Using SAS for Teaching Credit Risk: From Undergraduate Studies to Executive Education

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Agenda

• What do I teach?

• Teaching Dimensions

• Student Types and Best Practices

• Tips and General Advice

• Conclusions
My Bio

– Associate Professor of Business Analytics at the University of Southampton, United Kingdom
– Research: Credit Scoring, Business Analytics, Data Science, Credit Risk, and Banking Regulation.
– Part of the BKS team, teaching Analytics and Credit Scoring modules in Europe.
– Studied at the University of Chile (Chile)
  • Industrial Engineer, 2009
  • MSc. in Operations Management, 2009
  • Ph.D. in Engineering Systems, 2013
– Website (Spanish!): www.sehablanalytics.cl
– Twitter: @CrBravoR
What do I teach?
Undergraduate Modules

• I teach within the BSc. In Business Analytics.
  – Details:

• SAS base programming (second year)
  – Module oriented to giving basic programming skills within a statistical context.
  – Preceded by an introductory set of modules aimed at business skills.
  – Followed by a general data analytics module in R.

• Analytics in Action (final year)
  – Module oriented to giving advanced analytics skills in particular business environments.
  – SAS included in Credit Scoring context.
  – Key message: SAS for streamlined processes, Python for advanced methods.
MSc Modules

• Our programs have lower technical requirements than the BSc.
  – Some students will not have any quantitative background.
  – SAS key to facilitate learning of these concepts.

• Credit Scoring and Data Mining
  – Module for technical MSc. Students.
  – As in BSc, oriented towards creating scorecards and understanding credit risk.
  – SAS Enterprise Miner key to get quick results and understand the underlying processes.
MSc Modules (cont’d)

• Software for Data Analysis and Modelling
  – Introductory module teaching the **basics of data management** in SAS.
  – Students from the technical MSc’s in Business Analytics
  – Goal: Know the basics!

• Knowledge Management and Business Intelligence
  – Introductory module, for **non-technical MSc’s**.
  – SAS Enterprise Guide workshop as a gateway to visualization.
  – Goal: To give **context within a wider analytics framework**.
Professional Education

- All within the **Business Knowledge Series**.

- Credit Risk Modelling Using SAS
  - Intermediate course.
  - For professionals in the area of credit risk.
  - Credit risk analysis, insurance officers, auditing areas within banks.

- Analytics: Putting it All to Work
  - Basic course.
  - For companies that have just acquired SAS, or are thinking of acquiring it.
Professional Education

• Advance Analytics in a Big Data World
  – Advanced course.
  – For companies and professionals looking for a refresher and to answer what comes next.

• Every student has a different objective for the course!

• We need to design the teaching strategies of each module to be tailor made for each student type.

• We will see different teaching approaches for each student.
Teaching Dimensions
Learning Objectives

• Topics that will be covered in the course.

• Answers “What will you be able to demonstrate knowledge and understanding about?”

• Covers the specific new abilities that will be developed.

• Answers “What will you be able to do at end of the module?”

• What new abilities will you have that go beyond this module?
Approaches: Length

- Modules can be either **short-form** or **long-form**.

<table>
<thead>
<tr>
<th>Short–Form</th>
<th>Long–Form</th>
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<tbody>
<tr>
<td>● Dense in topics</td>
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<td>● Maturing the concepts is done after the module ends.</td>
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<td>● From a few days to a few weeks in length.</td>
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<tr>
<td>● Common in postgrad and profesional education.</td>
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<tr>
<td>● Thin in topics.</td>
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<tr>
<td>● Maturing the concepts occurs while the module evolves.</td>
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<tr>
<td>● Several weeks in length.</td>
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<tr>
<td>● Common in undergraduate and some MSc.</td>
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Approaches: Research-Led Teaching Cycle

- **Common for Undergraduate.**
- **Focuses on understanding the underlying concepts.**

- **Common for Professional Education.**
- **Focuses on direct skills for everyday use.**

- **Advanced studies modules (or PhD).**
- **Wide focus based on core discipline topics.**

- **Common for MSc Courses.**
- **Latest developments are discussed and studied in detail.**

**Couper & Stoakes, (2010)**
Approaches: Teaching

• Using SAS effectively requires both theory and practice.
  – Theory can be both SAS specific knowledge, or domain-specific knowledge.
    • Think programming, knowing the commands, etc.
    • ... and also knowing how to apply it.

• Activities:
  – Traditional lecture: High in content, low in retention.
  – Workshops (guided software use): Low in content, high in retention.
  – Problem-solving: Very limited in content, very high retention. Terminal activity!
  – How much do we trust our students to learn for themselves?
Student Types and Best Practices
Student Types

• For simplicity, we will split them in three categories.
  – The Newbie.
    • Students with no background and not-too clear expectations.
  – The Seasoned.
    • Students with some specific background and clearer (but often misaligned) expectations).
  – The Expert.
    • Students with a lot of very specific background and clear expectations.

• Design of activities must be tailored to the type of students!
  – Many sub–levels exist! Understand them to add real value.
The Newbie

• No context!
• Expectations are very vague.
• Losses attention quickly.
• Unclear value of discussion

• Our role:
  – First, to contextualize the what, how, why.
    • All learning objectives need to be spelled out.
  – Usually clear what do they know beforehand. Leverage this!
  – Lecture styles:
    • Theory necessary beforehand.
    • Lots of practice afterwards.
    • Long form works best.
    • Research informed!
The Seasoned

- Personal context!
- Expectations misaligned with objectives.
- Interested in both theory and practice.
- Value is aligned with experience.

- Our role:
  - Usually diverse backgrounds. Survey them at the start!
  - Widen their view!
    - Show value beyond their expertise.
    - Focus on practical implications.
  - Lecture styles:
    - Theory is required, but mix with practice often.
    - Both lengths are useful.
      - Learning objectives!
    - Research led!
The Expert

• Highly Specific context!
• Expectations very clear, usually aligned.
• Interested in what will be useful tomorrow.
• Value is apparent to them, might be off!

Our role:

– Usually student in focused, short-form courses.
  • Understand what do they want out of them!
  • Survey at the beginning!
– Applied and action research is key here.
  • Show the state of the art.
  • Show what comes next!
– Highly practical teaching style, focus on skills.
  • Will usually have lots of previous knowledge (maybe more than yours!)
  • Discussions are key! Get them to share this knowledge.
Tips and General Advice

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Control pacing!

- Example: Credit Risk Analytics, first day (6 hours with 30-min three breaks).
  - Three theory-based sections, each with its SAS exercise on laptop.
  - First two hours: Theory.
    - People are awake!
    - Attention spans longer.
  - First break.
  - Start with exercise (to motivate last few hours).
  - One hour theory + Second exercise.
    - Less dense, more practical. Wakes people up!
  - Second break.
  - Last 1.30 hours of theory + 30 mins exercise.
Gamify if possible!

- If covering lots of different topics, give space for reflection.
- Short-form: Use quizzes.
  - Tool: AnswerGarden. [www.answergarden.ch](http://www.answergarden.ch)
  - Allows you to ask questions on-the-fly and see the answers in a wordcloud.

- Long-form: Do reviews.
  - Tool: Kahoot! [www.getkahoot.com](http://www.getkahoot.com)
  - Interactive quizzes with awards.
  - Reward people to keep interest in games.
    - I use chocolate.
Key Takeaways

• Understand your audience!

• Tailor-made the module to them.
  – Impacts marketing.

• Set expectations correctly.

• Control pacing and use technology to support you.
YOUR QUESTIONS

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