Innovative Models for Delivering Training to Workplace Learners

Prepared for the Wood Manufacturing Council by Iain Macdonald

Centre for Advanced Wood Processing
University of British Columbia
Table of Contents

Executive Summary ............................................................................................................... 1

1. Introduction .................................................................................................................... 2

2. Project Methodology .................................................................................................... 3

3. Methods and Technologies for Delivering Training ...................................................... 4

3.1 Classroom Training ..................................................................................................... 4

3.2 Shop Floor Practical Training ..................................................................................... 4

3.3 Internet-based Training .............................................................................................. 6

3.3 Internet-based Training .............................................................................................. 6
   Advantages and Disadvantages .................................................................................... 6
   Learning Management Systems ..................................................................................... 7
   Webinars and Videoconferencing ................................................................................ 9
   Social Media ................................................................................................................ 10
   Video ............................................................................................................................ 11
   Standalone CDs and DVDs .......................................................................................... 12
   E-books ....................................................................................................................... 12

3.4 Mobile Devices in Training ....................................................................................... 13

   Smart Phone Advantages ......................................................................................... 14
   Tablet Advantages .................................................................................................... 15
   Attitudes to Mobile Training in the Wood Products Industry .................................... 15
   Design Guidelines - Using Mobile Devices for Training .......................................... 16
   Mobile Learning in Use – Pilot Projects and Case Studies ....................................... 17

3.4 Training Delivery Methods – Summary of Pros and Cons ...................................... 20
4. Putting it all Together – “Integrated” Training ........................................... 21
4.1 Integrated Training Case Studies (Non-wood Sector) .................................. 21
   Case #1 – RONA, Canada ............................................................................ 21
   Case #2 – Cosma International, Canada and Worldwide ................................ 22
   Case #3 – CNC training, Turkey ................................................................. 23
   Case #4 – Leadership training, India, US and UK ........................................ 23
   Case #5 - Management training, bakery sector, Australia .............................. 24
   Case #6 – Web-based training in the dairy industry supply chain, Australia ... 24

   1. Dynamic Windows and Doors, Abbotsford, BC ........................................ 25
   2. Loewen Windows, Steinbach, Manitoba .................................................. 26
   3. Triangle Kitchen, Moncton, New Brunswick ............................................ 26
   4. Tembec Industries, Chapleau, Ontario ..................................................... 27
   5. Stiles Machinery Inc., Grand Rapids, Michigan ......................................... 28

6. Conclusions and Recommendations .......................................................... 29
   6.1 General Findings ...................................................................................... 29
   6.2 Recommendations ................................................................................... 32
   6.3 The Future: Integrated Training in the Wood Products Sector ............... 35

7. References ..................................................................................................... 37

8. Acknowledgements ....................................................................................... 38

9. Appendix 1: Interviews Conducted .............................................................. 42
Executive Summary

This document is a report on the current methods of delivery of workplace training in the advanced wood products manufacturing industries and the potential for the introduction of training methods that utilize innovative combinations of face-to-face training, e-learning, and training using mobile devices. The document is based on a review of published literature, extensive dialogue with training professionals, as well as information gathered through industry steering committee meetings and interviews with those responsible for managing training and development at twenty companies, both within and outside the wood products manufacturing sector.

Integrated training refers to the practice of designing training programs that combine classroom or hands-on workplace training with other approaches that use computers or mobile devices such as smart phones and tablets. These technologies and the software applications that run on them are evolving rapidly and becoming steadily more affordable, offering benefits such as the ability to learn anywhere and anytime, interact easily with trainers and other learners, and view videos, animations and other highly visual content.

In general, Canada’s wood products manufacturing industry, dominated by SMEs, is characterized by a relatively informal approach to training. Systematic, company-wide training plans are uncommon in all but the largest of companies, and training efforts are hampered by lack of budget, the difficulty of substituting for key personnel on the shop floor while they attend classes, as well as by fears that employees who receive training will leave the company for better jobs elsewhere. Having said this, there is a small breed of forward-thinking companies that have put in place innovative and comprehensive training systems, and some of these are profiled in the case study section of this report. Because of the lack of systematic training approaches, few companies can be said to be employing integrated training strategies that include the use of technology. Some e-learning is taking place, but this is mostly on an ad-hoc basis, and only one wood industry example was found of a training program that integrated e-learning and face-to-face training. Essential skills issues and an industry culture that does not embrace new ideas such as e-learning were cited by some respondents as barriers to greater adoption of e-learning.

When asked, several companies expressed interest in the idea of delivering training using mobile devices, but none are currently doing this, and a major barrier is the common practice of banning mobile phones on the shop floor for safety and productivity reasons. There is strong potential for mobile learning to be used to train and support employees who spend substantial portions of their workday away from the plant or office at external locations.

The wood products industry appears to lag behind other business and industrial sectors such as software, financial services, automotive, and retail in its adoption of technology-supported training methods such as e-learning and mobile learning. As younger workers come into the industry who are “digital natives”, comfortable with social networking, computers and mobile devices, adoption can be expected to increase, and this offers great potential for cost savings and training that is tailored to the personal needs of each employee.
1. Introduction

Since the advent of the World Wide Web less than 20 years ago a plethora of new training delivery methods and forms of learning content have become available to businesses seeking to upgrade and develop the skills of their employees. In addition to classroom and shop floor training, modern human resources managers have at their disposal a mind-boggling array of print-based correspondence courses, e-learning modules, mobile learning, e-books, online tutoring services, pre-packaged and customizable course packages, and many other options. New tablet computers, portable media players and smart phones offer a wide range of choices for accessing training content, each with their own advantages and limitations. In light of the increasing complexity of the training world, this report attempts to answer the questions that many human resources and training professionals may be asking, such as:

- How can my company make the most effective use of today’s training methods?
- How can we effectively combine traditional face-to-face learning with Internet-based learning delivered via computers, tablets, smart phones and other devices?
- Can popular “Web 2.0” tools such as social networking play an effective role in workplace learning without simply becoming a distraction?
- How can training strategies that utilize new technologies be future-proofed to avoid premature obsolescence?
- How can we ensure that our employees adapt to and buy into new technology-driven learning methods?

To answer these questions, this report will first examine the various technologies, training platforms and online tools that are available in 2012, as well as the devices that learners can use to access them. Next, we will consider a range of possible ‘blended’ approaches to training (combining face to face learning with e-learning, mobile learning, and other methods) and their various advantages, limitations, and most appropriate uses. This discussion will be illustrated with case study examples from various industries to highlight best practices. The report will draw upon both published information and first-hand interviews with training managers from companies of various sizes. We will conclude by summarising best-practices recommendations for various kinds of training.
2. Project Methodology

To answer the research questions posed above, a multi-stage research process was undertaken, beginning with a secondary research component. A literature search of academic journals related to the fields of e-learning, workplace training, and mobile learning was carried out. Since technologies associated with e-learning and mobile learning change rapidly and mobile learning itself is such a new field, an emphasis was placed on articles published within the last 2 years. In addition to academic journals, reports and articles from professional training associations (such as the American Society for Training and Development and the e-learning Guild) were also reviewed.

The second stage of the project involved a number of primary research activities. First, requests were placed on four LinkedIn discussion groups, asking for information on companies that have successfully integrated elements such as e-learning, mobile learning and face-to-face learning into their training programs. The groups selected were the Learning, Education and Training Professionals Group, the Mobile Learning in Education Group, the Social Learning Group, and the e-learning Guild Group. As well as helping to identify companies for interview, participation in these online groups also highlighted many interesting developments in workplace training that were flagged for further investigation via the interview stage.

The research project was fortunate to draw upon the insights and perspectives of an 8-member industry steering committee, which provided guidance in several ways:

- Suggested and validated topics for analysis in this report
- Helped to identify companies that should be interviewed
- As wood products manufacturing businesses, shared their own perspectives and experiences with regard to training and technology
- Reviewed drafts of the report and commented on industry relevance and most appropriate format for the final document

Through the actions described above a list of companies were identified for interview, and ultimately the authors talked to 10 wood-sector companies and 10 non-wood sector businesses. The interviews were predominantly conducted by telephone, with the exception of one face-to-face meeting and one Skype audio call. A full list of companies and individuals interviewed is provided in Appendix 1.
3. Methods and Technologies for Delivering Training

This section of the report describes the various options available to companies when delivering training to their employees, whether they conduct training directly or through third-party organizations such as training consultancies, educational institutions and professional/trade associations. The pros and cons of each method are described, and case examples are provided.

3.1 Classroom Training

Classroom training is the most traditional form of lifelong learning and closely resembles the educational model that workplace learners experience in the K-12 system. As such, it offers the advantage of familiarity and the opportunity for trainees to communicate readily and face-to-face with instructors and fellow learners, but has the drawback that some employees may associate this form of training with negative academic experiences in school. Furthermore, employees who were not particularly academically oriented at school may feel reticent about speaking up (asking questions, voicing their opinions) in a classroom environment. Indeed, studies (e.g. Längin, Lewark & Ackerman, 2004) have found that trainees can sometimes feel more comfortable asking questions and making comments in an e-learning environment, since it offers a degree of anonymity in a group discussion context. (This point was reiterated during an interview with a mining company for this research project). Classroom training is typically quicker and more cost-effective to develop than e-learning, because in the latter case once the training materials are prepared extra steps (such as creating websites or uploading content and assessment materials to a dedicated learning management system) must be carried out before learners can access them. On the other hand, if trainees must travel offsite (away from their normal workplace) to attend classroom training, travel and accommodation costs can often outweigh the tuition fees themselves, and this is a major advantage of alternatives such as e-learning.

Classroom training can be carried out by a company’s own in-house personnel such as supervisors or dedicated trainers, or can be outsourced to consultants who visit the company location. It is also common for trainees to attend classes offsite that are run by equipment or materials suppliers, higher education institutions or training companies.

3.2 Shop Floor Practical Training

In a production environment it is common for employees to receive practical training to enable them to operate machines, use hand tools, carry out quality checks, organize production, and other tasks directly linked to the shop floor. In the wood products industry these kinds of training are, in the majority of cases, carried out by in-house staff (e.g. supervisors training new line employees) or by technical personnel from machinery supply companies (in most cases however machinery suppliers are brought in to perform training only when new machinery has just been purchased and installed). Training by in-house personnel can be very effective, but a common problem is inconsistency in the instruction that different individuals within the company give and receive. This typically
occurs due to a lack of written training materials and/or standard operating procedures (SOPs). Without such materials, employees develop different methods of performing the same job and, as these employees move into positions in which they must train others, inconsistencies occur. This can lead to differences in employees’ perceptions of acceptable safety or quality standards, which can have major repercussions.

A program that is readily available to the wood products industry and that can alleviate the issue described above is the Rapid Internal Skills Enhancement (RISE) program. This program was developed by the Wood Manufacturing Council and consists of a comprehensive set of training templates that manufacturers can obtain without cost, and then customize to suit their own needs. The templates cover standard operating procedures, applications, and safety protocols for common pieces of woodworking equipment such as table saws, planers, wide belt sanders, edgebanders, and other machines. There are many models of each kind of equipment available, and so it is recommended that a company using these templates should take the time to adapt them by adding specific instructions on the features of their particular machines. At the same time, they can add additional details about what each piece of machinery is used for in their production environment (because depending on what products are being certain features of the machine will be more or less important). Finally the customized training document can describe company-specific working procedures and any quality checks that need to be carried out at that work centre.

The full set of RISE documents can be obtained by contacting the Wood Manufacturing Council. Companies wishing to enlist support to customize the training templates for their own operations can contact the UBC Centre for Advanced Wood Processing.

Training Within Industry (TWI) is a formal program created by the US government during World War II to support the war effort at a time when millions of civilians needed to be rapidly trained to do production jobs as soldiers went off to war. After the war, when US manufacturers faced little competition, the program died away and became forgotten, but it was introduced to Japan and became a core part of the training efforts of companies such as Toyota. In the last few years the program is receiving renewed attention in North America, perhaps due to the fact that many of its principles support lean production methods and good quality management.

TWI uses a learn-by-doing approach to teach essential skills for supervisors and team leaders in all types of industries and businesses. An overarching theme is to achieve standardized ways of performing manufacturing tasks, with this lack of process variation helping not only improve quality, but also making it easier to track down the source should an issue arise. In this way TWI shares the philosophy driving the creation of the RISE program described above. TWI has three core programs, these being:

- Job Relations - a course that teaches supervisors to build and maintain positive employee relations
• Job Instruction – focused on training the trainer, this course shows instructors how to break tasks down into closely defined steps, demonstrate the correct procedures, then repeatedly coach the learner, gradually providing less and less direct instruction until the learner can perform it independently without assistance.

• Job Methods - a course that teaches workers how to objectively evaluate the efficiency of their jobs and to methodically evaluate and suggest improvements.

Companies wishing to pursue TWI typically contact consultants and trainers specialising in this program. One organisation in Canada offering such courses is FPInnovations.

3.3 Internet-based Training

Internet-based training, commonly known as e-learning, can take many forms and can be both passive and interactive. In the last few years, since the advent of high-speed 3G wireless data networks, individuals have been able to access the Internet via their smartphone or tablet device, but for the purposes of this document we will define e-learning as any learning activity that uses a personal computer to access training materials or interact with tutors or other learners using the Internet. Mobile access to the Internet will be covered later in this report in the section on mobile learning.

Advantages and Disadvantages

Internet-based training offers a number of benefits for workplace learners, as follows:

• Accessibility: training is available in the workplace, therefore avoiding e.g. production problems associated with key personnel being absent from the workplace to attend a classroom session. In many small businesses this represents the greatest barrier to training

• Flexibility: studying can be done at times convenient to the learner and the business, and either at the workplace or at home

• Cost-effectiveness: travel and accommodation costs associated with attendance at off-site training can be eliminated

• Ease of update: digital materials do not have to be reprinted and can be updated quickly and at minimal cost

• Communication: workers at geographically diverse sites can share experiences and perspectives, contributing to greater problem-solving and increased innovation

---

1 3G networks were first introduced commercially in South Korea in 2002 and describe systems that can provide peak data rates of at least 200 kbit/s, according to International Telecommunications Union standards.
Innovative Models for Delivering Training to Workplace Learners

This quote, from an Australian study on e-learning for electrical supply workers, illustrates some of these points;

“We used to do that [a legislated rigging course] as a face-to-face course, and we’d be charged a few hundred dollars for that. We’ve put all the theory for that online and we let them enrol to do that...And then the training only takes half a day. It’s four times more efficient use of the trainer’s time to start with, cost to the trainee is about half what it used to be, and by and large the whole course is gotten through in way less time....they probably only take half a day to do all the theory, and the outcomes are actually as good if not better.”

– Employer, electrical supply industry (Flexible Learning Advisory Group 2011, p.11)

Some limitations of online training are:

• The e-learning marketplace is complex, with a large number of e-learning vendors and competing products and systems, which can be confusing to companies trying to select the right solution

• Dropout rates are typically higher for e-learning programs than face-to-face classroom-based training

• Applications that require high bandwidth and therefore faster Internet connections, such as video content and videoconferencing, can still be difficult to deliver to rural locations using older, dialup connections

• Some organisations have attempted to create e-learning courses by taking the course notes from classroom-based courses and posting them online. This almost always results in poor training outcomes and should be avoided

In the early years of the Internet e-learning was focused mostly on delivering content to learners, but more recently a host of interactive tools have become popular, and are available either free of charge or at very affordable cost. Below we describe some of the many ways that the Internet and the various online tools can be used to facilitate training.

Learning Management Systems

The Learning Management System, or LMS, can be thought of as the most ‘traditional’ way of delivering online training. AN LMS is a server-based system that allows an organization to manage the various functions of delivering training online. It plays two roles – storing content (web-based training materials) and offering tools to monitor learners' training performance. In its first role, it can store training content in various forms (normally HTML pages or slides with audio, but also allowing images, PDF documents, video, animations and other resources to be used) within a password-protected secure site that lets you control access. A typical LMS also includes a quiz tool so that you can include multiple choice, true/false, matching, or open-ended question sets at various points in your training course. An online discussion forum and chat room are also fairly standard features, though this will depend on the product you select. Related to the training management role, the LMS allows the training administrator to divide learners into groups and enroll them in various courses, and to control the way each group
Innovative Models for Delivering Training to Workplace Learners

accesses the learning materials. For example, access to Lesson 2 of a course can be restricted until the learner achieves a score of at least 80% on the quiz for Lesson 1. If the quiz is a multiple choice or true/false type in which the correct answers are stored in the LMS, the system can automatically grade the quiz and let successful learners progress without involvement of the instructor being required. Lessons can also be time-released, so that learners do not jump ahead of the cohort.

Instructors can use the LMS to monitor or store grades, and can view detailed log files that show which pages or resources each learner accessed and how long they spent on each one. This can be a powerful tool for identifying problem areas in a course, either for the group as a whole or for individual learners.

Since blogs, WIKIs and other “Web 2.0” applications have become popular, many LMS vendors now include these features in their systems. To read more about and compare the features offered by popular LMS systems see the excellent tool provided by Edutools at http://www.edutools.info/item_list.jsp?pj=4. A comprehensive list of LMS products is also available at http://www.capterra.com/learning-management-system-software?gclid=CPzSlqS-a8CFQ5rhwodgBPSSg

For companies wondering whether investment in an LMS is prudent, consider the following advantages and limitations:

Advantages:
• Offers a secure and private place to store course content
• Provides convenient learner monitoring/tracking and training management tools
• Allows subject experts to create online courses without high-level knowledge of web programming

Limitations:
• System licence fees can be costly
• Requires an IT support specialist to have detailed knowledge of the system and take responsibility for administering and maintaining the system and providing the necessary training to staff
• Some of the features are more relevant to educational institutions than businesses, so companies should consider carefully what they really need

The costs of an LMS can vary greatly. One of the most popular open-source options is Moodle, a well-tested and comprehensive system which can be downloaded free of charge. When implementing an open-source solution such as this, companies should budget adequate amounts for web hosting costs and IT setup, but the IT time required is typically not substantially different than for costly for-profit LMS products. A 2009 survey found that the average first year cost for an LMS ranged from $25,000 for a 500-user licence to $193,000 for unlimited usage; averaged across 3 years the cost was $59,000 for 500 users and $435,000 for unlimited usage (Tagoras, 2009). For smaller companies
Innovative Models for Delivering Training to Workplace Learners

with more modest needs an affordable Canadian LMS is offered by Vancouver-based Odijoo (www.odijoo.com). Odijoo allows organisations to build e-learning courses free of charge within their system, and only collects a commission if the organisation charges users for the course. There is no server-side software installation required: everything is done using Odijoo’s web-based tools. A similar product is offered by Victoria-based Udutu (www.udutu.com).

**Webinars and Videoconferencing**

The term “webinar” has sprung up to describe asynchronous web-based learning sessions in which several participants log onto a website and view a live presentation. The most common type involves a presenter showing a slide presentation on the web page and talking over the slides. The audio link is provided via the Internet, and a toll-free teleconference option is often provided for participants whose Internet connection is insufficient to receive good-quality streamed audio. The options for interactivity vary depending on the platform used, but it is common for participants to be able to ask questions to the presenter and make general comments via a live chat function. A recording of the session can be made by the presenter and posted to a website afterwards.

Webinars are good tools for short informational seminars (one hour is typical) and don’t require any more preparation than would be required to make a face to face presentation. Most platforms allow various common media - PowerPoint or Keynote presentations, PDFs, jpeg images – to be quickly uploaded by the presenter. Because the sessions are live there is a slight disadvantage in that trainees must be available at set times – recordings of sessions are a useful resource but don’t allow participants to ask questions.

As with most things Internet there is much choice in terms of webinar platforms for multi-site companies wishing to host their own webinars for employees. A few of the most popular ones are Citrix’s GoToWebinar (www.gotowebinar.com), Adobe Connect Pro (http://www.adobe.com/products/acrobatconnectpro/), and ON24 (http://www.on24.com), with costs around $50 per month and upwards, depending on features and number of users per session. There are also various free options, though these are likely to be less reliable, allow limited numbers of users, and may include advertising on the sites.
Social Media

It is no secret that social media has exploded in the last five years. Facebook now boasts over one billion million users, Twitter 500M and LinkedIn 175M (therealtimereport.com, 2012). Google+, launched in July 2011, has close to 200 million users already, making it the fastest-growing social network yet. Businesses are now realising that they can use these networks as marketing channels, and are engaging with their customer base in new and interesting ways. But what about the potential to use these networks for training? This comment by a corporate trainer hints at one answer:

“For a long time now, employees have decided how they want to find answers when they have issues to address or find better and faster ways to respond. Our relevance is in helping to not only provide support materials/information for them to access but also to inspire them to comment, add to and update that information so the whole community is weighing in on the “best-practice” response.”

Tom Sales, Training Designer, Dallas, USA
(posted in Learning, Education and Training Professionals Group, LinkedIn)

There has been a lot of recent discussion among training professionals about how to use social media to enable or support learning. The comment above points to its possible use as a means of helping tap into and share the wealth of valuable knowledge that employees carry around with them every day on the job. This knowledge has been gained through a combination of formal education, on-the-job experience and informal means, and it is a resource that companies are increasingly interested in. Studies have shown that informal learning – employees passing information in non-structured ways – can be extremely effective, and has several advantages – it doesn’t have to be scheduled, it is peer-based, and it results in better retention rates than formal training in many cases (because it only occurs when learners are actively motivated to learn something, such as in a problem-solving situation). Because of these advantages, many trainers are using social networking platforms to experiment with different activities and exercises that can support or extend the more formal programs:

“Social media tools help to amplify the social and informal learning already going on in organizations all the time, every day, and make the learning available on a much larger scale. They provide ways to connect talent pools and expertise in an organization or within a practice area, and can offer just-in-time solutions to problems and performance issues.”

Jane Bozarth, eLearning Coordinator for the State of North Carolina

Many organisations are interested in using social media because they want to engage the new generation of young workers who have grown up with and use these applications every day. Using familiar social media tools for training purposes has been said to help
trainees feel a greater sense of control over their learning (Lauby 2012).

A mining company training manager interviewed for this research project described his vision of how social media could be deployed to engage and educate workers. Comeco operates a uranium mine in northern Saskatchewan, with 700 employees onsite at any one time. The training manager would like to install 25 large LCD screens all around the workplace, in high-traffic areas where employees move to and from their job locations, eat meals, etc. By using channels such as Twitter and text messaging, he hopes to engage employees in ongoing conversations about safety and efficiency issues, providing a channel whereby anyone can actively comment on issues that affect their work and help to pass on their knowledge and experience in ways that will benefit newer employees. Part of the reason for doing this is that younger workers already use texting and Twitter on a daily basis, but another reason is that much of the workforce does not respond well to formal classroom training. He hopes that by adding an interactive social dimension to workplace learning all of the company’s training efforts will benefit.

Video

“I had a bit of shock about six months ago when I was talking to one of my sons about his school days (he’s now 26). He said he learned more from YouTube than from any of his teachers.”

-Michael Beale, Trainer and Business Coach, UK
(posted in Learning, Education and Training Professionals Group, LinkedIn)

Today YouTube has almost 500 million global users, with 12 million of those in Canada, making it the second most popular social networking site (after Facebook) and also one of the world’s most important search engines.

Video training is popular, and can be as simple as a recorded version of a face-to-face training presentation or as elaborate as a professionally edited production. Social video-sharing sites such as YouTube and Vimeo do offer a wealth of useful information, such as this freely available video on lean manufacturing http://vimeo.com/1955798 (Ryan Eckdale-Dudley, Vimeo user). Video is a highly engaging medium, and many of the technical topics that manufacturing personnel must be familiar with lend themselves well to visual instruction. Using content from social sharing sites can be a great way to cost-effectively add multimedia to...
home-grown training programs, but using these sites does come with a set of caveats that training managers should be aware of. Anyone can post videos on these sites, and the training manager will need to carefully review videos for quality, accuracy of information, objectivity/neutrality of opinions given, and to screen out profane language and inappropriate content. Another way to add video to your training courses is to create your own, and while professional video production can be expensive, it is not always necessary to go this route (see panel).

The Canadian Automotive Repair and Service (CARS) Council has created “CARS OnDemand”, an Internet-based training program for the automotive aftermarket. Training lessons are presented as two-hour video-based instruction. All lessons include supplementary training materials, including Student Learning Guides and Exams that augment the learning experience. Students can choose to participate in hundreds of training programs, at a schedule that best suits their needs. Programs are on demand; they can be taken at any time at the shop, at home, or wherever the student wishes to learn.

A great advantage of video is that it is a familiar medium for trainees, but since it is one-way only, it should be used as just one component of a training program that includes other more interactive elements, such as quizzes, assignments, or discussions.

**Standalone CDs and DVDs**

We have talked above about Internet-based video training and the opportunities available to incorporate generic/public video clips available on services such as YouTube or Vimeo into custom-designed training programs. Many professional training companies, safety organisations, or industry associations offer standalone video training on DVDs – an examples is the National Safety Council, Nebraska which has developed facilitator kits and training DVDs for forklift safety and many other topics (see [http://www.safenebraska.org/products/compliance.php](http://www.safenebraska.org/products/compliance.php)).

In Australia, the Energy Utilities Skills Council has created a CD-based training tool to help electrical engineers to refresh their knowledge and ensure that all workers have access to standardised information. The CD contains text content, a simulation, and an assessment, and can be used in different ways and augmented with other materials depending on the organisation.

**E-books**

E-books can be as simple as a PDF document or can be created in a variety of formats that can variously be read on personal computers, e-readers such as the Kindle or Kobo, and tablets such as the iPad. There are a wealth of “how to” e-books online, but care should be taken in judging the quality prior to purchase, since they have become a popular moneymaker for would-be Internet entrepreneurs. Various free software applications are available to convert materials from MS Word, HTML files and other formats into e-books. An advantage of e-books over LMS-based e-learning websites is that learners can access the training materials even when there is no Internet connection available.
3.4 Mobile Devices in Training

Mobile devices have seen dramatic gains in market penetration and technical capabilities in the last 10 years, and in the last four or five years educators and training professionals have begun to look seriously at their potential for facilitating learning. Some of the advantages offered by mobile devices for learning are:

- Less infrastructure investment compared to personal computers, since many people already have their own personal smart phones
- Training content can be accessed in more places and with greater time flexibility than wired connections, which rely mostly on office/home locations
- Online content can directly support face-to-face training, especially where practical tasks are being carried out

On the other hand, early mobile learning research by Attewell (2005), Keegan (2002), Holzinger, Nischelwitzer & Meisenberger (2005) pointed to the limitations of small screen size, limited processing power, memory and battery life, and complexity due to the large number of operating systems. However, many of these problems have lessened due to the rapid development and increasing popularity of smartphones and tablets. Not all phones have the capabilities to do much more than voice calls and text messages, but the proportion of mobile devices that are smart phones, which offer the richest feature-set for learning, now exceeds two-thirds of the US market (as shown by Figure 1 above) and all but 15% of US phones sold in 2011 had text messaging capabilities. Furthermore, the top 3 mobile operating systems now account for 94% of the devices currently in use (Figure 2). Average screen size has also increased, and now ranges from 3.5 to 4.5 inches (International Business Times, 2011), while screen resolution has improved in tandem with these developments. Processing power has exponentially improved, and RAM storage has dramatically increased.

Simple Ways to create Mobile Content

Making your training materials mobile doesn’t have to mean spending the earth – in fact it can be done quite affordably. Creating inexpensive “how to” videos is covered in the sidebar above. These videos can be uploaded to a private YouTube channel that your employees can access (see http://www.ehow.com/how_8588803 build-private-youtube-channel.html for instructions). If you already have a YouTube channel for sales purposes we recommend creating a different, private one for training, unless you want your customers to see your training videos.

If you have PowerPoint slides that you use for classroom training, you can narrate your spoken presentation and synchronise it to your slides so that trainees can view your presentation as a video. Software applications that can be used to do this include Adobe Captivate and Articulate Storyline or Studio. The result will be a video file that can be played on a computer, tablet or smart phone, depending on what format you select to export the finished file. (Within PowerPoint itself there is a feature that allows you to record audio narration, but there are limited options for exporting the file. If you simply want to place the file on your company’s network and allow employees to view it on a PC then this is not a problem, but if you want to create formats that will play on mobile devices we recommend buying one of the abovementioned programs). Note that if you really want your audience to view a slide show on a smart phone you will need to go through your slides to make sure the font size is large enough and any diagrams are simple enough to be viewed on a small screen.
Table 1: Market Share of Major Mobile Operating Systems (source: Net Applications, March 2012)

<table>
<thead>
<tr>
<th>Mobile Operating System</th>
<th>Market Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>iOs (Apple devices)</td>
<td>60%</td>
</tr>
<tr>
<td>Android</td>
<td>19%</td>
</tr>
<tr>
<td>Java ME</td>
<td>15%</td>
</tr>
<tr>
<td>Symbian</td>
<td>3%</td>
</tr>
<tr>
<td>BlackBerry</td>
<td>2%</td>
</tr>
<tr>
<td>Kindle</td>
<td>1%</td>
</tr>
<tr>
<td>Others</td>
<td>1%</td>
</tr>
</tbody>
</table>

Tablet devices offer yet another option for mobile learning. They are light and portable, have long battery life, and are more affordable than personal computers. A comparison of tablets versus smart phone advantages is listed below:

**Smart Phone Advantages**

- 3G/4G connectivity to cellular network, meaning they can be connected to the Internet even outside Wifi networks
- Very personal and portable devices that are carried everywhere, so offering greater opportunities for learning/training
- Text messaging provides additional ‘channel’ for short bulletins, announcements, and simple interaction
- Location-sensing capabilities (GPS etc) allows content to be delivered based on physical context

*Figure 1: Device Type Mix of Handset Sales in the US, 2010-11 (Source: Techcrunch.com)*
Tablet Advantages

• Large screen allows for ease of reading and use of detailed graphics and high quality video content, including slides with text

• Greater storage capacity, processing power, and battery life than smart phones

• Larger keyboard is more convenient for training that requires typing long sections of text

• Many tablets now have cellular connectivity for ‘always on’ Internet connections

Beginning in 2009 the eLearning Guild, a major North American association of training professionals, has organized an annual conference on “m-Learning”, and participation has grown steadily. The use of mobile learning to provide “performance support” is also increasing – that is, a few pioneering companies are using mobile devices to make appropriately-formatted information available for review and practice of common workplace tasks.

Attitudes to Mobile Training in the Wood Products Industry

In speaking to training managers in the wood products sector we found many positive responses to the concept of training via mobile devices, such as:

• Young people are motivated by technology and may respond well to it, compared to classroom-style instruction

• Paper-based manuals and instructions can be difficult to keep organized, so a well-designed mobile website could help to avoid confusion and could be easily updated

• Visual learning is an effective means of training new Canadians whose language skills in English and French are not yet fluent. This can be facilitated via videos and slideshows on tablets and smart phones.

• Employees can review processes and procedures that they have learned without leaving the shop floor.

• Information can be delivered to installation sites and other remote work locations to enable employees to do their jobs effectively, using existing consumer-grade technology and at low cost.

• Many people on the shop floor do not have a computer at work and even at home, but almost all have a mobile phone.

Despite the advantages described above, we are not yet seeing widespread use of mobile devices for enterprise learning and support (Rossett, 2011). This may be because organisations are still largely unfamiliar with the concept, are confused about the many operating systems and tools, or that they tend to view mobile learning as putting whole courses on mobile phones rather than viewing mobile delivery as an extension of other modes of training such as e-learning. There are other issues as well. Many
manufacturing companies have strict rules that prohibit mobile phone use on the shop floor. Employers worry about lost productivity and safety implications due to employees texting and browsing the web during their shifts, and many workplaces allow the use of mobile phones only on breaks or in emergencies. Employers are also concerned about employee privacy and confidentiality around their firms’ manufacturing processes, both considerations that could be negatively impacted by the use of camera phones on the factory floor and subsequent sharing of those images via social media, email, etc. Some of these concerns could be addressed by using stationary tablets fixed in position at relevant machine centres, etc., but this unfortunately reduces the ‘mobile’ aspect, and also makes the learning less personal (for example, if an employee is using his/her own device to access a learning website they will be able to find their way around the device much more easily and can bookmark certain pages for quick reference later).

**Design Guidelines - Using Mobile Devices for Training**

The following are some general guidelines on integrating mobile elements into workplace training strategies.

1. Instructional design for m-learning should be non-linear. Rather than attempting to provide a complete course, with modules delivered in sequence, mobile should be used to provide targeted information such as job-specific support tools that help learners solve a particular problem. In most cases, it makes sense not to try to perform all of the training functions using the mobile device.

2. Content should be presented in as clear and simple a form as possible. Multiple methods of communication should be facilitated so that learners can choose according to their own preferences (Twitter, Facebook, Google Docs, text messaging). Learners should be encouraged to add to and improve the content.

3. If you are designing a training program to run on mobile devices, use applications that are already installed on the devices or are commonly available instead of designing your own – for example Twitter, text messaging applications, web browsers, cloud computing sites for storage, etc. Do not try to build monolithic custom apps that do it all. If you need to tie several apps together, have a programmer use APIs\(^2\) rather than recreating the functionality of apps that already exist and work well.

4. There are several typical stages in the learning process, starting with the presentation of new foundational information, then reinforcement of that information, followed by tasks that ask the learner to apply it to a situation to solve a particular problem. Although the first two could be facilitated using a well-designed mobile learning solution, the third one lends itself particularly well to mobile modes of delivery. For example, after a trainee views a video on how to operate a CNC router and takes a basic quiz about the topic, he/she could be asked to operate the machine, receiving tips on how to do so by scanning a bar code that is affixed to the machine itself with his/her smart phone.

---

\(^2\) An application programming interface (API) is a set of programming instructions and standards for accessing a web-based software application or Web tool. A software company releases its API to the public so that other software developers can design products that can communicate and interact with its service.
Mobile Learning in Use – Pilot Projects and Case Studies

To illustrate the potential for using mobile devices in training, some brief case examples are described in this section.


In 2009 the Centre for Advanced Wood Processing (CAWP) carried out a pilot test of a new online management training course for the WMC. The course was run over 6 weeks and attracted 30 learners, drawn from 10 woodworking manufacturing companies of various sizes in six provinces of Canada. The topic was quality management and control. The course was delivered using a Learning Management System called Blackboard, and the activities that learners undertook included reading chapters of text, watching several videos, taking part in online discussions, taking short multiple-choice quizzes, and submitting several short assignments to their online tutor. In order to investigate the viability of mobile learning, the CAWP team gave ten of the learners a Nokia smart phone and asked them to use it in addition to the computer-based e-learning. The mobile learners were able to access about 70% of the course materials using the phones, though some elements had to be specifically adapted, as follows:

1. Instead of requiring the trainees to read long sections of text on the small smartphone screen, audio files were created containing narrated versions of the text.
2. A special mobile quiz website was created so that the quizzes in the LMS could be duplicated in the mobile space
3. The videos were uploaded to YouTube so that they were accessible from the phone’s browser.

After the pilot course had been completed the CAWP team interviewed all of the learners, both those using mobile and those studying via e-learning only. The discussions revealed that most learners found the added convenience offered by the mobile access to be useful, and all stated that they would take a course offering mobile elements again. As might be expected, the degree of enthusiasm for mobile learning appeared to correlate directly with the amount of time learners spent away from wired Internet connections - i.e.
people who spend more time traveling or in the field would benefit from having access to the training materials during those times.

The trainees found video to be the best format for receiving information on the mobile device. A limitation was that the device used had no QWERTY keyboard or touch screen, so tasks such as typing discussion forum postings were impractical on the smart phone. Since this pilot project was conducted however a plethora of devices featuring larger touch-screens and full keyboards have become commonplace (See Macdonald and Chiu, 2011 for further details).

**Athabasca University ESL and Mobile Workplace Projects (2010)**

Athabasca University has pioneered research on mobile learning in Canada, and two recent projects deserve mention. The first was a mobile learning ESL project, carried out with 3 learner groups at Global Community College, Edmonton Menonite Centre for Newcomers and Evangelical Chinese Baptist Church. The mobile content included grammar lessons with interactive exercises, and it was based on open source Penguin English language textbooks. The content was made available in PDF and MS Word formats, and included interactive questions (T/F, multiple choice, matching, changing sentence order). The mobile website for the project can be found at www.eslau.ca.

Of the learners in the pilot project, 40% used a cellphone, smartphone or PDA regularly, and 22% never used such a device. The results showed that mobile was a good supplementary medium to let learners practice in their spare time, but it was not a substitute for classroom and traditional learning with a teacher. Some participants were concerned about the cost of data (this may not be as much of an issue in 2012, since many wireless carriers offer fixed-rate payment plans). In general learners liked the “anytime anywhere” flexibility, but some commented that the device was too small, the screen caused eye strain over time, and that scrolling was difficult on the phone screen when trying to answer matching questions (true/false questions were easier to answer as they didn’t require scrolling). It was suggested that audio would improve the learning experience, and that it would be useful if learners could interact with a teacher via the device. Learners liked the ability to take a quiz wherever they were and get instant feedback.

In the second Athabasca University project, 57 adult learners at Portage College, Northern Alberta were given 1st generation iPhones running on an EDGE network (pre-3G, slightly better speeds than dialup). 79% were between 18 and 25, 57% had never used a mobile device, and 36% used them on a daily basis. Eight themed areas with sector-specific vocabulary were created to build on the previous project. These included health and wellness, oil/gas/mining, retail and sales, hospitality and tourism, trades and labour, and food services and restaurant. Content included audio clips for pronunciation practice and video sketches. Ten lessons (most with audio or video) plus interactive exercises were created. Students completed the lessons in just over an hour, including filling in a questionnaire.
86% of trainees said the technology offered flexibility. 79% agreed that mobile technology “increases my enjoyment of learning”, while 79% agreed that it made learning materials more easily available. 86% would have liked more videos, and 86% also agreed that audio helped them learn. 71% stated that they would like to take other lessons using mobile devices.

As with the CAWP pilot program described above, course instructors in the Athabasca trial felt that the mobile mode of delivery would be ideal for students who were away from campus, and this has parallels for workplace learners who need to work in multiple sites, or travel to visit customers, suppliers etc.

**Air Ground Crew Training, Texas**

A pilot project held in 2010 with 160 trainees in an aerospace ground equipment apprentice course at Sheppard Air Force Base, Texas, examined the use of mobile devices to determine which one supported the best training results and was most compatible with military training requirements (Moore, 2011). All but one group of students were given either an iPod Touch, an HTC Touch Pro smartphone, or an ASUS netbook loaded with course materials, and were encouraged to use the devices both in class and to enhance their study time after classes. The study found a statistically significant difference in test scores between the groups using the mobile devices and those without them. The greatest reported disadvantage of the smart phone and iPod Touch was in the small size of the screen.
### 3.4 Training Delivery Methods – Summary of Pros and Cons

The table below briefly summarises a few of the advantages and limitations of different methods of presenting training content.

<table>
<thead>
<tr>
<th>Type</th>
<th>Advantages</th>
<th>Drawbacks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Classroom training</strong></td>
<td>Learners can get questions answered instantly, interactive, easy for instructor to monitor learner progress and participation</td>
<td>Class sizes are limited by room size and number of instructors, learners must attend at fixed time and place, trainer or learners may have to travel to instruction site</td>
</tr>
<tr>
<td><strong>Shop floor practical training</strong></td>
<td>Hands-on practice is effective at helping learners to apply what they’ve learned to their everyday jobs</td>
<td>Can be difficult to do due to the need to continue production, can be noisy, possible safety concerns, different trainers may not consistently teach the same methods</td>
</tr>
<tr>
<td><strong>E-learning via personal computer</strong></td>
<td>Flexible scheduling, learn at work or at home</td>
<td>Not all employees have access to computers at work site or home, computer literacy issues, not sufficient for teaching practical, hands-on tasks</td>
</tr>
<tr>
<td><strong>Mobile devices</strong></td>
<td>Flexible scheduling, learn anywhere, take learning materials to place that you will use them (e.g. machine on shop floor). Inexpensive device cost, personal device that most people are familiar with</td>
<td>Mobile phones can be a distraction in the workplace and are banned on shop floor by many companies. Small phone screens not ideal for viewing technical videos</td>
</tr>
</tbody>
</table>

*Table 2: Advantages and Drawbacks of various Training Delivery Methods*
4. Putting it all Together – “Integrated” Training

As can be seen from the above discussion, today’s workplace training managers have at their disposal a wide range of options for the delivery of training – some familiar and long-established, others quite new and dependent on rapidly-changing information and communications technologies and evolving web 2.0 applications. The main purpose of this study and report is to examine how best to combine these various elements to deliver training that is efficient and cost-effective for businesses to develop and manage, while offering trainees seamless and effective learning opportunities.

Since the birth of e-learning, trainers have combined Internet-based learning with traditional face-to-face learning in classrooms and practical settings. ‘Blended Learning” is the term used to describe this hybrid approach, and it has been used successfully in a wide range of contexts, including nursing training (Tao, Ramsey & Watson 2011). The more recent addition of mobile learning offers yet another means of training delivery. We should remember however that blended learning does not just mean adding new technological tools. Researchers such as Watson (2008) have pointed out that blended learning involves a fundamental shift in teaching strategy away from teacher-centred toward much more student-centred learning, and this has important implications for how training programs are designed and run.

Without getting overly academic, it is also worth mentioning a fairly new term that has started to appear in educational research. “Connectivism” is a term coined by researchers such as George Siemens and Stephen Downes that describes how today’s learners are starting to go about acquiring new skills and information in an age of pervasive Internet availability. The theory of Connectivism says that learning is not a process of memorizing facts, but instead is about learners building networks of contacts and information sources so that the right facts and information can be quickly obtained in a “just in time” manner when they are required to solve a given problem. This way of looking at learning assumes that trainees will have fairly immediate access to information through their online and offline networks of contacts and via the wired and mobile Internet. If you believe in this theory of learning, it means that the training programs you design in the future will be less about presenting content and more about getting learners to engage in problem-solving activities that will get them accustomed to efficiently finding and using the necessary facts in a practical way.

The next section of the report will look at a variety of non-wood case studies to illustrate how companies are using the wide range of delivery methods to train their employees.

4.1 Integrated Training Case Studies (Non-wood Sector)

Case#1 – RONA, Canada

With more than 800 stores across Canada and over 30,000 employees in its group, RONA is a leading retailer of housing and home improvement products. In our interview RONA stated that the maturity and sophistication of its training systems varied in different regions and divisions, but a current major initiative is to standardize its training for store employees across the country and throughout its operations. The Totem store chain in
Alberta is being used as a model for this rollout. Totem offers a new employee orientation that begins with one week of product knowledge training, after which employees work on the floor to put their knowledge into action. During this on-the-job time employees usually formulate a list of questions that they can have addressed in further training sessions. There are 1-week additional training periods on packaging, sales, delivery and customer service. RONA delivers this orientation training face to face at one of several regional training centres because of the complexity of the products and systems that are covered, but it is developing a library of e-learning materials to be used for post-training on-the-job support and reference. There are currently some computer-based training materials available, but because Internet bandwidth is largely consumed by point-of-sale transactions the training materials have been housed on the hard drives of store computers. RONA is looking at the connectivity upgrades required to move to web-based e-learning. The company is also interested in QR codes that can be scanned by mobile phones, but not for employee training – instead it would like to provide install videos and other product information to shoppers using this method.

When asked about the effects of training, RONA stated that it was tough to isolate training as the factor responsible for any particular business result, but the results of customer satisfaction surveys from the Totem division have consistently been higher than anywhere else in Canada, and average basket size and revenues are higher. We might expect employee turnover at Totem to also be lower, but there is not a clear correlation – however, Alberta has a more volatile job market due to the availability of high-paying oil and gas jobs in the north. RONA management were unconcerned about turnover statistics and had this to say: “The ultimate objective of training is to produce better business results…not everyone wants to make this their career, but that’s OK, as long as they do good work while they are with us.”

For store managers and senior corporate staff RONA offers a strategic management program called Altitude that is designed and delivered by the John Molson School of Business at Concordia University. Teams of managers meet for 16 days over an 18-month period and work on finance, marketing, leadership and change management. Participants meet face to face to facilitate teamwork and also to break down the psychological silos that often exist between divisions in large organisations. A similar leadership program is also available for front-line store management.

**Case #2 – Cosma International, Canada and Worldwide**

Cosma International is a wholly-owned subsidiary of auto parts giant Magna International, and manufactures vehicle body and chassis systems in 60 facilities globally. Cosma operates a two-year leadership program for supervisors, taking in 8 to 16 technical employees each year from all over the world, and various techniques are employed to select, train, and mentor each cohort. Online testing of technical knowledge using the Articulate e-learning system is used to pre-screen the applicants – 50 employees applied in the first year, and nine were selected. A month of formal training in the classroom follows, then trainees are sent in turn to various better-performing divisions where supervisors are assigned to mentor them in key areas such as maintenance and quality control. During this series of mentorships the trainees are periodically given more formal
training on topics such as lean manufacturing, the 5S quality system, and Training Within Industry. In the final 6 months they are placed in divisions identified as problem areas for the company, and are asked to implement what they have learned.

Of the first cohort of nine learners, six are now department leaders and are achieving very good key performance indicators. This success has prompted parent company Magna to expand the program throughout its operations, but at the same time the program is being compressed from two years’ duration to just one. As a result the company is looking carefully at how it can use online tools to provide support and reference materials for the program, and it sees opportunities to use mobile learning to reinforce processes on the shop floor, especially in the BRIC countries.

Case #3 – CNC training, Turkey

Sahin (2010) studied the use of blended learning in Turkey to train workplace learners on a CNC lathe. The blended learning involved first using a computer-based simulator program to write and test the G-code that is used to control the machine, then applying what they had learned to hands-on practice with a real CNC machine. One advantage noted in the trial was the ability of students to take the simulator lessons even if away from the workplace/training environment (because they were Internet-based), meaning that students did not fall behind in their training course. In addition, because the online self-study modules could be reviewed at any time, average performance of learners improved over purely face-to-face training situations. If online and F2F components were balanced, learner motivation increased, but if long periods of time were spent only on the online simulator learners tended to become “sleepy and bored”.

Case #4 – Leadership training, India, US and UK

The Harbinger Group, a software and services company, holds an Annual Management and Leadership Program, or “Base Camp” for about 40-60 employees in its various international locations using various modalities, including classroom, e-learning, mobile learning and social learning. The program typically starts with a classroom or e-learning session to teach specific concepts, followed by online discussions amongst teams through blogs or using a social interaction tool such as TeemingPod. Podcasts or videos are linked from the e-learning course management system or sent to the entire class group through Twitter feeds along with other updates. Finally, assessments are taken via smart phones. In all, the program makes use of seven different modalities – mobile, social interaction tools (Twitter), blogs, podcasts, online learning, classroom and videos. Rather than developing customised apps or software programs Harbinger Group makes use of existing tools that employees are already familiar with. More information on this program is available at http://learningharbinger.blogspot.in/search/label/learning%20modalities.
Case #5 - Management training, bakery sector, Australia
This program, piloted by the Baking Industry Association of Victoria, is training independent retail bakeries in business management as well as food safety. The program begins with a face-to-face session at each business location, in which the business’s work procedures and the individuals who work there are assessed. The assessment team then makes recommendations to the business owner regarding business improvements and training that should be undertaken. That training can be taken via e-learning, offering flexibility to the business owner and the trainees. Perhaps the most unique aspect of this blended training program is that it helps to overcome reluctance on the part of businesses to invest in training. Because the initial face-to-face assessment is focused directly on the independent business itself, the relevance of the recommendations made is guaranteed. Business owners are handed a recommended program of training that is tailored to the unique needs of the business and its employees. Furthermore, delivery of subsequent training via e-learning provides flexibility so that employees can complete modules in quiet times or at home. Finally, the e-learning modules presented content in a variety of interesting ways, which were popular with some employees who had been reluctant to return to a classroom environment and so were resistant to traditional training.

Case #6 – Web-based training in the dairy industry supply chain, Australia
To overcome the challenge of trying to train workers in rural locations within a huge, sparsely-populated country, the dairy industry developed e-learning modules on food safety and milk quality that can be completed on the farms. Field officers then visit the farms to assess food safety processes that have been put in place. The program also features synchronous webinars, which can be viewed by farm owners and supervisors as well as workers, led by world-leading dairy specialists.
5. Wood Products Manufacturing Sector – Current Training Practices

Our twenty interviews for this study provide an up-to-date snapshot of typical training approaches being employed in the wood products sector in 2012 and how those compare to other industries. Of the ten wood products firms interviewed for this report we have chosen to highlight five below to demonstrate the range of unique approaches to training that are being employed across the sector.

1. Dynamic Windows and Doors, Abbotsford, BC

Employing 120 people on the shop floor, Dynamic is a successful BC company that ships high-end windows and doors to clients throughout Canada and the United States. Its products and manufacturing processes are complex, and the company has invested heavily in high-tech CNC machinery and software in its production facility. Dynamic has fully embraced the Training Within Industry (TWI) method of skills development, which they first learned of while implementing a lean manufacturing program. Under the TWI method, each common task in the factory is taken and broken down into a series of Job Instructions (JIs). The TWI method states that there should be no more than 8-10 important steps in each “job”, so more complex ones are broken into several parts. In essence, the TWI method takes a job, breaks it into bite-sized chunks, and identifies the important steps and key points in each one. An appointed mentor or trainer then runs through the steps with the employee at least 4 times, then coaches the employee a further 4 times so that he/she is able to complete the job successfully at the end. Dynamic has created several hundred Job Instructions already, and has many more still to write. New employees are trained on lower-level JIs at first, then gradually move on to more complex ones. The process is also used to facilitate cross training.

Like many employers, Dynamic does not allow mobile phones on the factory floor, but its Manufacturing Resource Planning (MRP) system does provide an opportunity to support its hands-on TWI training activities using technology. The factory contains computer terminals at key locations to allow workers to access the MRP system, which tracks bar-coded parts through the factory and contains data on order schedules etc. Employees can also use the terminals to access the SOPs for each machine centre in PDF format. In the future, Dynamic’s training manager sees these SOPs evolving to be more visual, perhaps including video clips as well as illustrations and photos.

Dynamic does most of its training in-house because the content is consistent and specifically relevant to their organization. Where more generic training is required they occasionally send employees to external training or distance education. Even for supervisory training however, employees do not respond well to courses that are heavily text-based, and so this is an important consideration in their choice of external courses.
2. Loewen Windows, Steinbach, Manitoba

Established in 1905 in a small Mennonite community, Loewen has grown to become one of Canada’s largest window manufacturers, currently employing 550 people in its Steinbach facility. The company has utilised a variety of innovative strategies to address its HR and training challenges. Following the US housing crash and in common with many other manufacturing firms Loewen was forced to lay off many of its production employees, but as its market recovered it created a casual labour pool to enable former employees to be brought back to work in flexible part-time or term-based roles. Loewen works with the provincial government on essential skills training for its many immigrant workers. The company has also created an employee development program using cross-functional product teams that blend experienced and newer employees, allowing informal mentoring to occur.

Loewen has used off-the-shelf Skillsoft e-learning courses quite heavily in the past to train employees on topics such as IT, financial administration and lean manufacturing, but the results did not meet expectations. Although the courses were well designed, they required learners to be very self-directed and offered almost no interaction. The courses would have been far more effective if they had been linked with face-to-face follow-up sessions, but there were insufficient numbers of Loewen employees taking each course to warrant running dedicated meetings. Loewen is very interested in doing more technology-based training, since younger workers are tech-savvy and would be likely to respond well to such efforts, but they would like there to be more of a social feel rather than leaving employees “sitting in a room isolated, reading”. Loewen’s training manager sees safety and WMIS refresher training as being well-suited to web-based learning. Audio-based mobile training was seen as a method that would be appropriate for providing updates to managers and sales staff that travel a lot.

3. Triangle Kitchen, Moncton, New Brunswick

At the time of the research for this report Triangle Kitchen had just won the Wood Manufacturing Council’s 2012 Award for Innovation in the field of human resources management. Triangle was established over 30 years ago and is a mid-size company with two production facilities in New Brunswick and one in China. To boost worker motivation and increase flexibility in its Canadian manufacturing operations the company has introduced a system that ties the pay scale to cross training in the factory. Part of the hiring process is a personality profile test that evaluates the candidate’s suitability for particular job types. Within the first week of work the new employee is introduced to everyone in the organisation, and at the end of the first week there is a requirement that they should be able to perform jobs at a minimum of two workstations. Workers who do not fulfill this criterion may not continue past this probationary period. Beyond cost-of-living increases, the only way to proceed up the pay scale is to cross train and become capable of performing multiple roles within the factory. The system has been in place for 18 months and the results are promising in terms of the effects on retention, motivation and quality. President Pete Fournier suggests that most lean manufacturing efforts fail because companies don’t focus enough on human resources and corporate culture.
The cross training program at Triangle is taught chiefly by the plant’s own supervisors through a coaching and evaluation process. Training is supported by a full set of standard operating procedures developed with the help of external consultants. Technology-based methods do not really come into play, although some of the engineering team is periodically involved in webinars with the suppliers of the ERP systems. Fournier suggests that visual learning is a prerequisite for any technology-supported training. The company is soon going paperless within the plant, and so there is an opportunity to develop video-based training materials that are linked to and displayed on the ERP system terminals.

4. Tembec Industries, Chapleau, Ontario

Tembec Industries could be considered to be an early adopter of technology-based learning, having utilised computer-based training at its Chapleau sawmill since 1999. Training courses are offered via computer to all 200 employees on a wide range of topics. The training materials include real photos of machinery controls, videos showing how to troubleshoot common problems, and electronic quizzes that update the employee’s training records when scores are generated. There is even a chainsaw course offered via computer, teaching controls and safety protocols. For each of the courses that focus on technical topics there is a physical competency verification checklist that instructors print off and run through with the trainee. In addition to the technical subjects there is a 15-module supervisory course available online.

Tembec has a formal orientation process in place based on exhaustive risk assessments of each job role from OHS and environmental standpoints and with consideration of quality and regulatory requirements. Approximately 85-90% of training is delivered by their own in-house specialists, with the balance being provided by external consultants. There was originally quite a lot of resistance to the idea of moving heavily to web-based training, and to counter this the training team spent a lot of effort on creating solid physical competency testing to complement the theoretical side. The e-learning program, originally piloted at Chapleau, has now been extended on a trial basis to six other sites, including forest operations. In the forest operations sites workers commute from home rather than living in camps, so they do e-learning from home and can access the training materials via tablets, smartphones, or PCs. There is a periodic 2-week downtime that is scheduled in which employees can also do hands-on training.

The Tembec program is the best example of integrated training that we came across in our interviews. Manager Mike Martineau offers this example to highlight one of the benefits. “Everyone has to do WMIS training, and if we have instructors coming in then scheduling is complex and costs add up. With e-learning all we are paying for is web space – instead of spending $5-6,000 per site it costs $240 per year for hosting”.
5. Stiles Machinery Inc., Grand Rapids, Michigan

Stiles Machinery is one of the best-known machinery distributors to the US woodworking industry and has been in business for 23 years, in which time it has filled over 35,000 course seats. Its training activities encompass two distinct audiences: 20% is directed to its own salespeople, and the remaining 80% for manufacturers from “mom and pop” to major office furniture makers.

A sizeable proportion of Stiles’ sales force training is done through blended learning modules that are hosted on a learning management system known as LearnShare. The system allows detailed tracking and flexible scheduling of courses for employees that spend a large part of their time on the road, and this is the major reason for using it. The first versions of these courses were typically simple PowerPoint-style slide shows with voice-over narration, but today’s courses have evolved to be more sophisticated in a process that Director Duane Griffiths describes as “Hollywooding”. “Visual learning is an absolute must,” states Griffiths, “as is chunking content into small pieces that are easy to digest in small bursts. We used to create 90-minute modules – now we aim for 20-minute segments that have short video clips with some kind of evaluation or newsflash in between”. His dream e-learning scenario involves learners manipulating a fully functional virtual machine in preparation for working on the real thing.

Learning about all of the technical complexities of a major piece of machinery can be daunting, and a big advantage of e-learning is that the salesperson doesn’t need to try to learn everything at once – they can digest the basics, then go back and “train on demand” later when they need further details.

On the subject of mobile devices Griffiths states “iPads have become to a salesperson today like a hammer was to a carpenter in bygone days”. They are used constantly to demonstrate features and show images and video to clients, as well as to record notes and create sales proposals. Stiles has therefore invested in software that can publish e-learning content in a format that will display seamlessly on mobile devices.

Interestingly, Stiles does not offer a lot of e-learning to its wood manufacturer clients, other than on some programming-related topics which lend themselves well to that medium. They have found that the woodworking industry is still quite resistant to e-learning, even though it can be less costly. Retention rates tend to be low, learners comment that they do not feel comfortable with it, and would rather be in a face-to-face setting where they can get questions answered instantly. Stiles have tried offering blended learning, but have found that learners often arrive for the face-to-face session without having taken the obligatory web-based preparatory module. Stiles offers some training for the electronics, aerospace and plastics industries, and their experience with these sectors contrasts sharply with the woodworking industry. Perhaps because of the differing educational entry requirements in those industries there is much readier acceptance of e-learning, though Griffiths also notes a difference in training culture. However, age and educational background are key factors influencing attitudes to e-learning, and in 5 years he expects demographics, social networking, and increasing technological complexity in the woodworking sector to change the situation.
6. Conclusions and Recommendations

This final major section of the report will summarize the main findings of our research, provide some recommendations for manufacturers, and make some brief predictions about what the future holds for the world of workplace training in the wood products industries.

6.1 General Findings

(i) Use of integrated training approaches is not common in the wood products sector

In general, it is not yet common to find technology-based approaches such as e-learning or the use of mobile devices being systematically combined with more traditional approaches such as classroom instruction and shop floor hands-on training. We did find some examples of employees being enrolled in e-learning courses and participating in webinars, but in most cases these were arranged in an ad-hoc manner and were not part of an overall formalized training strategy (the sales training for Stiles Machinery and the e-learning taking place in Tembec sawmills were exceptions – see case studies above). The closest example we could find of a wood products company employing an integrated training approach involving the use of technology was that of Tembec. There seem to be several reasons for this situation: the average level of formal education attained by workers is generally low; a large proportion of the sector consists of SMEs that do not have a training manager (and therefore lack formal training strategies); most shop-floor workers do not have their own email account or computer; mobile devices are commonly banned on the shop floor, and; we heard many people refer to a culture within the sector that does not place much value on training in general. Some of these points are discussed further below.

(ii) Formal training strategies are rare among wood products manufacturing businesses

A large proportion of companies in the wood products sector, particularly small and medium-size manufacturers, lack a formal training strategy of any kind, and instead simply respond to the need for employees to gain specific new skills on a one-off basis. Planned and systematic company-wide training programs are uncommon in the sector for all but the largest of companies. Training is typically reactive and is carried out in response to critical, pressing short-term needs, rather than being based on steering employees along a steady path of skills improvement toward increasingly responsible job roles. It is unlikely that integrated training can realistically be implemented in organisations where such attitudes persist.

Training is also viewed in many small and medium-size companies as a peripheral activity rather than a core need. In discussing training with wood products manufacturers it is very common to hear that during times when production is busy there is no time to
train, and when business is slow there is no money to train. Another concern commonly voiced by business owners is that if they invest money in training an employee, that employee will simply use his/her new skills to obtain a better job. There were some interesting responses to this point among companies interviewed for this study. Dynamic Windows offered the most concise solution: “become the better job”, and they seek to accomplish this by rigorously implementing the Training Within Industry (TWI) system as described in the case study above. Asked about the same issue, RONA’s senior training personnel stated that having employees offer a high level of service quality and contribute to positive business results while the company employs them trumps any concerns over long-term retention. Finally, Triangle Kitchens has implemented an innovative pay structure that directly rewards employees who develop flexible skills that allow them to work in multiple roles within the plant.

(iii) Training can result in temporary dips in productivity but e-learning can help.

A traditional barrier to training in manufacturing organizations has been the difficulty in taking key personnel off the production floor for classroom training or offsite courses, and this is particularly so in the wood products sector with its preponderance of SMEs. The potential benefits of any training program must be weighed against the short-term loss in productivity due to members of the production team being away from their normal duties. This problem is greatly ameliorated by e-learning and mobile learning, since the training can be brought directly to the shop floor (mobile solutions) or can be done in the evening or on the weekends from the convenience of one’s home computer. If the training course is being offered by an external consultant or training organisation then e-learning can have even greater benefits, since costly travel by the instructor or learners can be avoided.

Of course, asking workers to train at home can be made more complicated by union regulations and the need to respect the specifics of job descriptions and other labour agreements, and companies must take care in this respect.

(iv) The wood products industry is slower to adopt technology-supported training than other sectors, mobile learning is still uncommon.

The wood products industry in general appears to be slower to adopt solutions such as e-learning and blended learning than other business sectors. This is especially true of the software industry which, due to the very nature of its products and the familiarity of employees with information technology, has been an early adopter of e-learning. Having said this, even software companies appear still to be in the early stages of adopting mobile learning, and in most cases their mobile efforts currently consist of adapting e-learning content so that it can be used on mobile devices rather than developing completely new and innovative forms of training for those devices. (This is true even of mobile technology giant Nokia, interviewed for this study). Other non-wood sector companies interviewed for this research project reported similar situations: several were actively evaluating
how mobile might change their training activities but none had designed and delivered training components specifically for mobile devices.

** (v) Presenting content visually is essential**

A major issue that impacts training in the wood products sector is that literacy levels in shop floor positions are generally low and employees consequently do not respond well to text-based learning. This does not mean that e-learning and mobile learning are inappropriate, but if those methods are to be used they should as much as possible present information visually through pictures, animations and videos rather than in predominantly written form. This is indeed a strength of e-learning and mobile learning over classroom-based training or correspondence courses that rely on trainees to read long passages of text.

**(vi) Companies can unwittingly create barriers to workplace e-learning**

Employers are generally open to allowing supervisory, management and front-office employees to take e-learning courses, but in most cases employees are left to take the initiative to find such courses and put in a request to their training manager that they be enrolled (rather than training managers suggesting to specific employees that they should take a course). It is common for companies to ask the employee to pay the tuition fees with their own money, then reimburse them if they successfully complete the course. When employees take e-learning courses they generally do most or all of the work on their own time rather than while in the workplace. Union policies around payment for training sometimes make it difficult for companies to set up these kinds of arrangements. Additionally, some employees do not have their own personal computer at home.

**(vii) Mobile device use is often banned in production settings, but having training content on the shop floor is of interest**

Most manufacturers have policies banning the use of cell phones on the shop floor, mainly for safety and productivity reasons. This makes it unlikely that mobile training will be adopted in the near future, even though many training managers were very interested to hear about the QR code-based pilot project at UBC (see Section 3.4). Most employers nevertheless were interested in the potential to have tablet devices available on the shop floor to display training information. Some employers preferred these to be fixed in place or to have certain applications or functions removed (for example, removing general web browsing, email and communication applications so that they do not serve as workplace distractions). Two of the managers we interviewed suggested that the computer terminals attached to the MRP/ERP systems throughout their plants could be used to also display training content.
(viii) Mobile has great potential for providing training and job support to employees on the road

There appears to be significant potential to use mobile devices to improve training and on-the-job support for employees that spend a large portion of their time away from the workplace doing jobs such as estimating, installation, sales, customer service support, etc. Workers in these situations are not constrained by workplace cellphone bans, and would reap efficiency gains from having up to date sales and/or technical information at their fingertips.

6.2 Recommendations

Based on the research and findings described above, this section offers some guidelines for creating effective integrated training programs for workplace learners. To complement the nine recommendations of the author, some further comments by training professionals are also quoted.

Present training content visually as much as possible, using illustrations, narrated slideshows, short videos, animations, etc. This has been discussed in some detail above.

1. One of the biggest challenges of implementing training strategies that mix different kinds of delivery elements is understanding and organizing the technologies used. Avoid using new technologies for novelty value. Let the learners, the context in which they will be learning, and the target learning outcomes dictate the methods of delivery to be used. Learners must be given time to fully understand the technologies they are using, so keep this in mind when planning how much time to allow for a training program.

“Instructional design is vital, and so is information design. One of the first steps you should take as you begin to design for different delivery modalities is to decide on the user interface and experience, and begin with a clear end state. It’s fundamental to ensure a communication structure that does not get in the way of learning, whether you’re using a social-media tool, mobile delivery, computers, or whatever. Be aware that the user experience can change by interaction — from tablet to mobile to laptop to face-to-face. Information design needs to account for these variables.”

David Metcalf and AJ Ripin (e-learning Guild 2012)
2. Make content platform-agnostic to avoid issues of multiple mobile operating systems etc (for example, use web-based content that can be viewed using a standard PC or mobile browser rather than an app that only works on one operating system (iOS, Android, Windows Mobile). Consider that not all content will play on all devices – for example devices such as iPhones and iPads do not support the use of Flash, which is a programming language commonly used to create and display short movies and animations on websites. When an iPhone user views a web page containing Flash content, that content will simply not be displayed. It is possible to avoid this problem by converting the Flash content into another video format prior to publishing the web page(s). The latest version of HTML (HTML5) allows video to be displayed without the need for Flash, but not all browsers currently support it.

3. Make content available in multiple formats. Users are becoming accustomed to being able to access content in various ways - for example the national news can be viewed on TV or via a computer, as well as read in a newspaper or using a smart phone or tablet application. Major political parties have speeches broadcast on television, then make them available as video and/or audio files that can be downloaded or streamed. In the same way, we see an emerging trend toward users demanding that training content be available in more than one medium. For example, a course could be hosted in a learning management system, but elements of it could also be available as an e-book, a set of PDFs, or a video podcast. The same can also be said for interactive elements - for example, PC users are normally quite happy to type their discussion-forum postings as text, but mobile device users would probably prefer to speak an audio clip instead due to the inconvenience of using a small keyboard. Some online discussion board systems are now available that allow both voice and text formats.

4. One of the best ways to take advantage of mobile devices is to focus on using it for performance support or as a job aid. It is a mistake to try to create whole courses that run on a smart phone for example – instead, design training in which the participant gets introduced to new concepts and practices them via other means (such as classroom sessions, on-the-job hands-on training, or perhaps through an e-learning website), then uses their mobile device to recap key information at the time that they need to use it. This could mean watching a short video on how to set up or operate a machine, viewing a PDF document containing a wiring diagram, etc.

5. Exploit the interactivity and usability of the phone – use the camera, recorder, messaging, location awareness, free apps, to create interesting experiences.

6. Use time-saving ways to take advantage of mobile – for example, narrate an audio track over an existing PowerPoint presentation so that it becomes a video podcast. There are several software applications that can be used to do this (see sidebar in Section 3.4).
7. Provide adequate support to trainees in your organisation, especially those taking e-learning courses on their own time. Make sure they have the necessary technical infrastructure (recent-model computer, up-to-date software, plugins etc.). Set up a schedule to obtain updates on their progress and make sure they have enough time in their workday or at home to fulfill the requirements of the course. Clearly spell out expectations regarding when learners should complete online or mobile training – can they take time during work hours, and how will you facilitate uninterrupted study time?

“All organizations have employees that, from time to time, have great ideas on improving efficiency or saving costs. Create a workplace environment where employees can share these ideas with the training department. When you use such an idea, make sure you give that employee credit or a bonus for promoting knowledge sharing. To avoid misunderstandings, make sure you’re clear up front on what is “substantially relevant.”

- Inge de Waard (e-learning Guild 2012)

8. In general, giving trainees more control of the learning experience is desirable, and it is in line with modern trends in education towards more learner-centred modes of teaching and training. Simply put, more emphasis is placed on the learners's own relevant experiences and opinions and how the subject matter applies to them and their job, rather than simply focusing on the information and perspectives presented by the trainer. Learner-centred training is more motivating and generally leads to better retention of new concepts and improved application of that information in the real world of the trainee. However, in other ways yielding control can be worrying to employers. If personal mobile devices are used in the workplace there is the potential for this to lead to misuse. Yet allowing people to use their own mobile devices has several advantages. The employee is already familiar with their device and how to use it, so there is no learning curve. The employer will save on their IT budget since they are not required to purchase the devices. And the phone or tablet can be carried with the employee, so that the mobile training materials can be accessed as soon as he/she encounters a situation that requires it.
To summarize, the decision to allow employees to use their personal mobile devices at work is going to require a trade off for employers, but one that brings with it a number of real benefits. To reduce the risks for employers, they might consider creating a training contract that spells out specific responsibilities for learner and employer. On the trainee’s part, these may include a pledge not to use the device for personal reasons while in the workplace or when performing company business. Once companies commit to this path they may find that the adverse impacts are far less than expected, as evidenced by the following quote:

“I have had much success with using portable devices, social media, online collaboration and gamification in my teaching….If I’m honest, the biggest hurdle was letting go of the “tried and tested” methods and embracing change. Once I did, it opened up a whole new world of learning and I am achieving better engagement and results. For example, I used to insist that mobile phones and tablets were switched off during training. Now I encourage my learners to use them for research, rapid knowledge sharing and networking. My concerns over distraction were largely unfounded; it actually creates better engagement, mutual trust and ownership of learning.”

Nicola de Visser, Simulation Designer at ProfitAbility Business Simulations, Oxford, UK
(posted in Learning, Education and Training Professionals Group, LinkedIn)

6.3 The Future: Integrated Training in the Wood Products Sector

“How different might training in our sector look five or ten years down the road? We have heard that demographic changes will mean that the average worker will be increasingly more comfortable with computers, tablets, and smart phones, meaning that training approaches involving these devices will be easier to implement and more and more natural as a means of learning. In 2012 one quarter of US adults now owns a tablet device, and with the plethora of product options on the market today it is safe to assume that the majority of Canadian workers will own one of these ever-more-affordable portable computers in a few years’ time. Phones themselves may eventually be bypassed as the main method of conveniently accessing online information on the move. Microsoft and Google are both working on versions of a head-mounted screen that users can wear to view the web – for example Google’s Project Glass device has a tiny screen mounted above and to the right of the user’s eye, as well as a microphone, small speakers, accelerometers, compass and a touchpad on the side (Figure 3).
Regardless of the devices that we use, we can expect that over time companies in the wood product sector and beyond will incorporate such tools more and more into their training activities. This will be done partly to take advantage of the increasing amount of high-quality free content and resources available online from universities, colleges, government agencies, industry associations, private companies and individuals. It may also be influenced by changes in the world of education itself. Shaun Clark, General Manager of eXact Learning Solutions, points out, “the concept of lifetime employment is completely gone, and in the future we expect to see a process of continual re-skilling. Workers will be more like contractors than permanent employees, and each worker will need to regularly access a very personalized set of learning services to remain current and marketable”. The European Union is already looking hard at this future scenario and funding research into how best to respond.

In terms of what form training will take, we predict that the traditional dominance of text-based learning will give way more and more to other means of displaying and interacting with content and other learners. As digital design tools such as 3D CAD/CAM software and handheld 3D scanners become more and more powerful and affordable, it will be possible to create immersive 3D virtual simulations of machines and processes commonly used in manufacturing, using the same approach taken in computer gaming. Online social sharing tools will help trainees to effectively learn from each other, and we expect that organisations will increasingly see the power and value of this approach. Trainees will increasingly use touch and voice commands to interact, rather than simply writing text. This move away from the reliance on text-based learning will favour industries such as wood products manufacturing, in which entry-level workers are often immigrants or those with lower levels of high school education, and will perhaps result in greater productivity and efficiencies over time.
For highly complex technical training – such as for 3D computer-aided-design software or advanced 5-axis CNC routers – the future is likely to bring a blurring of the line between contextual help and training. The help content that software providers build into their systems is already quite sophisticated, and the actual content that is displayed in the help menu depends on what the user is doing at that point. The trend for contextual help is toward including more and more rich content such as videos and animations that have traditionally been part of more formal training courses. Similarly, training content in general is being broken into smaller chunks than before, so that it can be used in different contexts and as part of various training programs (these small chunks are often known as “learning objects”). It is consistent with a societal shift in developed countries towards lifelong learning, which requires shorter but more frequent training interventions rather than in the past.

Lastly, as mentioned above, we expect that mobile training will be embraced first for employees such as salespeople, installation technicians and service personnel that perform a major portion of their work off-site. In the short term it is likely that concerns over distractions caused by the use of personal mobile devices on the shop floor will inhibit the growth of mobile learning in that context – however, over time control and monitoring system may be developed that overcome those challenges, or dedicated devices may emerge specifically for that purpose.
7. References


Innovative Models for Delivering Training to Workplace Learners


Retrieved October 20th from http://therealtimereport.com/2012/11/02/
social-networking-stats-linkedin-tops-187-million-active-users-rltm-scoreboard/

http://www.trainingmaterials.com/courses - Velsoft Training Materials – US company offering wide range of training materials on business and computer-related topics. Materials can be purchase on CD and customised to a company’s specific needs.

resources/promisingpractices/NACOL_PPBлендедLearning-ir.pdf.
8. Acknowledgements

The author would like to thank the following people and organisations for their kind assistance with this project:

Al Clarke, Taurus Craco, Brampton, ON
Isaac Fonseca, COSTI Immigrant Services, Toronto, ON
Violet Frost, Westwood Fine Cabinetry, Kelowna, BC
Erin Kirch, Human Resources Systems Group (HRSG), Toronto, ON
Richard Lipman, Wood Manufacturing Council, Ottawa, ON
Laurelyn Nielsen, BG Furniture Co. Ltd, Walkerton, ON
Mark Paddison, Humber College, Toronto, ON
Vivek Pandey, e-Learning consultant, New Delhi, India
Bob Porter, Wood Manufacturing Council, Ottawa, ON
Deborah Shaman, Human Resources and Skills Development Canada (HRSDC), Ottawa, ON
Deepali Tharkude, Associate Vice President, e-learning Content Services, Harbinger Knowledge Products, India
Shaun Vollick, Human Resources Systems Group (HRSG), Toronto, ON
Lee Webster, Manager, Learning Management Services at Department of Education and Training, Brisbane, Australia
9. Appendix 1: Interviews Conducted

Cecil Addison, Accenture, New York, NY
Charles Baribeault and Christy Ruhr, RONA, Montreal, QC and Calgary, AB
Steve Cheverie, Elmwood Kitchens, St. Catharines, ON
Shaun Clark, eXact Learning Solutions, Perth, Australia
Brian Davies, Dynamic Windows, Abbotsford, BC
Nancy Doran, Deslaurier Cabinets, Renfrew, ON
Pete Fournier, Triangle Kitchens, NB
Rebecca Fung, Nokia, Burnaby, BC
Wendy Friesen, Loewen Windows, Steinbach, MB
Miroslavka Gataric, SAP, Vancouver, BC
Duane Griffiths, Stiles Machinery Inc., Grand Rapids, MI
Mike Martineau, Tembec, ON
Laurelyn Nielson, Bogdon & Gross Furniture, Walkerton, ON
Sandra Nigro, Modular Housing Association, Calgary, AB
David Scholte, Cameko, SK (uranium mining)
Luzia Thannheimer, Senior Manager, HR, CORIX group of companies, Vancouver, BC
Januka Ruwanpura, iBooth Project, University of Calgary, AB
Mitch Toews, Lynden Door, Chilliwack, BC
Aaron Weston, Cosma International (Magna Group), Brampton, ON
Credit Union (anonymity requested), Victoria, BC