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From Backpacks to Briefcases: Making the Transition from Grad School to a Paying Job

Lauren Hall, MPH, Baylor Scott & White Health, University of North Texas School of Public Health; Elisa Priest, DrPH, Baylor Scott & White Health

ABSTRACT

During grad school, students learn SAS® in class or on their own for a research project. Time is limited, so faculty have to focus on what they know are the fundamental skills that students need to successfully complete their coursework. However, real-world research projects are often multifaceted and require a variety of SAS skills. When students transition from grad school to a paying job, they might find that in order to be successful, they need more than the basic SAS skills that they learned in class. This paper highlights 10 insights that I've had over the past year during my transition from grad school to a paying SAS research job. I hope this paper will help other students make a successful transition. Top 10 insights: 1. You still get graded, but there is no syllabus. 2. There isn't time for perfection. 3. Learn to use your resources. 4. There is more than one solution to every problem. 5. Asking for help is not a weakness. 6. Working with a team is required. 7. There is more than one type of SAS®. 8. The skills you learned in school are just the basics. 9. Data is complicated and often frustrating. 10. You will continue to learn both personally and professionally.

INTRODUCTION

Graduate school is meant to provide students with the necessary skills needed to successfully perform in a specific career field. In a data-driven research field, courses provide students with basic data and analytic skills. However, real-world research is more complex than what is presented in a classroom. This paper describes 10 insights I have had while transitioning from graduate school to a paying SAS research job. The goal of this paper is help other graduate students prepare for what to expect as they make their transition from a full-time student to a full-time job.

THE TRANSITION FROM GRAD SCHOOL TO A PAYING JOB: TOP 10 INSIGHTS

1. YOU STILL GET GRADED, BUT THERE IS NO SYLLABUS

In graduate school, students are provided with syllabi that contain all the information needed to successfully complete their courses. The syllabus can be considered a student's survival guide that includes due dates, course expectations, and grading criteria. This information is vital for keeping students organized and aware of what is expected of their performance.

Once students start their first job after school, they no longer receive a syllabus that outlines how they should perform their job tasks. Students will likely find that they are presented with multiple projects and tasks that need to be completed. It is now the responsibility of the employee to determine what is expected for each project, acknowledge deadlines and due dates, and ensure the successful completion of projects. Although there are no longer exams and formal grades, employees are "graded" in a sense on their job performance, attention to details, adherence to deadlines and schedules, and effort put forth in their work. To be successful in the absence of a syllabus, it is important to keep track of due dates on a calendar, schedule time on the calendar to complete projects and tasks, discuss expectations and requirements with a supervisor, and seek advice from co-workers.

2. THERE ISN'T TIME FOR PERFECTION

Many graduate students are highly driven, Type A individuals who strive for perfection in their courses. However, perfection is not a make-or-break job skill. This may come as a shock to many graduates. Once students start their first job, they will quickly realize there is simply not enough time to complete every project perfectly. Students will learn that they have to juggle multiple projects at one time, while still adhering to deadlines. It is not feasible to spend a great deal of time on one project in an attempt to

make it flawless. As long as the work is correct, adheres to guidelines, and does not contain major errors, it is acceptable!

3. LEARN TO USE YOUR RESOURCES

Students may find that many of the tasks and projects they will encounter in a SAS research job will require more than the basic programming skills they learned in grad school. Often there is not enough time to take a course or spend weeks trying to learn more advanced SAS programming techniques to complete a research project. However, there are many SAS resources available to help with basic and advanced programming needs including websites, books, and online tutorials. Another great resource is fellow SAS programming colleagues. Co-workers may know of more advanced programming techniques, offer insight to a different way of solving problems, and provide their code for a project that can serve as a template. Additionally, looking over another person's code is an opportunity to learn SAS programming.

Using these resources is a great way to enhance and learn new SAS skills. The following are a few resources I turn to often:

- SAS Support Website
- UCLA Institute for Digital Research and Education website
- *The Little SAS Book: A Primer*
- SAS books by Ron Cody
- Co-workers

4. THERE IS MORE THAN ONE SOLUTION TO EVERY PROBLEM

Students entering their first SAS research job may compare their basic way of coding with their more-advanced colleagues way of coding. They may feel as though what they are doing is completely wrong. As the old saying goes, "there is more than one way to skin a cat." This is especially true for almost any SAS programming task. For example, one person may prefer to use more complicated arrays and macros in their programming, while another person may prefer to write out lines of code for every step of a procedure. Neither way is wrong as long as the end result is correct.

5. ASKING FOR HELP IS NOT A WEAKNESS

Starting a new job can be a very intimidating experience. When entering a data-driven research field, new employees must learn the different sources of data and which data source is best to use for each project. There is often no formal training period or a written guidebook to help them get acquainted with the data. It is more of a learn-as-you-go environment. This can be daunting and often challenging at times.

Grad students just starting their first job out of school may feel that it is a weakness to ask for help in learning a new system. They may be under the impression that asking for help means that they are incapable of handling their job responsibilities. However, this is not the case. Asking for help is not a weakness, but rather it is a strength. It is impossible to learn everything there is to know in a few short weeks or months. In fact, employees who have been with a company for decades still ask for help from time to time. Colleagues and supervisors can be a wealth of information, and more than likely will not hesitate to offer any assistance.

6. WORKING WITH A TEAM IS REQUIRED

More often than not, the work in graduate school is more individual-based rather than team-based. For the most part, exams, projects, and assignments are individual tasks, while there may be an occasional group project. Graduate students may find that group work is a challenge because not every member of the group completes their responsibilities; the work done may not be up to every member's standards; group members cannot agree on how a project should be completed; or one or two individuals pull more weight than the rest of the group. Graduate students may leave school with a dislike of any kind of group work and prefer to work on their own.

However, working with a team is required in a real job. It is unrealistic to complete most projects without the help and input of colleagues. Unlike graduate school, teams in a real job often consist of individuals with similar work ethic, similar standards, and people who are open to hearing new ideas of approach. The work is distributed evenly and each member is responsible for their portion. Working with a team should not be something that is dreaded. In fact, it can be a great learning experience. Teams can complete projects more efficiently and team members can gain knowledge and new perspectives from each other.

7. THERE IS MORE THAN ONE TYPE OF SAS

Most students in graduate school learn SAS via base SAS. However, there are a number of different SAS types and components that students may encounter in a real job. SAS® Enterprise Guide® is one of the more common types of SAS. It is a Windows client application that requires a SAS server. It has easy-to-use point and click features and allows the user to easily organize their data and programs through projects (1). While some of the nuances take a little getting used to, the coding is the same as base SAS. Other more common SAS types and components that may be encountered include SAS® Enterprise Miner™ for data mining, SAS/STAT® for statistical analysis, and SAS/GRAPH® for graphics and presentation.

8. THE SKILLS YOU LEARNED IN SCHOOL ARE JUST THE BASICS

During grad school, most students learn SAS in a semester-long course or on their own for a research project. In graduate school programming courses, faculty focus on what they believe to be the fundamental SAS skills that students need to successfully complete their coursework and research projects. Students will learn how to read-in data, import data, and perform basic descriptive statistics using PROC FREQ and PROC MEANS. Some courses may briefly touch on more advanced topics such as arrays and DO loops.

However, real-world research projects are often multifaceted and require more than just basic descriptive statistics. The data used for research projects are complex and combining data from multiple sources is typical. Additionally, more complex analyses such as regression modeling are required. Therefore, students entering a new SAS research job will be introduced to some very advanced coding, and as a result, will greatly build upon their SAS skills. In a SAS job environment, students may encounter macros, arrays, and the use of PROC SQL in their day-to-day coding tasks. The following is an example of the type of complex code that may be encountered in a SAS research job. This example code combines administrative data to identify patients with COPD who were admitted to the hospital in 2014. It contains macros and uses PROC SQL code.

```
%LET    START_DATE     = %STR('01/01/14');
%LET    END_DATE     = %STR('12/31/14');

PROC SQL;
 CREATE     TABLE COPD AS
 SELECT    *
   FROM
         (SELECT SITE_ID
                      ,FACILITY_ID
                      ,ACCOUNT_NO
                      ,ADMIT_DATE
                      ,DISCHARGE_DATE
                      ,DISPOSITION_CODE
                      ,LENGTH_OF_STAY
                      ,PATIENT_CLASS
                      ,PATIENT_AGE
```

Macro variables that set the start and end dates

Using PROC SQL to create the table COPD

Selecting these variables from the existing Visits table to be in the new COPD table

```
        FROM     VISITS
        WHERE (PATIENT_CLASS IN ('I'))
            AND (DISCHARGE_DATE BETWEEN TO_DATE(&START_DATE.,'mm/dd/rr')
            AND TO_DATE(&END_DATE.,'mm/dd/rr'))) V

   INNER JOIN
        (SELECT SITE_ID
                      ,FACILITY_ID
                      ,ACCOUNT_NO
                      ,REV_CODE
        FROM    VISIT_CHARGES) Q
                  ON V.SITE_ID = Q.SITE_ID
                  AND V.FACILITY_ID = Q.FACILITY_ID
                  AND V.ACCOUNT_NO = Q.ACCOUNT_NO


    INNER JOIN

        (SELECT SITE_ID
                      ,FACILITY_ID
                      ,ACCOUNT_NO
                      ,DIAGNOSIS_code_DECIMAL
                      ,DIAGNOSIS_SEQ
                      ,DIAGNOSIS_TYPE
        FROM    VISIT_DIAGNOSES
        WHERE (((DIAGNOSIS_CODE_DECIMAL like ('491.%')) or
                (DIAGNOSIS_CODE_DECIMAL like ('492.0')) or
                (DIAGNOSIS_CODE_DECIMAL like ('496%')))

                 AND (DIAGNOSIS_TYPE = 'CU'))

  GROUP BY SITE_ID, FACILITY_ID, ACCOUNT_NO, DIAGNOSIS_CODE_DECIMAL)P

                 ON V.SITE_ID = P.SITE_ID
                 AND V.FACILITY_ID = P.FACILITY_ID
                 AND V.ACCOUNT_NO = P.ACCOUNT_NO

 );
QUIT;
```

Selecting only inpatients who had a discharge date in 2014 (macro variables from above)

Joining the observations from the Visits table with those from the Visit_Charges table based on the corresponding site_id, facility_id, and account_no variables

Joining with a 3rd table, Visit_Diagnoses, to get the diagnosis information for each patient

Using these specific ICD-9 codes to obtain patients with only COPD

9. DATA IS COMPLICATED AND OFTEN FRUSTRATING

Typically the data utilized by graduate students for courses or research projects is smaller in size, has been cleaned or partially cleaned, and is usually from one source. However, real life data that students will encounter in a work environment is much different and it can initially be very frustrating. The data utilized in a research-based job is often large, possibly consisting of hundreds of thousands of observations. The data, which comes from many different sources, have not been cleaned for errors and it is often incomplete.

A prime example of complicated data encountered in a research-based job is the data used in health services research. Researchers in this field have to combine data from multiple sources including clinical data, administrative data, billing and costs data, and data collected from surveys and questionnaires. Each of these types of data has their own challenges. A few common challenges that researchers will encounter often is that the data almost always contains errors that need to be corrected when possible; the data is often incomplete; and one data source may not contain all the necessary variables, so data

from two or more sources must be combined. Another issue that researchers may face is that it is often difficult to identify the best source of data to meet the unique requirements of each research project.

Below is an example of a high number of missing data. In this example, patients were scored on their mental abilities upon admission and then again at discharge. PROC MEANS was used to calculate the mean admit score and the mean discharge score for the variables. You can see that 45 out 108 patients (42%) were missing a discharge score. Missing data is a common challenge with real data.

The MEANS Procedure

Variable	N	Mean	Std Dev	Median	25th Pctl	75th Pctl	N Miss
ADMIT_SCORE	104	2.15	1.72	2.00	1.00	3.00	4
DISCH_SCORE	63	2.11	2.52	1.00	0.00	3.00	45
SCORECHANGE	61	0.07	2.21	0.00	-1.00	1.00	47

Display 1– PROC MEANS Results Showing Missing Data

It may be an eye-opening experience for students when they first start working with real-life data. Although the data can seem intimidating and sometimes impossible to work with, students should recognize that the process will become much easier once they are familiarized with the data and their SAS skills improve.

10. YOU WILL CONTINUE TO LEARN BOTH PERSONALLY AND PROFESSIONALLY

As graduate students make the transition to a paying research-based job, they will continue to learn every day. Starting any new endeavor can be very frightening. Students starting a new job will encounter new people, new types of data and research challenges, and will have to adapt to an entirely new environment. Although it is scary, it can be a very enlightening experience both personally and professionally.

On a personal level students may start to recognize their strengths and weaknesses. They may also find that they become more patient when dealing with frustrating situations and that working with colleagues can be a fun and educational experience. Additionally, they may learn that anything can be accomplished if they utilize their strengths and turn to others for help when needed.

A work environment is a great place for grad students in a research field to grow professionally. They will be presented with many types of data and data challenges that will allow them to develop their data management and research skills. Also, working with complicated data in SAS will allow them to enhance their SAS skills. Finally, a research job will also open the door to many different types of research projects that will allow young researchers to expand their analytic skills.

CONCLUSION

The transition from graduate school to a paying job can be a daunting experience for many students. There are many things that students cannot learn in a classroom, but can only learn when working in a real job. This paper highlights the 10 main insights I have had over the past year as I have transitioned from graduate school to a paying research job. These insights are meant to serve as guide for other graduate students as they prepare to transition to a real job.

REFERENCES

1. **SAS Institute Inc.** SAS Enterprise Guide. *SAS.com.* [Online] [Cited: March 23, 2015.] http://www.sas.com/en_us/software/enterprise-guide.html.

RECOMMENDED READING

- *The Little SAS Book: A Primer*
- *Learning SAS by Example: A Programmer's Guide*
- *SAS Functions by Example, Second Edition*

CONTACT INFORMATION

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

Lauren Hall, MPH
Lauren.Hall@baylorhealth.edu