Summary Report

Workplace Literacy and Essential Skills Research Project

The Financial, Strategic, and Intangible Value of Essential Skills Training

A Firm-level Investigation in the Canadian Manufacturing Sector

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Introduction

The Workplace Literacy and Essential Skills Research (WLESR) project was implemented to investigate the impact of essential skills training on business outcomes and return on training investment in the Canadian manufacturing sector. An associated goal was to identify those factors that contribute to effective LES training. In addition to 'effective practices,' it was also hoped that this research might also help identify those barriers that impede the transfer of learning to the job and, ultimately, to the bottom line.

Workplace Literacy and Essential Skills Research (WLESR) was implemented by Excellence in Manufacturing Consortium (EMC) through its Canadian Manufacturing Network with funding contributions from the Office of Literacy and Essential Skills (OLES) program, Employment and Social Development Canada (ESDC). To execute WLESR, EMC-Canadian Manufacturing Network partnered with Dr. Lynette Gillis and Allan Bailey of the Centre for Learning Impact (CFLI), a training evaluation company based in Mississauga, Ontario. EMC-Canadian Manufacturing Network employed CFLI'sHigh Impact Evaluation™ model and toolsets to design, implement, analyze and report with case studies and best practices outcomes.

This report examines ten Literacy and Essential Skills training programs. It highlights some of the effective practices as well as those situations and barriers that can derail even the best training. Taken together, these studies illustrate how organizations adopt strategies to improve performance, business results, or strategy.

This report demonstrates that, in order to deliver meaningful value, learning must evolve directly and organically from the organization's key mission objectives and business priorities. It should be designed, structured, and delivered to the right audience, at the right time, and with full consideration for the workplace barriers that often impede the transfer of learning into the desired performance improvement.

Methodology

Goal 1: Investigate the impact of LES training interventions on monetary outcomes and return on investment for manufacturing businesses. The WLESR study conducted ROI evaluation analysis in 10 manufacturing firms where an LES program was being, or had been implemented. Test sites were chosen, as much as was practicable, to provide variation in industry sector, region, firm size, learner characteristics, English and French, and training culture. The research examined and quantified the cost of training as well as the monetary outcomes (business results and ROI).

Goal 2: Investigate the factors that contribute to effective LES training and positive return on investment for manufacturing businesses—"what works." While conducting the ROI studies (Goal 1), WLESR employed the "Effective Practices Audit" to 'drill down' and examine the effectiveness of training design and implementation practices. The objective is to identify those practices that most highly correlate with positive monetary outcomes and return on investment. Previous research findings suggested that factors that tend to contribute to, or impede training's impact at the firm level include: training alignment to business goals, audience targeting, instructional quality, manager/supervisor support, and time available or opportunity for participants to apply learning.

Overview of Study

Workplace Literacy and Essential Skills ROI Background

The Workplace Literacy and Essential Skills Research project is animated by two fundamental and worrisome realities: first, the growing importance of Literacy and Essential Skills to the Canadian economy, and second, pronounced underinvestment by Canadian employers in LES training.

Over the past decade numerous studies have shown that higher levels of Essential Skills in the national workforce are critical if Canada is to compete in the increasingly complex and competitive global marketplace. Rapid changes in technology and software lead to ever more sophisticated skills requirements by employers. However, although Canadians as a whole have a comparatively high level of education, nearly half of the working population (42%) do not have an adequate level of essential skills to participate in the knowledge-based economy. (Goldenberg 2006)
In spite of this, Canadian employers play almost no role in essential skills and literacy training. In the assessment of the Conference Board of Canada: "basic training skills continue to sit at the bottom of the training priorities, accounting for only 2.2% of training investments (by employers) in 2004." (Conference Board 2005)

Why is this so? A possible answer to this question is lack of evidence. What evidence exists to convince employers that investing precious resources on essential skills enrichment is worthwhile? When an organization spends a dollar on LES training; that is one dollar unavailable to other pressing needs—capital equipment, marketing, etc. Until recently, however, there has been little reliable research evidence showing employers concrete examples of how investing in LES training actually improves business outcomes or return on investment.

There has been high-level, econometric research showing LES training benefits to the economy. Over the past decade, for example, encouraging evidence has come to light suggesting the economic value of increased LES investment on the national or regional level. According to Statistics Canada, for instance, just a 1% increase in average literacy rates would yield a 1.5%, or $18 billion, permanent increase in the GDP and a 2.5% increase in productivity. (Coulombe 2004)

At the firm level, econometric research also confirms the positive value in investing in employee LES skills. A 2014 research study by the Social Research and Demonstration Corporation (SRDC) involving more than a hundred companies and 1,400 employees demonstrated an average of 23% ROI for food industry organizations that invested in 40 hours of LES training per employee. The key impacts of the training were increased productivity, quality, customer satisfaction and employee retention. (Gyarmati 2014)

These large scale econometric studies offer solid and reassuring evidence for policy makers of the importance of investing in training. For employers and business proprietors, however, such evidence might be viewed as somewhat esoteric—based on large datasets and perhaps not necessarily germane to their business or industry. They offer little specific, firm-level examples of exactly how training enhances employee skills and capability. Or, for that matter, how improvement in employee capability translates into improved job performance and bottom line results.

Workplace Literacy and Essential Skills Research (WLESR)

The WLESR project was launched in part to provide employers a more granular, concrete picture of the business impact of enhancing LES skills. Rather than a statistics-driven analysis of large datasets of employers and employees, the WLESR study takes a closer look at the direct impact of essential skills training on employee skills, job performance, business results and return on investment in ten Canadian manufacturing organizations. A previous Canadian study, *Investing in People®*, had demonstrated that investing in general workplace learning can indeed drive very attractive returns to the

organization. (Gillis 2010). A goal of the WLESR project was to similarly determine, using a standard, systematic methodology, whether or not investing in essential skills training can help employers improve or 'move the needle.'

The research looked at a panel of 10 training programs from 9 manufacturing organizations across Canada that agreed to participate in the study. Participating companies agreed to collaborate with WLESR project team to survey training participants and gain access to relevant financial performance data.

If ROI was successfully demonstrated, this evidence would help make the business case for investment in LES training and hopefully encourage greater LES investment by employers.

Another key objective of the study was to try to identify those training practices that can do the most to help organizations ensure their learning investments drive business results. It was recognized from the onset that not all programs would succeed; some would achieve positive ROI and others would not. But rather than focussing only on the successful manufacturing firms and their training strategies, the WLESR study adopted a more diagnostic approach—one that would closely examine both 'successful' and 'unsuccessful' training practices to discover what works and what doesn't.

The intention here was to closely examine all training programs to uncover effective practices that can help training drive business impact—learning enablers. At the same time, it was reasoned that this diagnostic approach would expose those unsuccessful practices, or barriers, that so often prevent training from impacting business results.

The study employed the Gillis and Bailey High Impact Evaluation™ methodology (see Appendix A) to examine the key impact questions:

How successfully did the training program develop new capabilities (learning and intentionality) in participants?
How effectively were the new capabilities transferred to the job and improve job performance?
To what extent did improved job performance impact business results and return on investment?
Which practices 'enabled' success and which practices were 'barriers' to success?

Study Profile

In total, 10 case studies were conducted with manufacturers of all sizes, from a few dozen employees to 1700 employees. Industries involved in the study included textiles and materials, plastics, aerospace, wood manufacturing, precision machining, building structures and products. Participating organizations were selected by the appropriateness of their LES training, that is, how closely it is aligned to business goals.

Training participants were asked to complete a questionnaire at the end of training (Capability questionnaire) to assess participants' learning and their intentions to use the new knowledge and skills back on the job. A few months after the training, a second questionnaire (Transfer questionnaire) was sent to participants and their managers to evaluate the extent to which the training had impacted job performance.

Finally, a few months later, the evaluation team consulted with the key stakeholders in each company to determine if the training had impacted the desired business metrics and by how much. Organizations provided the financial data to allow researchers to determine the monetary value of the improvement as well as the total cost of the training program's development and delivery. These values were used to calculate the improvement in business outcomes as a result of the training (after factoring out other externalities).

The evaluation process also sought to identify intangible/non-financial benefits from the training. Although business outcomes and return on investment provide a more solid basis for evaluating the success of training programs, intangible outcomes such as improved employee engagement, workplace safety, and teamwork can often provide greater and more lasting value than immediate financial returns.

Finally, the return on investment was determined by comparing the training's financial benefits to its costs. The ROI methodology follows the widely-used model developed by Dr. Jack Phillips (Phillips 2003).

Essential Skills Targeted

The ten training programs targeted one or more of nine essential skills categories:

- Reading Text
- Document Use
- Numeracy
- Writing
- Oral Communications
- Working with Others
- Continuous Learning
- Thinking Skills
- Computer Use

The most commonly targeted essential skills in the ten training programs evaluated in the WLESR project were *Thinking Skills* and *Document Use*. Perhaps not surprisingly, given the manufacturing focus of the study, problem-solving was the most frequently targeted essential skill in all training programs—targeted in seven of the ten programs. (Problem-solving is one of the subcategories of Thinking Skills.)

Lessons Learned

Although a key objective of the WLESR study is to determine if investing in essential skills training can impact the bottom line, specifically, the goal is to ascertain if such investment will yield a positive return on the investment. Based on results from recent large-scale econometric research noted earlier (Gyarmati 2014) (OECD 2003), WLESR project team anticipated the likelihood that some of the essential skills training would indeed deliver positive ROI.

The overarching goal of conducting this research is, of course, to encourage employers and business proprietors to invest in essential skills training. By showing concrete examples of organizations that have improved financial results as a consequence of enhanced workforce LES, it is hoped that more organizations will be motivated to make similar investment decisions.

While evidence of positive ROI is a logical and persuasive motivator for businesses, there are other critical links in the organization's learning value chain. ROI is just one important link. The WLESR studies clearly demonstrates that there are other very significant, intangible benefits from investing in LES training. From the outset, this study was expressly designed to examine each level of the value chain—not just the financial benefits. It was designed to identify, measure, and evaluate those other important, intangible 'wins'—which, in many instances could be equally, if not more important to the to the organization's long term success.

The WLESR study was able to conduct this more in depth examination as a result of a new type of learning evaluation methodology, the Gillis-Bailey High Impact Evaluation (HIE) model. The HIE model is useful because it includes new tools and instruments that lets us close examine each link in the value chain to see if the training has enhanced employee capability, improved job performance, and impacted business outcomes. Finally, the HIE's Effective Practices Audit tool allows us to create a 'forensic' trail indicating what is working and what is not.

ROI Outcomes

Of the ten programs evaluated, five achieved positive ROI. The ROI outcomes ranged from 17% to 424%. Of the programs that achieved positive ROI, four were problem-solving training or LES Thinking skills. Importantly, the success of the problem-solving training owed much to the fact that the training was effectively transferred to the workplace. That is, in those successful programs participants were encouraged to think within the context of the organization and identify existing problems or challenges.

The study revealed that when participants are not provided with immediate opportunities to apply newly-acquires problem solving skills, the training can fail and no measureable improvement ensues. This situation occurred in the Advanced Precision case study. Ultimately, this failure had a positive outcome. The experience encouraged the organization to adopt more effective practices including ensuring that training is always conducted in the context of the workplace. The company reports that the past failure has led to improved training practices and very successful training and business outcomes.

It should be noted that the program that achieved the highest ROI, 424%, (BCT Structures) was not solely an essential skills training program. The program taught numeracy as part of a plumbing skills training program. While numeracy is an important component of the plumber's 'toolkit', it was not possible in this study to attribute any portion of the training program's high ROI outcomes to the numeracy portion. Nevertheless, these results serve as a useful reminder that it is not at all uncommon to observe robust ROI outcomes from training investments.

Business Outcomes

The types of business outcome improvements identified in the WLESR study included improved productivity, and cost savings/cost avoidance.

In the improved productivity outcomes (Allsco Windows and Doors and Argus Industries), the introduction of problem-solving to production teams substantially impacted the production process. It gave teams new insights and skills to examine existing processes and identify opportunities for improvement. In the Allsco case, for example, the Window & Doors assembly workers used root cause analysis to rethink the entire assembly process, eventually reducing the assembly time by 3.2%—a $31,000 annual savings to Alsco.

The introduction of problem solving skills also helped some organizations identify and mitigate chronic problem areas that are sources of unnecessary expense or waste (Canplas and MW Canada). As a result of enhanced technical knowledge and problem-solving skills training, textile production workers were able to reduce the frequency of costly loom shutdowns from five incidents to two per year—this will save MW Canada $20,400 per year in reduced production downtime.

Strategic Outcomes

Another insight from the WLESR study is the amplification of the notion of 'Strategic' outcomes. In the HIE model, Strategic outcomes are those outcomes that do not necessarily lead to monetary benefits to the organization but, nevertheless, are critical to the organization's core values, mandate, mission statement, etc. In other words, its *la raison d'être*. In evaluating success of these high-level goals, ROI may not be the most appropriate measure—or even a meaningful metric—with which to evaluate the success of strategic initiatives.

The Boeing Incident and Injury Free (IIF) training program, for example, sought to meet an enterprise-wide mission to reduce all injuries and work-related illness to zero ('Go for Zero'). The essential objective is to create a workplace where all employees go home each day in as good or better health than when they arrived.

Clearly, in such a large enterprise this is a long-term, and possibly unattainable objective. It should also be clear that such global and rigorous safety objectives must be expensive to achieve. Consequently, it is uncertain that the resulting reduced incident and insurance costs would necessarily equal the high cost of the training program. In short, Strategic outcomes are not necessarily pursued for monetary advantage. Rather, it is a commitment by the organization to the ethic of an injury-free workplace.

Although the study was unable to evaluate the ultimate success of the program (which might take years to materialize), it was possible to gauge the likely success of strategic objective in terms of a leading indicator—near-miss incident reporting. In the six months following training, the volume of near-miss incident reporting was up 20% over the previous year. This is not ultimate proof that Boeing will meet its strategic goal ('Go for Zero'), but it is a credible sign that the training has put the organization firmly on the path to ultimate success.

Intangible Outcomes

The WLESR research investigations also sought to identify other intangible benefits from the training that were important but not necessarily strategic. In the studies, 'intangible' refers to those benefits that for one reason or another are too difficult to translate into monetary value. Common intangible benefits might include, enhanced employee engagement, customer satisfaction; reduced workplace stress, etc.

It is important to recognize that although intangible outcomes are not quantified in dollar value, they can be as significant, if not more significant than the more measureable outcomes such as increased output or cost savings. The studies took every effort, therefore, to identify, and assess training's impact on key intangible outcomes. Intangibles were assessed by surveying participant and manager perceptions.

In the WLESR studies, two of the most commonly observed (and arguably most interconnected) intangibles were improved **'product quality'** and enhanced **'customer satisfaction'**. Product quality was identified as an intangible in six of the ten program outcomes. Importantly, five of those programs were problem-solving.

In these cases, too, the intangible benefits of improved product quality may well be more meaningful and ultimately even more valuable to the organization than the training program's immediate financial outcomes. In a final accounting, the intangible benefits might actually be shown to outweigh the measured financial outcomes. In the highly competitive manufacturing sector, few would question the primacy of product quality and its critical connection to customer satisfaction. And, as in most industries, customer satisfaction is the beating heart of business success—no doubt, even survival.

Another frequently reported intangible is **employee engagement**. Several studies note that this too, while not easily converted to dollars and cents, is an important metric that can have critical implications for the workplace dynamic. In problem solving training, for example, production workers were given the tools to better organize their reasoning, analyze complex situations, draw fact-based conclusions, and present and discuss those conclusions in a logical manner. If such skills are encouraged and nurtured, the on-going benefits to the organization are incalculable. It's a gift that keeps on giving. Most would agree that employees so empowered, engaged, and self-confidant would give back to the organization unseen benefits in many ways—taking more initiative and responsibility, becoming better team players, and handling debate and disagreement in a more logical, professional manner. And ultimately, such enhanced employee engagement may contribute to reduced employee turnover.

"The impact is not always easy to measure in terms of dollar-savings or gains. But it is easy to see that it's helping to keep our employees more involved with a positive attitude, so it has a positive impact on things like less turnover and good work environment which is always a good thing for any company." **Manager's comment**
"Employees are making fewer mistakes because they now recognize the key info on their paperwork. They are more active and involved. They don't always wait for the supervisor to tell them what to do." **Supervisor's comment**

But these intangible benefits to the organization are not the end of the story. Several of the WLESR studies revealed how poignantly important literacy and essential skills training programs can be to the employees themselves. Enhancing employee reasoning and communications skills can have a profound and lasting impact on the individual's life beyond the workplace.

In one study, Allsco, several participants reported intensely personal impacts on their family life.
"This program helped me with my home life. I am dealing with a difficult child at home and feel I am more informed, patient, and understanding in how to deal with the problem."

Another participant commented on the difference LES training had on his own emotional deportment.
"I'm calmer, cooler, and not so fast to be bummed out when things go wrong."

WLESR – Recommendations from participating companies

As part of WLESR project, a final workshop was organized with WLESR participating companies and project partners on March 26, 2015 in Toronto, Ontario. The goals of the final workshop were to bring manufacturers together for a detailed review of all case studies and to capture discussions on industry recommendations regarding the following key WLESR questions:

- Essential skills are rarely considered a priority, why don't employers invest more in literacy and essential skills (LES) activities?
- What is the relationship between literacy and essential skills and business impact?
- What are the effective ways/models to engage employers, particularly small and medium sized firms?

WLESR Industry Recommendations include:

On LES investments: Cost, time and productivity losses (i.e. releasing production employees for LES training) are the main barriers for employers to invest more in literacy and essentials skills activities.

- Streamlined and practical needs assessment tools are recommended - both for the manufacturing sector and for individuals companies. Employers need to better understand their skill gaps before they start investing;
- Continue promotion on benefit, value and direct pay back, including tangibles and intangibles. The notion of Essential Skills is creating confusion with the employers and a feeling of "not knowing where to start". Using "Productivity Skills" is recommended both for promoting training investments with employers and getting buy-in with employees; and
- Continue efforts are recommended to collect and disseminate Business Impact/ROI results, both on an industry-wide basis and by encouraging individuals companies to use the tool developed for this purpose.

On the relationship between LES and business impact: Main employers' drivers to establish a relationship between LES and creating business impact are: better understanding of manufacturing processes and process improvement methods, internal problem-solving capacity, effective communication in the workplace, working in teams and customer services principles.

- Determining the business objective is a critical step to confirm if essential skills can improve a situation and, among the most successful practices noted, buy-in from management to apply these essential skills with action-based learning projects (working in teams on real-work problems or opportunities) is a critically important practice to ensure LES training is effectively transferred from the training to the job; and
- Establishing a direct link with more workforce flexibility and the opportunity to enhance skill set diversity (commonly called cross-training) to generate business impact in the workplaces.

On effective ways/models to engage employers: In order to ensure that employer engagement progress continues, ongoing emphasis on providing hard evidences on the benefits of LES training is required**.**

- Engaging small and medium sized firms and regional considerations: Cluster approaches are recommended to create LES manufacturing regional groups where companies can pool their resources, needs and employees for creating LES training groups. The example and success of Nova Scotia was noted;
- Promoting funding opportunities for LES training. With WLESR participating companies from across Canada, we learned that provincial financing programs are available for employers in most Canadian regions. Opportunities to continue to expand are possible in this area with the Canada Job Grant as well as current social finance initiatives and with the interest to design a Pay for Performance (PFP) model, based on results of LES training initiatives; and
- Sharing WLESR findings with manufacturers and sectorial groups as a way to integrate LES training into Canada's workplace culture, supporting innovation within industry and enabling continuous learning in the face of change. Networking opportunities were discussed amongst WLESR companies and project partners to facilitate knowledge-sharing with other manufacturers and groups.

Outcomes Overview: Workplace Literacy Essential Skills Research Project

Table 1: WLESR Study Overview

Participating Organizations	Essential Skills Addressed	Type of Training	Business Results (1st Year Only)	ROI	Intangible Outcomes
Advanced Precision Dartmouth Nova Scotia (Precision machining)	Thinking Skills (Problem solving)	Process Improvement Through Problem Solving	None Measured	Not Calculated	↑ Established Quality Culture (**Note:** Initial training did not succeed, but triggered adoption of new Process Management System company-wide.)
Allsco Windows & Doors Moncton, New Brunswick (Window & door production)	Document Use Thinking Skills (Problem solving)	Opening Doors to Workplace Learning	**$31,206** Improved Productivity	**68%**	↑ Product Quality ↑ Problem-solving Skills ↑ Employee Engagement
Argus Industries Winnipeg, Manitoba (Rubber injection molding)	Thinking skills (Problem solving)	Problem Solving Skills Training	**$16,120** Improved Productivity	**33%**	↑ Production Quality ↑ Customer Satisfaction ↑ Quality Focused Culture
BCT Structures Lethbridge, Alberta (Modular structures)	Numeracy	Plumber's Training Program	**$46,080** Cost Avoidance	**424%**	↓ Labour Shortages ↑ Workforce Skills Diversity ↑ Employee ROI (↑Wages)
Boeing CASE#1 Winnipeg, Manitoba (Aerospace manufacturing)	Document Use Oral Communications Working With Others Thinking Skills	Incident and Injury Free (IIF) Training	**Improved Strategic Outcomes**	Not Calculated	↑ Strategic Safety Objective (zero injuries) ↑ Safer Workplace ↑ Safety Awareness
Boeing CASE#2 Winnipeg, Manitoba (Aerospace manufacturing)	Thinking Skills (Problem solving)	Employee Involvement/ Lean Manufacturing	None Measured	Not Calculated	↑ Product Quality ↑ Productivity ↓ Costs
Canplas Barrie, Ontario (Plastics Injection molding)	Thinking Skills (Problem solving)	Supervisory and Team Problem Solving Skills	**$16,500** Cost Savings	**65%**	↓ Energy Use ↓ Workplace Injuries ↑ Product Quality ↑ Customer Satisfaction
MW Canada Cambridge, Ontario (Textiles)	Thinking Skills (Problem solving)	Technical Skills Certificate Program	**$20,400** Cost Savings	**17%**	↑ Product Quality ↑ Problem-solving ↑ Independent Thinking
Niedner Coaticook, Québec (Fire hose manufacturing)	Reading Text Document Use Writing Oral Communications	French Comprehension and Grammar	None Measured	Not Calculated	↑ Product Quality ↑ Second Language Communication ↑ Team Efficiency & Morale
Soprema Drummondville, Québec (Waterproof liners)	Numeracy Reading Text Document Use Writing	Basic Training	None Measured	Not Calculated	↑ Workforce Confidence ↑ Participants' Self-esteem

Key Lessons Learned: Barriers and Enablers

As mentioned in the introduction to this report, one of the original goals of the research was to "Investigate the factors that contribute to effective LES training and positive return on investment for manufacturing businesses—"what works." The goal here is to develop evidence-based insight and informed guidance to help organizations develop LES training incorporating the highest quality practices, thus ensuring the greatest prospects for positive impact of their learning programs.

The Workplace Literacy and Essential Skills Research study employed innovative tools to closely examine each training program to find out which practices work and which ones don't. The goal was to identify those key factors that have the greatest potential to either enhance or diminish the impact of learning investments. To do this, the study employed the CFLI High Impact Evaluation™ effectiveness audit and survey toolsets. These tools helped identify three categories of factors critical to training's success: factors that facilitated learning; factors that 'enabled' transfer of new knowledge and skills to the workplace, and those 'barriers' that served to impede job performance and business impact.

The 'barriers' and 'enablers' identified in the study are crucial leverage points. Since they are based on systematic evaluation, they provide organizations with a convincing body of evidence they can capitalize on to ensure success of their own future LES training efforts.

It seems clear, for example, that learners value the support of managers and supervisors to help them apply new learning to the workplace. This is critical. Too often, the effort of maintaining deadlines and dealing with the next new crisis can leave production managers precious little time to devote to the mentoring aspects of their role. Nevertheless, as we learned from participants in the various studies, management attention is foundational to the success of LES initiatives (and almost any other workplace learning). In other words, if production realities preclude managers/supervisors providing support to learners, there may be little real prospect for success from the onset. Manager attention, it turns out, is often pivotal for LES training success.

There are other crucial ingredients. The following tables list the most frequently cited factors—barriers and enablers—that should be recognized as critical design opportunities to ensure training delivers desired outcomes. By paying greater attention to both the weak links and strong links in the Learning Value Chain, organizations can leverage effective practices to improve prospects for success or avoid the pitfalls that so often prevent training programs—even well designed learning—from impacting the bottom line.

Learning Enablers

Learning Enablers are those design and implementation practices that learners have identified as "effective" in facilitating their learning.

At the end of the training, all learning participants completed a questionnaire to determine if they had developed new Capability as a result of the training. The High Impact Evaluation™ (HIE) defines Capability as both 'learning' and 'intentionality'. That is, after attending training, participants should be able to demonstrate not only that they have learned something—increased their skills and knowledge—but it is also important that they demonstrate the intention to use the new skills on the job.

A key advantage of employing the High Impact Capability questionnaire in the WLESR evaluation study is the Effective Practices Audit—a diagnostic toolset that elicits from training participants which training practices contributed most to their learning. The Effective Practices Audit presents learners with a list of training practices—'Learning Enablers'—that research suggests are positively linked to improved job performance and business results. Participants' responses to the 'effective practices' list provides feedback allowing researchers to pinpoint design 'sweet spots'.

The factors identified most frequently by participants are identified as Learning Enablers. It is recommended that LES developers take advantage of these enablers (Table 2) when designing new learning programs, since experience shows they offer the greatest promise for helping employees successfully acquire new skills and knowledge.

Table 2: Most frequently cited 'Learning Enablers'

Learning Enablers	# Studies where 'Enabler' ranked highly
Providing opportunity for collaboration, discussion, and learning from others	**7**
Clearly communicating learning and performance objectives	**7**
Providing useful feedback during activities	**6**
Presenting key concepts clearly and logically	**5**
Small study groups	**4**
Dedicated training room	**4**
Providing a realistic and work-related practice activity	**4**

Enabling Transfer of Learning to the Job

The transfer of learning is a critical concern for organizations planning to invest in workplace learning programs. It is widely recognized in the learning community that no matter how well designed the learning program, or how much participants learned in training, it is important to take proactive measures to help ensure training actually improves performance on the job.

In our evaluation of the WLESR training programs we sought to identify those practices that participants believed helped them the most in transferring their new skills and knowledge to the workplace. To accomplish this, we included in our post-training surveys a list of factors that experience shows have the potential to help participants apply their learning to the job. Enabling factors include such things as: support from managers, opportunity to apply new learning to the job, support from colleagues and peers, etc.

Participants in all studies were asked to select the factors that most helped them apply their learning from the training to their jobs. The responses to this question were reviewed in each case study to identify the most frequently selected factors. A review of all case studies showed that participants in all training programs identified a few select factors that seemed to be especially effective in applying their learning. The list of 'Transfer Enablers' (Table 3) shows the ranking of the most frequently cited Transfer Enablers across all organizations.

The experience of participants in the WLESR studies suggests that organizations employing these more highly cited factors may enhance the prospects of ensuring their LES training programs drive job performance and bottom-line results. It is particularly critical to enlist participants' supervisors and managers to ensure that they are part of the solution—part of the learning transfer ecosystem.

Table 3. Most frequently cited 'Transfer Enablers'

Transfer Enablers	# Studies where 'Enabler' ranked highly
Support from my manager or supervisor	**9**
Sufficient level of knowledge and skills to apply learning	**7**
Information, reference materials, tools or job aids *(available after the training)*	**7**
Support from colleagues and peers	**5**
Adequate motivation and incentive	**3**
Follow-up discussions or coaching	**3**

Barriers to Transfer

In addition to identifying enablers with the potential to enhance the quality of LES learning development, the WLESR project also sought to give organizations informed guidance about barriers to LES training transfer. It has long been acknowledged that no matter how good the training program, no matter how skilled the facilitator, there can be no improvement in job performance or business results if training participants are unable to apply new knowledge and skills to the job. Several authors have warned that the transfer of new learning to the job remains as one of the single most serious impediments to improving performance and productivity (Gillis 2010; Holton 2003).

This evaluation study included a Transfer questionnaire for participants and managers designed to identify in each case study the most significant barriers to Transfer. Each Transfer questionnaire included a list of factors that research has shown have the potential to prevent training from improving employee job performance. As before, the list of 'Transfer Barriers' (Table 4) shows the ranking of the most frequently cited barriers to Transfer across all organizations.

One of the most pervasive barriers is opportunity to apply the new knowledge and skills on the job. Too often, employees return to training and hit the production line running. They are quickly caught up in the day to day demands of a busy production floor and have little time or opportunity to apply or practice what they learned in training. Without practice or application new learning rapidly is forgotten. This was a major finding in the Investing in People research mentioned earlier. To counter this, some organizations make it imperative that floor supervisors give participants a special projects or assignments to ensure they apply the new learning.

A successful strategy employed by several organizations including, Allsco, Canplas, and Argus, was to imbed application into the training. The training program is designed so that participants would actually begin to use the new learning to the specially assigned problems or job situations while still attending training. Other organizations provide 'protected time'—intervals in the day set aside from their normal duties so that participants can practice applying the new skills. No doubt the bedeviling dynamic in manufacturing training is striving to balance the demands of the production line with the need to help participants practice and consolidate their new skills. Skills if carefully nurtured will ultimately return the anticipated mid-term and long term-benefits to the organization.

By being aware of these barriers and employing strategies to circumvent them, organizations can go a long way to ensuring that their LES training investments yield the desired performance and productivity benefits.

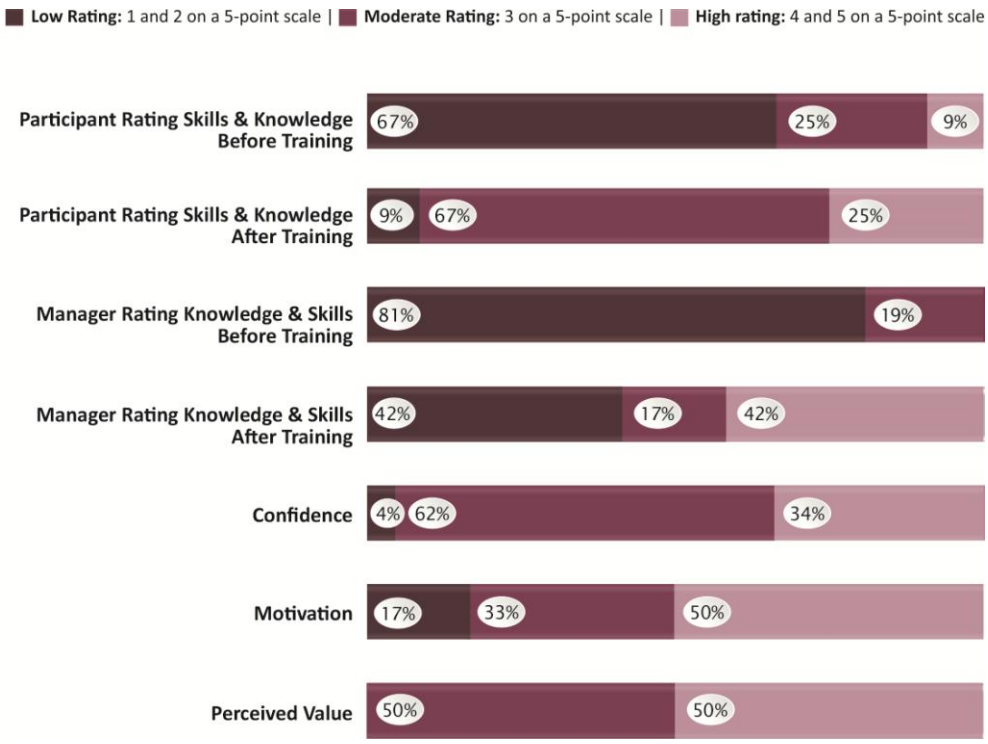
Table 4. Most frequently cited 'Transfer Barriers'

Transfer Barriers	# Studies where 'Barriers' ranked highly
Unable to dedicate time *(to apply new skills on the job)*	**5**
Lack of interest and support of management	**3**
Too difficult to break old habits	**2**
Lack of opportunity to apply new learning	**2**
Lack of support of colleagues and peers	**2**

Advanced Precision – Process Improvement Through Problem Solving

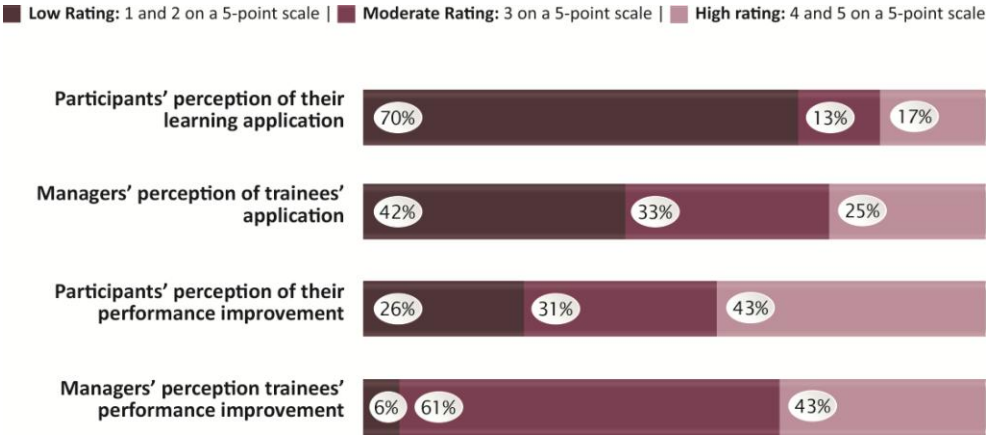
Company	Advanced Precision Machining and Fabrication Ltd. designs, manufactures and assembles high quality, precision components and complex fabrications. Operating from its Dartmouth, Nova Scotia, facilities, the company serves a range of Canadian and US clients in military, aerospace, ocean science, and oil and gas. A significant percentage of the firm's core business is with U.S. defence contractors who have selected Advanced Precision as a strategic partner for offset programs related to Canadian Crown projects.
OUTCOMES	
ROI	(Not Calculated)
Business Results	(None Measured)
Intangible Outcomes	Failure of initial training program became the springboard to launch improvement culture and permanent Process Management System Advanced Precision reports that the new Process Management System has 'significantly' improved current bottom-line results
Problem, Opportunity, Challenge	An assessment revealed Advanced Precision's continued success in the increasingly competitive world of precision machining would require enhancing critical capabilities of the workforce. In particular, it was recognized that key essential skills areas—communications and problem solving—required enrichment if the organization were to meet market demands of increasing complexity, quality, flexibility, and efficiency.
The Training	The training program, Process Improvement through Problem Solving, included problem solving and a verbal communication component designed to help work teams develop better understanding between departments and between various professional levels of the organization. This ten-week, 40 hour course focussed on thinking and problem solving skills—how to identify and address process challenges and opportunities for improvement.

CFLI Capability Index: Advanced Precision



Risk Alerts: The majority of participants report a moderate impact on their skills and knowledge following training and their confidence in their ability to apply the learning. The yellow flag alert suggests that moderate ratings may hinder learning transfer. Employing strategies to strengthen these results will enhance program impact on job performance, organizational results and ROI.

CFLI Transfer Index: Advanced Precision



Transfer Alert: The majority of participants (70%) reported that they did not apply the four problem solving techniques learned in training. (managers' assessment of learning application was higher.) More than half of training participants (57%) described the impact of training in other areas of job performance as low to moderate. (Managers perceived training as having a moderate impact on job performance.) The findings suggest a strong need to encourage greater application of learning to achieve desired business results and positive ROI.

Key Impacts

Evaluation results suggest that problem solving training did not measurably lead to direct, near-term improvement in business outcomes as originally anticipated. The results, however, may have shed a spotlight on a dimly understood strategic benefit of essential skills training. According to Advanced Precision, in spite of its lack of immediate success, the problem solving training led the organization to a heightened awareness of training's potential. This new awareness subsequently led to the adoption of additional and more focused Process Management training that is currently yielding substantial performance improvements leading directly to improved bottom line results.

Intangible Impacts

Essential Skills: The Springboard Effect
Even although the problem solving training failed to impact business outcomes, it did bring about other unintended benefits to the organization. The program gave managers and production staff a new appreciation for, and insights into, the possibilities and the potential of adopting new tools and strategies to improve workplace process and productivity. As a result of the learning from the problem-solving training, Advanced Precision management made the decision to develop and implement a formal quality program and training component to systematically and continuously manage and improve production quality and performance.

New Training Integrated into Job Context
A key difference in this most recent program is that all training takes place within the context of solving ongoing efficiency, quality, and productivity challenges experienced by Advanced Precision. The early success of the new Process Management training program has encouraged management to establish process management as a core element of its manufacturing culture.

Interestingly, Advanced Precision attributes the success of the new process management program: ***"By instilling fundamental problem-solving capabilities in our workers, the problem-solving training introduced us to the improvement concepts and possibilities. Although our initial effort in problem solving training did not have a great bottom line payoff, it was ultimately invaluable. It's been the springboard that launched our current successes in improving quality and productivity."***

Effective Practices
Enabling Learning (HE – Highly Effective ME - Moderately Effective)
Quality of Design and Instruction
Making recommendations for improvements (ME)
Clearly communicating the learning and performance objectives (ME)
Providing useful feedback during activities (ME)
Providing opportunity for collaboration, discussion, and learning from others (ME)
Enabling Transfer- to-the-Job (% Selecting factor, N=6)
Support from my colleagues or peers (100%)
Support from my manager or supervisor (50%)
Opportunity to apply learning to real workplace issues (50%)

Barriers to Success (% Selecting factor, N=6)

Commentary: The initial problem solving training program failed as a result of one of training's most notorious barriers to success—the failure of participants to *transfer* their new learning to their jobs. (See the Learning Value Chain below.) In this case the training was delivered by an outside vendor who provided classroom instruction but no provisions for follow-up activities or strategies to help employees integrate new skills in their jobs

Lack of interest and support of management (67%)

Policies, procedures, rules, work processes (67%)

Unable to dedicate the time needed to practice new skills (50%)

Too difficult to break old habits (50%)

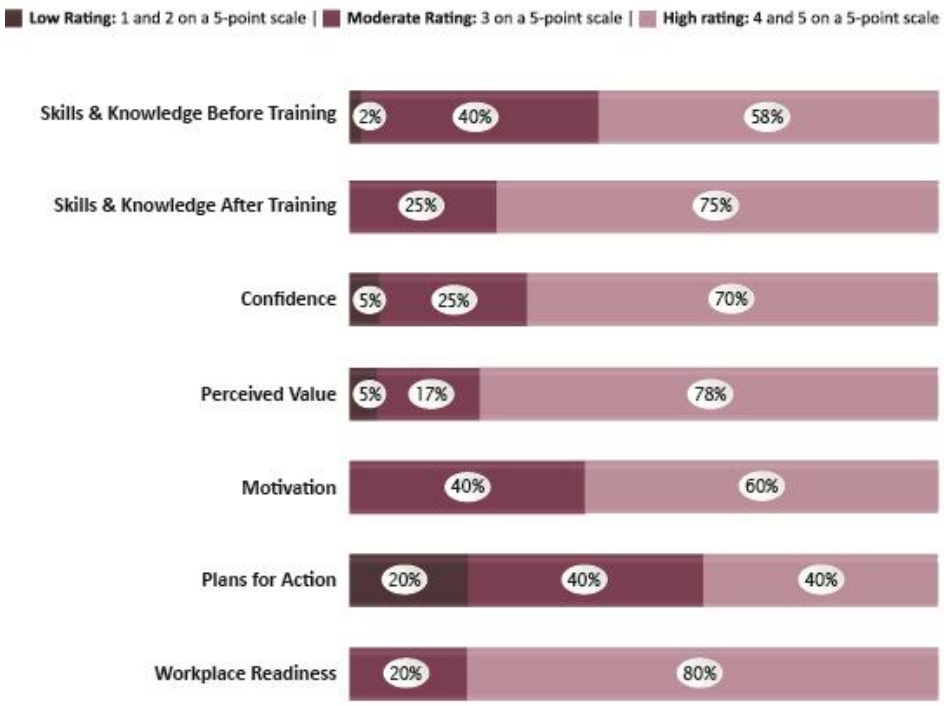
Lack of support from colleagues and peers (50%)

Existing policies, procedures, and work processes (50%)

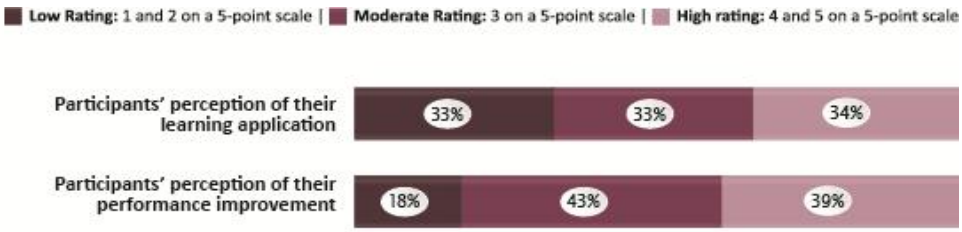
Allsco – Opening Doors to Workplace Learning

Company	Allsco is a manufacturer of doors and windows. The company has 93 employees – 55 in production in Moncton, and the remaining in a sales office in Moncton and in sales and warehouse facilities in Dartmouth. The company started as a family-run business 38 years ago and is now owned by the Atis Group, which provides doors and windows to dealers across Atlantic Canada.
OUTCOMES	
ROI	**68%**
Business Results	**$31,200 Cost Savings** – Reduced production downtime through improved preventative maintenance
Intangible Outcomes	• Improved product quality • Enhanced workforce problem-solving capabilities • Enhanced workplace culture • Enhanced employee engagement
Problem, Opportunity, Challenge	**Training Challenge:** Allsco management made a decision to implement training initiatives to improve productivity by improving overall team performance, enhancing communication skills and employees' collaborative problem-solving skills. An overarching goal was to increase workforce efficiency through enhanced problem-solving and decision-making skills in the production assembly teams.
The Training	The training program—"Opening Doors to Workplace Learning"— consisted of two training sessions per week for 17 weeks and included discussion and team-building activities. Techniques were also taught to enhance communication skills, problem-analysis, and problem-solving. A critically important feature of Allsco's training was the focus on engaging participants in the application of problem-solving strategies to real world workplace challenges.

CFLI Capability Index: Allsco



CFLI Transfer Index: Allsco



Transfer Alerts: The moderate level of learning application and improvement suggests a moderate risk to achieving organizational results.

Key Impacts

The primary business improvement resulting from the training is the reduction in the time required to assemble window and door units—Man Hours per Unit (MHU). As a result, the assembly teams, by making fewer errors reading the production plans and by employing new problem-solving skills, were able to reduce the assembly time by 3.2% per unit. Allsco's overall savings on more than 37,000 window units assembled was $31,206 in the first year following the training.

After factoring in the cost of the training and accounting for other factors that might also have contributed to the improvement (Isolation), the return on the training investment in the first two years was calculated to be 68%. A 68% ROI means that every dollar spent on training was returned to the organization along with a $0.68 profit.

Intangible Impacts

Ongoing Productivity Gains While this study calculates the effect of the training in the first two years only, there is every reason to expect that the improved performance of the training participants will likely continue, and possibly even improve, in the years that follow.

Improved Culture and Engagement A substantial intangible benefit of Allsco's Opening Doors to Workplace Learning program is the noticeable improvement in workplace culture and employee engagement. Managers observed how the training successfully encouraged independent thinking and engendered proactive, problem-solving behaviours in production employees.

"Workers are more likely as a result of the training to take the initiative and make decisions on their own instead of waiting for someone to tell them what they should be doing next."

"The impact is not always easy to measure in terms of dollar-savings or gains. But it is easy to see that it's helping to keep our employees more involved with a positive attitude, so it has a positive impact on things like less turnover and good work environment which is always a good thing for any company."

The training had an important impact not only on the atmosphere in the plant, it also gave some employees critical tools to communicate more successfully in their private lives.

"This program helped me with my home life. I am dealing with a difficult child at home and feel I am more informed, patient, and understanding in how to deal with the problem."

Opportunity for Further Impact Allsco trained only 50% of its production operators in 2014. These solid bottom line results suggest that it would be an entirely prudent business decision to provide the same training to the remaining production operators.

Effective Practices

Enabling Learning (HE – Highly Effective ME - Moderately Effective)

Quality of Design & Implementation

Teambuilding exercises (HE)
Problem-solving activities related to solving common work-life problems (HE)
Communication exercises (speaking appropriately with coworkers and management) (HE)
Reading exercises and quizzes with workplace documents (ME)
Reading and comprehension exercises (ME)
Individual case studies, group discussions, and problem solving exercises (ME)
Applying creative problem-solving principles to solve personal or workplace problems (ME)
Holding training during work hours (ME)

Quality of Instruction

Providing useful feedback during activities (HE)
Providing opportunity for learning assessment or reflection (HE)
Presenting key concepts clearly and logically (HE)
Providing opportunity for collaboration, discussion, and learning from others (HE)
Providing useful response to questions guidance or clarification (HE)
Clearly communicating the learning and performance objectives (HE)

Enabling Transfer-to-the-Job (% Selecting factor, N=10)

Sufficient level of knowledge and skill (70%)
Information, reference materials, tools, or job aids (70%)
Clear performance expectations (60%)
Adequate motivation and incentive (60%)
Support from my manager or supervisor (60%)

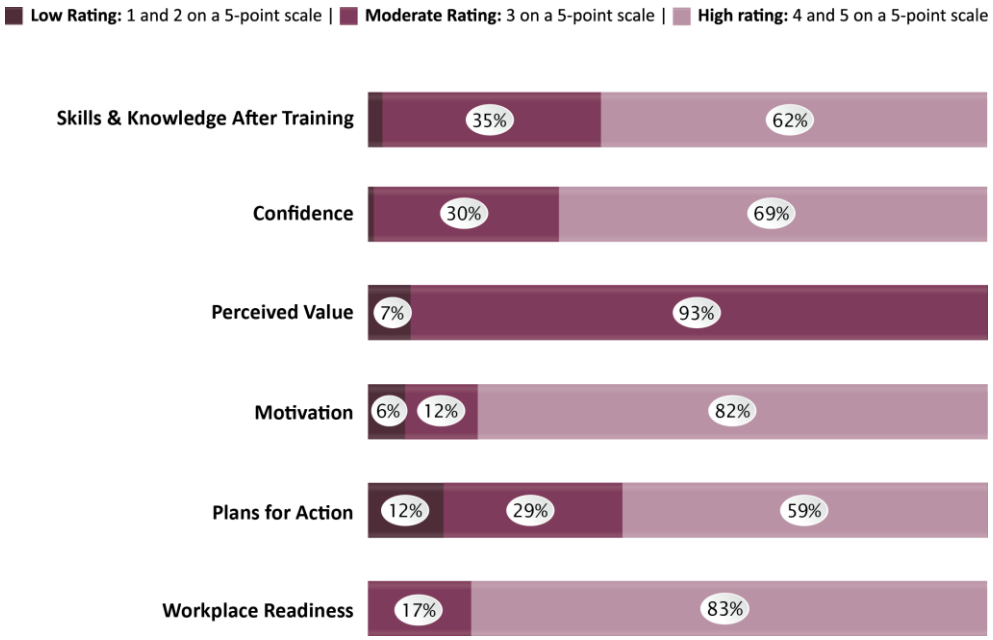
Barriers to Success

None noted.

Argus Industries - Problem Solving Skills Training

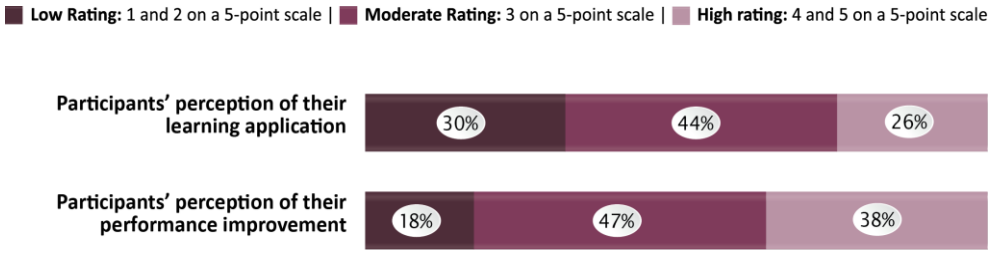
Company	Argus Industries has been serving the industrial and aerospace needs of customers from around the world since 1962. Argus is a custom manufacturer of rubber molded products and custom die cut gasket seals. The company has a total of 80 employees with headquarters in Winnipeg, Manitoba, and a branch plant in Pickering, Ontario.
OUTCOMES	
ROI	**33%**
Business Results	**$16,120 Cost Savings** – Reduced errors and product rework due to enhanced quality and more effective production practices
Intangible Outcomes	• Improved production quality • Enhanced customer satisfaction • Established quality-focused culture
Problem, Opportunity, Challenge	The training program was introduced to help employees be more effective in their jobs and thus improve the organization's customer satisfaction rating. Better problem-solving capability in the organization was seen as the key to enhance employees' ability to fix business and operational challenges. Not all Argus employees used a standard problem-solving methodology to resolve issues. Management wanted to establish a standardized problem-solving culture where addressing issues 'from the facts' would exist at all levels of the organization. To standardize basic problem-solving, Argus simplified the problem solving process with a briefer version of the APS (Argus Problem Solving) methodology. Also, the IRS (Issue, Root Cause, Solution) is used for more basic problems—those that are mostly individual or departmental and do not require people from other departments to be involved.
The Training	The focus of the training program was primarily on improving employees' problem-solving and thinking skills, with an added attention to increase team building and confidence. All employees—including executives and managers—participated in an eight-hour problem-solving, thinking-skills workshop. In addition, participants completed an assignment outside of class related to a real-world workplace problem.

CFLI Capability Index: Argus Industries



Risk Alerts: Only about half of participants (59%) have "a lot of plans and ideas" for applying their training. this may weaken transfer of learning to the job.

CFLI Transfer Index: Argus Industries



Transfer Alerts The low or moderate levels of learning application and performance improvement suggest a clear risk to achieving organizational results.

Key Impacts

The Argus Problem-Solving System was used initially to trouble-shoot costly and recurrent problems in foam gasket and seal production. The packaging and shipping process had been plagued by a series of quality errors caused by mislabeling. The errors incurred costs from returns, repackaging, relabeling, and reshipping. Apart from the added expenses, these errors created unwelcome annoyances for customers. The cost savings from resolving this one quality problem more than paid for the cost to Argus to develop and deliver the problem-solving training.

- The cost saving resulting from the resolution of the mislabeling errors was calculated to be $310 per week or **$16,120 annually**.
- The total cost to Argus of developing and implementing the APS training was **$12,161.**
- The return on investment to Argus on its LES investment was **33%**.

Intangible Impacts

The primary benefit of the APS methodology is to provide the Argus workforce with effective strategies to maintain high quality, productivity, and customer satisfaction.

Continuing Financial Benefits Since this one application covered the cost of the training, it seems clear that the APS system, continuously applied to other production/quality challenges, will reap ongoing financial benefits. A senior Argus quality leader estimates it will be employed to tackle recurrent quality issues including: late production work orders, seals and quoted materials out of spec, and part malfunctions.

Quality-focused Culture Argus employees have adopted the problem-solving mindset and are now using precise, quality-focused language and thinking.

Enhancing Customer Satisfaction It seems reasonable to anticipate that improvements in product quality ushered in by the application of the APS methodology will have a continuing impact on customer satisfaction—most training participants reported that the APS techniques will help them increase customer satisfaction.

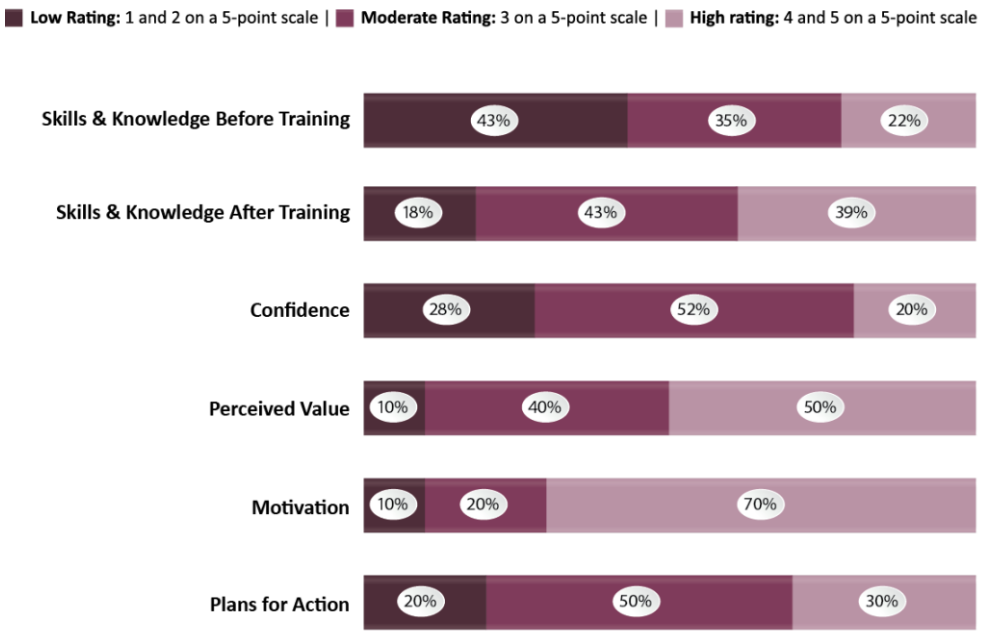
Effective Practices
Enabling Learning (HE – Highly Effective ME - Moderately Effective)
Quality of Design and Implementation Practices
Discussions (HE)
Applying the problem-solving method to a real-life problem (HE)
Quality of Instruction
Providing opportunity for collaboration, discussion, and learning from others (HE)
Providing a realistic and work-related practice activity (HE)
Providing useful feedback during the activity (HE)
Presenting key concepts clearly and logically (HE)
Engaging and sustaining learners' interest (HE)
Enabling Transfer-to-the-Job (% Selecting factor, N=16)
Support from my colleagues or peers (69%)
Information, reference materials, tools, or job aids (69%)
Follow-up discussions or coaching (44%)
Sufficient level of knowledge and skill (44%)
Support from my manager or supervisor (38%)

Barriers to Success (% Selecting factor, N=16)
Unable to dedicate the time required to practice new skills or adopt new ways of doing things (40%)

BCT Structures - Plumber's Training Program

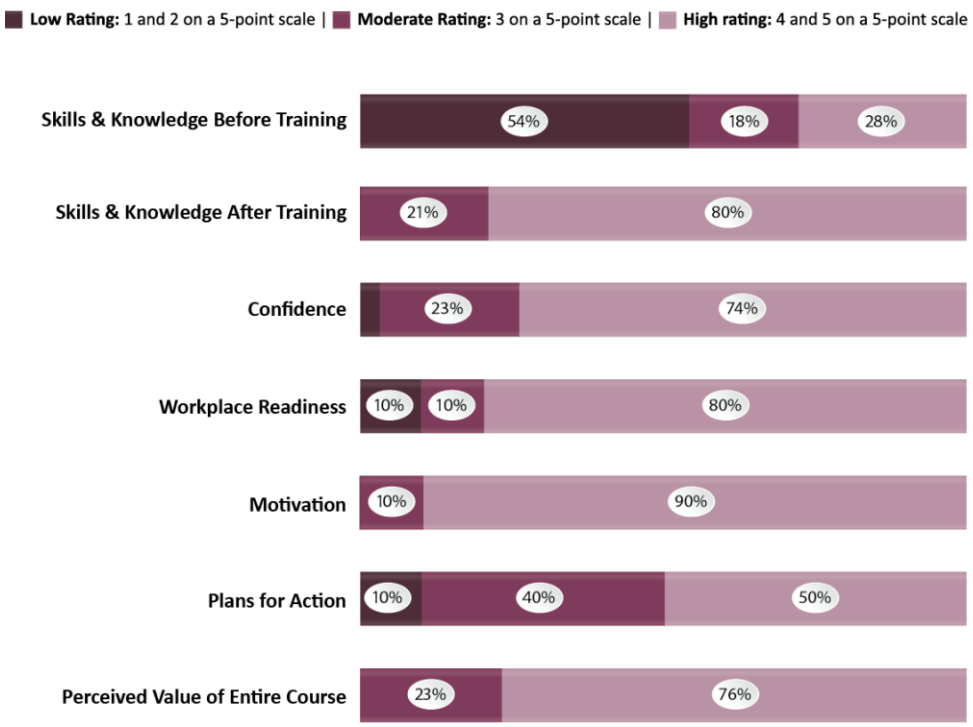
Company	BCT Structures Inc. is a premier custom manufacturer of modular buildings specializing in providing housing, schools and offices and other customized modular structures for a variety of industries. The company is located in Lethbridge, Alberta and is a division of Clean Harbors Energy and Industrial.
OUTCOMES	
ROI	**424%**
Business Results	**$46,080 Cost Avoidance –** Upskilling production workers avoided necessity of hiring two journeymen plumbers at higher wages
Intangible Outcomes	• Enhanced skillset diversity and workforce flexibility • Reduced labour shortages—especially in peak production periods • Enhanced employee ROI—enhanced skillsets lead to higher wages
Problem, Opportunity, Challenge	BCT recognized an opportunity to increase business success by addressing a key workforce skills gap. The company calculated that expanding plumbing skillset throughout its current workforce could drive business success by increasing efficiency and productivity.
The Training	The four-week training program, created in conjunction with Lethbridge College, was a mix of basic math theory and hands-on practice. The math included trade-specific concepts (volumes, capacities, grades, and blueprint reading). Plumbing application components included the use of power tools, understanding tubing and fittings, and the basic properties of plumbing materials (copper, iron, and plastic).

Capability Part One: Applied Mathematics & Blueprint Interpretation: CFLI Capability Index: BCT Structures



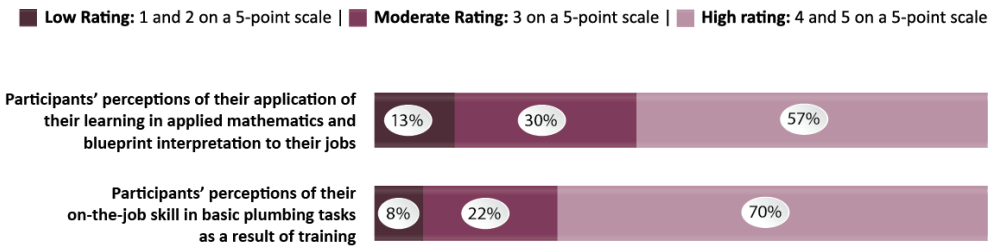
RISK ALERTS more than half of participants report having a low or moderate level of knowledge and skill following training and 80% have low to moderate level of confidence in their ability to apply their learning. these findings suggest that participants may need more practice before successful job transfer is achieved. half of the participants believe it will be possible to apply their training to a low to moderate degree in their specific job situation and 70% report having only a few or some ideas and plans for applying their learning.

Capability Part Two: Basic Plumbing Knowledge and Skills CFLI Capability Index: BCT Structures



RISK ALERTS 50% of participants report that they have only some or few plans and ideas for applying their learning. this may weaken job transfer.

CFLI Transfer Index: BCT Structures



TRANSFER ALERTS Note: Several participants indicated they need more time to practice their math on the job before they see improvement.

Key Impacts

A central concern of BCT Structures management is ensuring the availability of a variety of skilled journeymen to help meet demanding production/assembly schedules often associated with large contracts. In particular, a key bottleneck for BCT was insufficient plumber resources in times of peak production. These production bottlenecks result in inflated project costs as schedule pressures require substantial overtime and often the need to hire high-cost sub-contractors.

The plumber's training program provided ten newly-skilled employees that could supplement BCT's existing plumbing team during times of high demand.

The cost savings Prior to implementing the training program, BCT management had estimated their 2014-15 contract commitments would require the hiring of three journeyman plumbers. As a result of having ten upskilled employees who could work under supervision of staff journeymen plumbers, BCT determined that they would now need to hire only one plumber to meet peak demands.

The key financial benefits from the training is the cost avoidance from eliminating the need to hire two full time plumbers. The cost savings, **$46,080 annually**, is the wage differential between the annual salary of two journeyman plumbers and two upskilled production workers.

Training Development Costs Since training participants attended the training after work hours, the training costs in this case are limited to the development and delivery costs—**$8,800**.

Return on Investment

The return on the training investment is the net benefits—the total cost avoidance less the total costs of developing and delivering the training.

$$\text{ROI} = \frac{\text{Total Benefit} - \text{Total Costs}}{\text{Total Costs}} \times 100\%$$

$$= \frac{\$46{,}080 - \$8{,}800}{\$8{,}800} \times 100\% = 424\%$$

Return on Investment = 424%

(Note: It should be pointed out that the plumber training program relied on essential math skills for success. However, a substantial component of the program's success must also be credited to the plumbing trade skills acquired in the training.)

Perceived Organizational Results

As another option for evaluating a program's ultimate impact, WLESR studies routinely examine the perceptions of managers and training participants on the business impact of the training.

The majority of participants perceived the training as having a "high" impact on all business outcomes. Eighty percent perceived a high impact on "improving quality of work output" and 70% perceived high impact on "reducing labour shortage through diversification of skills" and "increasing plant output." Improved efficiency and improved safety in the plant were rated "high" by 60% of participants.

Two of the three managers perceived the training had improved efficiency and reduced labour shortage through diversification of skills to a "high" extent. All the managers reported that the training had improved work output to a "moderate" extent.

Intangible Results

Employee ROI Participants in the plumber training course also benefit financially from training in the form of anticipated future wage increases. BCT Structures rewards production staff with a competency-based compensation system that leads to higher wages as a function of skills attainment, job performance and on-the-job experience.

Eliminated Costs of Hiring Two Journeymen Plumbers

As a result of the plumber's training program, BCT was able to avoid the costs of hiring and onboarding two journeymen plumbers estimated to average $4,000 per tradesman.

Repeatable Trade Skills Formula As a result of the plumber training program's success, BCT are now considering adopting the same peak-volume skills supplementation strategy with other production-critical trades such as electricians and carpenters.

Effective Practices
Enabling Learning (HE – Highly Effective ME - Moderately Effective)
Quality of Design and Implementation Practices
Providing opportunity for collaboration, discussion, and learning from others (ME)
Quality of Instruction
Providing opportunity for collaboration, discussion, and learning from others (HE)
Providing a realistic and work-related practice activity (HE)
Providing useful feedback during the activity (HE)
Presenting key concepts clearly and logically (HE)
Engaging and sustaining learners' interest (HE)
Clearly communicating the learning and performance objectives (ME)
Enabling Transfer-to-the-Job (% Selecting factor, N=10)
Support from manager or supervisor (70 %)
Follow-up discussions or coaching (50%)
Sufficient level of knowledge and skill (50%)

Barriers to Success (% Selecting factor, N=10)
Unable to dedicate the time required to practice new skills or adopt new ways of doing things (40%)

Boeing Winnipeg - Incident & Injury-Free Training

Company	Boeing Winnipeg is one of the largest aerospace composite manufacturers in Canada employing more than 1,600 people in three locations. Boeing Winnipeg produces nearly 1,000 end-item composite parts and assemblies for Boeing Commercial Airplanes. Major products include wing to body fairings, engine strut forward fairings, engine strut aft fairings and landing gear doors. Boeing Winnipeg is a Tier I partner to the 787 Dreamliner program. Annual sales for the Winnipeg site were $511 million in 2013—all of which came from exports.
OUTCOMES	
ROI	(Not Calculated)
Business Results	**Advanced Boeing's Strategic Goals** A 20% increase in 'near-miss' safety reports suggests the training has substantially advanced Boeing's strategic goal of zero workplace injuries enterprise-wide.
Intangible Outcomes	• Improved active workforce involvement in safety reporting • Enhanced workforce safety awareness (enterprise-wide) • Ultimately, a safer workplace
Problem, Opportunity, Challenge	**Training Challenge:** In 2013 Boeing launched a major enterprise-wide safety initiative called "Go for Zero" aimed at reducing injuries and work-related illness. Boeing's Incident and Injury Free (*IIF*) training program was developed to support the Go for Zero safety program. The company's goal is to create a workplace where all employees go home, every day, in as good or better health than they arrived. *IIF* principles maintain that it is possible to eliminate all injuries and incidents through good relationships and a commitment to act and improve behaviours and workplace conditions.
The Training	The *IIF* training program aimed at improving job-related health and safety, as well as training on new equipment, procedures, products and services. **Specific goals included:** • Improve relationships to enable employees to communicate with each other and managers on safety concerns • Raise awareness and mindfulness of risks, choices and more safe practices • Invite feedback on ways to improve safety and become aware of processes for making such improvements • Drive personal ownership and responsibility for safety behaviours and attitudes at work and home • Drive continuous improvement of safety behaviours at work and home • A total of 1533 employees, in groups of 20, participated in a four-hour training workshop based on Boeing's safety goal of Incident and Injury Free (*IIF*). This included all levels of office employees as well as employees who work in the factory areas. All full time, term and summer students attended.
Key Impacts ***"The Incident and Injury Free engagement program that we delivered at Boeing Canada Winnipeg has been a great first step in generating a new***	At the organizational level, the success of programs are typically measured by the extent to which they improve financial outcomes or strategic outcomes. For enterprise-wide safety training programs such as Boeing's Incident and Injury Free training, however, the overarching concern or objectives are not necessarily bottom-line numbers. Rather, they are usually launched to help the organization satisfy a strategic goal, in this case a high-level mission statement such as Boeing's "Go for Zero" program. The Boeing IIF program, therefore, was a strategic change initiative aimed at a "mindset" rather than the balance

awareness around safety and improving Boeing's safety culture." Marty Lehman Director Operations Boeing Canada, Winnipeg	sheet. **Measuring Strategic Outcomes** Measuring the success of strategic outcomes, however, can be considerably more challenging than measuring more tangible, financial outcomes (increased sales, production output, etc.). Strategic impact is usually qualified (and measured) in three outcome stages: immediate outcomes, intermediate outcomes and ultimate, or final, outcomes. In the immediate aftermath of a safety training initiative we look for change in critical workplace behaviours—an increased use of personal protection equipment (PPE), adherence to proper safety procedures, etc. In the Boeing IIF case, it was hoped that employees would become better at spotting and reporting potential workplace safety risks and near-misses—the *immediate outcome* measure. Over time, near-miss reports should trigger safety decisions and corrective actions taken to eliminate risk situations. These actions are the *intermediate outcomes* from the training. Finally, the *ultimate outcomes* may be observed after safety measures have been put in place and lead to a *measurably* safer workplace—a tangible reduction in the number of workplace injuries and work-related illness. **Measuring Boeing's IIF Strategic Outcomes** Two of the signature safety measures tracked on a regular basis by Boeing are, a) the numbers of injuries and work-related illnesses and, b) the number of reported near-misses. **Near-Miss Reports** Although there were no measurable changes in harm incidents, there was a substantial uptick (20% increase) in near-miss reports in the months following training (when compared with the previous year). This *immediate outcome* suggests a beneficial relationship between the Boeing's IIF initiative and the organization's desired strategic outcomes. It might be considered as a leading indicator that the IIF program will ultimately lead to the strategic goal of measurably reducing injuries and work-related illness.
Intangible Impacts	• 66% have "become aware of safety issues" • 62% report that they "spoke with peers or others about a safety issue" • 55% "spoke with managers and leaders about a safety issue

Effective Practices

Enabling Learning (HE – Highly Effective ME - Moderately Effective)

Quality of Design and Instruction
Presenting key concepts clearly and logically (ME)
Clearly communicating the learning and performance objectives (ME)

Enabling Transfer-to-the-Job (% Selecting factor)

Support from manager or supervisor (13.4 %)
Sufficient level of Knowledge (12.9 %)
Support from my colleagues or peers (12.8%)
Clear performance expectations (10.5%)

Barriers to Success

Lack the interest and support of management (11%)
Lack the relevant opportunities to apply my new learning (10%)

Boeing Winnipeg – Employee Involvement/ Lean Training Program

Company	Boeing Winnipeg is one of the largest aerospace composite manufacturers in Canada employing more than 1,600 people in three locations. Boeing Winnipeg produces nearly 1,000 end-item composite parts and assemblies for Boeing Commercial Airplanes. Major products include wing to body fairings, engine strut forward fairings, engine strut aft fairings and landing gear doors. Boeing Winnipeg is a Tier I partner to the 787 Dreamliner program. Annual sales for the Winnipeg site were $511 million in 2013—all of which came from exports.
OUTCOMES	
ROI	Not measured
Business Results	Not measured
Intangible Outcomes	• Improved product quality • Reduced costs • Enhanced workforce problem-solving capabilities
Problem, Opportunity, Challenge	The Employee Involvement/Lean Training program is part of Boeing's efforts in the area of continuous improvement. It builds on the essential skills training done earlier in the WEM Program. The training was implemented to support the company goals of quality, safety and productivity to impact the overall cost of doing business. Specifically, these programs were designed to enhance employees' skills in working together in teams, decision making and running meetings. The Lean courses were designed to help employees understand the concepts of Lean and put the Lean tools into practice to solve problems in their work areas and to support Boeing's goals of enhancing quality, productivity, and safety.
The Training	The Lean training program, which was conducted over the past two years, covers Stage 1 (Team Formation) of the 4-Stage training program in employee involvement. Teams met once a week for approximately one hour. The Lean courses were designed to help employees understand the concepts of Lean and put the Lean tools into practice to solve problems in their work areas, as well as to continually improve performance. **The Essential Skills courses offered in the Lean training program included:** • Working with others • Continuous learning • Document use • Oral communication The training covered a variety of Lean topics and activities including creating a team charter and a team training plan (Skills Gap Matrix), and other related concepts including quality, waste, and value stream mapping.

Key Impacts

The Boeing Employee Involvement/Lean Manufacturing training resulted in a number of quality initiatives undertaken by a variety of work teams throughout the manufacturing facility (53% of participants applied the training in their jobs to a "modest" extent and 31% applied it to a "high" extent).

It was not practicable, however, within the context of the WLESR evaluation project, to precisely and credibly quantify the financial value of such quality initiatives or their return on investment to Boeing.
The Transfer evaluation evidence provides a summary of participants' perceptions of the impact of the training on several key business metrics as well as perceived return on Investment.

Perceived Organizational Results

Participants were asked to what degree they perceived the training as having impacted business results at Boeing. Participants were very much divided in their response.

- **Improved quality**: 37% reported the training had a high impact on product quality; 38% reported a moderate impact.
- **Meeting due dates for internal/external customers**: 26% reported the training had a high impact on timelines; 40% reported a moderate impact.
- **Reduced costs:** 29% reported the training had a high impact on cost reduction; 37% reported a moderate impact.
- **Improved productivity and effectiveness:** 25% reported the training had a high impact on productivity and effectiveness; 40% reported a moderate impact.

Intangible Impacts

- **Perceived Organizational Results**
- Participants were divided in their perceptions of the extent to which the training had impacted business results.
- **Improved quality**: 37% of participants reported the training had a high impact on product quality; 38% reported a moderate impact.
- **Reduced costs:** 29% reported the training had a high impact on cost reduction; 37% reported a moderate impact.
- **Improved productivity and effectiveness:** 25% reported the training had a high impact on productivity and effectiveness; 40% reported a moderate impact.

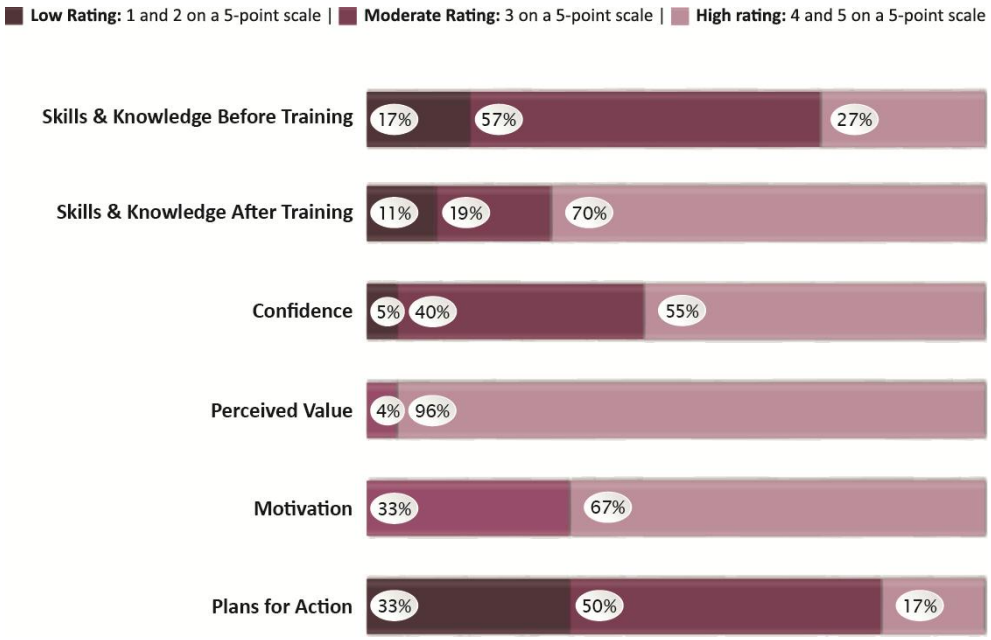
Effective Practices
Enabling Learning (HE – Highly Effective ME - Moderately Effective)
Quality of Design and Instruction
Providing opportunity for collaboration, discussion and learning from others (ME)
Providing useful response to questions, guidance or clarification (ME)
Providing useful feedback during the activity (ME)
Providing a realistic and work-related practice activity (ME)
Enabling Transfer-to-the-Job (% Selecting factor, N=101)
Support from my colleagues or peers (15%)
Follow-up discussions or coaching (14.2%)
Support from my manager or supervisor (13.1%)
Information, reference materials, tools, or job aids (12%)

Barriers to Success (% Selecting factor, N=101)
Too difficult to break old habits (12%)
Too little motivation or incentive (13.6%)
Unable to dedicate the time required to practice new skills or adopt new ways of doing things (10%)
Lack the support of colleagues and peers (9.6%)
Lack the interest and support of management (9.3%)
Lack relevant opportunities to apply my new learning (9%)

Canplas – Supervisory Certificate Program

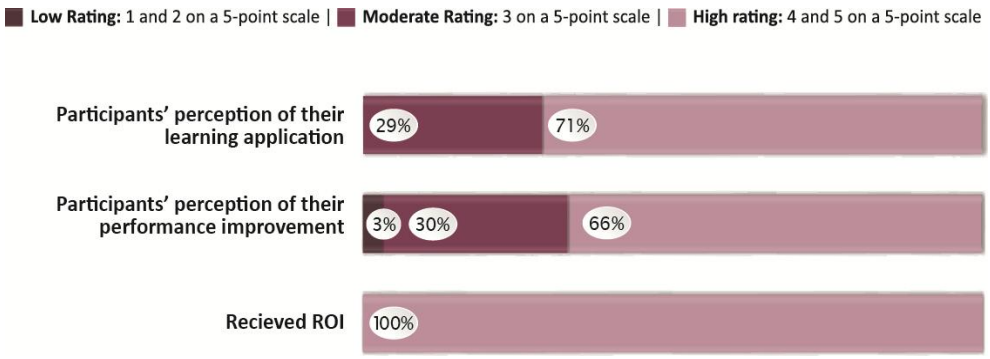
Company	Canplas is a manufacturer of plastic products employed in residential, commercial, and industrial building markets. Canplas has more than 230 employees in six locations in Canada (Barrie, Ontario; Edmonton, Alberta; and, Langley British Columbia) and the United States. With almost 50 years of experience in injection molding, the company has built a reputation for the design and manufacture of thermoplastic products.
OUTCOMES	
ROI	**65%**
Business Results	**$16,500 Cost Savings** – Reduced wasting of energy due to problem- solving solution resulting in replacing hazardous compressed-air cleaning equipment with a safer, energy-efficient alternative
Intangible Outcomes	• Improved workplace safety • Product quality • Enhanced customer satisfaction
Problem, Opportunity, Challenge	**Strategic Challenge:** A distinguishing feature of Canplas' overall strategy is a strong focus on quality and innovation. The company is ISO 9001 and ISO 14001 certified. As an innovator, Canplas has registered more than fifty patents and design registrations for products. The company constantly promotes innovation across all activities from manufacturing processes to supply chain management. **Specific Challenge:** Canplas implemented training as part of its efforts to continuously improve safety, quality, and customer satisfaction. One goal of training was to improve safety and costs in the production facilities by reducing or eliminating the use of compressed air for cleaning. The second goal was to develop and implement quality improvements to enhance customer satisfaction.
The Training	To address these goals, a training program, Supervisory Certificate Program (SCP), was implemented. In a blend of tutorials and webinars, 'high potential' participants completed a range of supervisory skills training including problem-solving, difficult interactions, health and safety, team building, leadership, and coaching and mentoring skills. An important aspect of the training was a 20 hour case study component in which participants were expected to apply new knowledge and skills to real-world, workplace problems.

CFLI Capability Index: Canplas



Risk Alerts: Plans for action: at the end of training, 83% have few or only some ideas or plans for using their training on the job. Typically this low level of planning poses a risk for transfer. In this training, however, it's expected that participants will formulate their plans when they develop their workplace learning project.

CFLI Transfer Index: Canplas



Key Impacts

The case study component led to measurable business results in two separate operational areas—safety and efficiency, and customer service.

Reducing hazardous use of compressed air for cleaning

Using newly-acquired problem-solving techniques, one team of participants used root cause analysis to develop alternatives to the existing hazardous and energy-wasting practice of cleaning machinery using compressed air. Based on the first implementation of the solution, Canplas is able to predict a **$16,500 annual savings** by employing the new cleaning techniques company wide. As a result, the training investment returned **65% ROI** (Return on Investment) to Canplas. (This means every dollar spent on training was returned to the company along with an additional $0.65 in profit.)

Customer Approval Rating System (CAR)

The second improvement case study project was the development of a rating system to monitor customer satisfaction and gain deeper insight into the needs, preferences, and concerns of its customers. The CAR tracking almost immediately exposed seriously high levels of errors in fill rate (ratio of items shipped to items ordered). Once identified by the new transparency of the order fulfilment process, the underlying fulfillment problems were soon identified and rectified. This new process provided Canplas with a critical new advantage in its ongoing effort to increase customer satisfaction.

It seems safe to infer that the introduction of the CAR tracking capabilities is delivering positive business impact by improving the client experience and retaining customers. Calculating the exact financial benefits of customer satisfaction is notoriously complex entailing resources beyond the scope of this analysis.

Intangible Impacts

Strategic Outcomes Beyond the near-term financial benefits of the Supervisory Certificate training program is the improvement in product quality and customer satisfaction. By doing this, the training delivered significant strategic value to Canplas by promoting one of the company's core mission objectives—customer value—enshrined in its mission statement: ***"We are successful when our customers value us as a supplier."***

Workplace Safety While this case study explored the clear monetary benefits from investing in the supervisory training, an important intangible benefit to the organization is the elimination of the hazardous practice of cleaning machining equipment using compressed air.

Effective Practices

Enabling Learning (**HE** – Highly Effective **ME** - Moderately Effective)

Quality of Design & Implementation

The re-arranging of work schedules so co-workers could attend together (HE)
Scheduling training during work hours (HE)
Preventing work interruptions during training (HE)
Forming small study groups for the Workplace Performance Project (HE)
Using a dedicated training room (HE)
Using a blend of learning delivery formats (e-learning, webinars, hands-on project, discussion group) (HE)

Quality of Instruction

Providing useful response to questions, guidance or clarification (HE)
Clearly communicating the learning and performance objectives (HE)
Engaging and sustaining learners' interest (HE)
Presenting key concepts clearly and logically (HE)
Providing opportunity for learning assessment or reflection (HE)

Enabling Transfer-to-the-Job (% Selecting factor, N=6)

Support from my manager or supervisor (100%)
Sufficient level of knowledge and skill (100%)
Adequate motivation and incentive (83%)
Information, reference materials, tools, or job aids (83%)

Additional Transfer Enablers (Researchers' communication with Canplas)

Opportunity to Apply: Training included opportunities for participants to immediately apply their new skills and knowledge to real on-the-job problems. This on-the-job application encouraged consolidation, utilization, and elaboration of the learning and promoted employee engagement.

Daily problem-solving team meetings: Daily team meetings with manager/facilitator to discuss specific problems or issues related to the training helped reinforce the training and provided opportunities to use new knowledge to problem-solve as a group.

Scenario-based Testing: Topic tests at the ending of learning modules provided effective realistic, working world scenarios that challenged participants to demonstrate their comprehension of the new materials and their abilities to apply new concepts in real world settings.

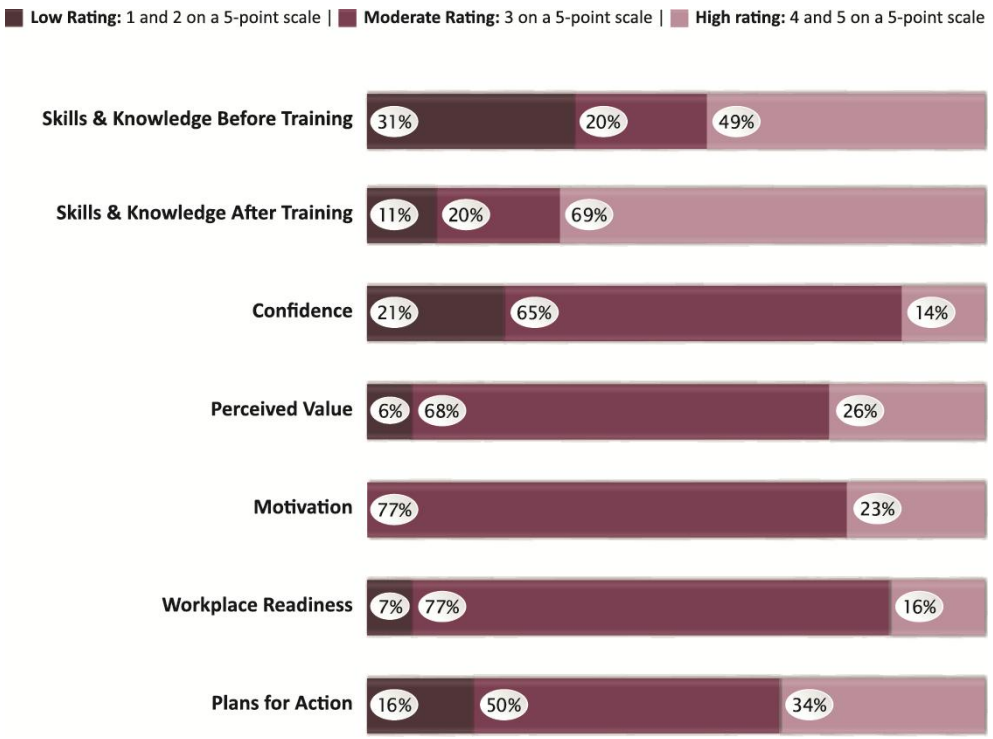
Barriers to Success (% Selecting factor, N=6)

Unable to dedicate the time required to practice new skills or adopt new behaviour (33%)

MW Canada – Technical Skills Certificate Program

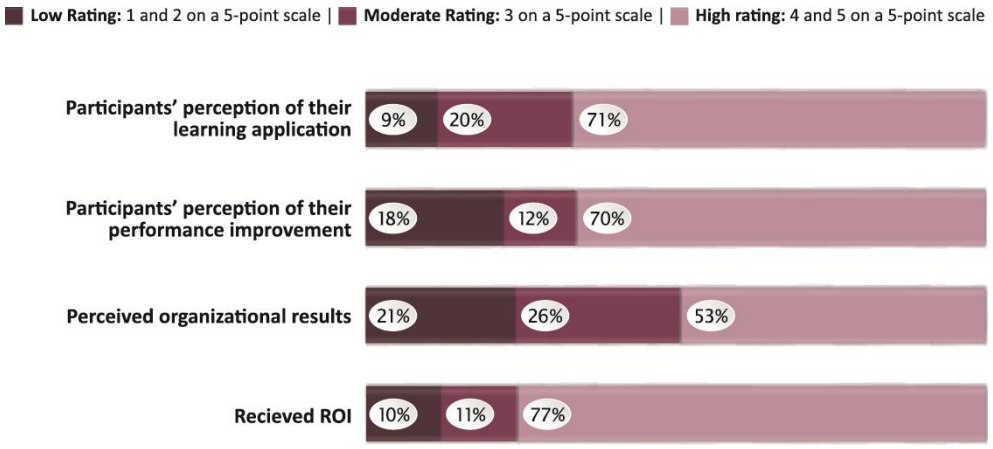
Company	MW Canada is an innovative textile manufacturing firm in Cambridge, Ontario. MW Canada's 65 employees manufacture window covering, filtration composite and energy-related fabrics.
OUTCOMES	
ROI	**17%**
Business Results	**$20,400 Cost Savings** – Reduced production downtime through improved preventative maintenance
Intangible Outcomes	• Improved product quality • Enhanced workforce problem-solving capability • Enhanced independent thinking • Enhanced workforce confidence level
Problem, Opportunity, Challenge	**Strategic Challenge:** MW recognizes that a key to its survival is its ability to quickly respond to shifting market changes by the design, testing and production of new textiles and products. To accomplish this, a highly skilled workforce is essential. This is key to achieving maximum productivity while ensuring customer satisfaction, and maintaining an innovative, high quality mix of product. In the words of MW President, Bob Berger, "As skilled workers retire, it is becoming more of a challenge to replace these valuable employees with those who have the same or even similar skills levels. With the advancements in technology, ongoing training is required for our current workforce." **Specific Problem:** A day to day challenge for manufacturing firms such as MW Canada is the need to adopt more effective preventative maintenance strategies in order to ensure production facilities can sustain optimum output levels. This requires skill building to raise the technical capabilities of the production workforce.
The Training	The company initiated a new learning initiative, the Technical Skills Certificate Program, designed to improve technical communications and problem-solving of its production staff. Although the six-month long training program covered a variety of technical areas, this case study evaluation focused on two segments— Mechanical Power Transmission and Introduction to Pneumatics.

CFLI Capability Index: MW Canada



Risk Alerts: The majority of participants assign moderate ratings on 5 key indicators of program impact: confidence to apply the learning, perceived value of the training, motivation to apply learning, plans for action or application, and the readiness of the workplace for learning transfer. The yellow flag alert suggests that moderate ratings may hinder learning transfer. Employing strategies to strengthen these results will enhance program impact on job performance, organizational results and ROI.

CFLI Transfer Index: MW Canada



Key Impacts

A key outcome from the training was the resolving of an ongoing problem that regularly caused the breakdown of the loom weaving production line. As a result of enhanced technical knowledge and problem-solving skills, the production workforce was able to reduce the frequency of costly loom shutdowns from five incidents to two per year. The bottom line savings for MW Canada is $20,400 per year from reduced production downtime. The training returned 17% ROI (Return on Investment) to MW Canada. It should be noted that MW Canada can reasonably expect to receive ongoing returns from reduced loom breakdowns in future years and from similar improvements in other areas of production beyond those measured in the course of this case study.

Intangible Impacts

Improved Product Quality Following training, managers observed sharp reduction in calls from the Mending department indicating a higher level of quality of finished product.

Improve Workforce Problem-Solving Capabilities MW can now save time and resources by relying on in-house production staff to resolve complex problems that might normally require outsourced solutions. *"We would have brought in outside assistance much earlier in the process to resolve the problem. This kind of problem- solving speaks well to our ability to effectively identify and resolve future issues."*

Increased level of independent thinking in production staff *"Loom mechanics now have the confidence to start jobs independently, without requiring supervisors to coax or push them."*

Enhanced confidence level in workforce *"Addressing complex problems has become a great deal easier since staff feel they have more knowledge and more confidence."*

Effective Practices
Enabling Transfer-to-the-Job (% Selecting factor, N=9)
Adequate motivation and incentive (66%)
Information, reference materials, tools, or job aids (55%)
Sufficient level of knowledge and skill (55%)
Other Effective Practices (Researchers' communication with MW Canada)
(Management Commitment & Support) MW Canada's President is a strong supporter of the training. Most communication about the training to employees came directly from him.
Production oriented: Involvement of a production manager in classroom activities provided learners with a coach who is able to continuously relate theory and training to the participants' work situations.
Daily problem-solving team meetings: Daily team meetings with manager/facilitator to discuss specific problems or issues related to the training helped reinforce the training and provided opportunities to use new knowledge to problem-solve as a group.
In-house training room: A dedicated training room was conducive to learning-preventing distractions on the factory floor.

Barriers to Success (% Selecting factor, N=9)
Unable to dedicate the time required to practice new skills or adopt new ways of doing things (33%)
Performance expectations were unclear (33%)

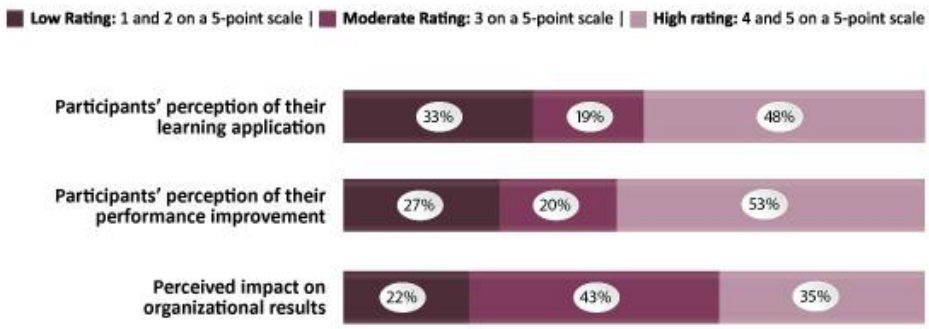
Niedner – French Comprehension and Grammar

Company	Niedner is a manufacturer of a wide range of high quality, lightweight, extremely flexible, compact, resistant large diameter hoses (12+ inches). Based in Coaticook, Quebec, Niedner today employs 150 people and a wide range of distinctive woven-jacketed hose products including both rubber-lined and lightweight polyurethane-lined fire hose versions. The company serves the following markets: forestry, municipal, industrial, government, automotive, oil and gas, and snowmaking.
OUTCOMES	
ROI	(Not Calculated)
Business Results	(None Measured)
Intangible Outcomes	• Improved product quality • Enhanced team efficiency and morale • Enhanced workforce problem-solving capabilities • Enhanced second language communications
Problem, Opportunity, Challenge	One of the primary objectives of the training investment was to instill in employees a better understanding of the factors and procedures affecting quality. The immediate goal was to reduce errors. Another fundamental objective of the training was to provide an opportunity for employees to update their secondary certification towards the GED on the job.
The Training	**French Comprehension and Grammar** Eleven mechanics and operators voluntarily participated in the training with the purposes of updating their secondary-level certification and improving literacy. Training methods included lectures, discussion groups among the participants, and individual and group exercises. **Specific workplace goals for the training included:** • Read and understand memos, instructions or written reports • Identify the subject in a text as well as the general meaning • Formulate a response to an information request; complete forms or write a text explaining a situation • Organize ideas in written form with an objective of informing, persuading, or requesting information

CFLI Capability Index: Niedner

RISK ALERTS Slightly more than one-third of participants have not developed plans or ideas for how or where they will apply their learning.

CFLI Transfer Index: Niedner



TRANSFER ALERTS Approximately half of participants report a 'Low' or 'Moderate' level of learning application to the job and performance improvement.

Key Impacts

Niedner has confirmed that it did not anticipate any measurable, tangible monetary impacts from the essential skills training. Nevertheless, managers reported that the training not only indirectly improved organizational outcomes such as efficiency and product quality, but also communication and company morale.

Intangible Impacts

Team Efficiency, Quality, Error Reduction In the time following the training, all eight managers agreed that the training was a worthwhile investment for the company. All of the managers also reported a "high" level of improvement in team efficiency, product quality/reduction of errors, and increased work output.

In addition, some managers commented that the training:

- Gave employees a better understanding and comprehension of key procedures.
- Helped employees better understand blueprints and more easily use blueprint plans.
- Helped employees develop greater confidence.

Improved Teamwork and Collaboration 89% of attendees reported that teamwork and workplace collaboration had improved to a "moderate" or "high" degree following training.

Second Language Proficiency The training has also helped employees become more comfortable, confident and productive in Niedner's bilingual manufacturing setting. According to Niedner's Director of Production, Alain Charette:

"One participant, an English first-language supervisor, for the first time is able to send his emails and communications entirely in French."

"Another benefit from the program was enhanced self-esteem amongst the participants and the pride of achieving a diploma, recognized by Québec Ministère de l'Éducation. This is a milestone they were unable to attain during their teenage years.

Effective Practices

Enabling Learning (HE – Highly Effective ME - Moderately Effective)

Quality of Design and Instruction

Re-arranging schedules so co-workers could attend together (HE)
Scheduling training during work hours (HE)
Preventing work interruptions during training (HE)
Using a dedicated training room (HE)
Pre-work assignment (HE)
Providing opportunity for collaboration, discussion, and learning from others (HE)
Forming small study groups (HE)
Clearly communicating the learning and performance objectives (HE)

Enabling Transfer-to-the-Job (% Selecting factor, N=9)

Support from my manager or supervisor (66%)
Sufficient level of knowledge and skill (66%)

Barriers to Success

Overall, participants reported very few barriers to learning or to learning application.

Soprema – Numeracy and Secondary Level Certification

Company	Soprema Inc. is an international manufacturer specializing in the development and production of waterproofing products for the building and civil engineering sectors. Founded in 1908, Soprema has its headquarters in Strasbourg, France and operates in 90 countries**.** The Canadian Research and Development Centre is located in Drummondville, Quebec and has 330 employees. Since starting operations in Canada in 1978, Soprema has manufactured and installed millions of square metres of waterproofing membranes.
OUTCOMES	
ROI	(Not Measured)
Business Results	(None Measured)
Intangible Outcomes	• Enhanced workforce confidence levels • Enhanced self esteem
Problem, Opportunity, Challenge	The Soprema Basic Training program was provided to expand the skills of Soprema production employees (forklift operators and labourers) in order to enhance their advancement opportunities within the company. The goals for the employees consisted of completion of secondary-level certification and general literacy, including a better understanding of mathematical data in their work. Another goal was increasing participants' self-esteem through pride in having completed the training. For the company, the training was implemented to increase production quality and reduce error through improved ability to efficiently perform rapid calculations -- in particular, percentages, means and averages, as well as making use of the Rule of Three.
The Training	**The skills focus for the case study was on calculation and basic mathematics operations. Learning goals for training participants include:** • Good command of mathematical operations including addition, subtraction, multiplication and division for work and other daily purposes. • Ability to calculate percentages for work and other daily purposes. • Ability to calculate and transform operations including fractions, decimals, averages and means. • Ability to solve mathematical problems and apply the Rule of Three. • Perform rapid mental calculations.
Key Impacts	The small number of survey respondents makes it difficult to draw valid or even meaningful conclusions about the impact of the training on business results and return on training investment.
Intangible Impacts	*"We have seen the impact of the training in the growth of self-esteem of the participants—in their pride at completing the program and finally obtaining their high school equivalence certification. This pride translates into a positive force in the working environment. It encourages employee peer support within production teams."*

Effective Practices

Enabling Learning

Quality of Design and Instruction

Group discussions during the training
Time allotted to participate in the training during work hours
Having a dedicated room for training
Clearly communicating the learning and performance objectives
Providing realistic and work-related practice activities
Providing useful feedback during activities
Providing opportunity for collaboration, discussion, and learning from others

Enabling Transfer-to-the-Job

Support of colleagues or peers
Information, reference materials, tools, or job aids

Barriers to Success

No appreciable mentions

Appendix A: High Impact Evaluation Model

The Case Study Methodology

The Learning Value Chain™ Framework

All WLESR studies employed the Learning Value Chain evaluation Methodology—the core evaluation framework and instrument-set develop for the Gillis and Bailey High Impact Evaluation model™. The Learning Value Chain™ framework offers an uncomplicated, field-tested framework for evaluating the learning effectiveness and the business value of training and human resource investments (Figure 1).

In the Learning Value Chain™, the training program triggers a chain of critical outcomes. Monitoring this chain of outcomes adds an innovative and critically important predictive value to the evaluation process. As desired outcomes are achieved at each link along the chain, greater value is added and the likelihood increases that training will result in positive business outcomes and return on investment. Conversely, if training fails to meet outcomes at any link, value is diminished and the prospect of positive business results and return on investment is at risk.

Using the Learning Value Chain™ framework, the training program is evaluated at each of four links (Capability, Transfer, Business Results and ROI). At each link, data is gathered to assess the extent to which the training has achieved key outcomes, added value and enabled the next critical event in the chain to occur.

The Learning Value Chain™ model also incorporates diagnostic tools that allow researchers to investigate which training practices strengthen or weaken outcomes at each link—'what works' and 'what doesn't' in LES training.

Figure 1

The Learning Value Chain™

Training Activates a Chain of Critical Outcomes

CAPABILITY	**Training Enhances Capability and Intentionality**: As a result of training, participants acquire new knowledge, skills or attitudes—enhancing their *capability* to take on new work roles and tasks or improving the way they currently do their work. They also develop the *intention* to apply their learning and begin to formulate plans or ideas for doing so.
TRANSFER	**Enhanced Capability Improves Job Performance**: The work context and learning strategy supports the transfer of learning to the workplace. As a result, participants successfully demonstrate new behaviours, perform new roles/tasks, or improve their job performance.
BUSINESS	**Enhanced Job Performance Improves Business Results:** Changes or improvements in the way in which participants perform their work contribute to positive improvements in closely linked business or organizational outcomes.
ROI	Positive ROI: Net benefits from business improvements exceed training costs, resulting in a positive return-on-investment (ROI).

Appendix B: Learning Enablers

Learning Enablers (% of participants selected item) (HE Highly effective, ME Moderately Effective)

Providing opportunity for collaboration (7 or 8)		
Providing opportunity for collaboration, discussion and learning from others (ME)	Boeing EI/LT	
Providing opportunity for collaboration, discussion, and learning from others (HE)	Niedner	Design & Implementation
Providing opportunity for collaboration, discussion, and learning from others (ME)	Advanced Precision	Quality of Instruction
Providing opportunity for collaboration, discussion, and learning from others (HE)	Argus Industries	Quality of Instruction
Providing opportunity for collaboration, discussion, and learning from others (HE)	BCT Structures	Quality of Instruction
Providing opportunity for collaboration, discussion, and learning from others (HE)	Allsco	Quality of Instruction
Providing opportunity for collaboration, discussion, and learning from others	Soprema	
Clearly Communicating Objectives (7)		
Clearly communicating the learning and performance objectives	Soprema	
Clearly communicating the learning and performance objectives (HE)	Canplas	Quality of Instruction
Clearly communicating the learning and performance objectives (HE)	Allsco	Quality of Instruction
Clearly communicating the learning and performance objectives (HE)	Niedner	Design & Implementation
Clearly communicating the learning and performance objectives (ME)	Advanced Precision	Quality of Instruction
Clearly communicating the learning and performance objectives (ME)	Boeing IIF	
Clearly communicating the learning and performance objectives (ME)	BCT Structures	Quality of Instruction
Providing useful feedback (6)		
Providing useful feedback during activities	Soprema	
Providing useful feedback during activities (HE)	Allsco	Quality of Instruction
Providing useful feedback during activities (ME)	Advanced Precision	Quality of Instruction
Providing useful feedback during the activity (HE)	Argus Industries	Quality of Instruction
Providing useful feedback during the activity (HE)	BCT Structures	Quality of Instruction
Providing useful feedback during the activity (ME)	Boeing EI/LT	
Flexible Scheduling (6)		
Re-arranging schedules so co-workers could attend together (HE)	Niedner	Design & Implementation
Scheduling training during work hours (HE)	Niedner	Design & Implementation
Scheduling training during work hours (HE)	Canplas	Design & Implementation

The re-arranging of work schedules so co-workers could attend together (HE)	Canplas	Design & Implementation
Time allotted to participate in the training during work hours	Soprema	
Holding training during work hours (ME)	Allsco	Design & Implementation
Presenting key concepts clearly (5)		
Presenting key concepts clearly and logically (HE)	Canplas	Quality of Instruction
Presenting key concepts clearly and logically (HE)	Allsco	Quality of Instruction
Presenting key concepts clearly and logically (HE)	Argus Industries	Quality of Instruction
Presenting key concepts clearly and logically (HE)	BCT Structures	Quality of Instruction
Presenting key concepts clearly and logically (ME)	Boeing IIF	
Small Study Groups (4)		
Forming small study groups (HE)	Niedner	Design & Implementation
Forming small study groups for the Workplace Performance Project (HE)	Canplas	Design & Implementation
Group discussions during the training	Soprema	
Individual case studies, group discussions, and problem solving exercises (ME)	Allsco	Design & Implementation
Dedicated Training Room (4)		
Using a dedicated training room (HE)	Canplas	Design & Implementation
Using a dedicated training room (HE)	Niedner	Design & Implementation
Having a dedicated room for training	Soprema	
In-house training room	MW	Interviews
Providing a realistic and work-related and practice activity (4)		
Providing a realistic and work-related and practice activity (ME)	Boeing EI/LT	
Providing a realistic and work-related practice activity (HE)	Argus Industries	Quality of Instruction
Providing a realistic and work-related practice activity (HE)	BCT Structures	Quality of Instruction
Providing realistic and work-related practice activities	Soprema	
Engaging & Sustaining Interest (3)		
Engaging and sustaining learners' interest (HE)	Canplas	Quality of Instruction
Engaging and sustaining learners' interest (HE)	Argus Industries	Quality of Instruction
Engaging and sustaining learners' interest (HE)	BCT Structures	Quality of Instruction

Applying problem-solving to workplace problems (3)		
Applying creative problem solving principles to solve personal or workplace problems (ME)	Allsco	Design & Implementation
Applying the problem solving method to a real-life problem (HE)	Argus Industries	Design & Implementation
Production oriented	MW	Interviews
Providing useful response to questions (3)		
Providing useful response to questions guidance or clarification (HE)	Allsco	Quality of Instruction
Providing useful response to questions, guidance or clarification (HE)	Canplas	Quality of Instruction
Providing useful response to questions, guidance or clarification (ME)	Boeing EI/LT	
Preventing work interruptions (2)		
Preventing work interruptions during training (HE)	Canplas	Design & Implementation
Preventing work interruptions during training (HE)	Niedner	Design & Implementation
Sufficient level of knowledge and skill (2)		
Sufficient level of knowledge and skill (55%)	MW	
Teambuilding exercises (HE)	Allsco	Design & Implementation
Learning Assessments (2)		
Providing opportunity for learning assessment or reflection (HE)	Canplas	Quality of Instruction
Providing opportunity for learning assessment or reflection (HE)	Allsco	Quality of Instruction
Single mentions		
Adequate motivation and incentive (66%)	MW	
Communication exercises (speaking appropriately with coworkers and management) (HE)	Allsco	Design & Implementation
Daily problem-solving team meetings	MW	Interviews
Discussions (HE)	Argus Industries	Design & Implementation
Information, reference materials, tools, or job aids (55%)	MW	
Making recommendations for improvements (ME)	Advanced Precision	Quality of Instruction
Management Commitment & Support	MW	Interviews
Pre-work assignment (HE)	Niedner	Design & Implementation
Using a blend of learning delivery formats (e-learning, webinars, hands-on project, discussion group) (HE)	Canplas	Design & Implementation
Reading and Comprehension exercises (ME)	Allsco	Design & Implementation
Reading exercises and quizzes with workplace documents (ME)	Allsco	Design & Implementation

Appendix C: Transfer Enablers

Transfer Enablers (**%** of participants who selected item)

Support from my manager or supervisor (9)		
Support from manager or supervisor (13.4 %)	Boeing IIF	
Support from manager or supervisor (70 %)	BCT Structures	
Support from my manager or supervisor (100%)	Canplas	
Support from my manager or supervisor (13.1%)	Boeing EI/LT	
Support from my manager or supervisor (38%)	Argus Industries	
Support from my manager or supervisor (50%)	Advanced Precision	
Support from my manager or supervisor (60%)	Allsco	
Support from my manager or supervisor (66%)	Niedner	
Management Commitment & Support	MW	Interviews
Sufficient level of knowledge and skills to apply learning (7)		
Sufficient level of knowledge (12.9 %)	Boeing IIF	
Sufficient level of knowledge and skill (100%)	Canplas	
Sufficient level of knowledge and skill (44%)	Argus Industries	
Sufficient level of knowledge and skill (50%)	BCT Structures	
Sufficient level of knowledge and skill (55%)	MW	
Sufficient level of knowledge and skill (66%)	Niedner	
Sufficient level of knowledge and skill (70%)	Allsco	
Information, reference materials, tools or job aids (6)		
Information, reference materials, tools, or job aids	Soprema	
Information, reference materials, tools, or job aids (69%)	Argus Industries	
Information, reference materials, tools, or job aids (12%)	Boeing EI/LT	
Information, reference materials, tools, or job aids (55%)	MW	
Information, reference materials, tools, or job aids (70%)	Allsco	
Information, reference materials, tools, or job aids (83%)	Canplas	
Support from my colleagues and peers (5)		
Support from my colleagues or peers (69%)	Argus Industries	
Support from my colleagues or peers (100%)	Advanced Precision	
Support from my colleagues or peers (12.8%)	Boeing IIF	
Support from my colleagues or peers (15%)	Boeing EI/LT	
Support of colleagues or peers	Soprema	
Adequate motivation and incentive (3)		
Adequate motivation and incentive (60%)	Allsco	
Adequate motivation and incentive (66%)	MW	
Adequate motivation and incentive (83%)	Canplas	
Follow-up discussions or coaching (3)		
Follow-up discussions or coaching (14.2%)	Boeing EI/LT	
Follow-up discussions or coaching (44%)	Argus Industries	
Follow-up discussions or coaching (50%)	BCT Structures	

Opportunity to apply learning to real workplace issues (2)		
Opportunity to Apply	Canplas	Interviews
Opportunity to apply learning to real workplace issues (50%)	Advanced Precision	
Clear Performance Expectations (2)		
Clear performance expectations (10.5%)	Boeing IIF	
Clear performance expectations (60%)	Allsco	
Daily problem-solving team meetings (2)		
Daily problem-solving team meetings	MW	Interviews
Daily problem-solving team meetings	Canplas	Interviews
Single Responses		
In-house training room	MW	Interviews
Management Commitment & Support	MW	Interviews
Production oriented	MW	Interviews
Scenario-based Testing	Canplas	Interviews

Appendix D: Transfer Barriers

Barriers to Transfer (% of participants who selected item)

Unable to dedicate time (5)	
Unable to dedicate the time needed to practice new skills	Advanced Precision
Unable to dedicate the time required to practice new skills or adopt new ways of doing things 10%	Boeing EI/LT
Unable to dedicate the time required to practice new skills or adopt new ways of doing things 33%	MW
Unable to dedicate the time required to practice new skills or adopt new behaviour 33%	Canplas
Unable to dedicate the time required to practice new skills or adopt new ways of doing things 40%	BCT Structures
Unable to dedicate the time required to practice new skills or adopt new ways of doing things 40%	Argus Industries
Lack of interest and support of management (3)	
Lack the interest and support of management (11%)	Boeing IIF
Lack the interest and support of management (9.3%)	Boeing EI/LT
Lack of interest and support of management (67%)	Advanced Precision
Too difficult to break old habits (2)	
Too difficult to break old habits (12%)	Boeing EI/LT
Too difficult to break old habits (50%)	Advanced Precision
Lack of opportunities to apply new learning (2)	
Lack the relevant opportunities to apply my new learning (10%)	Boeing IIF
Lack relevant opportunities to apply my new learning (9%)	Boeing EI/LT
Lack support of colleagues & peers (2)	
Lack the support of colleagues and peers (9.6%)	Boeing EI/LT
Lack of support from colleagues and peers (50%)	Advanced Precision
Single Responses	
Existing policies, procedures, and work processes (50%)	Advanced Precision
Performance expectations were unclear (33%)	MW
Too little motivation or incentive (13.6%)	Boeing EI/LT

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