



SOCIETY OF ACTUARIES

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Analytics

In Baseball And Business



ONE ACTUARY'S TALE ABOUT HER EXPERIENCES WITH BUSINESS ANALYTICS IS RECOUNTED IN THIS STORY OF BATS, STATS AND A TASK FORCE.

THERE HAS BEEN A MAGNIFYING GLASS on analytics in business over the past several years. Everywhere you look there are new books being published and articles written. It's even in the movies.

I anxiously awaited the opening of *Moneyball*, the movie based on the book by Michael Lewis that details General Manager Billy Beane's journey into analytics with the Oakland A's baseball team. I went shortly after it opened and it did not disappoint.

I have been an avid student of analytics my entire student and adult life. I just didn't know enough to refer to it in that way. I worked at McDonald's in high school. We were timed, rated and reviewed. And I loved it. I got more and more competitive—wanting to improve my scores and times every way I could. I didn't know it at the time but these were called metrics and we were doing analytics.

ANALYTICS AND SPORTS

I have played softball for most of my life and was really struck when one of my coaches back in my college years set the batting order based on on-base-percentage (OBP). I was the fastest on the team and I got a lot of line-drive doubles to the outfield. But our big home-run power hitter

got on base more often. She batted first—I batted third. We won a lot of games. I still play even though I am old and my daughters will likely be joining our team next year. Our team has been together so long that we can't use OBP to set the line-up. We have to split our hitters out by who can run the bases and who needs a runner.

I have also played fantasy baseball most of my professional life. We started with a

tensive but we loved it. What I found was the formula we used was more influenced by OBP and slugging percentage rather than batting average to identify the top performers. A theme was developing.

After one of my speeches where I brought softball and baseball into the discussion, which I often do, someone told me about the book *Moneyball*. I went straight to the book store and bought it. I read it in two days. It was so exciting

THERE HAS BEEN A MAGNIFYING GLASS ON ANALYTICS IN BUSINESS OVER THE PAST SEVERAL YEARS.

close, dear friend, Doug Bearrood, FSA, MAAA, who tweaked a formula he used in graduate school that identified and weighted statistics that best predicted the final score of a baseball game. He had this great idea to start a fantasy baseball league with a group of actuaries at Fortis using this formula. It was long and cumbersome but there we were, a bunch of young actuarial students, studying the paper every day (except Mondays and Thursdays because too many major league teams took those days off for travel) and entering player by player daily stats into these archaic Lotus 1-2-3 spreadsheets to calculate our team's score along with our opponents'. It was very time in-

for me. It talked about Bill James, senior advisor on Baseball Operations for Boston Red Sox, being one of the pioneers in looking at using analytics in baseball and discovering that OBP may actually be a better predictor of run generation than batting average, stolen bases, bunting, etc. The purpose of the book was more to show that Billy Beane trusted a well-educated economist to dive in and use statistics that were less accepted as standard and who celebrated the workings of Bill James. The bells were really starting to ring for me. Bill James' work started to make its way into conversations one way or another in the late '70s. It was in the '80s that the coach I had used OBP to set line-ups. I had no idea anyone was really using science to start to investigate these things.

$$\text{ABL Runs} = \frac{(25 \cdot H + 10 \cdot 2B + 20 \cdot 3B + 30 \cdot 4B + 10 \cdot BB + 10 \cdot HBP + 5 \cdot S + 7 \cdot SB - 7 \cdot CS)}{AB} - 4.5 - .5 \cdot E - .2 \cdot PB$$

Formula used by the ABL Fantasy Baseball league – simplified somewhat through the years

When we first started our actuarial baseball league (the ABL) in 1990 there was little information out on the Internet and downloading baseball statistics was not an option. For the first year, we relied 100 percent on statistics and rankings from the back of a magazine—none of which valued players the way we did. My actuarial husband and I shared a team and were lucky enough to draft Cecil Fielder in the 23rd round—a little-known player who had no statistics in the back of the magazine as he was just coming back to Major League Base-

we are ALL doing in-depth analytics. Is it worth all of the work we go through each year? Absolutely. Our effort keeps us competitive. In this case we would drown without it.

ACTUARIES AND ANALYTICS

So what about the current world we live in? Advanced Analytics is becoming the new buzz phrase and everyone proclaims to be doing it. Well, some are. But some simply claim to be. Where are you? Actuaries have long been looked to when

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ball from the Japanese baseball league—but the rest of our draft picks were a bit of a disaster. For our second year's draft we were all experts and there I sat, hand-entering all the statistics, player by player, from the back of a baseball magazine into a spreadsheet I had created. Then I calculated their ABL Score and we researched the top players in preparation for the upcoming draft. With all the research we did—and continue to do—we did not win the league until 2004. Then we went from first, to worst, to first, winning again in 2006. We have not won since. Is it because the analytics we do are not worthwhile? That's an uncon-

ditional "No" in my mind. It's that it's a league made up of several actuaries and

there is a need to perform analytics. The difference is that—many years ago—there were set formulae and the extent of the analytics we performed was fairly prescribed. When I look at the analytical world today, I can't help but wonder if actuaries are starting to get passed by. I know there are individual actuaries who are out there doing what I would qualify as advanced analytics. But I also believe that many have allowed themselves to be placed in an analytical box with their roles being defined for them. One of my colleagues at Humana, a well-respected leader of our organization, commented to me one time that the actuaries do the routine analytics, but the newly developed consumer analytics group is doing the newer, more cutting-edge stuff. Note there is not a single credentialed or exam-taking actuary in that consumer analytics group.

My very intelligent nephew opted not to pursue actuarial science because he said it sounded boring. My colleague makes the claim that actuaries do the routine analytical work. This is a theme I do not like and I think we as

a profession need to change—not only the perceptions, but also the analytic caliber of the actuarial talent entering and moving through the system today.

MY SOMEWHAT NONTRADITIONAL RESUMÉ

I look back at my career as an "Actuary." I started my professional career as an actuarial student at Fortis. Then I spent five years at Delta Dental Plan of Minnesota where I got a very well-rounded education of the various responsibilities generally staffed by actuaries including providing the actuarial opinion for annual statements and the establishment, adequacy, application and results of actuarial and underwriting formulae including corporate liabilities, forecasting (enrollment, revenues and claim expenses), provider reimbursement methods, new and renewal business rating formulae, and administrative/retention fees. As chief actuary, I oversaw the actuarial, underwriting and research departments.

It was in the research capacity that I started down the path of what I would have considered nontraditional actuarial work. It was in this role where I really started to study the value of the health care dollar. Where was it being spent? What were the outcomes? Were we really improving health with each dollar that was spent? Were we as an industry contributing to the improvement of health at all? I had the pleasure of hiring and working closely with associates I would qualify as advanced analysts. These folks were taking all the information we had in our claims databases, starting to blend it with non-claim-based information such as perception and satisfaction surveys and were working analytical magic to develop relationships and to move down the path and draw conclusions. I was fascinated by

it. The folks doing this type of work were those with advanced degrees in areas such as biostatistics or economics.

I spent about eight years in the United Health Group family where my time was spent in health care economics. Basically, we were looking for nontraditional ways to understand the health care dollar. We developed methods and models to help answer some previously unanswered questions (in fact, some questions people didn't even know to ask). When I made the move to Humana, though this specific role was not included in the job description that was originally defined for me given my history, it quickly became one of my many responsibilities.

One of my accountabilities at Humana was to fix our data and analytic issues. We were starting from decentralized, siloed analytics that typify many payer organizations. I am proud to say that our efforts to date to realize analytical value through an enterprise competency and our subsequent progress toward establishing analytic competency has taken us a long way down the path to becoming a pioneering analytical competitor.¹ Today, we relentlessly search for new ana-

lytic information and methods to understand key questions around the future of the health care dollar, how you define health, and how we as an industry can provide and prove value to our customers.

ANALYTICS MOVING TO CENTER STAGE

I was fortunate enough to get introduced to the authors Tom Davenport and Jeanne Harris. They had already written and published their book *Competing on Analytics*. Oddly enough—it was softball that brought us together. I was attending dinner the night before an analytics conference and happened to sit next to Tom Davenport. Neither of us had met, nor did we know who each other was. Throughout the meal our conversation flowed and softball came up. We talked endlessly about softball and baseball and a friendship was born. Throughout Tom's speech on analytics the next morning, he kept looking to me and asking questions about analytics in health care, and softball. Shortly after that conference, I was fortunate enough to meet Jeanne Harris, Tom's co-author on the book. Any time I got the opportunity to talk to either of them, the discussion always led to analytics of one sort or another and I could feel my temperature rise as

my excitement level increased.

I always walked away dreaming of what more I could possibly do. Then I was honored beyond words when they shared with me they had decided to feature me in their upcoming book *Analytics at Work*. I was very touched to have true experts in the field look at what I was doing and conclude we were achieving success.

It's Jeanne I have to thank for inviting me to an analytics meeting at Fenway Park where the assistant GM spoke to us and told us the reason Nomar Garciaparra was traded to the Cubs in 2004 was because everyone else's stats decreased when he was on the field. I distinctly remember questioning that move when the trade was made because his stats were pretty strong—from an ABL perspective anyway. Note the trade included a popular player from my hometown team the Minnesota Twins, Doug Mientkiewicz. The word "plague" was included in the conversation regarding Garciaparra. Ah, I got it and was even more excited. I promptly offered to work for the GM—even if it only paid \$8 per hour. And, by the way, though the Red Sox tried unsuccessfully to hire Billy Beane following his incredible results based on analytics at Oakland, they did hire Bill James—the father of a lot of the pioneering baseball analytic work. The Red Sox were definitely seeing the light.


A TASK FORCE IS BORN

No matter where I was or what the topic at hand was I could not stop thinking about

EXTRA INFO

FOR MORE INFORMATION ON THIS TOPIC, VISIT THE WEBSITES LISTED BELOW.

The SOA offers a variety of audio recordings from meeting sessions covering business analytics and other topics. Visit www.soa.org/baaudio

Read a book review of *Analytics at Work*. Visit www.soa.org/babookreview 



the fact that I felt actuaries were starting to get pigeon-holed into analytic work that now seemed to be deemed routine. It made me sad. I saw a light at the end of the tunnel when the executive director of the SOA, Greg Heidrich, approached me at the reception of the 2010 Annual Meeting. We quickly got into a passionate discussion around advanced analytics and whether the actuarial profession was getting left behind in this area. Not long after that, I was approached to lead the Advanced Analytics Task Force for the SOA to determine if we should increase the focus for the actuarial profession in this area (either add a credential, a certificate or, at a minimum, offer more intensive advanced teaching opportunities for actuarial students). I gladly jumped at the opportunity. Not only did I want bright young analytically minded students wanting to become actuaries, I also wanted companies that hire advanced analysts to quickly think about actuaries when they look to fill these roles.

Now, I know there are actuaries who are out there doing what I would call clear advanced

analytical work. The problem is I feel they are much more the exception than the rule.

As a task force, one of the first accomplishments was to set forth a definition. Sounds easy but we had many personalities and opinions to work with. We now have one we are working with: *“Advanced Business Analytics for Actuaries is a set of tools and techniques used to describe, predict, and recommend business courses of action based on consumer and distributor behavior. It draws from many disciplines. It relies heavily on vast amounts of data and computing power, statistics, modeling, optimization, dashboard and alerts, market research, and clustering. Advanced business analytics provides employers with insightful decision making and affords the opportunity to assess a marketplace from a totally new perspective.”*

With the definition set we have a floor from which to build upon. Our next steps are to identify the skills and techniques that define an actuarial practitioner of advanced business analytics, identify the gaps between

those skills and techniques versus an FSA education, describe a course of study to address these gaps, develop ideas for key measures as input to market research questions and plan internal and external market assessment. Our ultimate task is to present our findings and recommendation to the board in early 2012 in hopes they will be accepted and we will move forward.

There’s a lot of work left to do to determine if the SOA should add special training, certifications or designations to encourage actuaries in the learning of advanced analytics and its techniques. Me? I just want kids coming out of college thinking actuarial science is fun and exciting and will take them down the path to do all of the cool analytics they are hearing and learning about! Google? Microsoft? Apple? Why not hire an actuary?

Finally, actuaries are often thought of as smart, but we can do amazing things outside of what historically has been considered the traditional world of actuarial science. We want to set ourselves up to make that happen! **A**

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ENDNOTES

- ¹ Humana’s analytic progress as the International Institute for Analytics “HLSARC Leading Practice Brief—Humana.” May 10, 2011. Authored by Kyle Cheek.