



L & D News

Learning & Development Newsletter

Building a culture of learning and skill development, one step at a time.

Youth Development Project — Clydach Refinery, South Wales, UK.

By Peter Rees, HR Business Partner, UK

Youth development has been identified as a significant benefit to the Clydach nickel refinery and indeed aligns to Vale's commitment to develop young people across the globe. The Youth Development Project (YDP) was initiated as part of a Human Resources objective to support local business needs as well as aligning to wider Vale HR/Business objectives.

After extensive planning sessions, we identified that we need to start educating young people from an early age about careers in industry. With this in mind, we developed a primary school-field visit program that targeted local schools and provided opportunities for 11 year olds to tour

the Clydach facilities and carry out a basic engineering project with Careers Wales (our business partner on this project), who are part of the Welsh Assembly Government. In June, we piloted the program with three local primary schools, which has resulted in excellent feedback. We want to complete a full evaluation this summer prior to a full launch in the autumn of 2012.

The second initiative within the YDP is to engage older students (15 year olds) and provide one-week work experience within our refinery. This would allow the students to

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Engaging Learners and Audiences with Open-Ended Questions — Part 2: A Case for Effective Facilitation

By Ken Shaw, L & D, Toronto

In Part 1 of this article in our last L & D newsletter, two best practices for training/facilitating were examined and I asked for your thoughts and experiences with closed and open-ended questions.

What came back was feedback from a Human Resources colleague, Sherry Barnes, who had developed and delivered training for PeopleSoft queries. She created the content for the training event herself guided by consulting Corporate Learning & Development for effective design of the course materials and delivery method.

I'm glad Sherry took the time to reflect on both sets of questions in the last article as even her responses — which follow — further illustrate the differences between closed and open-ended questions.

Question set 1 (examples of closed questions):

Can you think of times when you were asked open-ended questions at a meeting or training event?

SB: Yes. I attended a two-day workshop in June which incorporated the use of open-ended questions.

Did it make the meeting or training event more impactful for you?

SB: Yes, definitely. I found that open-ended questions can be used to draw out various responses and viewpoints for just one question, and in turn each response provided by the participants can be used to build and/or brainstorm a solution to a specific situation.

Question set 2 (example of an open question):

Tell me about your experiences — either about your own successes or challenges with open-ended questions, or what you've observed.

SB: I have approximately 12 years of experience with using facilitation skills in computer-based, hands-on, in-class HR systems training. My main agenda for these sessions was to teach participants how to navigate and perform transactional work within different modules of the HR systems. At the end of each session I would hand out a training evaluation form



and gather feedback for the session completed. I was very consistent in receiving positive feedback, which reinforced my ability as a facilitator/trainer.

Just recently (in February 2012) however, I was coached and challenged by a member of the L & D Team to focus on changing my delivery method for this type of training. I found it quite challenging to adopt a new method of facilitation whereby my new role as facilitator was to guide the participants through the session by using open-ended questions. I found I was drawn to asking closed (yes/no) questions and often had to correct myself when preparing for the workshops I would soon hold. I actually had to “learn” how to ask open-ended questions and, believe it or not, it is not an easy task to learn!

The most significant change that was hard for me to adopt was as a facilitator I was no longer “telling” participants how to perform a specific task. Instead my new role was to use open-ended questions to encourage participants to engage in class discussion and learn the material on their own!

I must say, this was a very eye-opening experience and a very valuable one. As humans, we learn and retain knowledge from “doing,” which is the impact from using open-ended questions.

Thank you L & D Team!

For example:

- **What kind of open-ended questions were you asked, or did you ask, at a meeting or training event?**

SB: One that I used a lot was: “Tell me how...”

- **How did it impact the meeting or training event — either for better or worse?**

SB: Asking open-ended questions increased participation and in turn, confirmed that the participants learned the material presented.

- **What have you observed about the questions asked earlier in this article [Question set 1] and the ones I asked above [Question set 2]?**

SB: The questions asked earlier were closed (yes/no) questions that do not leave much room to stimulate the

participant’s thought process. In comparison, the open-ended questions challenge the participant to actually think about the question presented. In doing so, the trainer and/or facilitator initiate responses from multiple participants.

In closing, I’d like to draw everyone’s attention to the most interesting result of open-ended questions and something that Sherry mentioned in one of her responses. One of the targets the Corporate L & D team is striving for when we are designing courses is to set the stage for participation of the learners by providing an “Instructor’s Guide” that has open-ended questions scripted with key phrases to listen for in the resulting responses and discussion.

So please allow me to ask you one more question simply so you can reflect on your own response (it’s about the thing I want to draw your attention to):

What do you think about the fact that, by responding to open-ended questions, Sherry actually wrote most of this article?



Underground Mines Mobile and Stationary Equipment Manuals Project: Thank You to Our Regional L & D Staff and Trainers in Thompson and Sudbury

By Steve Ball and Ken Shaw, L & D, Toronto

With the completion of the project to standardize and update equipment-training materials for the underground mines in the Canadian Operations, credit is due to those who have made this work possible.

Since the beginning of the project in 2011 and, in particular, the first round of reviews for the new training materials for the underground mine equipment, many members of our Learning & Development (L & D) teams in both operations — along with those in production and maintenance who helped in Thompson — provided us

with their insight gained by their extensive knowledge and experience with mine equipment.

To complete this work — which was a major undertaking — these teams spent many dedicated hours reviewing, editing and validating countless manuals that had to be

transformed from being outdated and visually unappealing into professional, colourful and easy-to-read documents. It was a considerable amount of work and the efforts of everyone involved cannot be understated. We are very appreciative of this level of commitment.

We are thankful to the following people who participated in this project:

Thompson

Ben Waldner
Bill Drover
Carl Hall
Darcy Buttar
Dayna Waring
Elmer Sharp
Eugene Farkas
Frank Remic
Garfield Jackson
Garry Legacy
Gary Unreau
Glenn Laycock
Grant Richter
Jeff Lindstrom
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Keith Langan
Kelly Kopeechuk
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Rick Gallant
Rob Murray
Roy Dobchuk
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Shane Estabrooks
Stu Cunningham
Todd Yuskow
Travis Bloomer
Vance Clendenning
Vince Nowlin
Warren Early

Sudbury

Aaron Hutchings
Albert McCallum
Andrew Noob
Boris Martel
Bruce Gervais
Bruce McKee
Camille Chevrier
Carol Walton
Chris Bamberger
Chris Pula
Claude Burns
Claude Daoust
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Dan Stefanczyk
Denis Theriault
Eddy Langlois
Evert De Haan
Frank Clark
Gerard Chaumont
Greg Taylor
Henry Komar
James Oakes
Jason Scott
Joel Belanger
John Whitehead
Joshua Birtch
Kevin Rayner
Lonnie Whiting
Marc Sylvestre
Mario Ceccon
Michel Laurin
Michelle Parent
Mike Lariviere
Norman Lafleur
Paul Boulard
Pierre Labine
Pierre Lefebvre
Randy Pinkos
Richard Gaudet
Roland Mirault
Ron Decaire
Tim O'Connor
Todd Moggy
Tracy Miller

We hope we have recognized everyone involved and, if we missed anyone, please let us know so that we can bring attention to their efforts.

The result of everyone's effort is a set of training materials in formats below.

For each Equipment "Family" / Type (General type of equipment — classified into 27 types):

- Participant "About" workbook;
- PowerPoint presentation;
- Instructor's guide; and
- Quiz (based on the workbook).

For each specific model in the Equipment Family (63 specific models across all "families"):

- "Specific" manual.

Each of these items has been designed in an engaging way with content that is consistent across the operations.

Many have expressed their desire to begin using the new materials as soon as possible, which is a great indication of the pride in the work done.

However, these manuals are part of a bigger picture. In order to ensure that their introduction into the workplace happens in a manner that is not disruptive to the business, other parts of the picture have to be completed first along with a carefully thought out change management plan which will guarantee that nothing has been missed. Progress to the next steps will be constrained by the current economic situation and the consequent availability of funds, though it is a possible that a targeted pilot for implementation could occur this year. It will be worth the wait. Listed below are two of the essential next steps, which are now being worked on or planned to help with this implementation.

1. Development of Standard Curricula Format

These training materials have been redesigned for trainees to learn what the equipment is, what it does and how it is used. There are topics that were traditionally parts of our old manuals that, due to their nature, required constant revision — often the content of these sections could not be updated when needed, due to the number of manuals requiring the changes. These parts are now segregated and will be covered in a standard curriculum document along with the new equipment-training materials. We are now very close to an agreed design for this document and will be developing it further for a planned roll-out in 2013.

2. Train The Trainer

With the redesign of the training materials and the addition of the curricula, there is now a need to re-examine the "TTT" we have used with the previous generation of manuals that were introduced almost 30 years ago. We now have an opportunity to set a new standard for training employees in the operations and helping them learn as much as possible from our L & D instructors — while ensuring the methods and materials are sustainable yet flexible enough to efficiently incorporate the changes and updates that are a necessary part of our business.

Once again, thank you for your efforts in developing the new materials and your patience while the work to ensure they are rolled out in a sustainable and effective manner is being carried out.



The Transfer of Tacit Knowledge in the Workplace: Part 1

By Rodrigo Ribeiro, Production Engineering Department — Federal University of Minas Gerais, Brazil



A few months ago the regional Learning and Development team held a two-day learning workshop in St Johns, Newfoundland. It was a real pleasure to have the company of an invited guest, Rodrigo Ribeiro, to share his insights and research into just how the transfer of the unwritten — and sometimes not even spoken — yet well-known knowledge that comes from experiences occurs in the workplace. Rodrigo is a senior lecturer at the Production Engineering Department of the Federal University of Minas Gerais (UFMG), Brazil and has specialized in how to speed up the transfer of knowledge and technology within and between companies. He conducted his post-graduate research at Cardiff University in South Wales, UK and has been working with Vale at OnçaPuma in Pará, Brazil since 2008, studying the practical application of his research. During his visit to Canada, Rodrigo also spent a day in our Sudbury operations. The following is an interview with Rodrigo about this interesting subject.

L & D News: What is tacit knowledge?

Tacit knowledge is the type of knowledge developed through experience and cannot be verbalized or converted into rules that can be successfully used by novices (people new to the work) in the workplace. Tacit knowledge has been classified into three main categories: somatic, contingent and collective.

Somatic tacit knowledge is acquired through the development and “tuning” of our senses and motor skills within a given culture, work or business environment. For instance, experienced workers know how full or empty a ball mill is by the sound it makes, and experienced hot metal operators can distinguish slag from metal at the tapping hole by seeing the tenuous differences in the shades of colour of the metal where a novice only sees bright yellow. By the same token, sensitive maintenance relies on maintenance professionals being able to identify problems in the equipment by feeling the vibration of motors, listening to different noises and so on, not to mention the wide variety of

different sorts of manual skills you need to fix things. Finally, this concept is also present in nonoperational areas. For example, the “feeling” that comes from a face-to-face meeting with a new client is largely based on sensorial inputs and the “reading” of body language that can only be developed through years of experience.

Contingent tacit knowledge is embedded in the practices of a collectivity, but is in principle amenable to codification (for example, by writing down the rules). The best examples here are taken-for-granted practices and social rules that we learn without realizing that we have learned something. They usually become apparent when we see someone breaking them. For instance, although it is very hard to physically write down and make a list of the many rules we use in order to know the distance to keep from another person in all the different situations where two people come into contact — when running, buying something or getting onto a full train where people are in close contact — it is easy to spot someone doing it wrongly (by being in someone’s

“personal space”). Another example is in regard to posted speed limits on a highway — we all know by experience of ourselves and others that the chances of being stopped for speeding at 5 km or maybe 10 km over the speed limit are very small, though the person who shoots by us when we are already speeding is certainly breaking the “collective rule” we all go by. Try exceeding the speed limit by 10 km in a marked school zone though and this is an entirely different matter — the rule is much more likely to be enforced.

Finally, there is the type of tacit knowledge that we learn by becoming a fully-fledged member of a “form of life” or of a technical culture — the so called **collective tacit knowledge**. This is the basis of our ability to make “correct judgments” in our daily work. For example, to spot a problem requires being able to carry out judgments of similarity/difference. That is, a problem is something different from the usual, yet in order to spot it, a person must have the necessary experience to drawn upon in order to know what to expect — be

it with regard to the outcomes of an industrial process or the numbers in a monthly managerial report. An example is the judgment between what constitutes normal ground noises in an underground mine from those that would be of concern and need urgent attention to ensure the safety of workers. Another example comes from my research: a group of novices were welding an electrode case on the top of the electric furnace when a huge “bang” was heard. They started running in the direction of the stairs while the experienced supervisor did nothing; where the novices listened to an “explosion,” the supervisor had listened to a huge but normal noise that happens from time to time inside the furnace. In other words, the “bang” did no harm, but the running could have led to an accident!

It is clear then that knowledge gained through experience can be classified in different ways. In the next several issues, L & D News will explore Rodrigo’s insights further to show just how this knowledge transfer can be better understood and applied effectively in the workplace.

For additional information on Tacit Knowledge see below.

Note from the L & D Newsletter — Three academic papers bearing on the topic of this interview have been published this year and a third one was published in 2007 in which the possibility of automating the tacit knowledge of a master baker is discussed in detail. The references of these papers can be found below. For more information on Tacit Knowledge please contact Rodrigo Ribeiro (rodrigoriibeiro@ufmg.br)

Ribeiro, R. (2012a). Tacit knowledge management. *Phenomenology and the Cognitive Sciences*. doi:10.1007/s11097-011-9251-x

Ribeiro, R. (2012b). Levels of immersion, tacit knowledge and expertise. *Phenomenology and the Cognitive Sciences*. doi:10.1007/s11097-012-9257-z

Ribeiro, R. (2012). Remarks on explicit knowledge and expertise acquisition. *Phenomenology and the Cognitive Sciences*. doi: 10.1007/s11097-012-9268-9

Ribeiro, R. and Collins, H. (2007). The Bread-making Machine: Tacit Knowledge e Two Types of Action. *Organization Studies* 28(9): 1417-1433.

Youth Development Project — Clydach Refinery, South Wales, UK. (Cont’d from page 1)

experience the world of work and typical roles that we have on site within the Clydach Refinery. Again, the outcome is to educate the students on potential career routes into industry. So far, this is working extremely well and feedback is good.

The third YDP initiative is to provide a three-month work experience for undergraduate students from local universities. We have identified three areas for the pilot program (Laboratory, Engineering and Human

Resources) with the intent to attract the best candidates and provide meaningful work experience throughout the summer, which is coupled to a workplace project.

Lastly, we have recruited three engineering apprentices to work at the Clydach site over a four-year period. The apprenticeships are in Electrical/ Instrumentation and Mechanical Engineering and will help Vale develop its own highly-skilled tradesmen, who are introduced to the values of the

company from day one with a goal to enable them to provide a high return on investment after completing the apprenticeship. This is indicative of Vale’s vision to develop its people and become the best mining company in the world.

At Clydach, we are all very proud of the success of the YDP and how it is creating greater ties with the local educational institutions in a mutually beneficial initiative.

Underground Equipment Training Using Simulators — Underground Mines, Manitoba Operations

By Glenn Laycock, L & D, Manitoba

It is an ongoing goal at Vale to ensure that our employees have the environment, tools and training they need to do their work safely and effectively. With this in mind, Vale's Manitoba Operations is now home to an \$800,000 mining simulator that was purchased by the Northern Manitoba Sector Council as part of a collaboration project between Vale and the Manitoba Provincial Government. It is one of only two simulators of this nature in the province.

In 2011, camera crews filmed the underground environment at the T-3 Mine to ensure the simulated world is as true to life as possible. Trainers have been testing and tweaking the simulations — which have been produced from the filmed images — to ensure trainees experience scenarios that occur on the job and in their work area. The simulator can also simulate situations that are hazardous and rarely occur in the field, such as brake loss and engine fires. The situations are key for training as they can be tested in a controlled environment where the risks to the employee, trainers, equipment and coworkers are diminished. The Learning and Development team is working with the supplier on a pilot program to establish best practices and a study on the economic benefits from this kind of simulation training.

With the transition to mining and milling by 2015, a large number of surface employees will be moving from surface to underground roles, and this equipment will help to provide a safe, efficient, realistic and controlled environment to develop and hone the

initial skills necessary to succeed in a new and unfamiliar workplace.

Similar to a computer, the trainer logs onto the mining simulator using a unique password to begin the training session. As the operator controls the heavy equipment, all aspects of operation are electronically monitored and digitally presented, including adherence to operating and safety procedures and student's economic performance (costs of wear and tear on machinery and efficiency of operation). Exercise results are stored in a comprehensive database for viewing and printing by the instructor. The entire mine operator training exercise is recorded for analysis by the trainer.

These simulators immerse the operator in a highly realistic operating environment within a 3D virtual-training world. Instruments and controls are the same as the actual equipment used in the field. The operation of sub-systems such as engines, braking systems, hydraulics and drilling heads is mathematically modelled to the original manufacturer specifications so as to provide accurate and realistic feedback to the student. Other simulated equipment and vehicles interoperate with the student to test and enhance skill levels. Accurate 3D surround sound reproduction and composite visual effects such as reflections, dust and shadows complete the picture to ensure a high-fidelity training experience.

This interactive learning tool is also capable of simulating heavy equipment from all major manufacturers of underground mining equipment.



Valer Training Centre — Cybermine simulator in action.

Currently the simulator is equipped with two modules: Haulage Truck and Scooptram. We expect to expand our capabilities by adding more simulation modules such as Bolter and Jumbo. Each program costs between \$200,000 and \$300,000. This new technology can help increase skill, while cutting costs on equipment damage and production loss that is associated with training.

Upcoming leadership workshops

Supervisor Rite of Passage:

- October 21–26, 2012
- November 25–30, 2012

Superintendent Foundations of Leadership Program:

- November 6–8, 2012

Manager Rite of Passage:

- November 18–23, 2012

Contribute an Article

Let's all work together to make this newsletter a great success and a great communication medium in years to come. We hope you enjoy reading our newsletters, and if you have any suggestions or comments, please email them to michael.itiniant@vale.com.