



SOCIETY OF ACTUARIES

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ADVANCED BUSINESS ANALYTICS THE SOA TODAY

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ON FEB. 13, 2012, a Society of Actuaries (SOA) board task force issued a white paper titled “Actuaries in Advanced Business Analytics.” There were several recommendations made at that time. In this article we discuss some of the SOA endeavors that have occurred since then and ask where we should go from here.

To have a common framework, the task force settled on the following definition:

Advanced Business Analytics for Actuaries is a set of tools and techniques used to describe, predict, and recommend business courses of action that take into account consumer, provider, and distributor behavior. It draws from many disciplines. It relies heavily on vast amounts of data and computing power. Practitioners use statistics, modeling, optimization, clustering, and market research. Combined with actuarial judgment, using Advanced Business Analytics provides employers with insight for decisions related to managing complex risks and optimizing product design as well as improving outcomes and value for consumers.

The white paper had several key recommendations. Discussed in this article are:

1. In 2012 and 2013 large meetings should include an overview (new) session on advanced business analytics (ABA).
2. The SOA should develop online and e-learning courses that involve case studies.
3. Development of an in-depth seminar in advanced business analytics, available once or twice a year.
4. Additions to prequalifying education.

MEETINGS

The first-listed recommendation regarding meeting sessions has moved well beyond offering a few overview sessions. The growth in sessions devoted to ABA has been phenomenal. By year for the health, life, and annual meetings the numbers have been eight in 2012, 10 in 2013, and 17 in 2014. As the number of sessions has increased, they have also become more structured, for example:

- The 2014 Annual Meeting included eight related sessions covering a range of topics from “Business Side of Predictive Modeling” to “Predictive Modeling Techniques in Insurance.” In addition there was a session on using analytics to detect fraudulent claims and a presentation on the Applications of Statistical Techniques module (more on that later).

- The 2014 Life and Annuity Symposium featured a series of three sessions sponsored by the Product Development and Forecasting and Futurism sections.
- The 2014 Health Meeting featured two related sessions on advanced analytics (“Getting a Foothold” and “Building Your Toolbox”).

The trend will continue in 2015. The Life and Annuity Symposium has four ABA-related sessions while the Health Meeting will feature five.

SEMINAR

A major follow-up activity for some of the task force members was the creation of the in-depth seminar in ABA. An RFP was prepared and the contract awarded to Deloitte. A 2.5-day seminar was developed to provide a blend of theory and practice. Among the methods and techniques taught in the seminar are:

- Regression and generalized linear modeling
- Survival models
- Time series analysis
- Tree based models
- Cluster analysis.

Each topic is presented with theoretical discussion that emphasizes the concepts

and then those concepts are developed with practical case studies. Prior to the seminar, participants receive a self-contained introduction to R so they can follow along and get hands-on practice. Attendance at the seminars is kept small (35 maximum) to ensure active participation.

The hands-on experience has proved very popular. The seminar has received extremely high ratings and comments such as:

- The instructor “was able to make the material come to life. He provided many examples both in and outside of actuarial science. He included first principles to motivate the material and showed how to use R to run without reinventing the wheel.”
- “Please continue this class as it is very useful to the actuarial community.”
- “This seminar was jam-packed with valuable information.”
- “This could easily be a five-day seminar given the breadth and complexity of material.”
- “Every health actuary should know this material.”

Due to high demand, seven seminars will have been conducted by the end of 2015. Locations are Chicago (3), Boston, Hong Kong, Toronto and Philadelphia. If you plan to attend, sign up early as these seminars are typically sold out.

E-LEARNING COURSE

In late 2013 the first e-learning course with a business analytics theme was released. The Applications of Statistical Techniques module was designed (and required) for candidates pursuing the SOA’s fellowship track in General Insurance. This self-paced course provides instruction regarding use of the R statistics package (a free open-source statistics package) and covers the following topics:

- Review of ordinary least squares
- The generalized linear model, with an application to classification ratemaking
- Cluster analysis
- Credibility using the generalized linear mixed model
- Measuring variability in claim reserve estimates.

While the examples focus on general (property/casualty) insurance, the methods covered have broad application. In particular, the generalized linear model has become the staple for deducing complex relationships between a dependent variable and several independent variables. Health actuaries will recognize the claim triangles studied in the sections on measuring variability in claim reserve estimates.

While designed for the SOA’s education pathway, the module is available for professional development, providing an easy introduction to some of the most commonly used ABA methods.

LEARNING STRATEGY

The next step is to broaden ABA education across the spectrum of actuarial practice.

The SOA board-appointed Learning Strategy Task Force was expected to complete its work at the June 2015 board meeting. Due to publication deadlines we cannot know which of its recommendations the board will adopt. However, there is likely to be strong support for a key ABA-related initiative: To ensure that all future SOA members learn key ABA techniques as part of ASA education.

An important aspect of this will be determining the best means for educating and evaluating candidates. It is clear that a multiple-choice test will not be sufficient. When analyzing data, there is no single important number to be calculated. Rather, there will be a set of numbers, graphs and tables that help

the analyst select a model, estimate its parameters, and then use the model to respond to the business question being asked. Therefore, ABA education may involve an in-person seminar, a combination of self-study and online interaction, or something we haven’t even thought of yet.

But it is clear that an innovative approach will be needed to ensure candidates become effective users of these techniques.

WHAT’S NEXT?

It is clear that the SOA has made a good start with business analytics. Both authors are deeply involved with the SOA’s efforts in pre-qualification and continuing education. We would like to hear your ideas as we help move this initiative forward. We have some specific questions, but comments are welcome on all aspects of actuaries and ABA.

- Would sessions at meetings be better presented as an add-on seminar?
- Should future ABA seminars continue to concentrate on discussing techniques or shift to being geared to specific practice areas?

We hope you are as excited as we are about the future of the actuaries and ABA, and the ways in which the SOA can provide support. **A**



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