

Rethinking Programming Assignments

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ABSTRACT

Programmers working on a project team in the pharmaceutical industry can reside in all regions of the world, often with little or no work hours overlapping. What happens when deadlines are approaching with much work to be done and the production programmer for a data set or display and the QC programmer work in different regions of the world? Often it means working odd and/or long/extra hours so questions can be answered immediately and more back-and-forth production and QC runs can be made at the same time to get your tasks done on time.

But does it have to be this way? Can we re-think this process so people aren't working so many odd/extra hours to get things done? This paper will examine potential fixes, including findings from an experiment trying to see what works and what doesn't.

INTRODUCTION

Most, if not all of us have been on project teams with tight timelines. We've had to work extra hours to meet those deadlines. But sometimes, things seem to go all wrong and it's much worse. Why? It's not always resource shortage that causes these trying times.

Two recent projects I was a part of were the inspiration for this paper. For the earlier one, I was added to the team, replacing someone who left the company. If I had my way, I would have done things differently. The second project, I was oversight on the study, in addition to a project programmer. I got my chance to see if I could improve the efficiency of the assignments, as it was a new project, with no prior assignments.

CAUSES

1. Resource. The most common cause of long, grueling hours on any project is an obviously simple one, resource, or more specifically, the lack of resource. Not enough people to go around. Sure, it would be great to add 1 or 6 more people to the project, but it's often not available.
2. Staff turnover. In the CRO industry in particular, turnover tends to be high. New people on a project, regardless of experience, will take some time to get used to everything at a new company....systems, processes, etc.
3. Programming preferences/expertise. Programmers often have types of tasks they don't like or prefer over another. If people are not assigned to tasks they are better at, then they can lag behind.
4. Inefficient staff assignments. Production in India, QC in U.S.(or vice versa)....need I say more?

DISCUSSION

1. Resource. This is something out of most of our hands and is self-explanatory as to its role in productivity. This will not be discussed here.

2. Staff turnover. Turnover is unfortunately common in the CRO industry, but of course can happen anywhere. It is also out of most of our hands, but the effects can be lessened when a new team member/new hire is added in the discussions for Causes 3 and 4 below.
3. Programming preferences/expertise. Even the most experienced programmers have preferences for their jobs. Some may like creating the data sets/displays, while others may prefer QC. Within the products we produce, there are data sets, tables, listings, and figures. And even among data sets and displays, there are simple tasks and more advanced tasks, up to and including advanced statistical techniques. There might even be other specialized types of outputs such as narratives, publications, and new tools. There are also specs and other metadata to create and QC. Log checking, running P21 reports, and creating define files are other tasks, as well.

Personally, keep me away from lab data set production. 😊 I'm a Subject Matter Expert for creating figures within my company and, by extension, for my only client, so I am usually the production programmer on them, and I enjoy creating them. I really like the challenge of creating something that the tools can do....something that needs some creative programming/research to get done. Most of the rest of programming tasks are somewhere in between for me.

On a side note, my client added some requirements for some types of displays. Any display (mostly tables) that has some level of advanced statistical analysis required is to be produced and QC'd entirely by statisticians. Previously, the advanced statistical analysis code was provided by the statisticians to the programmers creating (and QC-ing) the displays. My two cents on this...it discounts statistical expertise that some programmers may already have, either by schooling/training (I have a B.S. and M.S. in Statistics and was an industry statistician for 12 years) or on-the-job learning and experience. The other side of the coin is that many statisticians are not advanced programmers to create and/or QC these displays. I've already been asked multiple times by a statistician for both programming and production app help.

Regardless, a theory of mine is that programming times would decrease if people worked on the types of programming they prefer or have expertise in, versus just being randomly assigned. Later, an experiment seeing if this could work was put to the test.

4. Inefficient staff assignments. Don't get me started on this. Well, I guess I have to.... Let's see if this rings a bell, especially for those in the CRO world....you finish a project and need work, so they put you on a project already in progress, because someone on the team left the company (or is on leave, etc). So they assign you to that person's tasks. Fine, but you're in the US on the west coast, and that person is in the UK, 7 hours earlier in the day. Or you're on the east coast of US and that person is in India. Um, your day is their night, and vice versa. Unless one or both of you works long or odd hours, there is little overlap in your normal working days. I have found that folks in India occasionally rotate who works into the evening, so there is overlap with US working hours, but that may not be the person working on *your* task.

Unless the study is an easy clone, with little new calculations/derivations and mostly perhaps subgroup analyses, having little to no overlapping hours is very inefficient to get things done. One person will make changes, then the QC person runs QC and sends a list of things still not matching....and this gets done once a day. If no one works odd hours. It can often take many more attempts to get things matching.

Why not have the production programmer and QC person be from the same time zone, if

possible? If starting from scratch, that's easy, but what about when a new person is added to an already-existing team? Just because it seems logical to assign the new person to the tasks of the person who left, it is *not* necessarily logical if the 2 programmers have little to no overlapping hours, and there will be new, untested programming to be done. Consider re-shuffling to similar time zones (or at least half-day crossover, such as east coast US and someone from UK. Or UK and India, which are at least partially overlapping).

'TEST TRIAL' RESULTS

When I got to be oversight programmer for this project, I decided to put both of my theories above (#3 and #4) to a test to see if they'd work. Here's how they went:

PROGRAMMING PREFERENCE

I laid out my theory to the team and while creating the spreadsheet with all of the data set domains and displays to be done, I left the production and QC names blank. These were mostly new tasks, with little cloning available to be used to help with the process. The data set production wasn't a normal kind, using CRF data, but combining past studies into pooled data sets, making sure to rename variables, convert some numeric to character or vice versa, etc., when necessary, as these were not CDISC studies. I said to them, put your names in the spreadsheet for what you would like to work on, production, specifically.

Crickets.

No one, or practically no one, put their name down. It turns out, not entirely surprisingly, that programmers tend to be the type that just want to be told what to do. I think it's a characteristic of programmers (not all, but perhaps a majority) and also for some cultures (there were quite a few in India) to just prefer to be told what to do and we/they are happy to oblige. We would rather potentially struggle on tasks we may not be strong at than to go ask for something preferable.

So even though I gathered a result of this experiment, I deemed it a failure. A failure in assumption, perhaps, but at least it didn't waste much time up front. So I went through the spreadsheet of tasks and assigned people to them....grouping like tasks together....clones, etc. to the same person, of course. And who did I assign for QC on these tasks? That's the next part....

PROGRAMMING ASSIGNMENTS (PRODUCTION AND QC)

From past experience, I have seen programming assignments be done in haphazard ways that leads to inefficiency due to time zone difficulties. Have you heard this one before? Someone leaves the company and the new person assigned to that person's tasks are now from opposite ends of the world as the person opposite them in the spreadsheet. Now, production is in India and QC is in US. Or production is in west coast US and QC is in UK. In both instances, there is little to no overlap in normal business hours. So unless one or both parties alters their schedule, very little can be done in a day to resolve issues. If people have at least a half day overlap, then much back-and-forth can be done to resolve issues....one fixes, the other runs, and on and on for multiple iterations, if necessary, if you both focus on each other's issues during your overlapping hours.

So I made sure, as much as possible, to keep production and QC in the same time zone. 2nd choice, if that's not possible, is to have half-days overlapping. This proved to be a good choice. What wasn't a good choice, that I found out soon enough, was to have only one person (me) doing oversight, as it was entirely due to time zone issues. I worked an entire month, working long hours, trying answer questions for people from all around the world...west coast U.S., east coast U.S., UK, and India. Some of the programmers were very 'green' and I thought I answered questions (via email) proficiently, but they still didn't understand things, so essentially, nothing was done for an entire day. And I spend my entire time answering questions, while I still had my own programming assignments to do that hadn't been started yet. So I pled for help, and one of the programmers from the UK was assigned co-lead with me, so he could do oversight for the India folks, as they had overlapping hours.

This was a godsend for me, as I was finally able to start my programming tasks, as I now had half the oversight issues to deal with and they were in my normal working hours. Needless to say, the new co-lead soon found out the issues I was dealing with (green programmers, communication issues) and he had to work more hours. He understood what I was dealing with. But the newer efficiencies for all led to much better working environments for (almost) all, and the project was completed on time, with high quality.

CONCLUSION

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I got to try out my 2 theories on rethinking programming assignments. One worked and one didn't. Even a different problem arose due to the time zone differences I didn't envision, but that got fixed eventually, as well. Due to the one-off nature of the project, and the fact I haven't been primary on anything since, means I haven't been able to try it again (and I haven't attempted to 'rock the boat' by suggesting changes to the projects I've worked on since). I hope my ideas can help somebody else down the road, even for competitors 😊.

CONTACT INFORMATION

BIOGRAPHY

Scott was a statistician for GlaxoSmithKline for almost 12 years until switching to a full-time programmer role 16 years ago. He has worked at PAREXEL International since March, 2015 and has worked in the Research Triangle Park, NC area since 1994. He has programmed in SAS extensively since 1992 while at a previous pharmaceutical company. He has a B.S. and an M.S. in Statistics from Virginia Tech.

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

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