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Futureproof Employees and Students with Data Analytics Training

By Markus Ahrens, CPA, CGMA; and Cathy Scott, Ph.D.

“We always overestimate the change that will occur in the next two years and underestimate the change that will occur in the next 10. Don’t let yourself be lulled into inaction.”—Bill Gates

Are you feeling a bit overwhelmed when you hear or read about disruptive technology changes coming to the accounting profession? If so, you are not alone. We hear terms like artificial intelligence, machine learning, robotic process automation, augmented reality, virtual reality, mixed reality, blockchain, big data, data analytics, data visualization, 3-D printing-additive manufacturing, and the Internet of Things. We are told that these disruptive technologies will impact the future of accounting, but do we really need to worry about this now? The answer is yes! Changes in technology are going to disrupt the future of the accounting workplace and the time to adapt is now. The future is now!

In Thomas Friedman’s book, *Thank You for Being Late*, he states “When fast gets really fast, being slower to adapt makes you really slow....and disoriented.” If you are feeling a bit overwhelmed by technology at times, this is normal. Figure 1 below shows the rate of change for technology vs. the ability of humans to adapt. As you can see, technology is currently changing faster than people can adapt, which explains why some may feel overwhelmed.

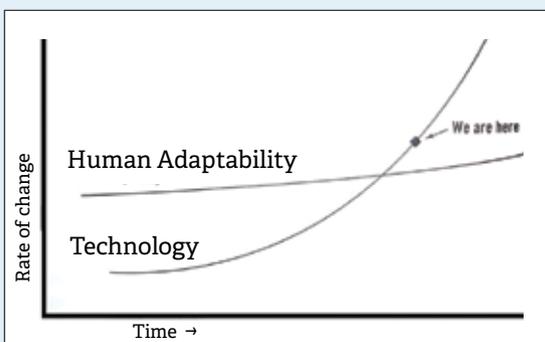


FIGURE 1: Technology Rate of Change/Human Adaptability Graph. Friedman, T. L. (2016). *Thank You for Being Late*.

However, those who fail to proactively prepare and address disruptive technology changes that will impact the accounting profession will quickly move from feeling overwhelmed to disoriented. So, let’s look at some of the disruptive technologies that are or will impact the accounting profession and discuss how to begin preparing for this inevitable future now.

Artificial Intelligence, Machine Learning, and Robotic Process Automation

Artificial intelligence (AI), machine learning (ML) and robotic process automation (RPA) are terms often heard when there is discussion about types of automation that could replace certain accounting functions in the future. These are the technologies that have triggered concerns about what the future of accounting will look like. Though no one can completely predict the future, it is clear that AI, ML and RPA will enhance accounting functions. While AI, ML and RPA won’t actually replace the human element of the accounting profession, they will transform the skill sets that future accounting personnel need. CPAs can predict how AI, ML and RPA will benefit the profession by improving workflow, speeding up repetitive tasks, lowering the cost of data and helping people to make quicker and better decisions. Accounting professionals will still be needed to apply cognitive skills, such as critical thinking, problem solving and decision making to the information provided by the AI, ML, and RPA technologies. Accountants will also need to be able to communicate information to their clients and companies.

Augmented Reality, Virtual Reality, and Mixed Reality

Augmented reality (AR) connects the digital and real world. It influences our view of reality. Many people have used popular AR entertainment apps such as Snapchat and Pokemon. AR is also changing the way consumers shop. For instance, Wayfair and Ikea have smartphone apps that allow a person to see how products will look in their home before making the online purchase. AR will be utilized by clients in education, healthcare, financial services, entertainment, farming, and the automotive industry, to name a few.

Virtual reality (VR) provides an immersive or near reality simulated experience. For instance, VR is used for pilot simulation training, education, marketing, medicine, and real estate. During COVID-19, VR helped the real estate industry to continue offering open houses and work with clients using virtual tours of homes. Imagine the audit of the future using VR.

Mixed reality brings together real and virtual worlds, which allows real-world workplaces to share virtual workspaces. Future auditors may be able to engage with clients using holograms to navigate around the client’s organization.

AR, VR and mixed reality technology will help accountants adapt to the needs of the future workplace whether blending employee virtual and real-world work spaces, reshaping client interactions improving data collection or offering virtual services such as audit or tax.

Blockchain

Blockchain technology's impact on the accounting profession will be seen through the way transactions are initiated, processed, authorized, recorded and reported. This technology will significantly impact financial reporting, audit and tax preparation activities. Accountants will have to consider both the traditional general ledgers as well as the blockchain ledgers. Blockchain will enhance accounting transparency, which can provide those involved with better data and analytics. Accountants will need to understand how blockchain technology works with their client's organization whether providing audit, consulting or tax services.

3-D Printing/Additive Manufacturing

3-D printing/additive manufacturing is going to change the manufacturing industry, from research and development through the entire production process. This type of technology will have various accounting and tax implications. Examples include: reduced inventory costs, supply chain reductions, transfer pricing modifications, R&D tax credits, and tax implications such as VAT and GST.

The Internet of Things

The Internet of Things (IoT) involves a network of connected objects that exchange data. For instance, the IoT in people's personal lives includes smartphone connections to security systems, thermostats, electronic appliances, lights, and vehicles. IoT will impact all aspects of the accounting profession, including how CPAs receive data and process client data, track productivity, conduct audits and protect data.

Big Data, Data Analytics, and Data Visualization

Today's accountants find themselves performing more and more tasks that require analyzing data. Data analytics skills are utilized by accountants in the areas of audit, tax, financial and managerial accounting. Accountants use big data to find patterns that impact decision making and organizational strategy. Data analytics can help accountants and management better understand their organizations from an internal and external perspective.

Data analytics helps answer questions such as what's happened (descriptive analysis), why it happened (diagnostic), what the future may look like (predictive) and what direction should be taken next (prescriptive). Accountants are accustomed to looking at problems that need recommendations or solutions. Data analytics skills enhance the accountant's ability to quickly determine trends or irregularities in order to more rapidly identify potential problems and find solutions. Data analytics requires accountants to develop an analytical mindset.

It is important for accounting practitioners and accounting students alike to develop data analytics competencies. The question people often ask is, "How do we get started incorporating data analytics into our organization's training activities or accounting education curriculum?"

To provide a solution to this question, consider this "step-approach" to data analytics. This approach has worked well with students and can be applied to employee training within accounting firms and industry as well. From an accounting education perspective, integrating data analytics into courses has increased synergy, engagement, collaboration, attendance, as well as student interest in the potential of data analytics within the accounting profession. Additionally, this approach helps prepare graduates with the required 21st century workplace skills. Incorporating data analytics training in public practice and industry helps to improve decision-making, reduce costs, better meet client needs, enhance internal controls, improve performance, minimize risk and improve efficiency, effectiveness and profitability.

Step-Approach Data Analytics Training Model

The importance of data analytics in the accounting profession is highlighted by this topic's inclusion on the CPA exam. The "step process" above (Figure 2) can benefit public practice and industry employees, interns and accounting students as a way to enhance their data analytics and data visualization knowledge and skills.

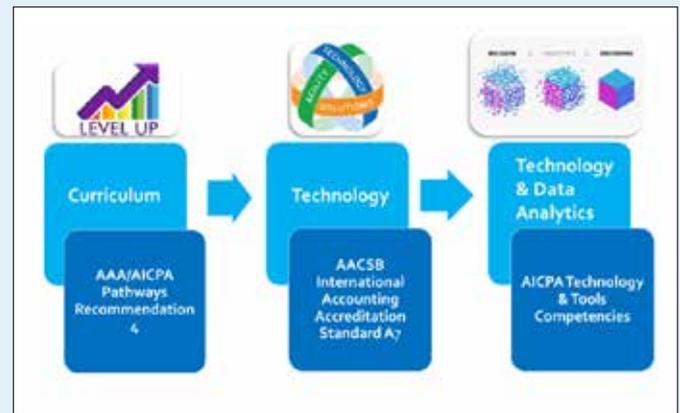


FIGURE 2: Step-Approach Data Analytics Training Model. *TeachingAndLearningToolbox.com* (2019)

The first step in the above data analytics model is to introduce employees, interns or students to big data concepts and problems looking for solutions. Next individuals interpret already prepared data visualization reports from Microsoft Power BI and/or Tableau. This provides the participants the opportunity to see the results of data analytics before working with any raw data. After you understand the big picture of data analytics, it is time to work with data visualization modeling using advanced Excel or Power BI through Microsoft and/or Tableau.

Getting Started

Programs like Tableau and Microsoft Power BI offer free training videos and data sets. There are also several YouTube videos about big data, data analytics and data visualization that utilize Excel. As mentioned above, it is often good to start with exercises that analyze data visualization results. This helps to develop an analytical mindset when analyzing trends with the provided data. After mastering the interpretation of the data visualization sets, one gains a more holistic approach to utilizing data sets. The resources provided by Microsoft Power BI, and Tableau allow first-time users simple step by step video and database resources. Let's take a look at Power BI and Tableau.

Microsoft Power BI

Business intelligence encompasses the strategies and technologies used for data analysis of business information. Microsoft Power BI is a tool that allows non-technical users the ability to assemble, analyze and share data. Many individuals who currently use Excel have discovered Power BI to be a natural fit. Excel and Power BI interfaces →

are very similar, and Power BI's visuals are easy to create and export. Power BI is a natural migration for analyzing data sets when they become too large for Excel's capabilities. In addition, there are many extra analysis tools available in Power BI that help users create relationships between data sources and create various visualizations. Additionally, Power BI offers numerous free learning resources, including FAQs and a guide for getting started. You can learn more and sign up for a free single-user account at <https://powerbi.microsoft.com/en-us/>.

Tableau

You don't have to be an expert with data analytics and data visualization to try Tableau. Tableau provides free ready-made curriculum materials, including lecture notes, student handouts, and assignments. These resources are an excellent opportunity for individuals to expand their data analytics and data visualization skills. For practitioners and industry employers, download Tableau

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Other free or low-cost data analytics and data visualization training solutions include: Coursera, Udemy, LinkedIn Learning—Lynda, Skillshare, Future Learn, and Codecademy.

Technology and education are continuously evolving. Therefore, today's

accountants must be lifelong learners. Integrating data analytics and data visualization into continuing education or academic courses allows employees, faculty and students to stay current with industry and educational trends. It allows individuals to develop the analytical mindset that is needed for future success. Additionally, data analytics integration allows us to address AAA/AICPA Pathways, AACSB Accreditation Standards and AICPA Technology and Tools Competencies. Data analytics and data visualization training is not something to push off until tomorrow. The future is now! Big data and analytics are everywhere and for everyone. 



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Markus and Cathy co-founded *TeachingandLearningToolbox.com*, a free, nationally acclaimed website dedicated to providing educators with up-to-date teaching and learning resources.