



Critical Path Learning – How to Develop Top Level SAS Programmers

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CROS NT

CONTRACT RESEARCH ORGANISATION



Agenda

- Introduction
- The need for qualified professionals in the biometric environment
- Training Path
- CROS Academy
- Partnership & Training Integration with Universities
- How to develop top SAS programmers
- Conclusions

Introduction



- In order to train statisticians to become top level SAS programmers, it is important to define the guidelines of a quality training program
- Critical path learning is a method for ensuring the integration of basic concepts, followed by a training path to ensure continual learning of subject matter

Topic of the Presentation

- How to create a Training Path & Training Plan
- How to create a series of training courses and webinars for top statisticians as well as external people?
- How to integrate the training path through a partnership with universities, creating specific courses in Statistical programming

The need for qualified professionals in the biometric environment

EFSPI Career Path for Statisticians in the Pharma Industry

- “More operational functions like Clinical Operations, data management or statistical programming... outsourcing activities going to sites in India or China”
- “In such a situation it will be very important for the statistical community to deal with this changing environment adequately”

Changing Environment

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 Expert SAS programmers, Statisticians, Biostatisticians and Data...

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Please call me on 07889 767 078 for more details
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We will soon be
faced with a lack of
experts in EU
countries

Professional Development Paradigm

- Lack of senior experts with professional skills to manage outsourcing activities going to sites in India or China
- Need of professional development in developing sites like India and



Company Strategic Plan

- Training Path and Training Plan
- CROS ACADEMY
- Partnership & Training Integration with Universities

Training Path

- Under the responsibility of “Training and Development department” to:
 - Set-up training path through company Job Ladder
 - Validate the training path by means of a Pilot Exercise
 - Maintain the Training Path through updates and evaluations

Critical Path Learning

- T&D dept together with Head of Unit (HoU)
 - Identify critical training needs for each new employee
- Part of an on-going process:
 - Creation of a training plan that covers critical needs before starting relative activities
 - Tailor to assigned responsibility within a clinical study

Training Plan

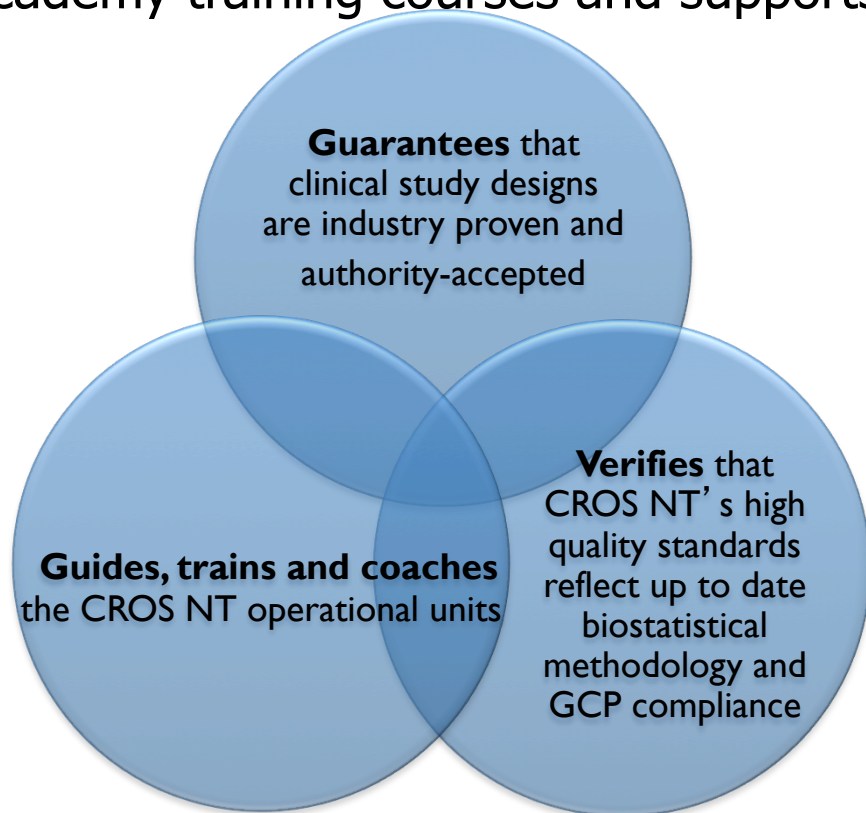
- T&D dept together with HoU
 - Identify yearly training needs by employee
 - Creation of training plan
 - Qualify trainers
 - Evaluate external offerings
 - Assure quality assessment of trainings

CROS ACADEMY

- The idea: to support internal and external training through a proper internal organisation; in particular focusing on:
 - Statistical Methods
 - SAS programming
 - Oracle Clinical
 - Data Management procedures

Statistical Scientific Board

The Board is comprised of biostatisticians and prominent statistical consultants who provide a **think tank** for statistical methodology in clinical research. The Board validates CROS Academy training courses and supports training.



CROS ACADEMY: SAS Programming

Basic Courses

SAS PROGRAMMING 1:

- SAS windows and syntax rules
- Description of datasets and variables' characteristics
- Operations using datasets (DROP/KEEP/RENAME variables, statement for selection)
- Data IMPORT/EXPORT
- IF/THEN/ELSE statement

SAS PROGRAMMING 2:

- Management of datasets (MERGE/SET statement, TRANSPOSE and APPEND procedures)
- Management of variables (operations/functions on numeric and character variables, ARRAY, use and creation of FORMAT/INFORMAT, etc)

SAS PROGRAMMING 3:

- Management of date variables (creations, dates format/informats, operations using dates, etc)
- SAS procedure (MEANS, FREQ, APPEND, etc)

SAS PROGRAMMING 4:

- MACRO language (functions and variables)
- ODS language
- SAS procedure for presentation of results (PRINT, TABULATE, REPORT)
- Good programming practice rules

CROS ACADEMY: Statistical Programming

Basic Courses

Statistics Level 1

- Introduction to basic statistical concepts: Means, SDs, Confidence Intervals, Hypothesis testing;
- Introduction to t-test, ANOVA, Regression and logistic regression

Statistics level 2

- Analysis of variance (ANOVA)/covariance (ANCOVA) with PROC GLM
- Regression (linear, poisson) with PROC REG, PROC GENMOD
- Logistic regression for categorical data analysis

Statistics level 3

- Mixed Model Analysis with PROC MIXED

Statistics level 4

- Survival analysis using Cox proportional hazard model

CROS ACADEMY: Training Configuration

- Training sessions
- Pre-configured exercises
- eLearning

LSJ

L I F E S C I E N C E S L E A R N I N G

eLearning: Example of Design & Technology



LSJ

Certificate of Completion

Course: Oracle RDC OnSite 4.5.3 Demo Course

This certifies that

John Doe

has participated in the e-learning programme and achieved a score of 100%.

Date: 9/4/2010

Signed: _____

Please get this form signed by your immediate line manager. It should then be stored on file thereafter.

Login Page:

Training:

Modular Structure:

Contents:

Practice:

Knowledge Assessment: Tests

**Knowledge Assessment:
Certificate**

The user can print out the certificate of completion of the course as soon as he has successfully completed the assessment.



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Partnership & Training Integration with Universities

- Integration of the training path through University courses by CROS Academy
- Partnership with University to support internal internships

Training Integration with Universities



- University of Bologna: One of the oldest universities in Europe, established in 1088.
- Extensive experience with the use of R and SPSS. In 2009 the college of statistics decided to also invest in SAS.
- Basic concepts of SAS programming and Statistical Programming in a 20-hour accelerated course (2 different Statistical degrees)

Training Integration with Universities

LLSA

- Course description:
 - SAS windows and syntax rules
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 - Operations using datasets (DROP/KEEP/RENAME variables, statement for selection)
 - Data IMPORT/EXPORT
 - IF/THEN/ELSE statement
 - Management of datasets (MERGE/SET statement, TRANSPOSE and APPEND procedures)
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 - SAS procedure (MEANS, FREQ, APPEND, etc)
 - SAS procedure for presentation of results (PRINT, TABULATE, REPORT)

Training Integration with Universities

MMSA

- Course description:
 - SAS windows and syntax rules
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 - SAS procedure (MEANS, FREQ, APPEND, etc)
 - SAS procedure for presentation of results (PRINT, TABULATE, REPORT)
 - Proc GLM, Proc lifetest, proc mixed

University Partnership for Internal Internships

- At the end of the courses groups of 3-4 students are created
- They are requested to perform an analysis on data coming from “dummy” data (banks, insurances, clinical data)
- At the exam, they present the results together with SAS code

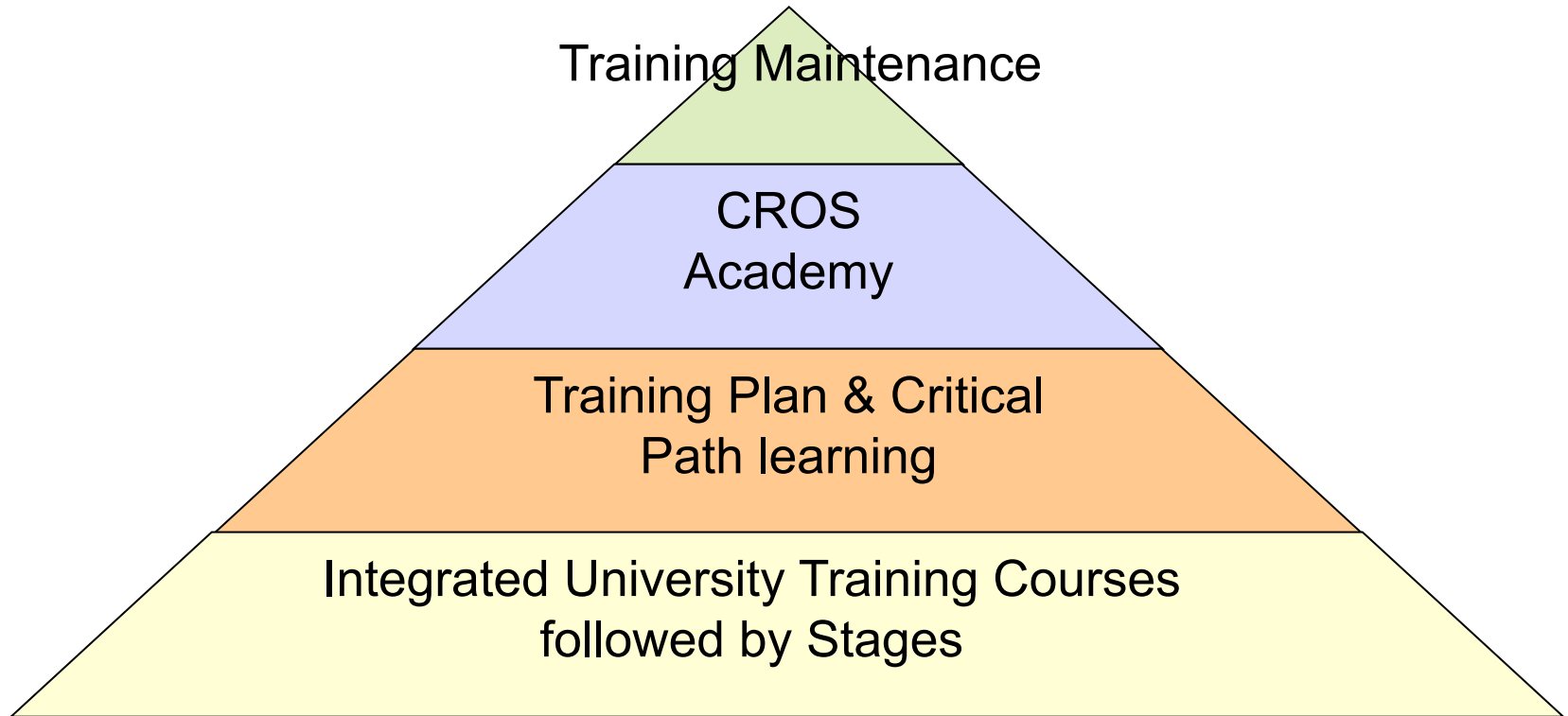
Training Integration with Universities

Feedback from Students

- As part of the Quality assessment of University courses, feedback from students is asked and shared
- In general feedback is positive, excited to be analysing real data using SAS
- Probably 20 hrs are too tight!



How to Develop Top SAS Programmers



Conclusions

- Training is **essential** to successfully perform our daily job
- Organisation of training is **strategic** for Pharma & CROs
- Training path **optimizes** efficiency in learning objectives
- Training packages & eLearning can **improve** and **speed-up** the process
- Collaboration with universities are strategic for **innovation** and training support

Thank you!



Any questions?

