Each week we will review the assigned articles in the live session. Questions are listed on the following pages.

Week 1

Article #1: Business Analytics Insight

How are companies using analytics?

· Analytics are used to analyze current business processes and to design better ones, and analytics are integrated into work flows to monitor and increase their efficiency and effectiveness.

· Predictive analytics can be used to identify the attributes that are best for predicting job performance and thus score applicants for positions. With this approach, every application is considered, but only the "best" applicants are interviewed.

· If BI directors fail to plan for and integrate big data into their BI strategy, governance, architecture, technologies, processes, and activities, they risk facing a vacuum filled by the business units, resulting in a new generation of analytic silos

Which analytics techniques does your company use?

Kathi Fox - Time Series, Regression, Risk adjusted O/E ratios are very important for my work
Michael - Predictive and Descriptive

Eric - We use descriptive, predictive, and optimization techniques for everything from # of people to hire, to marketing, energy production, AI, and space travel.

Ryan - mainly descriptive, maybe more predictive for executive management (i hope)

Jaycee- Intel uses, predictive, descriptive, and Optimization analytics. From a finance perspective we use data analytics to forecast revenue, predict budgetary needs, set commission goals, and make investment trade off decisions.

John - primarily descriptive for internal and starting to develop predictive products to sell to customers

Kelly - we use predictive and descriptive- one visual we use is stoplights to tell us what area we are over/under- staffed in. We find the executive staff really likes this :)

Amber

· Optimization analytics
  ○ Mathematical programming (e.g., linear, integer), simulation
· Predictive analytics
  ○ Decision trees, CART, genetic algorithms, neural networks
· Descriptive analytics

- Data visualization
- Dashboards/scorecards
- Published reports

- Predictive analytics

Bria- we use a lot of predictive analytics within our department (sales) with some descriptive analytics as well

Article #2: GE and the Culture of Analytics

How is GE using analytics for process improvement?
They break up analytics into two categories; “big machine data” applications to analyze technical issues with customer assets and how to utilize the incoming data to improve commercial objectives to continuously improve performance for the long term.

What did they do to accelerate analysis and results?
GE borrowed the concept “agile methodology” which scopes work load and encourages “sprint planning”. They use data methodology like Lean to drive change in behavior and organize the team through daily calls, identifying the benefit up front, and asking the team “how they know they will be successful or unsuccessful. They utilize the Measurement and Control group to look at ROI and analyze impact quantitatively.

Why is culture important?
“Innovation is contingent on that culture” without a supportive environment, there would be a lack of striving for improvement and innovation. Employees could quantify success criteria and measure activities.

Article #3: Location Analytics

What are some applications of geographic data in businesses?
Political maps showing electoral votes, GPS applications using geospatial data, city identification geospatially using data for addresses, trees, landmarks, etc., product specific marketing campaigns dependent on geographical location

What are the advantages of consolidating individual accounts by location? What are the risks of consolidation?
Risks may include multiple business (strip malls) that may contaminate other nearby businesses, multiple device login congestion notification, fradualant activity, marketing analytics to better understand household profiles (netflix, utilities, amazon/shopping).

How is your company using geographic data?

Kathi Fox - The VA medical system is broken in regional districts and sub-districts. Demographics are affected by geographical reach so occasionally, the regions are adjusted based on access for the veterans.

Parsing of inbound customer calls to regionally specific call centers to provide better customer service

Week 2

Article #1: Sustaining an Analytics Advantage

What are some examples of creating competitive advantage with analytics (companies and their techniques)?

1. *Keep your analytics secret.: Walmart kept their supply chain analytics secret and it has maintained the competitive advantage.*
2. *Implement the analytics fast and defeat your competitors before they can react: analytics can be effective in a time of intense competition, when the analytics first mover advantage becomes magnified. ABB targeted transformer market. Others could not afford to keep up.*
3. *Apply your analytics to the right problems: Many groups prioritize the low hanging fruit where they can have easy wins and save money or drive incremental revenue, however it is easy to replicate and does not provide a sustained advantage. Instead prioritize the meaty projects to develop a competitive advantage. Procter and Gamble and the ICBC (Chinese Bank) and branch network design*
4. *Recognize that sometimes control of the data is more important than control of the analytics. American Airlines developed a crew algorithm to schedule crews. It then sold the algorithm to other airlines so that the other airlines would not build our their own data set and algorithm and find something that could potentially create a competitive advantage for them. Less here is to own and keep tight control of data driving the strategic analytics even though the analytics themselves can be sold to others.*
5. *Become a truly data driven corporation. Need tops down management support to have affective analytics teams. Best teams are rewarded and supported by senior leaders. Amazon is a clear example of this, analytics are mentioned in earnings report, they are run by an engineer, etc. IBM also mentioned*

Article #2: Creating Business Values with Analytics

What are the differences between competencies in information management and analytics expertise?

Information management and analytic expertise complement each other. Information management (data management) is based on structuring the data environment to keep tight control on the quality and timeliness of relevant data delivery. Information management specializes in collaborative organization since it is already focused on data integration. Analytic expertise is built off like the article says, off of "talent, tools and technology" and understanding the data and making quality decisions on the data. Analytic expertise supports specialized organization and focuses more on probability rather than delivery.

What are the advantages of focusing first on information management versus analytics expertise?

One major advantage is that information management already has the data infrastructure necessary for building an analytics platform and has already gone through the growth pains for developing it. Data structure needs to be in place to be able to access data in a meaningful manner. Focusing on analytics first is more cumbersome due to probability of data not being as organized as information management.

Article #3: Raising the Bar with Analytics

What new opportunities did StyleSeek and Entravision encounter when they used analytics?

Clifford:

Both StyleSeek and Entravision discovered opportunities outside of their initial business models to leverage their analytics platform to create other business opportunities. In the case of Entravision, the company created a separate entity to sell the insights it extrapolates from its customer's behavior to advertisers and marketing companies. Similarly, StyleSeek used its data insight to create a different business model that focuses on reselling the customer's intelligence it gains from the company's analytics platform.

They have an opportunity to enhance their business models viewing their analytics platforms as assets with strategic and commercial value that can help other businesses use analytics in more effective ways. In essence, this was an opportunity to develop a new revenue stream through the selling of analytics based on expertise in their specific industries.

The ability to increase sales at partner sites (by getting users "StyleDNA") and StyleSeek is working to become a better producer of data to increase data effectiveness for other businesses Entravision used data from its stores to set up a its own analytics division (Luminar) to sell the insights they'd been gathering to media spot buyers

What opportunity allowed MillerCoors to create efficiencies with analytics?

Clifford:

Analytics allowed MillerCoors to streamline its operation by using data to increase efficiencies and lower its operating cost. I can imagine that bringing two companies together would create a lot of redundancy and duplicity in the operation of the business. By collecting data and using analytics to extrapolate useful data to drive the decision on the optimal use of the processes, human resources, financial, production, logistics, and market segmentation, etc..

The merging of brewing companies to create MillerCoors highlighted the need for efficiency increases, waste reduction, and behavioral change at the senior leadership levels
Data analytics provided the path to this end through providing key components of information that allowed decision makers to better invest resources and fully leverage the data (this impacted decisions for the better and the company is more competitive as a result)

Week 3

Article #1: Web Analytics: Enhancing Customer Relationship Management

1. Describe the four main categories of metrics and relate to the Google analytics lessons

· Website usability - the tracking of how long a person stays on each page was demonstrated in Google Analytics and provides feedback on issues in a website and how engaging the content is on each page.

· Traffic sources - Google Analytics tracks the origination point for traffic and has a visual flow which shows how a person navigates through a website and at what point they exit

· Visitor profiles - It is important to understand the location, language, technology and keywords from users to tailor the website for these needs. GA allows for this type of tracking.

· Conversion statistics - Tracking visitors through IP, "cookies", or site login allows for the tracking of the status of visitors (new, returning or defectors) but also has privacy implications that are now regulated through GDPR (Global Data Protection Regulation). GA allows this type of tracking, but they have also been criticized for not being more open about data protection and privacy.

2. Describe the common techniques for Web analytics

Clustering/classification - Clustering items with similar characteristics. Enhances the ability to discover relationships that are otherwise not obvious.

Association rules - Utilized to predict the correlation of items. Affiliates one item with a set of items.

Path analysis- Generation of a graph that represents relations defined on web pages

Sequential patterns - discovering patterns that indicate user visit patterns over a certain period.

3. What are some business applications of web analytics?

· Science, health, marketing and finance all use Big Data and web analytics to derive meaning and business advantages (gaining more customers, learning about competitors, identifying critical industry trends)

· CRM (customer relationship management) and CEM (customer experience management) can be better managed using web analytics

· User behavior can be predicted and taken advantage of

· Ads and marketing campaigns can be more accurately and powerfully tailored

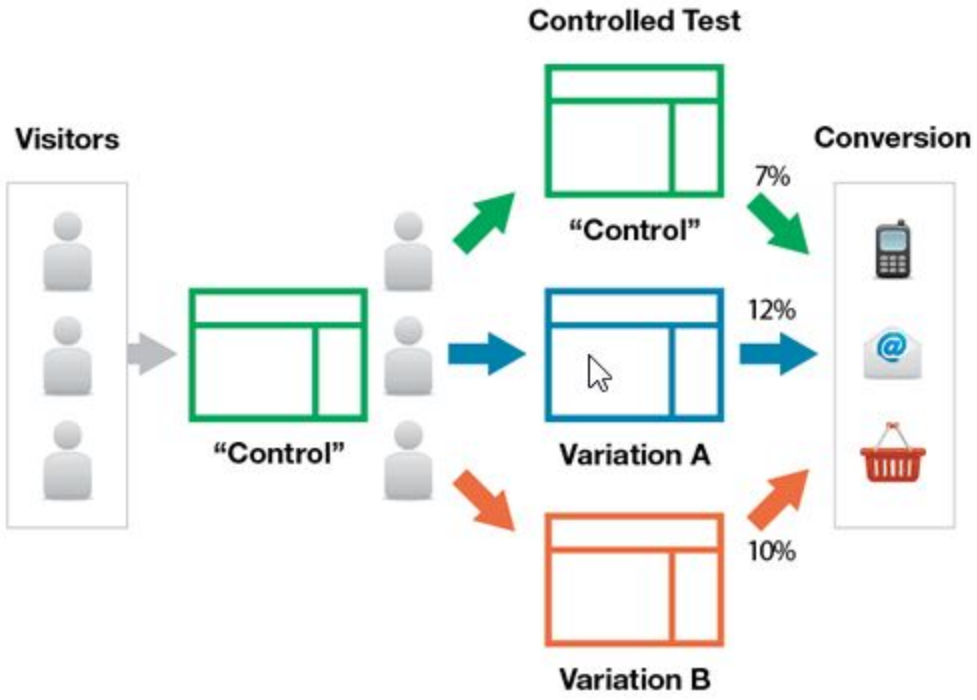
- Evaluate Promotional campaigns
- Provide users dynamic information based on their interests.
- Target electronic ads based on user patterns.
- Design more effective marketing strategies.

- Predict user behavior.
- Provide better customer care and customer intimacy.
- Maintain and manage customer base.

Article #2: How eBay Uses Data and Analytics to Get Closer to Its (Massive) Customer Base

1. What is an A/B test and what is its purpose?

AB **testing** is essentially an experiment where two or more variants of a page are shown to users at random, and statistical analysis is used to determine which variation performs better for a given conversion goal.



2. Describe the three biggest challenges of web data

- Data at a large scale - managing scale - how can we ensure we can handle the amount of data coming in from a hardware and software aspect? The platform needs to handle the data in terms of storage but also in accessibility

- Collecting the right data - the data has to be relevant, Ensuring new data is adding value and not just creating noise - in addition to this notion, cutting the data the right way is also key
- New kinds of data - Being able to deal with/handle new types of data and understand what they mean such as audio input

3. How can Power Sellers use data better?
Power sellers are using data to run their own experiments on how their policy changes affect demand. Example what is the effect if I offer free shipping vs. if I charge $5 for shipping. Power sellers are testing consumer behavior and collecting the data to make business decisions.

4. Why are web analytics better than surveys? Web analytics run off of data rather than opinions. Ebay found the those who use surveys tend to be those that complain. The complainers were also found to complain a lot. Paired with the opposite approach to dissatisfaction, leave the site and never come back, quality data is hard to achieve or derive quality information from. Some behaviors that cannot be captured in surveys are better seen in data. It helps us understand the friction points when they use our system.

Overall, surveys don't get an accurate picture of the whole, rather, they get a lot of "squeaky wheels" that complain a lot and this can alter the actual truth.
· There is a discrepancy between what people say and do

Week 4

Article #1: Minding the Analytics Gap

1. What is a barrier to using analytics?

The number one barrier by far was translating analytics into business actions — in other words, making business decisions based on the results, not producing the results themselves. Another gap identified in the article is the gap in management's ability to understand the analytics being run and thus they have a hard time translating the analytics into business actions.

Translating analytics into business action or otherwise stated making business decisions based on the results. Middle management skills necessary to interpret the data in meaningful ways/understanding the data are lacking.

2. What can be done on the production and consumption side of analytics to overcome this barrier?
From the consumption side, a couple of key things can be done. First, data analysts can learn more about the business. Many organizations actually utilize time and resources to train their analysts about the business. Managers could also receive additional training in order for them to have a better understanding of the data and how to apply it.

From the production side, organizations can systematically improve infrastructure and processes; improved data quality, for example, can make it easier to turn data into competitive advantage.

a. Production Side: better industry specific training for the data analysists could lead to better displays of data that are easier for management to interpret. Organizations can also make it easier to collect quality data through process and infrastructure improvement.
b. Consumption Side: Management training so the data is easier to understand and interpret actionable items based on the analytical results. Also, “identifying trustworthy analytic professionals within the organization, requiring straightforward explanations and asking detailed questions” also assists with better managerial interpretation and decision making.

3. Describe the three levels of analytics maturity

Analytically Challenged – organizations generally rely more on management experience than data analytics and tend to lack data management and analytical skills

Analytical Practitioners – organizations tend to use analytics for operational purposes, have “just good enough data” and are working to become more data driven.

Analytical Innovators – organizations are more strategic in their application of analytics, place a high value on data, and have higher levels of data management and analytical skills.
1. Analytically Challenged: organizations rely more heavily on management experience than data analysis. Generally, data management and analytical skills are lacking.
2. Analytical Practitioners: Organizations utilize the analytics for operational decisions and continue to work to become more data driven.
3. Analytical Innovators: Organizations are generally more strategic in it's application of analytics, consider data highly valuable and employees/managers are skilled in higher levels of data management and data analytics.

Article #2: Innovating with Analytics

1. Describe the three characteristics of analytics innovators

Innovators tend to use more data- generally most to all of the data their organization generates or collects is used.

Innovators manage the information more effectively throughout the entire information transformation cycle (capturing data, analyzing information, aggregating and integrating data, using insights to guide future strategy and disseminating information and insights, through which, provides better decision making and a competitive advantage over others.

Innovators also understand the need and are capable of processing and analyzing data more quickly. Innovators are focused on utilizing speed for customer service/experience, pricing and innovative advancements.

Week 5

Article #1: Innovating with Airborne Analytics

What are the three areas of focus for their strategy for the next 3-4 years? Give examples of what they are doing

Operational efficiency/improved performance – they are fine tuning their engines to improve engine performance which will ultimately reduce fuel costs, which account for 40% of cost. They also use analytics to optimize crew and shift deployment that needs to take into account plane types, destinations and special breaks that are needed.

Customer intimacy – they are reviewing click-stream data to see customer stage, as well in trends in customer complaints

Innovation – understanding customer preferences and catering to those, such as understanding the types of things customers were downloading before getting on a flight allowed them to tailor and streamline their cache to allow customers to download *The Financial Times* and *The Wall Street Journal* onto their iPads in the lounge. Using RFID tags to track luggage and get to root cause analysis and customer satisfaction.

What are the challenges with hiring data scientists?
Data Scientists: specialized data scientists are not budget friendly; they're expensive. Hire as consultants as opposed to full time employment. They also need to be paired with an industry expert to assist with what if hypothesis and analysis/prediction models.

What are the risks trying to use technology in the organization? Give an example of each
Interoperability - data from source system can't be imported in analytics system, common understanding of how all the data comes together (Ford example from prof Harter)
Security - users who need access cannot get to it due to security concerns
Proper Taxonomies - inconsistent classification can cause conflict/information mismatch
Data Ownership - wrong group trying to change/edit when they don't own
Lack of Judgement - trusting any data, especially from the internet, w/o validating

Article #2: A New, Analytics-Based Era of Banking Dawns at State Street

What were the key questions that they asked which analytics could help?

a. How do I better manage, measure, visualize and report on risk?
b. How do I deal with all of this regulatory change?
c. How do I continue to find new sources of return?

d. What new types of investments, asset classes and geographies do I have to expand into to achieve better yields?

e. How do I keep my costs down, and how do I made sure I'm getting a fair shake in my trading activity?

What was the challenge of launching analytics at State Street?
-Getting manager buyoff/executive support to drive the analytics initiative by providing air cover while the program was working up to launch and continues to improve.
Massive culture shift, teaching an old dog new tricks.

Larger companies require many discussions prior to acting and tend to move slower than smaller companies. Moving fast enough to compete is the goal. Inspiring everyone to engage and break away from the cultural safe haven employees were used to by integrating individuals from different parts of the organization together.

How do they continue to push analytics forward?
Lead by example
Be dedicated to disruption
Being smart about how, when, and where to enact change - sometimes push, sometimes pull

Week 6

Article #1: Modern Analytics and the Future of Quality Performance Excellence

Define analytics (page 6):is the use of data, information technology, statistical analysis, quantitative methods and mathematical or computer based models to help managers gain improved insight about their business operations and make better, fact based decisions.

A process of transforming data into actions through analysis and insights in the context of organizational decision making and problem solving.
Analytics is the use of data, information technology, statistical analysis, quantitative methods, and mathematical or computer-based models to help managers gain improved insight about their business operations and make better, fact-based decisions

"a process of transforming data into actions through analysis and insights in the context of organizational decision making and problem solving." "the use of data, information technology and statistical analysis, quantitative methods, and math or computer based models to help managers gain improved insight about their business operations and make better fact based decisions."

How are companies using analytics in (page 7)?
· Banks – use analytics to predict and prevent credit fraud
· Manufacturing – use analytics
for production planning, purchasing and inventory management
· Retail – use analytics
to recommend products to customers and optimize marketing promotions
· Pharmaceuticals – use analytics
to get life-saving drugs to market more quickly
· Sports – use analytics to
determine both game strategy and optimal ticket prices

· Banks --- predict and prevent credit fraud
· Manufacturing—production planning, purchasing and inventory management
· Retail – recommend products and optimize marketing promotions
· Pharmaceuticals—drug research
· Sports—tickets sales and game strategy

Modern analytics integrates which three fields (page 8)?

- Business intelligence/information systems (BI/IS), statistics, and quantitative methods/operations research.

Descriptive Analytics – understand past and current performance and make informed decisions

Predictive Analytics – analyzing past performance in an effort to predict the future by examining historical data, detecting patterns or relationships in these data and then extrapolating these relationships forward in time.

Prescriptive Analytics – using optimization to identify the best alternatives to minimize or maximize some objective.

Business intelligence (BI) - collection, management, analysis and reporting of data
Statistics- summarizes data in a coherent manner and can find unknown or interesting relationships
Quantitative Methods/Operations - determine the relationship between one thing [an independent variable] and another [a dependent or outcome variable] within a population.

What are some examples of data sources (page 9)?
Click streams from websites, customer transactions, social media info

a. Numerical
b. Textual
c. Audio
d. Video

- Big data is captured using sensors such as scanners, click streams, transactions, emails, tweets, etc.
- . Sensor data (consumer and industrial)
-

Big data – unstructured and messy.
Other sources include numerical (customer transactions, clicks), textual (social media, tweets, emails), audio/video (smart tv activity, youtube)

What are examples of data visualization (page 11)?
Space

a. Time
b. Multivariate
c. Text
d. Graph
e. Network
f. Effective Data visualization:
    i. Both axes and units of measure are clearly labeled
    ii. Levels and trends are reported for a key performance measure- defects per million opportunities

iii. Results are presented for several years
iv. An arrow indicated that a downward trend is good for this measure
v. Appropriate comparisons are shown clearly
vi. Segmentation
vii. Improved performance.
viii. Known as dashboards/scorecards

Article #2: A Process of Continuous Innovation: Centralizing Analytics at Caesars

Why does Caesars use analytics (pages 1 & 2)?
Ultimate goal is to garner a better understanding of customer & operations. Gary Loveman (prior Chief Analytics Officer) changed the culture in Caesars to be forward thinking and adapt Analytics into a more centralized organization – reorganization turned the silos into a more cohesive all encompassing environment – increasing efficiency, communications and utilization of it's own resources.
To create a rich customer experience, marketing to customer based not only on their preferences, but their actions while at the Caesars property, including whether they've had a winning day or a losing one.

Caesars uses analytics:
- To guide business strategy
- Operations
- Innovation
- Creating a rich customer experience
- Gaming
- Revenue Management
- Finance
- Marketing
- Labor

What are four lessons learned from their experience (page 3)?
1-consolidating and centralizing different analytics departments (labor, marketing, casino, etc) required major reorganization which in turn required effective leadership for the new formed sub-organizations. Because of the previous isolations of the various sites and departments, consideration and selection had to be very deliberate.
2- Infrastructure needed to be severely overhauled. Degradation from acquisitions, communications and connections had to be addressed while at the same time, the ideology of 'one version of the truth' needed to be ingrained into the entire organization. So not only had physical and abstract obstacles but also emotional and cognizant challenges. Major challenge – developing a common language, buy in, costs and benefits to each department.

3-identifying and maintain communications with the major stakeholders through transparency and soliciting and acting on their feedback.
4- Visibility of the ‘big wins’ were communicated upfront and maintained high visibility particularly whenever a big win was approaching so the entire organization was aware of what this meant to themselves.

Week 7

Article #1: Big Data in Health Care: Using Analytics to Identify and Manage High-Risk and High-Cost Patients

What are the six opportunities to reduce costs through analytics?

1. High cost patients
2. Readmissions
3. Triage
4. Decompensation (when a patient's condition worsens)
5. Adverse events
6. Treatment optimization for diseases affecting multiple organs

How can cost be reduced in each?

1. Use analytics to identify potentially high-cost patients to determine the patient's' specific needs and gaps in care. This is especially important for behavioral health issues (eg depression). Tailored interventions and risk analysis for follow-ups.
2. Use of algorithms to predict who is likely to be re-admitted
    a. Tailoring the interventions
    b. Ensuring patients receive the intended interventions
    c. Ensuring a low ratio of patients flagged to patients who experience a readmission
    d. Monitoring with IoT device (phone, monitoring device)
3. Estimating the risk of complications when a patient first presents to a hospital. This information can be used to manage staffing and bed resources, anticipating transfers and informing the overall strategy for managing the patient. Examples of studies - Apgar score for newborns and adult emergency room visits
4. Monitor patients in general care and use indices such as Rothman Index to prevent decompensation. IoT monitors can capture the breathing/heart/movement of bed-ridden patients and alert care-givers.
5. Early detection and on-going monitoring for Renal Failure, Infection and Adverse Drug Effects
6. Use analytics to project the trajectory of a patient's disease to target high-cost treatments to those who will benefit the most

Article #2: A Review of Analytics and Clinical Informatics in Health Care

What are some methods for improvement in health care using analytics? (page 2)

1. utilizing risk assessment analytics to process EHR data to identify the patients at greatest risk for utilizing more resources than their peers with the goal of improving patient outcomes and managing costs

2. (Ryan) value of aggregating data enhanced with real-time analytics to provide point-of-care information to oncologists that was tailored to individual patients

3. Unlabeled and free-text databases such as mammography data can be transformed into searchable and accessible collections that are usable for large scale health analytics

4. Analytics can supplement real-time analysis of physiological data streams in the neonatal intensive care unit for earlier detection of worsening medical conditions

5. Enhance less sophisticated, rule based systems already in use. reduce errors and improve clinical outcomes in certain settings, such as pediatric intensive care units and CDS can result in performance improvement on perioperative quality and process measures

6. Wearable monitors that patients use at home. Wearable health monitoring systems consist of a variety of sensors, actuators, and multimedia devices, and enable low-cost, noninvasive options for continuous monitoring of health, activity, mobility, and mental status, both indoors and outdoors reduce health-care costs by disease prevention and enhance the quality of life with disease management, and can be tailored to specific uses such as intelligent health monitoring of the elderly in nursing homes and for individuals with dementia or Parkinson's disease

7 (Eric). cost savings based on improved patient care and outcomes, but also the identification of simple billing anomalies (i.e., revenue leakage). Most health care organizations find billing anomalies via a combination of rules-based approaches and manual audits; however, this approach is time-consuming and error-prone. Advanced analytics approaches (e.g., machine learning and predictive modeling) can be used to find patterns in billing records that are most likely associated with missing or erroneous charges.

What are some challenges for analytics in health care? (page 4)

Data is both quantitative and qualitative making it more difficult to pull and assimilate in data files to analyze. This can also make it difficult to produce accurate results

Week 8

Article #1: What Businesses Can Learn from Sports Analytics?

Describe the five key lessons of analytics in sports (give an example of each)

1. Align Leadership at multiple levels: Need to align decision making on which players to acquire, what strategy to adopt, and how much to pay players.
2. Focus on the human dimension: Teams assess individual performance through typical stat keeping, they also assess performance in context (what combinations of players are on the court at the same time).
3. Exploit Video and Location Data: track players movements on the field to predict how they will play in different arenas (NY Yankees Baseball). Other companies are using this to optimize routes for delivery and reduce customer wait times.
4. Work with a broader ecosystem: draw as much from the partner while maintaining key internal capabilities. Orlando Magic established a close relationship with a software vendor and Disney, but maintain expertise of their business model and operations. Does allow other teams to catch up and can hinder a long lasting competitive advantage.
5. Support Analytic Amateurs: players are now studying their specific data. Example- Analyzing Fielding Independent Pitching metric to understand that you throw too many foul balls due to your pitching style.
    a. Performance metrics, sales CRM

Article #2: Team GB: Using Analytics (and Intuition) to Improve Performance

What is the value of predicting team performance? (page 2)
Predicting team performance helps to determine how a team stacks up against its competition, and also helps to determine which sports to investment in, which in the U.K. is based on medal potential at the Olympic Games.

What is the biggest challenge? (page 2)
The biggest challenge is difficulty in collecting the data. Analytics are very sport specific, and some sports don't produce data that is as quantifiable and/or data collection methods don't yet exist for them. Or, sensors do exist but are simply too expensive.

What are some of the barriers? (page 3)

Resistance to change by coaches who have used intuition and experience in the past plus they may not understand the technology (lack of computer skills among coaches)

Intellectual Property – if I write programs, I don't want them used by everyone

Where is the power of the data? (page 5)

- more data about themselves, can help prevent injury and train smarter instead of harder
- glean more information about the competition, more likely to beat them
- With these two pieces of information, models can be created to to predict performance

The power resides in good longitudinal information rather than in snapshots.

Week 9

Article #1: An introduction to data mining and other techniques for advanced analytics

What are the key differences between statistical analysis and data mining? (page 140)

- Statistical analysis deals with small samples, while DM deals with entire populations - requires different approach, else you'll have misleading results
- DM does not provide confidence intervals
- Data mining is more detailed by including diagnostic results to indicate likely business benefits from the model

Describe tools for advanced analytics (page 149-151)

· Data visualization a. makes it easier to interpret large amounts of data and transform it into multidimensional pictures and animations while highlighting areas of interest. This can be completed prior to engaging in DM or after the model has been created (black box- neural networks/genetic algorithms). Most popular techniques include scatter plots, heat maps and geographical maps in addition to animations.

· Text mining: a. converting valuable information from unstructured format within text files so it becomes a structured variable to be included in DM. It uses linguistic analysis to extract facts from unstructured text (identify certain words with high association of fraudulent claims).

· Social network analysis : a. Identifies groups connected together in some way by applying network theory concepts such as nodes and links (nodes- individuals within the networks; links- relationships between the individuals). SNA metrics are correlated with customer loyalty. SNA extracts useful new variables such as size, strength and composition of each customers calling circle for use in DM projects (churn prediction)

· Contact optimization: a. Optimizes the communications budget by identifying which channels to use to connect with customers. It takes all the analytical model predictions as inputs and searches for the optimal allocation of products and channels to customers over time. The allocation itself must meet budget constraints, contact rules and min/max volume limitations. Inbound vs. outbound:

- Inbound- concerned with delivering the best solution for each individual customer who contacts the company's call center or logs onto their website. Extension of CRM, supply the next best offer for each customer based on a set of predicted propensities for the available products.
- Outbound- aims to find the best solution at an individual level and at the same time meet overall outbound marketing business targets and constraints.

How do you mitigate the risks of data mining? (page 152)

· Data quality - spend time before modeling and deployment to insure the data is accurate and structured appropriately
· Train workers so they don't make misleading or nonsensical results from highly automated modeling tools
· Workers need the experience to identify meaningful patterns in the data
· Training to identify model efficiency, understand descriptive statistics and not modeling outside the domain of the data

Other articles of interest

Deep Neural Networks:

DeepMind AlphaGo defeats world champion in game of Go (March 2016; Jan 2017 update):
https://www.scientificamerican.com/article/how-the-computer-beat-the-go-master/
http://fortune.com/2017/01/07/google-alphago-ai/

Google Brain's neural network develop AI encryption (November 2016):
https://www.scmagazine.com/google-brains-neural-networks-develops-ai-encryption/article/570049/
http://www.wired.co.uk/article/google-artificial-intelligence-encryption

DeepStack Defeats 10 out of 11 poker champions (March 2017), develops intuition:
http://www.cnn.com/2017/03/02/health/artificial-intelligence-poker-intuition-study/index.html
https://www.scientificamerican.com/article/time-to-fold-humans-poker-playing-ai-beats-pros-at-texas-hold-rsquo-em/

Not Neural Networks:

DeepBlue defeats Gary Kasporov in chess (1996):
https://en.wikipedia.org/wiki/Deep_Blue_(chess_computer)

DeepThought defeats chess grand master Brent Larsen (1988), but loses to Gary Kasparov in chess (1989):
https://en.wikipedia.org/wiki/Deep_Thought_(chess_computer)

Week 10

Article #1: Business Analytics: Transforming the Role of Management Accountants

What are some external and internal data sources for accountants? (page 3)

Internal: Files (Spreadsheets, CSVs, MS Access) and Databases (SQL, ERP, Data Warehouses)
External: Google Analytics, SEC XBRL databases, Salesforce, ZenDesk
Other: Email, Sensors, Videos, Tweets….

What are four challenges for accountants using analytics? (page 4)
Awareness – smaller companies are often constrained because their resources are much more limited. Access is limited by cost constraints, inadequate IT structure and technical knowledge. As Helen Brand, CEO of ACCA (Association of Chartered Certified Accountants), said, "The key issue now is how the finance function adapts to the fast-evolving technology to better serve businesses in the future."3
Interoperability – internet data is unstructured so there is a challenge to mesh existing structured data with internet data. World Wide Web Consortium (W3C) is working on developing standardizations of web data sources into usable formats.
Security – data security becomes even more of an issue as web data is pulled in. Integrity of data is paramount since breaches can have traumatic repercussions for the company, so the accountants also need to monitor and protect the data and ensure privacy controls are practiced.
Analysis Quality – companies need to focus on structured design processes for filtering in data. (Garbage in – garbage out) becomes amplified if the wrong data is focused on.

What are five areas for leveraging analytics in accounting? (page 4)

1. franchise sales analysis- analyze franchisor sales metrics to determine point of sale promotions
2. Accounts receivable and credit analysis- days sales out tracking, accounts receivable collection history. Companies can develop credit and collection policies that minimize bad debt risk.
3. accounts payable analysis and payment monitoring- payments are constantly monitored and evaluated against payment decision rules that flag fraudulent transactions. Can find fraudulent payments more efficiently and reduce the risk of overpayment.
4. mergers and acquisitions (M&A) due diligence - accurate business valuations
5. forensic accounting- fraud detection analytics to identify fraud, bribery, and corruption in companies. Textual analysis on payment description fields

Article #2: Elevating Data, Analytics to the C-Suite

What are the steps to elevate a department using analytics? (page 5)

Data first (not necessarily perfect data)
Then reporting
Then analytics
Then quantitative and predictive modeling
People have to trust your information and analysis

How should you address non-perfect data? (page 5)

Data cannot be perfect only reasonable. The time and effort to obtain perfect data is not worth the investment of resources and time. By the time data is perfected to 100%, there is the potential it may be obsolete also. Data that is 80% good provides adequate support for making decisions. It's very important to communicate the deficits in the data to help make more informed decisions.

Acknowledge that data has to be good and clean as well knowing that data quality is a journey. Understand that in the absence of data, a decision will be made anyway. Also acknowledge that there may be blind areas that could impact, but may not necessarily stop a decision if acknowledged and managed

Should analytics teams be centralized or decentralized? (page 6)

- analytics teams need to be connected to their lines of business, and should support and the decision makers. When organizations are large, it's very difficult not wise — to centralize as there is too much distance between the organization and the decision makers and the people developing the information for them.
- For smaller organizations, it's easier to centralize; however, it is a difficult and constant balancing act for an organization. Centralizing has all the benefits of better training, skill growth, and career paths, but has the down side of losing connectivity to the business