Customer training in Latin America: Experiences and challenges

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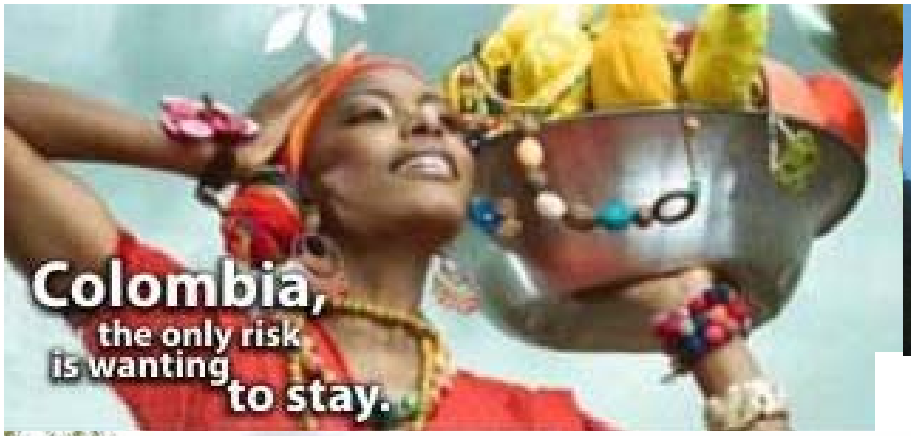
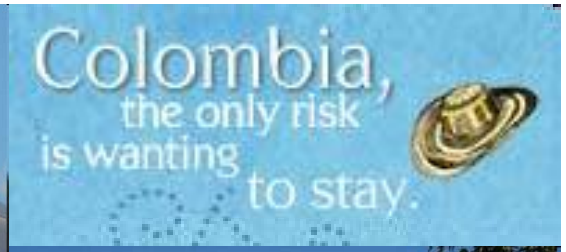
UWO XRF Symposium - 2010

Introducing myself

- Joost Oostra
- Dutch chemical engineer, living in Colombia
- Worked in cement quality control 1990-2005 (lots of XRF)
- Attended UWO XRF course in 2004 (both weeks)
- Working with Thermo-ARL representative since 2006

Welcome to Colombia!





The company I work with

- Symtek S.A.
- Thermo-ARL representative for Central America, Caribbean, and parts of South America
- Also sells Claisse and Herzog
- Based in Bogota, Colombia
- Small company, 20 employees
- 90% of customer base are mineral industries: Cement, iron, aluminium, nickel

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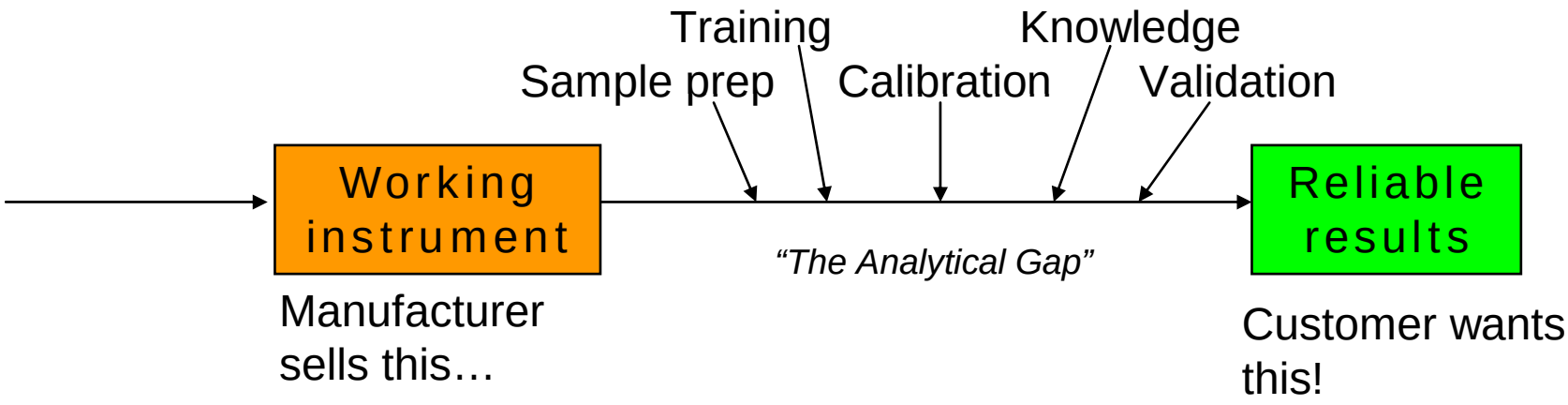
The “analytical gap”

- Many industries lack expertise or time needed to correctly set-up an instrument or method
- They need a “black box” solution, with all knowledge included
- Hovewer, the instrument supplier usually supplies just that – a working instrument
- My job is to fill the gap!



XRF at a typical customer´s lab

- XRF is used for process and quality control
- The spectrometer is a critical instrument, can't stop
- The company's business is selling cement, not analyzing samples. Costs have to be kept at a minimum
- Precision is often more important than accuracy: Plant wants to see trends and changes, more than absolute values
- The workload is 99% routine - Instrument is calibrated once for a narrow range of materials and concentrations, and then the same calibration is used for months or years
- Sample preparation is almost always pressed pellets or fused beads
- Sounds boring... not much chance to use all the nice tricks I learnt at UWO?

Don´t worry – there is plenty of excitement!

- Mixed-up drift corrections
  - Setting-Up Samples wrongly (or not) associated with calibrations
  - SUS get lost, break, or are changed
  - Initial (day zero) intensities of SUS are overwritten
- Sample preparation
  - Sample prep methods copied from elsewhere, but not suitable for the material being analyzed
  - Changes in sample preparation methods, inadvertent or intentional
  - Old equipment: worn-out grinding vessels, bent (or perforated!) fused disk molds; often the user doesn´t know that such things can affect the results
- These two are actually the main causes of wrong results
- However, as soon as the results are wrong (or when they simply do not agree with the plant manager´s expectations), we get a call: Your spectrometer is not working properly!

Your spectrometer is not working properly!?

- So there we go…
  - Check power supply, vacuum, detector gas… OK
  - Check goniometer position… OK
  - Check energy profile… OK
  - Stability test… OK
- And if the instrument is fine (which is most of the time):
  - start helping the customer to improve his sample preparation, set up drift corrections, check the calibrations…

Other common situations

- Industrial environment
  - Dust, temperature changes, no airconditioning
  - Incompatible activities in the spectrometer room (wet chemistry, grinding and sieving…)
- Funny calibrations
  - Discarding a lot of standards until the curve “fits”
  - Randomly applying interelement corrections until one of them gives the best fit
  - Using standards of questionable or untraceable quality

In defense of users!

- The mentioned problems are very common, but:
  - Not because users are stupid – they aren´t
  - Not because it is the third world – many belong to big American and European corporations
- Industrial plants don´t have XRF specialists, nor the money to develop or keep them – it is not their core business
- The lab´s priority is not increasing knowledge, but keeping the plant running
- There frequently *is* a specialist – usually a self-trained, enthusiastic technician or engineer who really understands the spectrometer. Working together with this people is VERY rewarding
- With this kind of specialist, things run very well – until he is promoted or retired. Then, all of a sudden nobody knows the “how and why” of the methods

There are many rewards also!

- From each customer, I learn something:
  - Many labs have good practices or have found nice solutions to specific problems
  - Many get really good XRF results
  - Some have been able to correlate the XRF results with other (non-chemical) quality parameters of their product, reducing the need for other tests
  - In some labs the spectrometer is busy >90% of the time, for 24 hours
- In many cases a distinct improvement can be seen over time:
  - In results precision and accuracy…
  - In lab organization and cleanliness…
  - In sample preparation quality…
- … which shows that, the more people understand what they are doing, the better they do it

Some nice ideas from our customers

Handle for moving heavy grinding vessels

Coiled tube to stabilize the temperature of the detector gas (the gas cylinder is outside the lab)

So what do we do to “educate” XRF users?

- Formal training courses
  - On-site, practical, 3 to 4 days
  - Basic, operator-level
  - XRF theory, sample preparation…
- Method development
  - Sample preparation
  - Standards selection
  - Calibration
- Method validation and control
- Lab diagnostic and evaluation
- That is my job description, from Guatemala to Peru!
- The training I received at UWO in 2004 is a very valuable asset and I use it *every* day

Some things that the UWO course enabled me to do

- Selecting optimal instrument parameters
- Recommending instrument configurations for specific applications
- Recommending sample preparation procedures
- Diagnosing sources of analytical error
- Give the XRF operators a sound theoretical understanding of what the instrument is doing
- Give tips and suggestions (do's and don'ts... and “don't evers!”)

- In short: UWO XRF Short Course strongly recommended for anyone who wants to understand XRF!

Some of the best lessons of UWO 2004

- XRF is a technique which makes it possible to make really spectacular mistakes

  James Willis
- A good analyst is always suspicious of the results

  Andy Duncan
- Good routine analysis is boring. Any sign of excitement should alert you to the fact that something is going wrong

  Tariq Ahmedali

Some questions that haunt me still – and that you might think about

- Are the situations that I describe typical for Latin America, or do they happen in developed countries too? What is the technical level of industrial, routine analysts in other places?
- Is training and teaching really the solution? Or would it be better to supply complete black boxes, including sample preparation, validation and results control?
- Suppose there was a complete “black-box” scheme, like “The customer only puts his routine samples in the instrument, we do all the rest”. Where would the liability for wrong results (or out-of-spec product) end up?

Final comments

- Many thanks to James, Andy, Fernand, and all the others who taught me so much in UWO-2004
- Congratulations to Charlie for keeping the course available year after year
- Any questions, comments and visits are welcome!

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