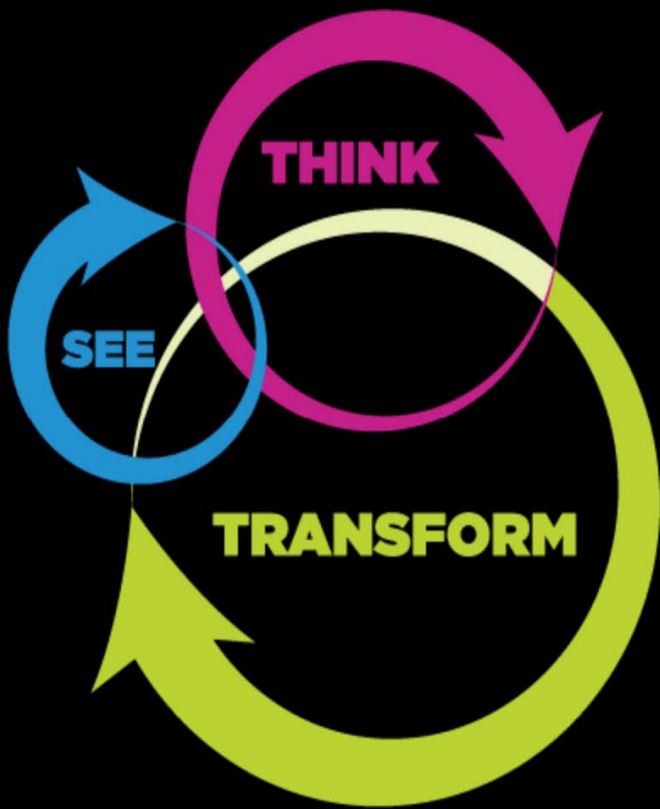
Accounting *IS* Big Data Webinars

Thank you Sponsor!

Ernst & Young
FOUND▲TION™

Academic Resource Center

Centers for
Advancing
Accounting

Accounting *IS* Big Data Conference 2017

The Ever-Changing Big Data Ecosystem--Learn the latest

The Accounting Function of the Future-How to be prepared

Gain Insights from 3 Different Company Perspectives-How They See Around the Corner to determine when to move and what are their keys to success in data and analytics

New this year: Hands-on Workshops Friday afternoon

Back by Popular Demand: Young Professionals Panel, New Big Data Cases, and Technology Visionaries Panel

THINK

SEE

TRANSFORM

OUR SPONSORS

Deloitte.

KPMG

pwc

EXHIBITORS

EY Building a better working world

ORACLE | NETSUITE

+ableau

2017 Accounting IS Big Data Conference
Brooklyn, NY
9/7/2017 - 9/8/2017

New York Marriott at the Brooklyn Bridge
333 Adams Street
Brooklyn , NY 11201
718-246-7000

Accounting *IS* Big Data Webinars

CPE Reminder

June 7, 2017

To receive CPE Credit, be sure to *respond to all of the polling questions* **during the session and** *fill out the CPE Verification Form* **at the end of the session.**

The CPE Form will appear as you click off the webinar

Your responses, along with your attendance, will comprise the criteria for Continuing Professional Education credit, as regulated by NASBA. Attendees at this presentation who meet the criteria will be awarded 1.2 CPE Credit Hour in the NASBA Field of Study category, "Specialized Knowledge and Application"

NOTE: The American Accounting Association is registered with the National Association of State Boards of Accountancy (NASBA) as a sponsor of continuing professional education on the National Registry of CPE Sponsors. State boards of accountancy have final authority on the acceptance of individual courses for CPE credit. Complaints regarding registered sponsors may be addressed to the National Registry of CPE Sponsors through its Web site: http://www.learningmarket.org

Centers for Advancing Accounting