



Case Study December 2002

Establishing a Baseline for Training Literacy and Numeracy at Bristol-Myers Squibb

The Education and Learning case studies examine outstanding education and lifelong learning programs and initiatives. This case study addresses workplace literacy.

OVERVIEW

Bristol-Myers Squibb is a pharmaceutical company with both a research and development, and a manufacturing arm. Pharmaceutical research and development is carried out by the company's Pharmaceutical Research Institute in several areas, including the development of medicines to treat cancer, cardiovascular and infectious diseases, neuropsychiatric diseases, and immunological and inflammatory disorders. The Pharmaceutical Research Institute also produces small batches of drugs that are used in clinical trials.

The company employs a wide range of personnel, including research scientists, trades people, and laboratory

technicians (usually known as operators). Research scientists at Bristol-Myers Squibb typically have MAs or PhDs, and their basic skills are at a commensurate level. The basic skill levels of trades people and operators are less predictable. Trades people are generally certified by their regulatory bodies, and operators have some specialized training and experience. But in both cases their

Effective practices case study in providing training and supporting workplace literacy

Name of Program

Basic skills testing and training for operators and non-professional workers involved in pharmaceutical manufacturing

Date Established

2001

Skills Developed

- Literacy and Numeracy
- Leadership
- Communication
- Teamwork

Contact

Paula Ingerman
Training Coordinator,
Clinical Supply Operations
Pharmaceutical Research
Institute
Bristol-Myers Squibb
100 de l'Industrie Blvd.
Candiac, QC J5R 1J1
Tel. (450) 444-6108
Fax (450) 444-4147
paula.ingerman@bms.com

basic pharmaceutical research and manufacturing skills may need upgrading. At its Pharmaceutical Research Institute in Candiac, Québec, Bristol-Myers Squibb recently assessed the skill levels of all employees without a university degree and provided development opportunities to help them address skill gaps.

Pharmaceutical manufacturing is a highly regulated industry. Companies operating in this environment must meet exacting standards relating to Good Manufacturing Practices (GMP) and other requirements set by regulatory bodies in the countries in which they do business. Bristol-Myers Squibb operates worldwide, and must demonstrate to agencies such as the Food and Drug Administration in the United States (U.S. FDA) and Canada's Health Protection Branch that it is carrying out its work in a consistent, reproducible, and confident way, *with qualified personnel*. Like other drug manufacturers, Bristol-Myers Squibb measures its manufacturing processes against the most stringent standards (often those of the U.S. FDA, but not excluding European and Japanese regulations, which also tend to be very stringent) in pharmaceutical manufacture regulation. The United States is also the single largest market for pharmaceuticals, which makes meeting that country's standards even more important to drug manufacturers.

It is fundamental that employees engaged in this manufacturing process need to be able to read, understand and follow written procedures, and perform simple calculations (such as adapting a formula for a cleaning solution for a different sized batch). Being able to write short messages is also important, as is problem-solving. In a drug manufacturing facility, cleaning and maintaining temperature and air quality are especially important. For example, if residues from the manufacturing process are not properly "scrubbed" from the air, they could pose a health risk to workers. Similarly, product contamination could result from cleaning solutions not mixed in the proper proportions, since a solution that is too diluted will not be effective in the manufacturing environment. Stabilizing temperature is also crucial to the safe storage and compounding of chemicals, which requires staff vigilance in monitoring heating instrumentation. Finally, when manufacturing small batches of medicine for drug trials, extra care is required in the preparation of kits (including accurate labeling and complete prescribing information for

doctors and patients), since successful drug trials are key to obtaining the relevant government approvals to take new medicines to new markets.

To be qualified, according to GMP and industry rules, personnel must possess basic literacy and numeracy skills (reading, writing, and mathematics). Bristol-Myers Squibb can rely on the basic skills of research scientists in its Drug Discovery and Process Research, and Development and Analytical/Microbiology groups, given their levels of formal education (most have two post-secondary degrees). In contrast, operators in the manufacturing and facilities maintenance groups have many years of experience in the workplace, but may not have a high school diploma or CEGEP qualification, or may not have participated in formal education for many years. In these groups, basic literacy and numeracy skills are less reliable.

While this does not mean that employees are necessarily performing their jobs without adequate basic skills, it does point to the need for basic literacy and numeracy skills to be adapted and updated as manufacturing processes become more complex and related quality standards become more demanding. This is why it is a necessity to accurately assess workers' skill levels in a safe, non-threatening way and to provide support for developing or refreshing workplace related skills. While the industry does not formally require it, inspectors are routinely sent out to check the competency levels of workers. Actively addressing basic skills challenges is an effective way of maintaining a high-quality process and satisfying inspectors. Bristol-Myers Squibb has taken an active approach to refreshing its employees' skills and documenting their competencies, for examination by visiting inspectors.

THE HISTORY OF WORKPLACE EDUCATION IN BASIC SKILLS AT BRISTOL-MYERS SQUIBB

Bristol-Myers Squibb participates in a training forum, through which the company learned about a provincial training fund available to companies that want to invest in basic skills training for their employees. The training fund derives its revenues from the Québec government's so-called *One Per Cent Law*. This requires companies that fail to spend 1 per cent of profits on training their employees to pay into a common pool.

At the training forum, Bristol-Myers Squibb also learned about the skill-related concerns of companies in the pharmaceutical and biotechnology sector in the province of Québec. While many employees in these sectors have 25 to 30 years of work experience in their fields, they were hired when having a high school diploma was not required, and, while they have been performing their jobs for a long time, changes in the industry often tax their basic skills. Similarly, newer employees who have high school diplomas, may experience challenges applying their basic skills in the workplace. Bristol-Myers Squibb believed that it could help certain employees, who, like so many others working in the industry, faced basic skills challenges.

Step 1: Finding an Industry-specific Diagnostic Test for Basic Skills

Pharmabio Développement is a not-for-profit company that represents businesses, workers, industry associations, and government agencies (such as Emploi-Québec and the Ministère de l'Industrie et du Commerce of the province of Québec) operating in the pharmaceutical and biotechnology sector. Working in close collaboration with the Commission Scolaire de Montréal, the Centre de ressources éducatives et pédagogiques (CREP), and the pharmaceutical industry, Pharmabio had developed a diagnostic test pitched at the Grade10/11 reading level, to assess the basic mathematics and reading comprehension skills of workers in the pharmaceutical sector.

The test had been validated through use with 15- and 16-year-old students, and with adult learners, and its content had been vetted with industry representatives, to ensure that its questions reflected problems requiring the use of literacy and numeracy skills in a real pharmaceutical manufacturing workplace.

Pharmabio proposed that any company wishing to participate be given access to the test at no charge (including an analysis of each candidate's results). In addition, companies whose employees demonstrated areas of weakness on the test would be able to engage the services of a trainer from the Montréal School Board and appropriate training materials (relating to the use of decimals, fractions, proportional reasoning, the metric system, and basic operations), once again, at no charge.

Pharmabio's only condition was that participating companies sign an undertaking with the province of Québec indicating that the results of the test would not be used against employees who took the test (that is, they would not be fired or have their pay cut). Participating companies are, in turn, free to administer the test as they see fit, when they see fit, and with whom they choose.

When Bristol-Myers Squibb (Candiac) agreed to try out the test, Pharmabio met with the company to outline its vision and share experiences it had gained using the test in the food industry. It brought forward factors a company should consider when administering the test and implementing a remedial training program based on the results. Pharmabio encouraged Bristol-Myers Squibb to ask itself some hard questions, such as:

- Who is going to administer the test?
- How is the test going to be administered?
- When, and with which employees, is the test going to be administered?
- Will the test be mandatory for selected employees or categories of employees?
- How many hours will be invested in remedial training, to address gaps in employees' basic skills that are revealed in test results?
- Will management commit to training, once a need to train has been identified?
- What will happen if an employee refuses remedial training when it is offered?

Step 2: Persuading Senior Management to Proceed with Basic Skills Testing and Training

The second step in implementing basic skills workplace education at Bristol-Myers Squibb's Candiac plant involved selling the concept to senior management. Three factors emerged as key to this discussion.

First, testing and training support were free.

Second, the company did not have benchmarks for training workers in basic skills and it lacked a baseline for comparing the impact of training in basic skills from one round of training to the next. Testing operators and non-professional personnel would set the basic skills training baseline at the company. If the impact on workplace productivity of the first set of tests was tracked, the company would have the key data for future return on training investment calculations.

The third factor was the presence of a viable implementation plan, including buy-in from employees and their supervisors.

To establish a solid implementation plan, the training coordinator for Clinical Supply Operations had first to decide who would be tested, who would see the test results, and how the results would be used. In this case, the company decided that any employee who lacked a university degree and whose work had an impact on the manufacture of a drug product would be required to take the basic skills test.

A second decision needed to be made regarding the confidentiality of employee scores. The manager of the Facilities Group, who supervises maintenance personnel and trades people, was concerned that maintenance people not be “picked on,” a legitimate worry for someone who might feel “inadequate,” in the presence of so many university-trained research scientists. To avoid anyone forming negative perceptions of employees based on their test scores, it was decided that only the training coordinator would be privy to test results. The employee’s immediate supervisor and senior management need not know.

The third decision that needed to be made was how to introduce training into the workplace, once testing was complete. The company’s plan was to offer classes to employees who needed to “refresh” their basic skills. Modularized training (not on every topic covered by the test, but only in those areas where an employee exhibited difficulty) would be offered discreetly in the workplace, on company time, to groups of four to six students. Facilities personnel could opt out of certain training, but only if they chose to work in a non-regulated area. This reinforced the point that quality assurance is everybody’s responsibility.

OBJECTIVES

- To enhance employees’ literacy and numeracy skills, relative to workplace tasks
- To establish a baseline for future training

TARGET GROUPS

- Drug manufacturing operators
- Maintenance personnel, including electricians, cleaning staff, etc.

ACTIVITIES

Once Bristol-Myers Squibb had identified target groups for testing and training, and had sorted out a process for preserving the confidentiality of test results, as well as how to put on refresher courses in workplace mathematics and reading comprehension, it needed to engage employees, administer the test, and offer basic skills training.

A brochure outlining the benefits of basic skills training was prepared and an information lunch was held to introduce testing and training. The tests, which were administered in December 2001, took one hour each to complete and were offered in English or French (depending on the language preference of the employee). Results were shared with individual employees, and training commenced in January 2002.

Classes 3.5 hours long were offered once a week, for four to five weeks. They started at 10 a.m. and finished at 2 p.m. In addition to releasing workers during work time for basic skills training, Bristol-Myers Squibb treated participating employees to a free lunch, where they could socialize with each other.

Learners were re-evaluated after one or two classes to determine how much more help they would need to master the material in the training modules. In some cases, training schedules were compressed; in others, additional sessions were held for employees.

POSSIBLE NEXT STEPS

Bristol-Myers Squibb sees a desirable next step as evaluating the impact of basic skills training, even informally. Employees leave documentation trails describing their activities weighing and mixing chemicals, dispensing drugs, and providing sign-offs, when they prepare cleaning solutions to a formula. These could be checked, not only for quality assurance purposes, but also to determine the impact of basic skills training.

Another possible next step might be for Bristol-Myers Squibb to work more closely with post-secondary educational institutions and the government to establish industrial internships. This would be greatly facilitated if the government proves willing to pay interns for the training they receive, as part of their transition to the labour market.

A specialized mini-course derived from the Pharmabio test could also be developed at the community college level to provide basic, industry-specific training for operators and non-professional personnel in the pharmaceutical manufacturing sector. Bristol-Myers Squibb would, of course, need to have Pharmabio's permission, as a prerequisite to using the test as a tool to screen job applicants. It should be noted that the test was not designed for this purpose, nor has it, as yet, been validated in that context.

RESOURCES

From Bristol-Myers Squibb

- Release time for employee-learners
- Lunch for employees, during courses
- Publicity material, and lunch and learn session costs
- Time to train the coordinator, who liaises with employee-learners and their supervisors, as well as the tutor, who is available before and after each training session

From the Provincial Training Fund (through Pharmabio)

- Industry-specific test
- Validation of test
- Costs associated with developing training modules
- Salary for tutor, who would prepare lessons and facilitate classroom sessions, as well as consult one-on-one with learners, address their fears about the course, review their progress periodically, and explain the results of their tests

From the Commission Scolaire de Montréal and the Centre de ressources éducatives et pédagogiques (CREP)

- Expert adult educators

INNOVATION

The most innovative aspects of Bristol-Myers Squibb's workplace education program are the company's policy of offering remedial training only in areas where employees demonstrated gaps in basic skills, its longer term commitment to developing trades people and operators, and its treatment of initial basic skills tests and remediation as a baseline against which to measure the success of future training.

BARRIERS

For Employees

- Not all employees were open to participating in workplace basic skills testing and training.
- It can be difficult for employees to find the time to take refresher courses that are not offered in the workplace; it is hard for employees with families to go home after a day's work, feed the children, and then attend a class.

For Bristol-Myers Squibb

- The company had to overcome the assumption that employees already have the appropriate skills.
- It was difficult to estimate accurately the amount of time needed for individual learners to "get up to speed" in literacy and numeracy areas when they exhibited difficulty in the tests.
- The company had to develop a yardstick to measure ongoing changes in behaviour (using a newly-developed or enhanced skill consistently in the workplace), as opposed to changes in competence, as assessed at a moment in time through a written test.

SOLUTIONS/KEYS TO SUCCESS

Clarity

- The company needed to be clear about why it was testing employees' basic skills.
- It was important to communicate to employees the purpose of taking basic skills tests and how the results would be used, while emphasizing that no one's job would be at risk, on the basis of individual test results.
- The company showed employees a paper, signed by Pharmabio and senior management, including the facilities supervisor at Bristol-Myers Squibb, which guaranteed that no one would lose a job, on the basis of a test score.

Supervisor Education

- The company notified supervisors of class times.
- Management encouraged supervisors to let employees go to training sessions.
- Supervisors were advised not to ask employee-learners to reveal their grades.

Employee Commitment

- At the suggestion of the trainer, make-up classes were scheduled if a class was missed.
- The tutor had to be advised if a class had to be missed.
- Meetings with the tutor were rescheduled if they need to be, and employees had to complete home-work and preparatory work.

Pre-testing

- Employees were set up for success through the use of pre-tests or the option pushing ahead dates for a final test if they were not ready.

Celebrating Results

- The company held a graduation ceremony.
- Graduates received commemorative binders.
- Credit was given for classroom instruction and there was collateral credit in employees' training records.

Following Up on Further Identified Needs

- Second language instruction (French and English) was made available at the operator level, not just at the professional level.
- The company sponsored computing courses, where appropriate.

OUTCOMES

- Twenty employees were tested and received basic skills training.
- Bristol-Myers Squibb has been able to satisfy inspectors from the industry that they have qualified operators and non-professional personnel.

IMPACTS AND BENEFITS

For Employees

- They now demonstrate enhanced workplace performance.
- They found that learning refreshed their memory and knowledge.

- They were able to perform calculations more quickly, more easily, and more accurately.
- They were better able to read, understand, and follow written instructions.
- They experienced greater self-confidence and felt more comfortable in their jobs.
- They were able to apply skills enhanced in the workplace to home situations.

For the Company

- The company has now determined a baseline for future training.
- Management has assurance that staff are comfortably performing tasks associated with their jobs.
- The company gained innovative capacity as employees learned to ask more questions, contribute more ideas, and became more open to process refinements.

USE AS A MODEL

The process used by Bristol-Myers Squibb to implement its basic skills testing and training initiative could quite easily be used as a model by other companies in the pharmaceutical sector. Companies in other sectors might inquire about the availability of other industry-specific tests or explore possible partnerships with government and educational institutions, to develop customized tests for their industry sectors.

Our thanks to the people we interviewed, and others who provided comment, including the following Bristol-Myers Squibb employees:

Roland Champagne
Jean Corriveau
Francine Hotte
Lucille Jacques
Paula Ingerman

About the Education and Learning Case Studies

The Education and Learning case studies examine outstanding education and lifelong learning programs and initiatives. The case studies provide in-depth analysis of the methods used to develop, assess, implement, and deliver education and lifelong learning in schools, colleges, universities, workplaces, and communities. They focus on goals, activities, resource requirements, achievements and outcomes, benefits, innovations, and keys to success and challenges.

This case study is one of a series addressing workplace literacy and basic skills development. The series is part of the *Overcoming Barriers* research project on workplace literacy being undertaken by The Conference Board of Canada and funded by the National Literacy Secretariat, Human Resources Development Canada.

Establishing a Baseline for Training: Literacy and Numeracy at Bristol-Myers Squibb
by *Kurtis Kitagawa*

About The Conference Board of Canada

The Conference Board of Canada is the foremost independent, not-for-profit applied research organization in Canada. We help build leadership capacity for a better Canada by creating and sharing insights on economic trends, public policy issues, and organizational performance. We forge relationships and deliver knowledge through our learning events, networks, research products, and customized information services. Our members include a broad range of Canadian organizations from the public and private sectors. The Conference Board of Canada was formed in 1954, and is affiliated with The Conference Board, Inc. that serves some 3,000 companies in 67 nations.

The Conference Board of Canada
Insights You Can Count On



255 Smyth Road, Ottawa, ON K1H 8M7 Canada
Tel. (613) 526-3280 • Fax (613) 526-4857 • Inquiries 1-866-711-2262

The Conference Board Inc. 845 Third Avenue, New York, N.Y., 10022-6679 U.S.A. Tel. (212) 759-0900 • Fax (212) 980-7014 • www.conference-board.org
The Conference Board Europe Chaussée de La Hulpe 130, Box 11, B-1000 Brussels, Belgium Tel. (32) 2.675 54 05 • Fax (32) 2.675 03 95



©2003 The Conference Board of Canada*
Printed in Canada • All rights reserved • ISSN 0827-1070
ISBN 0-8873-536-9 • Agreement No. 40063028
*Incorporated as AERIC Inc.

For more information about this Case Study,
please contact us at the numbers listed above.
Case Studies summarize the key findings of Conference Board
research and outline the implications for member organizations.