SAS® Enterprise Guide® – A Powerful Tool to Bridge the Gap between Statisticians and Medical Students

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ABSTRACT

The presentation concentrates on introducing Enterprise Guide / SAS Learning Edition as excellent interfaces for co-operations between statisticians and medical students performing research work such as diploma theses. It is discussed how Enterprise Guide can be used effectively from the planning phase of a scientific project up to the interpretation and presentation phase. The paper is not a basic tutorial on Enterprise Guide but offers ideas how to realize concepts for the process flow of a scientific work. For further information about Enterprise Guide see the REFERENCES section.

The presentation will be interesting and useful for people who are involved in teaching statistics to non- statisticians or in scientific co-operations between statisticians and non-statisticians

The examples highlighted in the paper refer to SAS Software 8.2 and Enterprise Guide 2.0

INTRODUCTION

The aim of a course in statistics for medical students or physicians cannot be turning them into statisticians but founding a basis for co-operations. It is sufficient that students/physicians are familiar with at least some basic methodological concepts and ideas of probability theory and statistics. Above all an intuitive understanding is required.
Performing a thesis means that the student has to do as much himself as possible. Of course medical students are no experts in the field of statistics, therefore statistical advice in combination with an easy to use software tool to carry out data analyses is required.
The paper tries to explain why Enterprise Guide / SAS Learning Edition are excellent interfaces for co-operations between statisticians and medical students or physicians. General ideas and concepts rather than examples will be highlighted.
Enterprise Guide is a front-end Windows client that provides a point-and-click interface to access and analyse your data. SAS Learning Edition combines roughly speaking a student version of SAS Software (limited access) with Enterprise Guide. Within Enterprise Guide various tasks are organised into projects.. With projects, you can run multiple tasks on the same group of data files. Figure 1 shows the Enterprise Guide Welcome window at start up unless you did not turn it off.
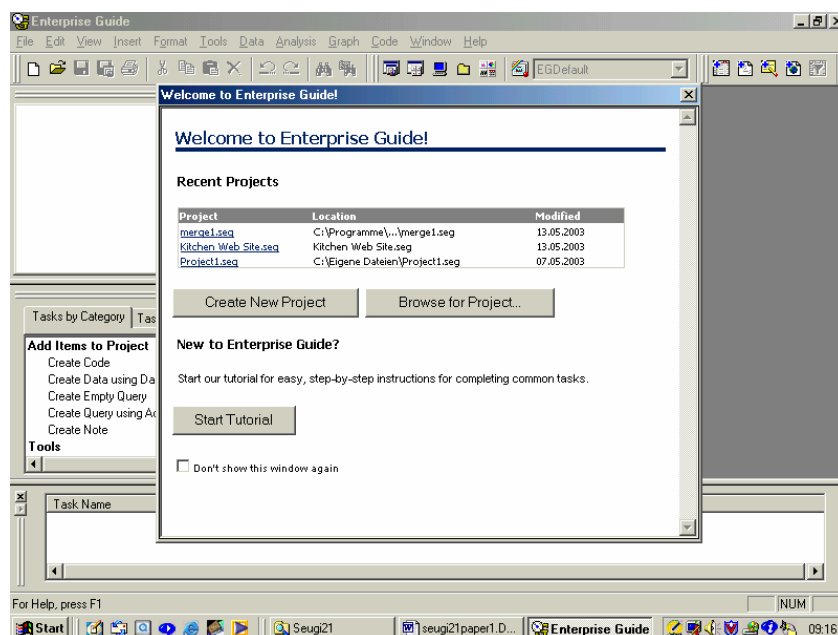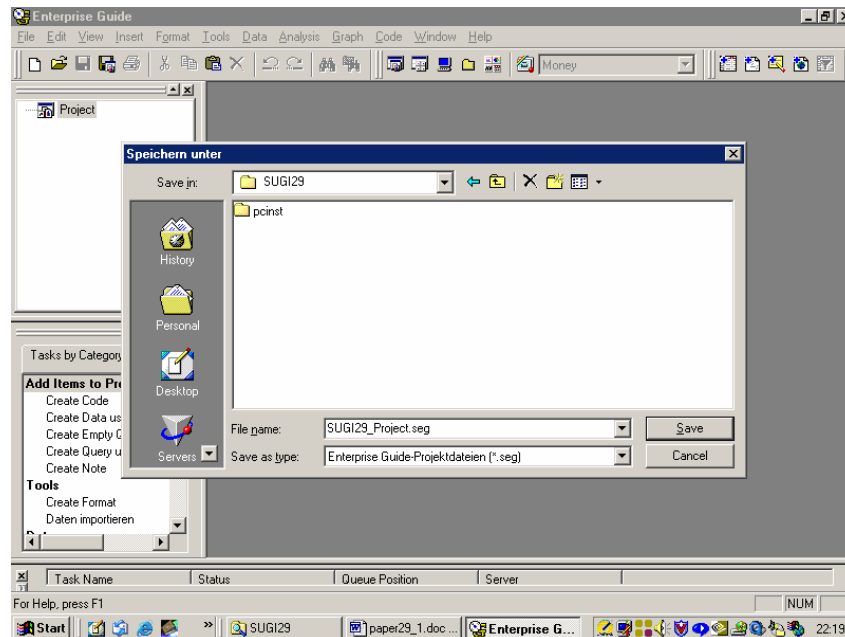
Figure 1 invoking Enterprise Guide

Figure 2   renaming and saving the project

Performing a medical study comprises several phases:

- planning
- patient recruitment (if the study is prospective)
- data acquisition
- data entry
- data cleaning
- analyses and interpretation
- publication and presentation

In the following it is described how to use Enterprise Guide throughout the phases of medical studies. I introduce Enterprise Guide to students in a basic seminar. Students use Learning Edition for practice. In an advanced seminar students gain more statistical knowledge together with additional skills concerning Enterprise Guide. Part of this seminar is statistical supervision for those who work on their thesis.

PLANNING PHASE
Rule number one: when starting a medical study statistical consultation is required. This paragraph will point out how Enterprise Guide can be used from the very beginning on.

Getting started many items have to be discussed and specified e.g.:

- aim of the study (primary and secondary endpoints)
- type of the study (randomized clinical trial, observational longitudinal study, …)
- population
- how to draw the sample
- data table definitions
- appropriate statistical methods

Now the student can store these specifications within Enterprise Guide creating a note (if a student is equipped with a laptop computer he can do this job during the meeting).
Enterprise Guide allows you to create notes to accompany a project or any file in the project. Notes help you keep track of things you need to do and can give others valuable information. Note files are saved as Text Files (*.txt). The next figures show how to proceed.
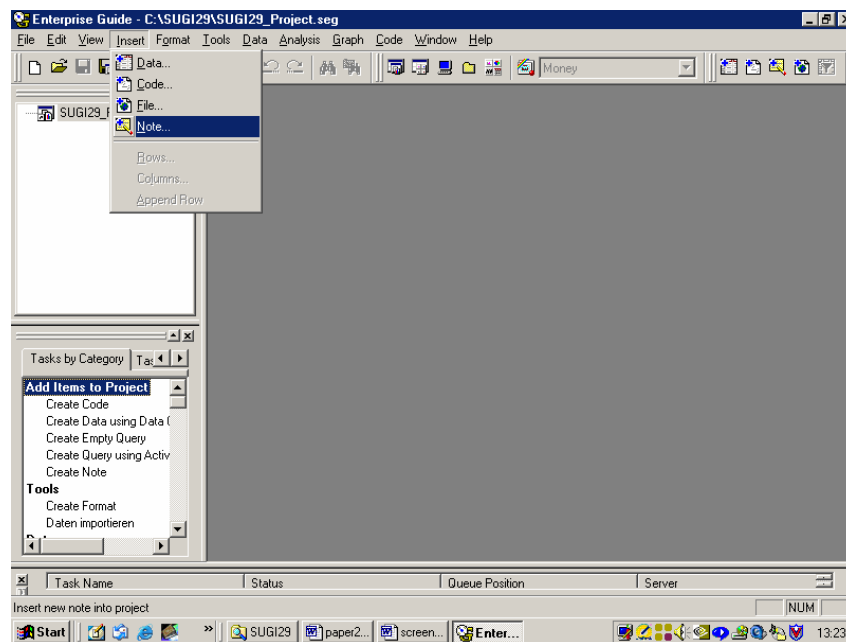
Figure 3   creating a note

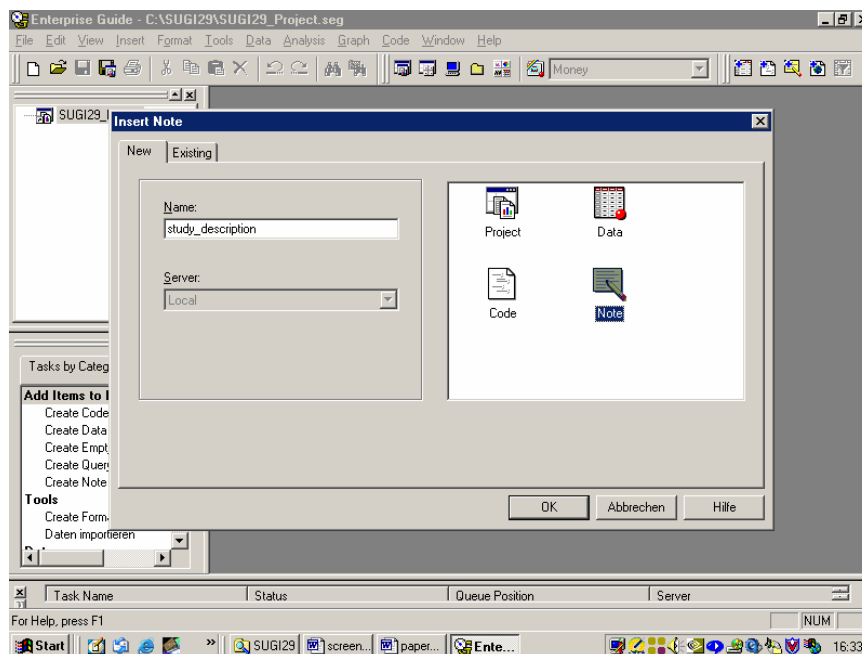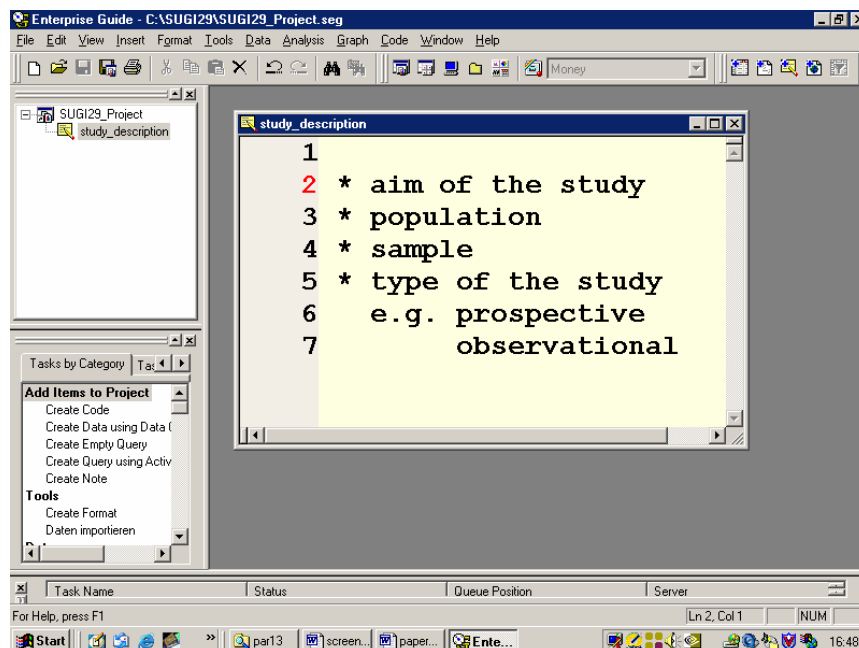**Figure 4   renaming and saving the note**

Figure 5 statistical consulting protocol


DATA COLLECTION – DATA ENTRY

After data have been collected (it is recommended to use case report forms -CRF) they have to be stored in data tables. Again notes containing specific variable information are a big help to create data tables correctly.

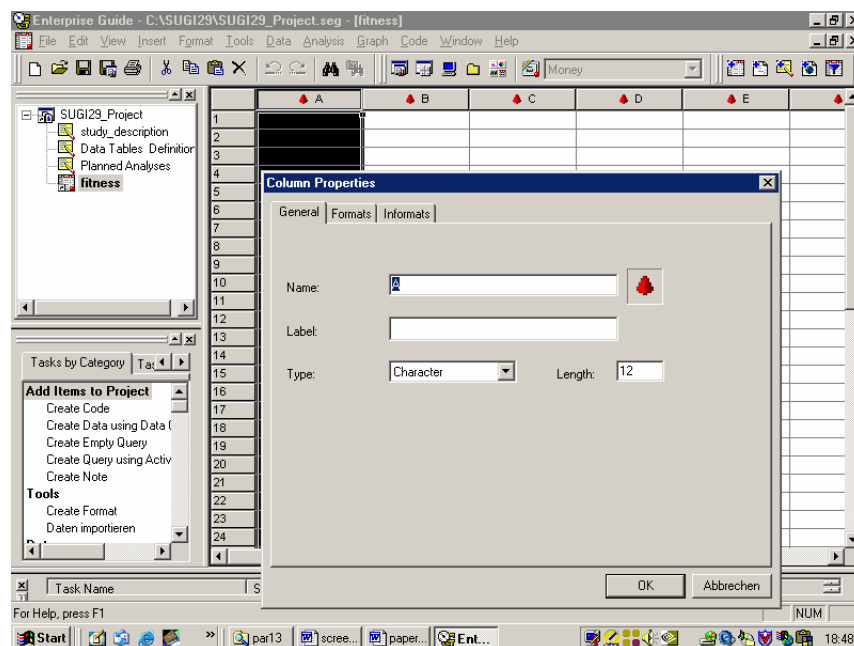**Figure 6 statistical consulting protocol**
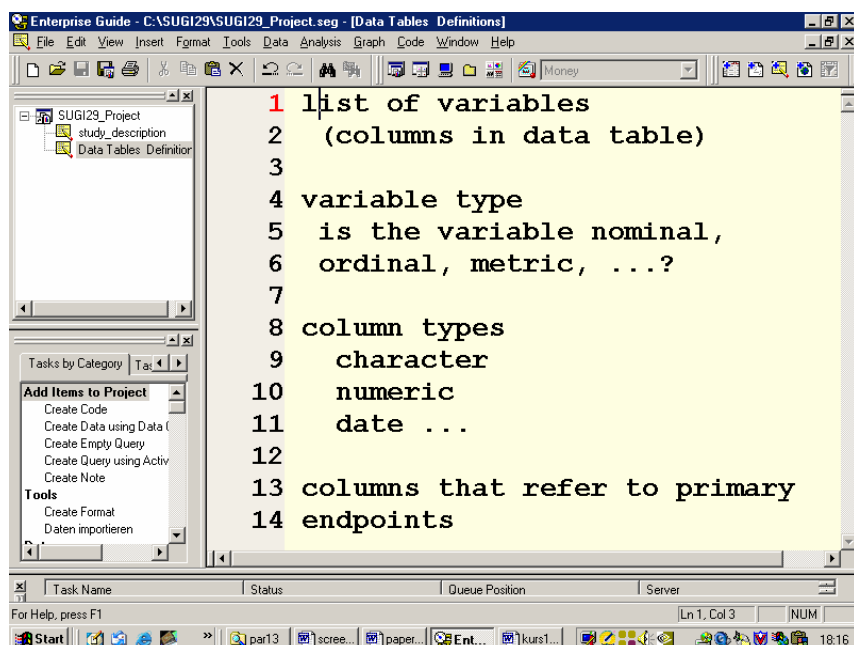
The information stored in Figure 6 is also very important for future data analyses. The student has to remember the types of the .variables to choose the appropriate statistical procedures. Using Enterprise Guide you can easily create and edit data sets. To create a new data table select **Insert → Data**. Figure 7 displays how to proceed

Figure 7 creating a new data table
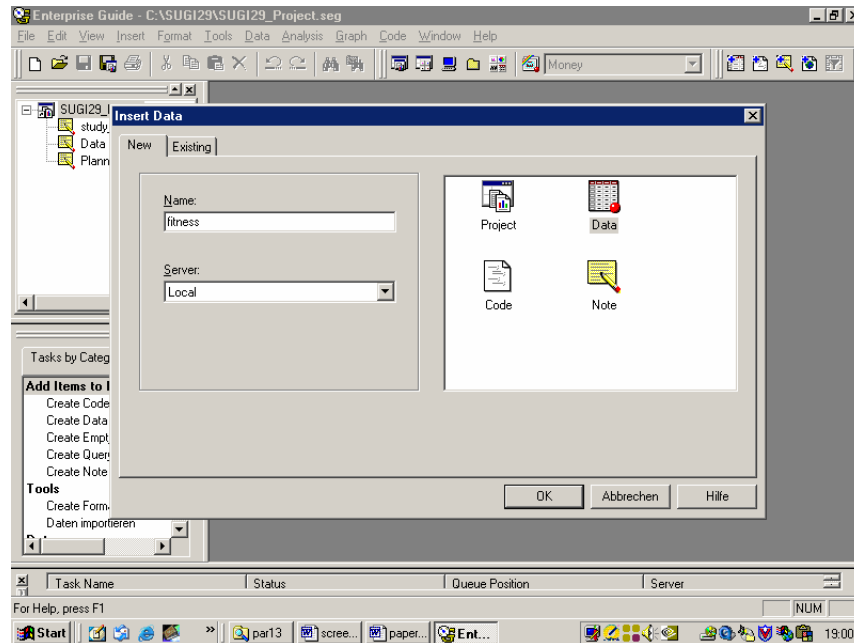
An empty data grid is displayed. Then you have to define the columns according to the information given in *data tables definitions* note.

Figure 8 defining columns

As an example the well known fitness data set is used

Figure 9 portion of the fitness data set

DATA ANALYSIS
Which analyses to perform has to be specified during the planning phase. Figure 10 provides an example of such a statistical consulting protocol note

Figure 10 statistical consulting protocol concerning data analysis

As soon as some data is available you can start creating and running customized tasks. Proceeding in this way must not be understood as an invitation to stop the study if the desired outcome is reached. But this strategy helps to save time. If you have finished data entry you immediately can rerun the tasks by double-clicking the specific node of the project tree and press the finish button or simply right-clicking on the task node and selecting *Rerun this Task*. The project tree is part of the project window (Figure 11). The project window displays the active project and its associated data, code, notes, and results.

Figure 11 The Project Tree
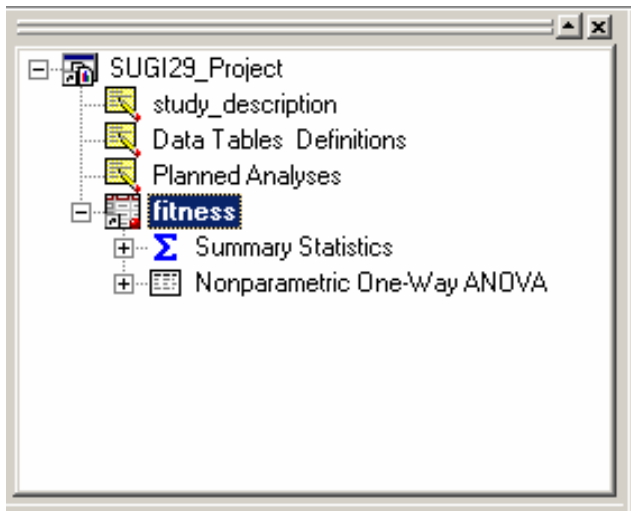
You can choose tasks from the **Data**, **Analysis**, **Graph**, and **Tools** menus in the Enterprise Guide window or use the **Task List**.
A variety of data management (queries) as well as statistical facilities (tasks) is available. Students are recommended to insert notes in order to collect statistical explanations and interpretation of the results. When students have finished data analyses they already should have collected what they need to complete the paper concerning statistics.

Figure 12 note for statistical interpretation
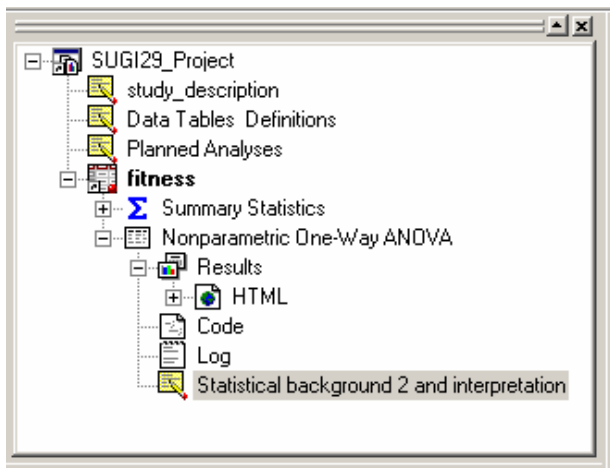
If a specific analysis- or data management task is not available within Enterprise Guide or if it seems easier to create SAS code rather than getting the job done by point and click you can insert SAS code into the project tree and submit the code. Through SAS code you reach of course the whole power of SAS.
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Figure 13 inserting SAS code
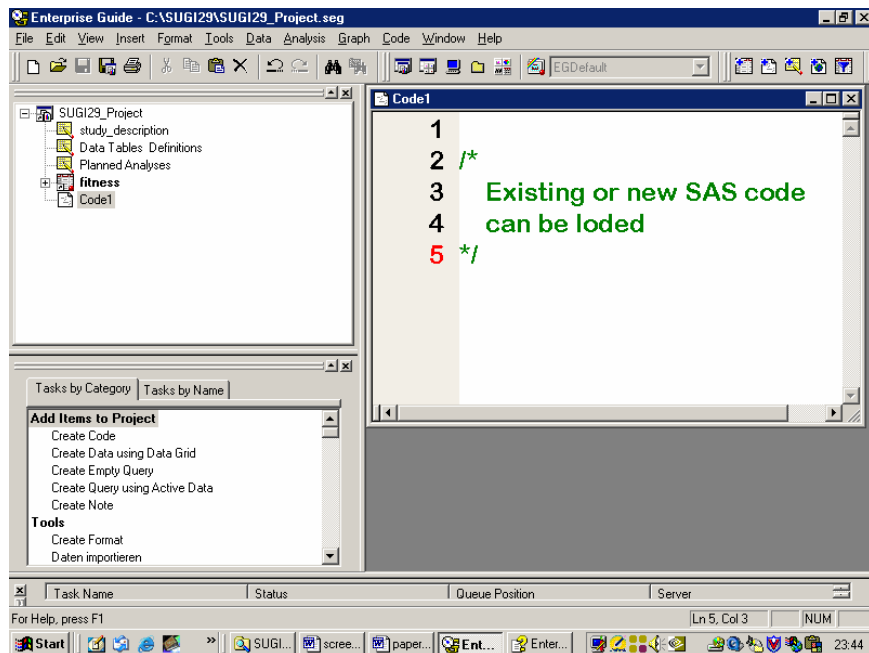
Suppose you have to update your data and have prepared many, many customized tasks. So it is very time consuming and very often frustrating to rerun them one after the other. Enterprise Guide allows you to automate this process by providing the process flow builder (PFB). In case that you want to select only a few tasks for your final analysis the process flow builder also is the right tool.

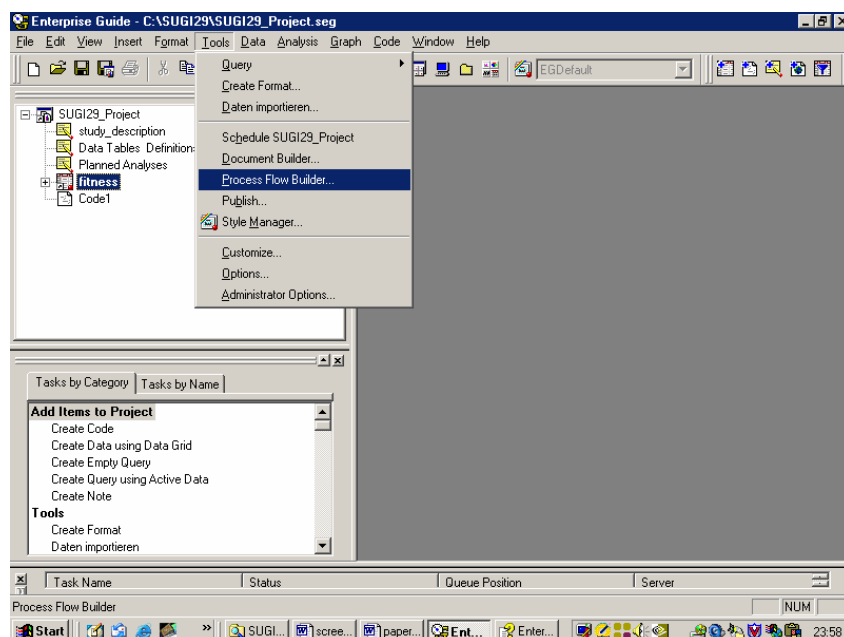**Figure 14 invoking the Process Flow Builder**

Figure 15 example of a process flow
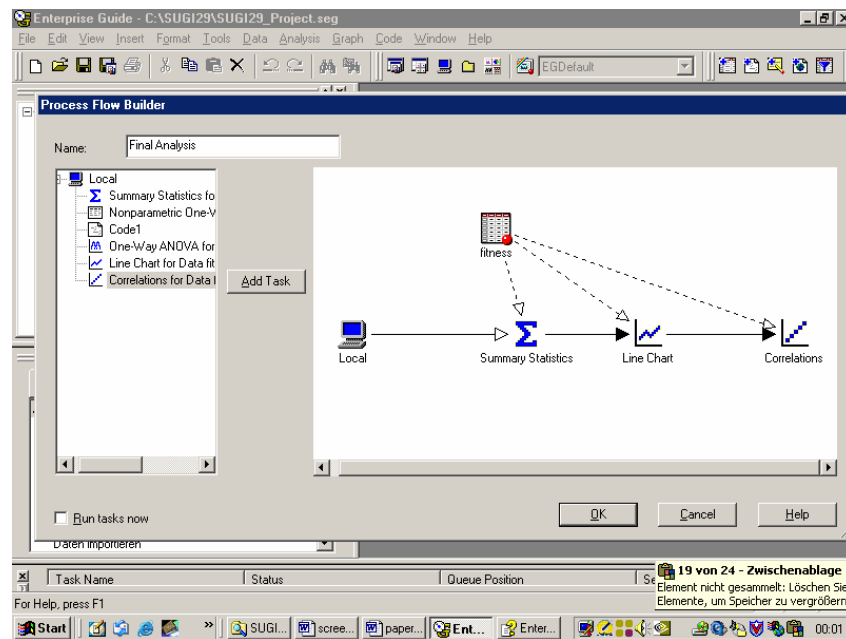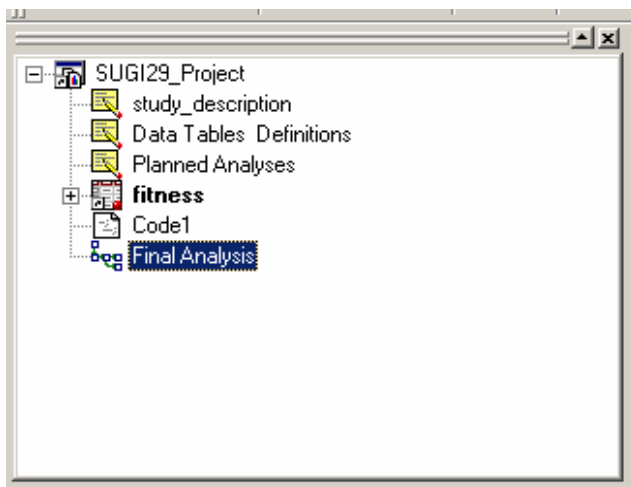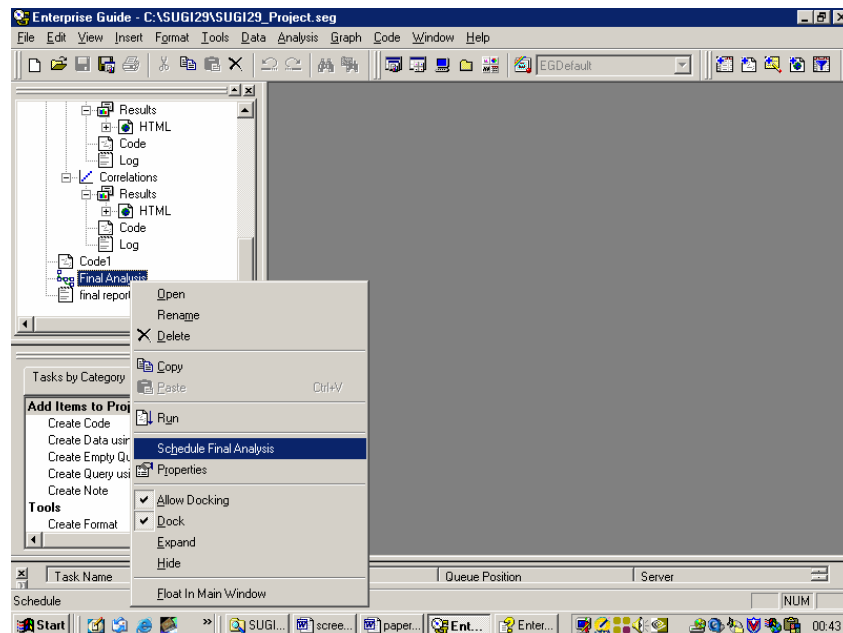

Figure 16 the process flow – available from the Project Tree

The PFB can be scheduled at a regular time. To activate the PFB right-click on the PFB in the project window and select Schedule from the menu that pops up

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Figure 17 schedule the process flow

After you have performed the planned analyses you can create a final report consisting of a selection of all generated output using the document builder. This final document is then sent to the doctor father and the statistician.

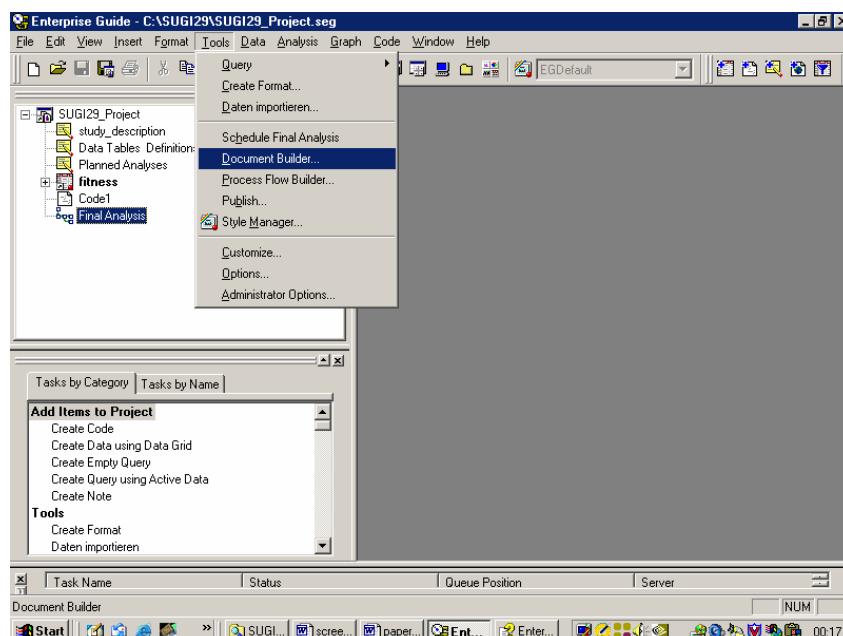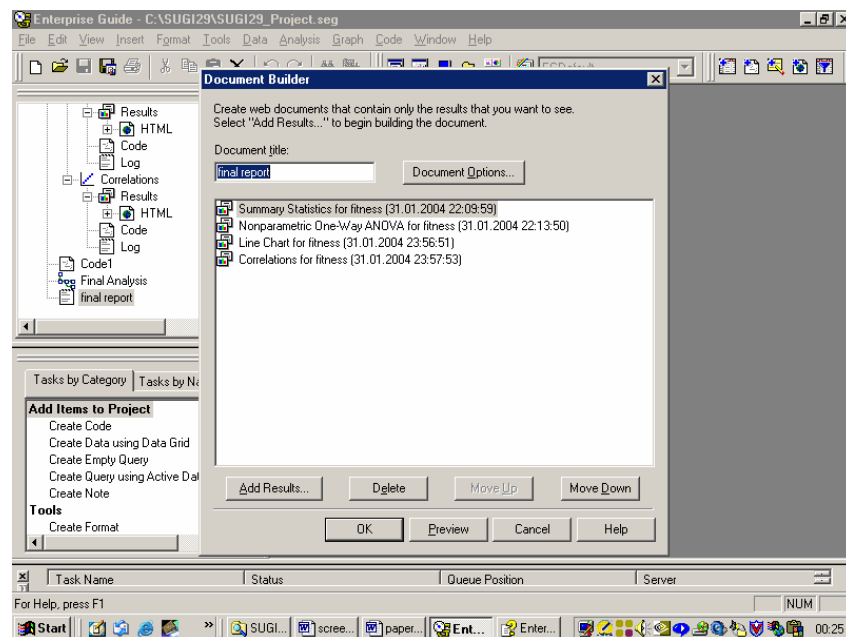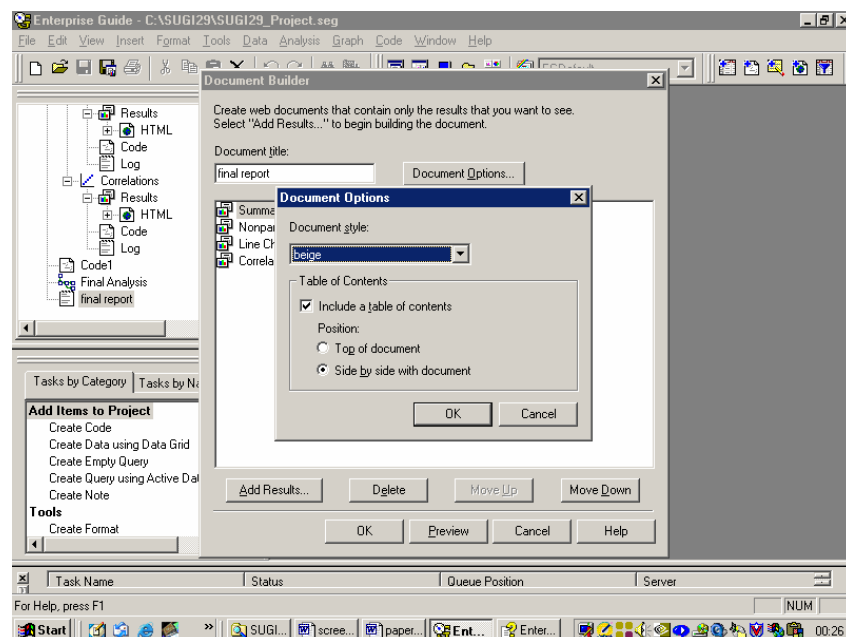**Figure 18 invoking the Document Builder**

Figure 19 selecting output

Figure 20 customize the *final document*

In addition it is possible to create your own task e.g. using visual basics. But this is rather a topic for technically trained users than students in medicine or physicians. For further information see the REFERENCES section.

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CONCLUSION

Enterprise Guide is perfectly designed for collaborations between statisticians and non-statisticians such as medical students or physicians. Projects organize your work, notes can keep track of important statistical information and interpretation of results. Through SAS code all the power of SAS can be reached. The document builder organizes results and the process flow builder and the scheduler automate the analyses.

REFERENCES

Getting Started with Enterprise Guide®, Second Edition

Andy Ravenna (2003),“ SAS® Enterprise Guide® -- Getting the Job Done “,SUGI28 proceedings, Paper 69-28

Catherine Truxillo, Ph.D., Stephen McDaniel, and David McNamara, (2003), “ Advanced Analytics with Enterprise Guide® “,SUGI28 proceedings, Paper 9-28

Joe Carter, Stephen McDaniel, Mike Porter, (2003),“ Developing Custom Analytic Tasks for SAS® Enterprise Guide® “,SUGI28 proceedings, Paper 51-28

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