

Life of a Statistical Programmer A Personal Journey

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ABSTRACT

Can you imagine a life without laptop, internet or mobile?

The past 25 years have revealed tremendous technical developments. How has this influenced our daily work? The changes to our lives are quite obvious when focusing on technical equipment, but what about the parallel ongoing development of our work contents, work conditions, work organization and their impact on the individual? What special demands are requested of a programmer nowadays? What will be expected of us in the future?

Based on some examples I will give a personal view on this development.

Finally, demonstrating that there has been a big shift from the mainly technical-oriented way of programming to the new understanding of underlying scientific questions and the necessity to display key skills like social competences and managing skills by each of us.

INTRODUCTION

Last year at the PhUSE in Basel I met a former colleague of mine. We talked about the "good old" days. This made me realize how different my current work today is in comparison to that of 25 years ago.

There are obvious changes due to the technological development of computer systems, globalization of the pharmaceutical industry etc. But what is the impact of these changes on our lives? How have those of us, who have worked in the industry throughout these times, had to adapt? What are the modified requirements for people starting in the job now?

The overall development and its underlying demands will be presented using examples from my own experience.

WORK OF A PROGRAMMER THEN AND NOW

Using development in technical tools, standardization and specializing as an example I would like to show how our work itself has changed and how this has influenced our way of thinking.

TECHNICAL DEVELOPMENT

When I first started to work in a Biometrics department, SAS® was only running on mainframes. (The first SAS version running on a PC was launched in 1985.) The IBM 3081 we worked on was located in our head office. And as the internet didn't yet exist we had to use an acoustic coupler to connect via telephone line from our local HP3000 to an HP3000 in the company's main computer center. From there we could submit NRJE (Network Remote Job Entry) commands to run our jobs on the IBM.

This meant I wrote a program, walked to our local computer center, dialed a number, put the telephone receiver on the acoustic coupler, went back to my terminal, copied the program via the described connections to the IBM, allocated a log- and an output-file on the IBM and checked several times whether my job was finished. Then I would copy the log-file and if the output-file had filled this as well the same way back. For graphics there was an additional file. Imagine how you felt if you discovered that there was a typo in your program!

While in those days we were only submitting well-thought-out and at least double-checked code, everyone nowadays knows the advantages of trial-and-error programming. But often this is not much faster than spending more time in getting your ideas well structured first. Our daily work was mainly defined by technical requirements. Whereas today it necessitates much more self management and self discipline to organize our work in an efficient way.

STANDARDIZATION

As the biometrics department I first worked in was only founded one year before I joined, everything we did was more or less for the first time. Therefore all study data we received had whatever variable name the person creating it liked. For example, I worked on a number of studies at the same time which had different names for the patient identification ("PATNO", "ID", "PATIENT", "LFDNR"). We realized very soon that we needed to define a set of standard names.

Nowadays we live with a lot of standards: FDA requirements, company internal systems for data storage and reporting, CDISC standards etc.

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The definition of standards originally was triggered by our own needs. We wanted to make life easier for us. We wanted to save time to concentrate on more interesting jobs. Nowadays there is often the impression that we are doing this just to fulfill the requirements of others. We should better remember that the use of standards simplifies our work life.

Our customers sometimes don't see instantly the advantages. They would like to have their individual tables. Sometimes a lot of negotiation and persuasion is required. The picture of a programmer sitting happily in front of a screen without talking to anybody doesn't even work as a joke anymore. Programmers nowadays need to be good communicators and influencers. If we are able to present the advantages in a clearly understandable way, it will be for the benefit of both our customers and ourselves.

SPECIALIZATION

In 1985 I was working on studies for several therapeutic areas and responsible for SAS and SQL training, installation (of PC SAS), support for SAS, BMDP®, SQL etc. Nowadays these bits of work would be split by several people working in different departments. Our work is much more specialized. We know a lot about a part of our project. But still it is worth showing interest in the whole process. If only because it is usually motivating to see the use of our work.

Additionally, if we want to improve our processes and be real partners in the study teams we belong to, we need to know and understand the background of our study.

FOCUS OF OUR WORK

Computer resources were very restricted. Running a single program in PC SAS could easily take up to an hour. Therefore it was important to have some understanding of efficient programming. While in the past, we were concentrating on developing fast programs, we are now putting much more effort into getting the variables in the right shape. And we take care that our programs are maintainable. A lot more time can be saved by writing programs that can easily be adapted for other similar work and shared with other programmers than by using 10% less CPU time. We need (a bit) less technical background knowledge but at the same time we have to acquire a better understanding of the underlying scientific questions to optimize our processes rather than our computing time.

WORK ENVIRONMENT OF A PROGRAMMER THEN AND NOW

Not only has the work itself changed very much but also the environmental components like the structure of our teams. In addition, the background of our colleagues and the external work conditions are different to how they were 25 years ago.

EXP: NAMES AS AN INDICATION OF CHANGE

In 1984 my future employer was looking for a "MaTA (Mathematisch-technischer Assistant " to work in the "Biometrische Abteilung". I am now a SPA (Statistical Programmer & Analyst) in PDBPE (an acronym for the English name of our department, the 2nd "P" stands for programming).

While "MaTA" is a profession linked to a 3-year vocational training, "SPA" is a job description and the people working as programmers usually have very heterogeneous qualifications. Thus the change in name shows the shift from a technical to a more application-oriented emphasis.

The department names indicate further changes, like a stronger specification (nowadays biometrics departments consist of several groups and subgroups), a love for acronyms and abbreviations. And when preparing this talk I realized that I don't know how to properly translate MaTA to English and SPA into German. While we still spoke our mother tongue in the late 80's, nowadays a knowledge of English is essential. In deed some degree of fluency in English is usually mentioned as being required in most job advertisements independent of the companies location.

TEAM STRUCTURE

Our working groups in 1984/5 consisted of a statistician, a programmer, a documentalist, a medical doctor, and on request, a secretary. The study management team responsible for each project nowadays is much bigger and the members are not assigned according to their educational training but to the task they fulfill, e.g. Clinical Trial Monitor, Safety Scientist, Study Data Manager etc.

In the old days the programmers had a homogeneous education (technical assistant or medical documentalist). The background of my current colleagues is in Biology or Economy or Psychology or Biotechnology or Agriculture or....

This shows that our work is more oriented to achieving the scientific goal rather than on the technical achievement.

On the other hand the department structure is more homogeneous. While my boss in 1984 was a statistician, my current boss is a programmer. The statistics group is parallel to the programmers' group. Programmers nowadays show more self-confidence. They don't feel like "assisting" statisticians/scientists but being equal partners in a team with people who have different competences.

GLOBALIZATION

In 1984 I worked for a German company. All of my colleagues were German. Not only the programmers and statisticians who belonged to the same group but also the team members from other departments. And we all had our offices in the same building. Only once within four years I was in touch with colleagues from our English subsidiary.

In times of globalization we are now all in touch with customers and/or colleagues of different nationalities. Most of us need to speak a foreign language. Some because they are not native English speakers. Others because they don't

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live in their home country. And those who can speak their mother-tongue have to use them in another way. They usually have to speak slower, use simpler words etc. This is sometimes referred to as "Pharma"-English. Multinational teams demand not only a common language but also good communication skills and cultural empathy. Understanding is much more than just knowing the meaning of words.

EXTERNAL WORK CONDITIONS

In 1984 we sat in our offices from 7:30 am to 5:30 pm with a 15 minutes break in the morning and a 45 minutes lunch break.

Nowadays we work flexible hours and some of us more or less regularly from home or while traveling.

This has an advantage in terms of flexibility and work-life-balance, but also the disadvantage of being available at "funny times" as well. Especially when you work a lot with colleagues or customers in foreign countries the time-table is set for you and not really flexible. So I guess these are just two sides of the same coin. Additionally, there is the risk of social isolation for those living alone and the burden of role conflict e.g. for mothers working from home. It is much more effort for each individual to ensure that there are clear borders between work and private life.

CONCLUSION / IMPACT ON THE LIFE OF A PROGRAMMER

While in the mid 80's we concentrated on writing elaborated programs taking the data as they were, we now concentrate much more on collecting data in an optimal way to process them in a standardized manner. Thus, the technical and organizational development of our work has helped us to get more work done in less time.

This is leading to an expectation that productivity should continuously increase. Which is often experienced as high pressure by the individuals.

Looking at our work as it is now I don't think we can further increase productivity by optimizing the technical aspects of our work. Instead we might have to change our focus. We are investing most of our time in defining or improving our work processes and our interactions with other functions. As we are one link in the chain we need to concentrate much more on the way we interact with the other colleagues in our study teams. Key behaviours like social skills, managing abilities, stress resilience, flexibility, tolerance etc. have become increasingly important.

Only in transactions with other functions and by improving the interaction with them we will be able to further increase our efficiency.

OUTLOOK / IMPACT ON THE TASK OF A PROGRAMMER

Bellinger et al (2004) describe the evolution from data to information to knowledge on the basis of understanding. Data just exists. It doesn't have any meaning of itself. Only by understanding relations it becomes information and by understanding patterns the knowledge increases.

Accordingly I see the change in computer science from "Electronic Data Processing (EDP)" to "Information Technology (IT)", now reaching the stage of "Knowledge Management".

Thus, not only does the job of the statistical programmers itself require management skills, but the underlying task is also focused on managing information to generate the necessary knowledge.

Examples like Biomarker Analysis and Personalized Healthcare indicate this. We are no longer satisfied by the information that most of the patients receiving drug A live six months longer than most of those getting drug B. We want to understand why some patients respond and others don't. We want to know what combination of medical parameters improve the effectiveness of the treatment.

This needs exchange within a group of different thinking specialists who combine their knowledge towards a common goal: The knowledge about the human system with its instabilities and disorders.

According to the sequence described by Bellinger et al (2004) our future task will be to understand underlying principles to achieve the next step which is wisdom. Our aim will be to make the best use of our knowledge to produce optimum results. Some day we might be able to help not just in the process of developing drugs, but also to identify and activate healthy parts of the body and to prevent diseases.

The technical oriented person and the psychologist in me are looking forward to exciting times and I hope you are as well.

REFERENCES (HEADER 1)

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