

Making SAS® Education Relevant to the Future Workforce

Charlotte Baker and Matthew Dutton, Florida Agricultural and Mechanical University

ABSTRACT

SAS® education is a mainstay across disciplines and educational levels in the United States. Along with other courses that are relevant to the jobs students want, independent SAS® courses or SAS® education integrated into additional courses can help a student be more interesting to a potential employer. The multitude of SAS® versions (SAS® University Edition, Base SAS®, SAS® Enterprise Guide, SAS® Studio, and the SAS® OnDemand offerings) provide the tools for education but reaching students where they are is the greatest key for making the education count. This presentation will discuss several roadblocks to learning SAS® syntax or "point-and-click" from the student perspective and several solutions developed jointly by students and educators in one graduate educational program.

INTRODUCTION

One of the goals of education is to increase the skills that graduates can use to find gainful employment. No matter the job area, there is a growing need to hire employees that can use a statistical program such as SAS®. Employees that come in with training keeps projects running smoothly and the focus can be on continuing education rather than initial introduction to statistics or statistical programming. Many of the students in our graduate public health program aim to work in government at the local, state, or federal level or in the non-profit arena. As jobs are being vacated by retiring employees, the need is greater now than ever to make sure that students are being educated on how to use statistical programs but also that they find the education relevant and thus retain what is being communicated to them. This paper will talk about roadblocks students identified to learning SAS and the solutions that our program has put in place and will be implementing in the months to come.

THE EDUCATION

INITIAL ROADBLOCKS

Students in our program are all required to take a one semester lab course in conjunction with their biostatistics class. The lab revolves around learning the basics of SAS programming – bringing data into SAS, cleaning data, and descriptive statistics, bivariate tests such as the chi square, and regression methods such as logistic regression. Students identified multiple barriers:

- The class time was too short and it did not allow for in-depth coverage of syntax
- There were too many people in the lab to get enough assistance during class
- It was not clear why SAS was the tool they needed to learn
- Students felt SAS was hard and had heard SPSS was easy
- They could not see where SAS would help them in the future
- Not enough immediate feedback
- Some students did not have opportunities to use SAS again until their culminating research project approximately three semesters after taking the course. Other students were able to use SAS during rotations at the health department or in additional courses.

In addition to faculty agreeing with the barriers that students identified, faculty also identified that faculty themselves were a barrier. Faculty know the power of understanding SAS syntax, but all students did not have an interest in syntax nor did they continue using SAS because they felt it did not provide a non-syntax mechanism to obtain answers. Teaching only with syntax lost those students.

While attending SAS Global Forum 2016, a few faculty came up with a way to revamp the class and give students exactly what they had been asking for.

SOLUTIONS

To reduce the number of students in the class, additional course sections were created and an additional instructor was added. While only one professor would teach any given section, teaching assistants were added that could help with questions in any class. One course section was chosen to test any changes to the course and get regular student feedback. The additional sections received the course as it had been taught in the past.

The class traditionally met for one to one-and-a-half hours once a week and consisted of a lecture and exercises. We experimented with extending the class to two hours and that worked well as it gave more time for in-class exercises for a grade. The latter was also a change as students had previously completed four take-home projects during the semester for a grade. The in-class exercises gave students immediate feedback and students were able to focus on the assignment not the grade. Exercises were always real-life scenarios that might need to be solved in public health and actual public health data was used for both lecture and exercises. Various examples were used that would cover the wide range of interests students had. As one student stated, "My favorite part of the course was being able to work with the systems hands on in class, instead of listening to a lecture without the hands on experience. Having the hands on experience prior to completing assignments helped me understand the material better."

The unaltered course contained approximately 12 weeks of lectures solely dedicated to SAS syntax. To show students that SAS could be just as easy or easier than SPSS to use for statistical analysis and to show them that SAS was more powerful than SPSS, particularly when it came to a large number of observations, half of the revamped course was dedicated to SAS syntax but the other half integrated the same examples using both SAS Enterprise Guide and SPSS. This was in response to students finding syntax difficult to master and wanting to be able to select a test through menus rather than through code. Students were able to dictate what should be demonstrated using the menu driven commands in order to diversify the education about statistics. Some students still preferred SPSS by the end of the semester but had gained an appreciation for what SAS could do. Other students who had heard that SPSS was easier reported that they preferred the interface for Base SAS and found it easier to customize output using SAS syntax than trying to use the menus in SPSS or SAS Enterprise Guide. They appreciated the ability to have options.

During the second half of the class, students were given the opportunity at times to pick a public health problem they were interested in and obtain the solutions. They needed to find their own freely available data that could be used to answer the question. This gave students direct practice with identifying data as they might in the "real world" and give them another opportunity to become engaged in identifying an answer. As several students were also interested in presenting work for professional purposes at some point during their matriculation, part of the final examination was for students to write an abstract based on the results of their data project. This added to the course objectives more discussion on data interpretation, the importance of being succinct, and how to communicate results from data.

Students felt these solutions solved several of their issues with the course and with knowing how SAS fit into their education and career trajectory. Students also indicated they clearly understood some of the differences between SAS and SPSS. Most importantly, students were much more engaged and wanted opportunities to continue learning SAS beyond the lab course.

ROADBLOCKS AFTER IMPLEMENTING SOLUTIONS

Even after making changes to the course that will be rolled out to all students this upcoming fall, students still indicated the need for:

- More integration of SAS into additional required courses
- Another standalone SAS course that provided more in-depth instruction into SAS
- Formally making the course a three contact-hour class so students can be prepared for that length of

a class every week and have more time to really grasp the material

Even with the lengthening of the class to two hours, some students still reported needing or wanting more time in class to really get a more in-depth lecture so they did not feel lost at the end of a lecture or so that they could have a refresher on previous material at the beginning of class. One student said if there was one thing they would have changed about the course, “[i]t would be a longer designated time for the course”. Other students indicated that the longer exercises given as a midterm and a final were very instrumental in helping master the material, but that they could perhaps be delivered or worked on during a longer time span during the semester (both are take-home over a period of seven days). Students in the class that had been changed indicated fewer problems with mastering the covered material at the end of the course compared to students who were in the class as it had traditionally been taught. This means that the exercises that are in-class and take home may need to be better integrated with each other in such a manner as to be extremely daunting to a newcomer to the SAS world.

Students in the doctoral program directly applied their newfound knowledge to other classwork during the same semester and the following term. Students in the masters program need more opportunities to utilize their knowledge that are available near the semester when they take the lab. We are currently visiting the idea of implementing the SAS certificate program based on our curriculum and how to revamp existing courses and curriculums to meet the demand.

Faculty are still interested in improving the course to improve retention of statistical knowledge, not just programming knowledge. A barrier that came up due to the change was that the half of the course dedicated to syntax was easy to deliver using lectures with Microsoft PowerPoint handouts. The half of the semester dedicated to menu driven commands was easy to deliver face to face but there was a need to dedicate the time to create videos of the menu driven commands that students could review the same way they reviewed Microsoft PowerPoint slides for syntax. This would increase the amount of class preparation time and might be an undue burden for any faculty selected to teach this course.

CONCLUSION

At the onset of the year there were several barriers for student learning and retention that could and did impact student outcomes and graduate job offers. We identified several roadblocks for students in our lab course and, along with students, developed several solutions for these roadblocks. All of the issues were not resolved but we feel that we are on the path to making a long-term solution that can have a positive impact on the number of students that elect to use SAS outside of the required course and on the job outlook of our graduates.

ACKNOWLEDGMENTS

The authors would like to thank the students enrolled in the Fall 2016 PHC 6050L course at Florida Agricultural and Mechanical University for being patient and willing to participate in our teaching experiment.

CONTACT INFORMATION

Your comments and questions are valued and encouraged. Contact the author at:

Charlotte Baker
Florida Agricultural and Mechanical University Institute of Public Health
1515 S. Martin Luther King Jr Blvd
Tallahassee, FL 32307
charlotte.m.h.baker@gmail.com

Matthew Dutton
Florida Agricultural and Mechanical University Institute of Public Health
1515 S. Martin Luther King Jr Blvd
Tallahassee, FL 32307
matthew.dutton@famu.edu

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration.

Other brand and product names are trademarks of their respective companies.