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Using SAS® to Streamline Periodic Reporting of Summary Statistics: Proc Format, Proc Means, and Output Delivery System

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ABSTRACT

With the need to analyze and report survey results periodically, SAS can be used to streamline and record the steps, from formatting to performing statistics to producing report-ready summary statistics of survey data. This paper shows how to extract and format raw survey data from Excel, produce the means for each of the participating organizations, and report using the Output Delivery System. By saving the steps and procedures used in producing the summary statistics report, not only is the process streamlined in each iteration but the statistics are also produced in a consistent manner allowing for reliable comparability in the trend analyses of the sequence of data points.

INTRODUCTION

This paper discusses the use of SAS to streamline the process of producing summary statistics of a satisfaction survey administered to managers applicants involved in the hiring process. There is a need for periodic reporting to understand the progress being made in improving the hiring process. The main question item of interest being tracked and trended is the overall satisfaction with the hiring process. The average satisfaction scores of all respondents and the average score for each organization are included in the report. The coding in SAS used to manipulate the raw data, compute the statistics, and produce the summary report serves as a way to save the procedure and reapply to future iterations, thus allowing for consistency and comparability in capturing trends in future iterations. More importantly, the process is streamlined and the manual steps of manipulating and formatting the data are reduced to a minimum.

SETTING UP THE DATA

The first step is to bring the raw data of the survey results from MS Excel format into SAS.

```
PROC IMPORT OUT=SatisfactionRaw
    DATAFILE="C:\SatisfactionQ1.xls"
    DMBS=EXCEL REPLACE;
    SHEET="Sheet1";
RUN;
```

Once it is in the SAS environment, the data step is used to format the data. One response option in the survey question item was "N/A" and had to be omitted from the calculation. The data step includes a statement for dealing with "N/A" responses. Missing values were not included in the calculation as well but no statement was required to execute that command because SAS procedures that perform computations which includes PROC MEANS handle missing data by omitting the missing values.¹

```
Data SatisfactionRaw;
    set satisfactiondata;
    if satisfactionVar in ('N/A') then delete;
run;
```

The organization names in the raw data are coded and will need to be formatted for the final report. PROC FORMAT is used to match up the organization names with their respective codes in the raw data.

```
PROC FORMAT;
    value $OrgFmt
        "A1" = "Organization 1"
        "A2" = "Organization 2"
        "A3" = "Organization 3"
```

```

    "A4" = "Organization 4"
    "A5" = "Organization 5";
run;

```

Running the PROC FORMAT will make the format option in the PROC MEANS and ODS available for output and the actual organization names will appear instead of the raw data codes.

PROC MEANS AND OUTPUT DELIVERY SYSTEM

Once the data is set up in the SAS environment, the coding for the calculations required for the report can begin. The first calculation for the overall average satisfaction score of all the survey respondents, excluding the missing values and the N/A responses. A statement for the calculation of the average satisfaction score for each of the organization is also included. Preceding these calculation codes is a statement for the Output Delivery System (ODS) which commands the program to output the report to a designated folder in a designated format. The particular statement below is for an Excel output to be placed in Folder1.

```

ods html file='C:\Folder1\SatisfactionQ1_2011.xls';
proc means data=satisfactiondata n mean maxdec=2;
    var satisfactionvar;
    title 'Overall Satisfaction Average, 1st Quarter 2011';
run;
proc means data=satisfactiondata n mean nonobs maxdec=2;
    var satisfactionvar;
    class organization;
    title1 'What is your overall satisfaction with this hiring process';
    title2 'By Organization, 1st Quarter 2011';
    format Organization $OrgFmt.;
run;
ods close;

```

The title statements in both PROC MEANS are set-up to distinguish the overall average score from the organizations' average scores. The FORMAT option allows for the reporting of the organization names spelled out in the report as previously set-up in the PROC FORMAT statement.

CONCLUSION

A survey results' summary report is required periodically and is executed quarterly to monitor and analyze trends. These analyses and reports are used to understand and to track the continuous improvement of the hiring process. These same steps in this particular report's iteration are saved and can be used to repeat the process in future reporting requirements. One key in keeping this process streamlined is to keep consistency in the naming of the variables, files, and paths. By saving the steps and procedures used in producing the summary statistics report, not only is the process streamlined in every iteration but the statistics are also produced in a consistent manner allowing for reliable comparability in the trend analyses of the sequence of data points.

REFERENCES

Missing Data in SAS. UCLA: Academic Technology Services, Statistical Consulting Group. from <http://www.ats.ucla.edu/stat/sas/modules/missing.htm> / (accessed August 1, 2011).

CONTACT INFORMATION

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