

**Joinery and Glass Industry Training Organisation**

**On and off the job: learning experiences,  
connections and implications for *Literacy  
Language and Numeracy***

**Report**



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## CONTENTS

<b>Executive Summary</b>	3
<b>Introduction</b>	7
Policy Background	7
Integrated literacy	8
Formal and informal learning	8
JITO Apprenticeships	9
Methodology	9
Process	9
<b>Findings</b>	11
The first block course and job connections	11
Learning on the Job	13
Literacy and numeracy on the job	17
Certificate completion and mentoring	18
Literacy and numeracy and certificate completion	20
JITO support	20
Supporting block course learning	21
The second block course	22
Implications for literacy and numeracy	30
Connecting the block course to the job	31
On and off-job health and safety	33
Summary and conclusions	34
<b>Recommendations</b>	36
References	39

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Chris Holland

## Executive Summary

This research project was commissioned by the Joinery Industry Training Organisation (JITO) to understand learning on and off the job, the connections between them, and where learning support (specifically with literacy, language and numeracy) can be provided. Specifically it asks: How do glass apprentices manage formal and informal learning?; how does learning on the first block course support learning on-the-job?; how do apprentices learn on the job and in self-directed study?; how does learning on the job and self directed study support learning on the second block course?; how could learning, and literacy and numeracy development in particular, be strengthened? It should be kept in mind that the small sample size of the study means that the findings can only be indicative. A larger follow-up study is recommended to verify these results.

### *Overall*

- The system of block course learning is effective. Most learners make new connections, apply learning, reflect, refine, and transform their practice.
- Strong learning links were apparent from courses to the apprentices' work.
- The links and support from job to course were weaker, largely due to poor mentoring
- Some apprentices struggle with the expectations of the trade, coursework and study.
- Most apprentices struggle with distance learning

### *On the job*

- Variety and a balance of autonomy and supervision produces the best outcomes.
- Opportunities to engage in tasks involving literacy and numeracy need to be provided and supported on the job where possible.
- Apprentices' preparation for block courses will be enhanced by supervisors working through the trainer handbook with them.

### *Distance learning*

- Apprentices who had had on-job mentoring tended to complete their workbooks more quickly than those who hadn't.
- Support for distance learning seemed to be a relatively low priority in the workplace.

- Important skills needed to help apprentices complete distance learning workbooks and assessments are held by administrators.

#### *On the courses*

- The course environment was experienced by apprentices as positive and unthreatening and they were comfortable with well established and varied routines.
- Apprentices need some skills (time management, literacy and numeracy competencies) to be explicitly taught.
- Trainers would like to see better connections between themselves and mentors and to have more connection to and understanding of the JITO pre-assessment tool.
- Trainers were interested in improving their own assessment and teaching strategies, with particular reference to literacy and numeracy.

#### ***Recommendations:***

The recommendations include some that JITO can directly implement, and others where JITO can work with employers and trainers to encourage their implementation. It is recognised that in two instances, JITO has already begun work. These recommendations show that such initiatives are supported by the research.

#### *Overall:*

Employers and supervisors need to be convinced of the value of investing time and energy into apprentice learning support. Recommendations are:

- a) That JITO mentoring support should acknowledge the constraints of employers and supervisors and provide acceptable learning support alternatives.
- b) That ongoing support in mentoring is provided to new mentors over a period of a year, to help them recognise and work with learners who are struggling with expectations of the trade, coursework and study (particularly distance learning).

#### *On the job*

It is important that apprentices have the opportunity to practice skills learned on the course, when they are back on the job. The best circumstances for this practice are where the apprentice has a balance of supervision and autonomy in their work. There should also be a variety of tasks, including tasks that involve literacy and numeracy. Recommendations are:

- a) That a workshop is offered to employers and supervisors (or mentors) to familiarise them with the JITO training handbook and course programmes. This will assist them to better prepare apprentices on the job for block course learning.
- b) That employers and supervisors use their knowledge of the JITO training handbook to frequently and incrementally increase apprentices' independence with on the job tasks.

### *Distance Learning*

Distance learning requires that apprentices undertake a range of self-paced learning and tasks related to distance assessment. Those who have not engaged in distance learning before may struggle not only with the content, but with estimation of learning time, developing a learning plan, identifying support persons, identifying and assembling resources (e.g. internet use, appropriate trade advice), liaison with JITO etc. Recommendations are:

That JITO assists employers and supervisors to identify candidates (e.g. administrators) who can commit to providing this *specific* mentoring support over a period of approximately one year.

### *On the courses*

The courses ran smoothly, although trainers identified that they could make changes to improve apprentice learning. These changes included strengthening the links from job to course, and improving assessment and teaching strategies. Recommendations are:

- a) That JITO supported mentors work with apprentices to create and provide to trainers a checklist of competencies practiced on the job between courses.
- b) That trainers engage in ongoing informal professional development in assessment and teaching strategies, with particular reference to literacy and numeracy.
- c) That trainers explore further formal professional development opportunities to augment their existing knowledge.
- d) That JITO provides support to trainers to expand course content to include the explicit development of time management skills and literacy and numeracy competencies.

## ***Introduction***

This research project was commissioned by the Joinery Industry Training Organisation (JITO). The aim of the research was to learn about how JITO can strengthen learning both on and off the job, and understand where learning support (specifically with literacy, language and numeracy) can be provided. The research explores what happens to apprentices on the job that may support their block course learning, and what happens in the course that may impact on job knowledge, skills, attitude and performance. The analysis will seek to highlight strengths and weaknesses in the links between formal and informal learning in the sites studied, and to draw implications for the future development of learning support. Specifically the research asks:

- How do glass apprentices manage formal and informal learning?
- How does learning on the first block course support learning on the job?
- How do apprentices learn on the job and in self-directed study?
- How does learning on the job and self-directed study support learning on the second block course?
- How could learning, and literacy and numeracy development in particular, be strengthened?

## ***Policy Background***

As for other industrialised countries throughout the 1990s, New Zealand faced increasing international competition in a rapidly shrinking global marketplace, and began to pay greater attention to the need to raise skill levels of its workforce in order to meet new production demands. In the same decade, New Zealand was a participant country in the International Adult Literacy Survey, and the survey revealed that literacy levels in the population were poorly equipped to meet the higher level demands of the changing workplace. The Adult Literacy strategy *More Than Words* presented literacy as crucial to economic transformation in New Zealand. The NZ strategy document warned that “There will be no sustainable future for our growing knowledge economy without urgent action [to improve adult literacy and numeracy competence]” (Ministry of Education, 2001:20) In line with these early admonitions, the recent *Literacy Language and Numeracy Action Plan 2008-2012* reported that 43% of working age adults have literacy skills below those needed to ‘participate fully’ in the knowledge society (Tertiary Education Commission, 2008:6). Unsurprisingly, an

employer survey conducted by Green, Huntington and Summers (2007) echoed government prioritising of literacy and numeracy skill development. The second and third most prominent skills ranked by employers were communication, literacy and numeracy skills.

### ***Integrated literacy***

In the meantime, international literacy research developed during the 1990s and 2000s strongly indicated that literacy was not a discrete end in itself, that it was always learned for some other social purpose and context (Lave and Wenger, 1991; Sanguinetti 2000; Billet 2004; Belfiore et al, 2004; Evans et al 2006). There was a need, therefore, to situate, contextualise and integrate literacy and numeracy learning within the workplace learning cultural environment and vocational and organisational learning content. Government literacy initiatives developed in the mid and late 2000s began to focus on embedding literacy and numeracy within formal vocational training. However, the relationship between formal and informal learning, and the implications for integrated literacy provision, remains under-researched in New Zealand.

Much of the literature on learning and innovation seems to suggest that making knowledge explicit in a formal learning context is too slow and cumbersome a process to be effective. International research draws attention to the importance of informal learning (e.g. Coffield, 2000; Eraut, 2004; Taylor et al., 2007), and the delicate relationships involved in apprenticeship learning.

Maurice Taylor, professor of education at the University of Ottawa, claims that learning engagement is likely to be stronger when formal learning is linked, and acts as a catalyst for, informal learning activities in the workplace (Taylor et al., 2007). He notes that ways of engaging in informal learning include watching experienced tradesmen, working with experienced tradesmen, practicing without supervision and searching independently for information (Taylor et al 2008). Stephen Billett, associate professor at Griffiths University (Billett, 2004), points out the more unique worksite activities that a worker can access and engage with, the more learning may result. In the United Kingdom, Evans and colleagues found that workers confined to routine work, and whose roles may be less valued, may have fewer chances to expand their learning (Evans, Hodinson, Rainbird & Unwin, 2006). All of these conditions for learning will be explored during this research.

Dennis Dressler, principal consultant for The Learning Alliance, U.S., was the keynote speaker at the *New Zealand Evaluating Workplace Learning Conference* hosted by the

Department of Labour in 2008. He asserted that the tertiary education sector underestimates the value and importance of preparation for formal learning and of follow-up in the workplace environment. An understanding of the relationship between on-the-job and off-the-job learning in New Zealand is important to a wider understanding of capability building in the sector and to learning transfer and literacy language and numeracy gains.

### ***JITO Apprenticeships***

The Modern Apprenticeship Act, 2000, revived trades apprenticeships in New Zealand, extending the age range for apprentices and establishing a system of support (coordinators). Since then the number of apprentices has risen markedly. This research focuses on glass and glazing apprentices whose learning is overseen by JITO. Modern Apprenticeships in Glazing involve 85% on job learning and 15% off job learning in block courses. Apprentices' pay rates range from \$10.00 per hour at the start of their apprenticeship to perhaps \$18.00 at the end of their time (depending on the employer). Females, Maori and Pacific people are under-represented in the industry and in the modern apprenticeship scheme generally. In 2003 females represent 6.6% of total modern apprenticeships, Maori represented 14% and Pacific people represented 1.9% (McGregor & Gray, 2003). The government is concerned to redress this imbalance. Over the last three years, JITO has undertaken important literacy and numeracy focused initiatives to improve apprentice learning. These include pre-assessments and post-assessments of learners attending block courses, improved resources and workplace mentoring support.

### ***Methodology***

This investigation used a qualitative research design, where issues are explored through the 'lenses' of different participants, sites and artefacts, affording a 'crystallisation' of the data (Taylor 1996:43). From this, apprenticeship profiles and accounts of learning on the job and in formal learning can be constructed. Profiles and accounts were constructed from data gathered mainly from four apprentices (although others contributed), four supervisors or mentors, two trainers and the different sites of learning. The data was collected over three months at on-job sites and the off-job course attended by the apprentices. At the on-job sites of learning apprentices were observed engaging in a range of types of work within domestic glazing, commercial glazing and glass processing. On-the-spot 'conversations' were conducted with apprentices as they carried out their tasks. They were invited to talk through their tasks, goals and work in general. Additional, semi-structured formal interviews asked



about their learning on and off site and about their backgrounds. Apprentices were provided with an on-job journal of learning to be used over a two week period. Finally, environmental facilitators and inhibitors to learning were explored at each site through observations of workplace and training environments and interview/ discussions with supervisors, mentors, employers, trainers and assessors, as appropriate.

Apprentices for the study were chosen on the basis of location, range of pre-assessment scores and range of ethnicity (including Maori and Pacific). Due to cost considerations, it was necessary to base all on-job interviews in one New Zealand locality. Apprentices living in that locality were selected from a list of those attending an upcoming second year block course. All apprentices in the study were male, reflecting the general under-representation of female apprentices. The companies chosen for the study were from the glass industry and all had apprentices attending the same block course during the period of the research. On-job sites ranged from small contractor businesses to factory branches of large national organisations. The companies were engaged in either domestic or commercial work. Two sites included medium sized factories. A third site comprised two contractors working together with their apprentices at commercial sites. The remaining site comprised the domestic job locations assigned to an apprentice working from his van on home glass repairs. Immediate supervisors and/or mentors, and the two course tutors at the JITO block course (off-site learning) were also interviewed. The off-job site was the Glass and Glazing Institute of New Zealand, based at Upper Hutt, Wellington.

### **Process**

All four apprentices were observed on the job on three to four separate occasions, for between two and three hours at a time. In one case this involved travelling to and from domestic jobs with an apprentice. In another, the apprentice was met at the day's commercial building site and in the two larger factory sites, apprentices were shadowed at their work stations. In one factory-based case the apprentice was being moved around work stations, although he was impatient to be included in outside jobs. In the other, the apprentice (who had been out on the road for a short time) was not being moved around, but kept at the one repetitive job throughout the research period. These different features of apprentices' work situations and associated benefits and limitations, were taken into account when observing their formal learning at the block course. On-course observations and interviews (with learners and trainers) took place over three consecutive days during the middle week of the course. The final on-job interviews took place after the block course. Data was gathered from both learners and mentors / employers.

## ***Findings***

These findings explore the following questions:

- How do glass apprentices manage formal and informal learning?
- How does learning on the first block course support learning on the job?
- How do apprentices learn on the job and in self-directed study?
- How does learning on the job and self directed study support learning on the second block course?
- How could learning, and for literacy and numeracy development in particular, be strengthened?

The following are profiles of four glass apprentices, showing some of their approaches to learning and conditions of work.

### *Apprentice profiles*

The four apprentices are shadowed as they learn on a block course, at their work sites and on the road. They range in age between eighteen and twenty three, and for the sake of anonymity, they are called Bryan, Andy, Colin and Pierre. Each comes to the work with unique life and work experiences which impact in their level of confidence and influence their approach to work and learning.

Bryan has an understanding of how trades work, as he has tried other trades before settling on glazing. He has a strong competitive self image, seeing himself as someone who can achieve success, both on and off the job. He takes pride in his work and his work space (his van). He is also innovative – he has made improvements which increase his van's glass carrying capacity and his working space. Bryan works quickly and purposefully, interacts confidently with customers, supervisors and co-workers and is impatient to move forward. He brings this attitude to learning and work, and generally achieves good results.

Colin is from a 'trade's family'.<sup>1</sup> A family member is employed at the same workplace, and therefore has acted as an informal mentor. This gives Colin a degree of cultural capital<sup>2</sup> in

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1. According to an employer, a 'trades family' is one where one or both of a worker's parents or other close relatives have been or continue to be employed in one of the trades.

that he knows what to expect in a trades environment and what is expected of him. Colin fits in well with the workplace culture and seems sure of himself. He is quick to learn and able, but also willing to ask for help, although he is also keen to show independence from his relative. He has been hoping to get out on the road and learn/apply new skills with qualified glaziers. This opportunity arises during the research period.

Andy is conscientious, reflective and deliberate. He does not come from a trade's family but from one involved in formal learning. He studies and works relatively carefully with much attention to detail and tends therefore to achieve excellent results with block and distance learning coursework, which has made his employer proud. Although he works hard on the job often asking what he can do next to be helpful, there seems to be a slight cultural deficit in terms of the trade environment. For instance, Andy's employer has found that Andy's careful attention can sometimes be a drawback when work has to meet deadlines.

Pierre is a little older, married with young children, and his first language is not English. Like Colin, he also has a relative in the workplace. However, whatever cultural capital this affords is balanced against the lack of cultural capital in a new country. Pierre feels more comfortable in the factory than out on the road with the glaziers. He manages his repetitive tasks with ease and does not try to get more from his on-job situation than is offered as his primary goal is to keep his job so that he can support his family. Pierre is struggling with his coursework, especially the written components. He is not confident asking for help from tutors but does ask and get help from fellow apprentices and co-workers.

### ***The first block course and job connections***

Learning engagement is likely to be stronger when formal learning is linked and acts as a catalyst for informal learning activities in the workplace (Taylor et al., 2007)

Formal learning activities expected to be undertaken by apprentices in the first and second year of their apprenticeship include a sixteen unit distance learning programme (introductory certificate) and a year one block course.

The first block course seems to have been helpful to the apprentices and to have given them confidence to apply their newly acquired skills to the job. Where their workplaces have

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<sup>2</sup> The term Cultural Capital was introduced by Bourdieu (1977) to discuss access to different 'capitals' or advantages afforded by different classes. Here it means advantage in terms of understanding how things are done in a local environment such as the workplace or community.

allowed them a variety of situations in which they can practice these new skills, apprentice learning has become more embedded and they are more prepared and keen to begin their second block course. For instance, Bryan has faced new challenges on the road every day, and Colin has worked at a range of different job stations in the factory. Andy has been able to practice new skills such as siliconing, to make mistakes and to discuss them with experienced contractors. Other circumstances however seem less likely to build confidence in learning. These included lack of opportunity to practice new skills and lack of mentoring support. Pierre, lacking both skills practice opportunities and mentoring, is anxious about the upcoming block course.

Learning from the first block course has stayed with the apprentices and impacted positively on their expectations of the second course. The learning atmosphere of the first course is reported as positive, collective and supportive. Some of the course work was difficult for those who had not been exposed to a range of on-job skill development, but the course tutors had encouraged apprentices to help each other. Apprentices talked about helping those who had never done glazing, or who were struggling with coursework. One apprentice compares his experience to that of some others:

I get to do a bit of everything. Commercial and domestic, e.g. frameless shower. The wooden stuff gets [other course participants] if they've never seen it before, hacking out a window...

The apprentices talk about skills learned on the course that they use on the job now: "In the first course they told you about measuring economically" and "He taught us how to work out area last year". They also comment on small differences between what is learned on the course and work carried out on the job:

In our first year (block course) we had to have a 5 ml gap assignment, and we had to fill that with silicone. Just to prove that you can work with silicone. (On the job) we generally use a smaller gap. In our case it's better that you don't use too much silicone.

In the last course they made us do a hammer out, but it wasn't a true indication of skill cos they didn't have enough...windows had been stored upstairs out of the sun, so the putty hadn't gone that hard.

These comments show that the apprentices are reflecting on how the block course work relates to their on job work. They are also adapting lessons from the course to fit their on job circumstances. Thus the formal learning of the block course is acting as a catalyst for informal learning activities such as watching experienced tradesmen, practising skills with and without supervision, asking questions and searching for new information.

The distance learning introductory certificate work is a little more problematic. Comprised of sixteen workbooks and sixteen assessments, the task is cumbersome if not daunting for all apprentices. It requires significant commitment from employers in terms of mentor support and time, and from apprentices in terms of time and motivation to complete. Where mentoring occurs and apprentices are able to relate their distance learning to what they are doing at work, motivation to complete the modules is strengthened. Thus formal-informal connections become the catalyst not only for learning at work but also for further distance learning.

Progress among the four apprentices is so far uneven: two apprentices have had very good success with their block courses, two have completed at least half of their introductory certificates, and two have had good opportunities to apply learning on the job. Three of the apprentices have struggled in at least one of these areas. Generally, the connections from formal to informal learning could be strengthened by more deliberate interventions by mentors, and by greater opportunity to apply new learning to a range of tasks in a range of situations. Apprentices' workplace learning conditions should ideally include a balance of support and independence and a range of opportunity to practice skills, including literacy and numeracy skills.

### ***Learning on the job***

Below, the apprentices' working circumstances and how these facilitate the application of new learning, are discussed. It can be seen that more support could strengthen literacy, numeracy and vocational learning outcomes. In most instances employers have identified changes needed and are doing what they can to implement them.

Up until very recently, Bryan has been operating his own van, picking up his job sheets at the beginning of every day. He has had significant variety in his work as no two domestic repair call outs are quite the same. The jobs tend to be those that can be managed within an hour or two such as a broken door panel or window pane, and thus he can expect a range of jobs in one day. He has been calling customers, making appointments, reading

maps and locating job sites, estimating job requirements, carrying out repair work, calculating costs and preparing invoices and receipts for customers. This is an unusual amount of responsibility for a year two apprentice, though quite normal in this company.

Bryan manages his time well. This may be because he has had ownership of his work schedules:

I just sort of plan it so you are not going back and forth between places, that's all really, you never know how long it will take you till you get there, can be bigger than what the customer tells you. Employers are not too worried so as long as you get it done.

He reports that he enjoys finding his way around the locality, the challenge and opportunity of solving new problems and developing skills and interacting with customers by phone and face to face. Bryan demonstrates that he can talk with customers politely, solve problems such as finding an address wrongly given on the job sheet, and make on-the-spot decisions about jobs and pricing such as giving a discount when a customer had been inconvenienced by the company. He keeps a pricing matrix which has been made for him by the company, and which make it easier for him to assess costs and to issue invoices. His employer explains the matrix and its purpose:

Rather than having to sit down and work it out, all they need to know is a square metre and anything after that we have a matrix. It's just something we have developed for a certain price bracket for a certain type of glass, and square area. We say the glass is this by this, so that is the price, to try and get payment then and there rather than it coming back and then you can't get hold of the customer.

Bryan is capable of ensuring that he is appropriately equipped for the job in hand, showing pride in his arrangement of tools and equipment and in the systems he has developed for working out on the road. He is confident with measuring and cutting tasks, demonstrating skills he has learned from skilled tradesmen on and off the job. He is capable of self-identifying mistakes, and while there is still a risk of mistakes and accidents he feels confident in his ability deal with them. Thus Bryan has been given plenty of independence and opportunity to practice skills. He is fortunate that his employer recognises that he would benefit from the opportunity to practice skills he does not usually encounter in his daily work, and from further mentoring. The employer explains:

I think what's happened in the glass industry previously... [the apprentices have] got to a certain point where they have been semi-competent, [and so we] load them up on the van and send them out and you tend to forget about them, then they finish their apprenticeship and it's not until possibly they move to another area of the glass trade where they have been solely doing commercial or solely installing showers or something where they then take the next step in learning.

One of the ways of providing Bryan with further opportunities for skills development has been to (very recently) team him up with an experienced tradesman for up to sixteen weeks. His employer comments:

Just to see how he goes, this guy has specialised in another area that we haven't previously covered, so more of the frameless sort of work. So if we get a bit of that we'll give it to them, and then it's another opportunity for [Bryan] to learn as well...In the long term or probably the medium term we'll have him out in the van again.

Andy works with his two contractors and another apprentice. Working at commercial building sites, the jobs are similar to each other in many respects - interior partitions, exterior glass and awnings. All sheets of glass require carrying, position identification (gleaned from labels), fitting, blocking, silconing, sealing and cleaning. For Andy the variety is in the size and location of the job, and in rectifying errors (such as glass cut to the wrong size) where he can learn a new skill.

Andy is involved in different challenges every day, but does so as a junior member of a team, so that the responsibility for solving problems is taken over by the employing contractors. All decisions about equipment, tools and materials needed are made by the contractors. He has much less opportunity to act autonomously because many of the tasks are heavy and require teamwork and because his employer is not yet confident of Andy's capabilities. He and the other apprentice are occasionally sent on small jobs on their own but mostly they work under the guidance of the contractors.

Andy is very willing to learn from his employer and the other contractor. He is attentive, very careful and concerned to get things right. His manner with co-workers and other contractors on the site is polite. He sometimes works without help but is mainly under instruction from at least one of the contractors. Andy has the benefit of constant opportunity to closely observe, be observed by, and learn from skilled tradesmen. He takes good advantage of this by asking questions to build his knowledge and skill base and to try to anticipate what the

tradesmen might need next. At this point he would gain from more opportunities to complete tasks independently so that he can test his learning. While he has shown that he is able to complete his distance learning modules without workplace support, mentoring interest in his progress could further improve outcomes.

Colin has spent much of his time doing factory tasks. He has worked at the factory for a short time before becoming an apprentice and knows all aspects of the work. Colin moves around the factory performing a variety of different tasks such as double glazing, machine and hand cutting, polishing. He has autonomy in the work areas where he has been assigned but the work is not complex.

Like Bryan, he has an independent attitude. He too has taken ownership of the work and developed methodical systems for getting the work done quickly, efficiently and economically. "I've got my own way of doing things". He starts by cleaning his work area and adjusting tools where necessary and lining up the job sheets and labels according to when the jobs will be picked up and the type of glass to be used. He is confident with measuring tasks. He is able to make decisions about appropriate measuring tools and to explain those decisions.

Colin has had good support from a family member and mentor in his first year, and in his second year he asks for help if necessary. For example, he calls other tradesmen when he is working with very thin glass, as such glass is more likely to break and Colin has had quite enough cuts in the past. He has clearly learned valuable lessons and is keen to demonstrate correct glass handling techniques.

He appreciates the variety of tasks as they allow him opportunities to make judgements, learn and practice new skills. However, Colin has been in the factory two years now and considers himself to be quite competent in each work area. He is ready to expand his skills base through working with experienced glaziers. In recognition of this he is now being given the opportunity to join glaziers on the road. This allows him to observe experienced tradesmen, to be observed and taught by them, and to practice new skills. He is already pleased with his new learning:

I'm cut free this year, pretty stoked about that. The [two] dudes I go out with are pretty good, they help me. Installing laminated and safety glass, they are slowly at the moment teaching me siliconing, which we did at tech. [They are] making sure I'm wearing the gauntlet, visors, hard hats, they are pretty full on.



Pierre is not so fortunate with regard to having the opportunity to take on more complex tasks and to work at them independently. Neither New Zealand born nor a confident English speaker, he is not out glazing, but instead spends all his time at one cutting desk doing simple, routine tasks. He remains at the same table all day, lining up and machine cutting glass, trimming, loading bins with trimmed off pieces, emptying the bins and sweeping the floor. There is almost no skill in this work and no opportunity to learn anything new. His supervisor promises that at some stage he will be moved to other parts of the factory to learn how to do new tasks.

Pierre reports that he is satisfied with this work, although it is very repetitive and keeps him from gaining a range of experience in glazing. He asks for and gets helpful assistance and support from a co-worker. His supervisor comments that Pierre was placed on a later shift in the factory as he could not make the very early starts required for glazing. Pierre is therefore in a difficult position: currently and for the foreseeable future, he works in a processing rather than glazing environment yet he is locked into a glazing apprenticeship. He has no formally established mentor to support him through his introductory certificate. The limitations of his work experience negatively impact both on his ability to cope with distance and block course work and to practice skills learned from the block course, on the job. Pierre would benefit from workplace and ITO support to enable him to complete his apprenticeship.

### ***Literacy and numeracy on the job***

Literacy and numeracy are vital to the smooth operation of glazing work. Tasks include reading and completing job sheets, reading maps, speaking with customers, calculating travel and completion times, making appointments, planning journeys and jobs, solving problems, measuring, calculating glass size and related costs and preparing invoices and receipts. Some of these skills are taught on the first block course. Apprentices would ideally have the opportunity to apply and practice what they have learned back on the job. Bryan has opportunities to practice almost all of these tasks. Colin is able to read and complete job sheets, speak with contractors who call to pick up glass orders, problem solve, measure and calculate glass sizes and completion times, plan jobs and solve problems. Andy is more limited in the literacy and numeracy skills he can practice on the job. He sometimes greets customers, but generally does not discuss the job with them. He can read and complete job sheets, but these are normally the responsibility of his employer. He is required to read street maps and understand floor plans. He has some opportunity to solve problems under supervision. Although there are opportunities to measure spaces and panels, much of his

work involves fetching, lifting and carrying tools, equipment and glass needed for the job. Andy would benefit from a wider range of tasks in order to practice these skills. Pierre is the apprentice who would most benefit from practice in literacy and numeracy, yet is least able to do so in his current job, which involves a minimal amount of measuring, job sheet reading and completion.

### ***Certificate completion and mentoring***

#### *Supporting Distance Learning*

A number of mentoring tasks can impact positively on apprentices' learning achievement. Mentors can, for instance, support learners to complete their 16 unit introductory certificate, prepare them for new learning before each block course; discuss progress after each block course, and to arrange specialist learning assistance as necessary.

There seems to be some correlation between the existence and effectiveness of workplace mentoring and apprentices' completion of introductory certificate assessments. For instance, Colin has had effective, ongoing mentoring in in-house classes run by a woman in the office until late 2008 and has completed assessments for six workbooks during that time. He thinks he might be able to complete some on his own but wishes he could have a return to the 2008 classes:

[I could do] some of them, but it's sort of like the work down at the block course aye. You sort of need someone to show you. The guys at tech, most all of them got given the workbooks. When I told them that I had a class for it, used to, three days a week, go upstairs for an hour they couldn't believe it. It might start again, he said something about doing it differently.

The books are held with his supervisor (the new mentor) who initially comments that "...they don't do too much before their first two years as they won't understand it." He later shifts his approach, but still finds time a significant issue. He hopes to move the apprentices on quickly once he gets started.

I only ended up taking over that last year so we've only done a couple. We've had a few changes at work with restructuring. So I plan on working with the apprentices finishing all their books by the end of this year. One has only got four books to go

The supervisor / mentor intends to support the apprentices at the site by setting up a system of cascading peer support. Two experienced apprentices will support each other through workbooks and then pass on their knowledge to two less experienced apprentices. The mentor will provide oversight and support to all four apprentices.

Bryan had completed two workbook assessments at the outset of his apprenticeship, but now with no mentoring for the introductory certificate work he seems to have lost motivation. House-shifts, he says, have meant that the work is packed away. Also, the company has had a shift in location which has disrupted their support of apprentices. Bryan's manager is aware of the tendency of apprentices like Bryan to leave their introductory certificate workbooks till the end of their time. He has tried to encourage them by offering incentives, with little success.

They get the books at the beginning of their time and they usually get to the end of their time and they still haven't done them. They are given time and they are told, look team up, there's a group of you I don't need to be here, we'll pay you. Meet whatever, in the morning after work, in the weekend three to four of you. I had all the books printed out and bound so that they had a decent record, and out of the four copies I've given out I don't think anyone's done too much of it.

In terms of on the job mentoring, Bryan is able to call on a senior tradesman for advice if needed and he is at times invited to watch and assist the tradesman at a complicated task. In addition, the company is offering short in-house courses to apprentices, at least one of which Bryan has attended. The manager is exploring how to develop an overall company training plan which will further improve apprentice support and learning.

For Andy success is not associated with effective workplace mentoring: he has done eight of the introductory certificate assessments without related mentoring assistance. Such success may be due to his generally thorough and determined approach to all his work. On the job Andy is luckier than Bryan, as he has two senior contractors who are constantly explaining the intricacies of the work. Their proximity allows him opportunities to ask questions, which he does. If there is any problem at all one of the bosses take over. This does not necessarily lock Andy out of the process. Often he is kept on to assist with the task while at the same time being given explanations and test-type questions about how the problem should be solved. He handles criticism well, learning from his mistakes.

Pierre has not yet begun his introductory certificate and has not yet had mentoring to support it. He voices his uncertainty about all requirements related to the certificate and learning on his apprenticeship and asks for help in getting information about course and distance learning work.

### ***Literacy and numeracy and certificate completion***

JITO has been aware that the language and layout of distance learning material is an important factor in learner motivation and accessibility. They have recently reviewed and re-developed all 16 modules for the introductory certificate, focusing on relevance and clear language principles (including appealing graphics and uncluttered layout). The apprentices in this study have been working with the old modules but will shortly have access to the new ones.

The apprentices have struggled with the dense and sometimes irrelevant material of the old workbooks. The less confident and able readers and those who have had no mentoring, can be commended for progress they have made. However there are also 'hidden' literacy competencies in distance learning that should be considered: learners must know how to estimate the amount of time each module will take and to plan a calendar of work to ensure completion. They need to be able to search for information not provided in the workbooks or by the people around them. They are likely therefore to need information searching skills, which could involve understanding of how library catalogues and shelving systems work. They need to know how to use internet search engines and keywords, and how to select the most appropriate sites identified by an internet search engine. Finally, they need to understand the procedure for submitting assessments, know where and how to send them. Often there is no-one to support them to develop literacy and numeracy skills if they are needed.

### ***JITO Support***

JITO recognises that completion of the introductory certificate is slow among JITO apprentices in general and new methods of support for workplace mentors are being developed by the ITO. One of the more successful models of workplace mentoring has been where an office administrator has been used to organise and keep records of the workbook and assessment materials, help the apprentice to plan his study, work with the apprentice to identify difficult learning areas, help the apprentice to identify where to locate the information (e.g. internet, tradesperson), help the apprentice to develop internet searching skills and

send off completed assessments. In this study the two administrators who provided support were female and had the necessary skills for this level of support. As has been mentioned a range of literacy and numeracy skills are required on the job, and correspondingly in the certificate modules. The administrator uses these skills every day and is therefore possibly in a better position to offer some support to apprentices. In addition the course workbooks and assessments require that information is searched on the computer. An administrator is most likely to have a computer and computer skills. She / he is not ranked on the same career 'ladder' as the apprentice, and therefore is more likely to be accepted as a safe person in terms of asking for help and admitting lack of knowledge. One employer comments:

Yes it's something we could do. Makes sense. The only drawback is someone's got to be on the backs of these guys. From my point of view it's worth paying to get them done [paid study time].

### ***Supporting block course learning***

Prior to each block course JITO recommends that mentors go through the Glass and Glazing training handbook with apprentices. This handbook clearly lays out what apprentices can expect at each course level, and provides detailed information about learning that should be covered for each unit standard. Employers / mentors report that they have seen the manual but have not used it to discuss the upcoming course with apprentices. It is not clear whether this is because there has not been time or because they were unaware of the content of the manual. Employers tended to indicate that lack of time was the reason.

Apprentices comment that talking to a workplace mentor would be an advantage prior to the course, as it would help prepare them. None of the apprentices have experienced mentoring to prepare them for the course. An apprentice believes the manual is his sole responsibility, and comments:

I didn't prepare for it at all, I didn't know anything. I've got one of those (manuals) but I didn't read it. I should do.

However one employer suggests that perhaps the lack of attention given by employers and supervisors to mentoring their apprentices is also because:

The mentors aren't really trained either. I know when [XXXX] came up and spent a bit of time, he said this is what you look for. Some people are good, I wouldn't be so

good. I get frustrated if people don't understand. Some of the guys, some of them are tradesmen some of them pretty competent, and some of them are better tradesmen so they are mentors. It doesn't mean to say they'll be good mentors.

A good mentor would need to be comfortable with the language of educational qualifications. The manual is a bulky folder of sixty or more pages of this type.

Effective mentoring is not yet well supported or established and is certainly not currently in place for any of the four apprentices in this study. These and other apprentices need course content discussions to prepare them for new learning before each block course, opportunities to practice new knowledge and skills between courses and opportunities to discuss progress after each block course. They also often need organisational, time management, information searching and other learning support in order complete their introductory certificate. Apprentices who struggle beyond this level of support will need individual learning assistance (e.g. literacy and numeracy) which is funded by the Tertiary Education Commission.

Overall, apprentices need a 'big picture' induction from the mentor, about what they are expected to learn in self directed and block course programmes, how they might manage their learning time, and what resources are available from the company and from JITO. For instance, if their workbook assessments are completed and signed off prior to their last six months of their apprenticeship they may have their remaining time taken off the apprenticeship. Thus there is an incentive for the apprentices to complete early. Often the apprentices are unaware of what they need to do to affect this on a day to day, month by month basis.

### ***The second block course***

At stage two, nine compulsory unit standards and one elective are to be covered. Apprentices are keen to attend the course and look forward to meeting up with other apprentices at the same level to compare situations and socialise. They attend because they are required to attend the block course as part of their apprenticeship agreement and because they will qualify for a greater hourly rate of pay once they complete their qualifications. They hope the course will further their knowledge and skill development. Knowledge of what to expect on the course has been gained from discussions with apprentices who are further through their time. Some apprentices have seen the JITO training handbook but none have discussed it with mentors prior to the course and none

have it with them on the course. They have all seen the Metro Glass Tech handbook that is used and recommended on the course.

Course trainers would like to see stronger connections between themselves and on job mentors as they feel it would be helpful to them if they knew what apprentices had done before they came onto the course. One trainer suggests that a checklist of what has been learned on the job might be useful, similar to the report given by trainers to the workplace. The trainers themselves keep in touch with industry changes through the Glass Association of New Zealand and the Metro Glass Tech handbooks. They feel it is important to provide detailed information about the course content to mentors back in the workplace in order to build the connections between the course and on-job learning.

### *The learning environment and course structure*

The teaching and learning space is a building divided into a workshop area and a 'classroom'. The classroom area comprises a teachers' desk facing four rows of long tables, three of which are able to seat five learners comfortably and one smaller one for two learners at the back. The workshop area consists of a large central table surrounded by several work stations. These work-stations serve as a circuit where apprentices move from one to the other (as they become available) in order to complete 'projects' and have them checked off in project books issued by the trainers. The project books contain assessment checks for five of the nine compulsory units. The structure of each day is routine. It comprises:

1. A test covering class work of the previous day (approximately half an hour)
2. Theory and calculations (approximately one hour)
3. Practical (approximately two hours)
4. Theory and calculations (approximately one hour)
5. Practical (approximately two hours)

The course is taught by two very experienced tradesmen who alternate training days. The atmosphere is positive and mutually respectful, with apprentices being expected to manage their learning as independent adults and to seek peer and tutor support when necessary.

Apprentice responsibilities include planning carefully, using safety equipment, completing tasks, checking that their work meets specifications, reporting on their tasks, studying for tests and helping peers as needed. The trainer comments that apprentices lack good time

management skills. These skills are not listed as part of the qualification but are expected to be gained through apprentices' experience of working through the projects. (See later discussion).

Participants report that there are similarities in routines and tasks between the first and second block course which help them to feel at ease and to increase independence in the second course. Three of the projects developed in the first course are repeated in the second course (21<sup>st</sup> key, a simpler version of the terrarium and mirror mount), which builds confidence in apprentices' ability to manage the project requirements.

### *Formal Learning and Teaching (theory, calculations and tests)*

Both trainers are aware that their students are being pre-assessed for literacy and numeracy (LLN) by JITO as part of the Embedded Learning Pilot. They feel separated from the process in the following ways: (1) Although they are given the results they have insufficient guidance about what to do to raise the competence of learners so they feel limited in what they can do. (2) They feel that the formal assessment can label students and fails to measure attitude:

[The pre-assessments] are not really useful at all. You can work out pretty quickly who is good and who struggles in the first couple of days. Formal assessment might give you pre-conceived ideas. Or they could have a shitty attitude but good handwriting.

Trainers' remarks about limitations in regard to following up on assessment seem to indicate that the trainers' issues are less with assessment methods than with knowing how to connect assessment to delivery. Teaching aids include videos. Trainers commented that they would like to access or develop more up to date resources of this kind.

### *Theory, calculations and tests*

Current delivery of theory and calculations on the course uses a traditional classroom teaching approach, with teacher at the head of the class, the use of whiteboard and overhead transparencies, handouts, note-taking by apprentices and focused questions to the whole group to check for recall and understanding. This approach means that participants who are struggling to understand the oral discussion and / or written work might not necessarily be noticed. One such apprentice reports:



I got lost. Just copied what he wrote on the board. [It only made sense] at the beginning and then I got lost when it came to writing it down. I just wrote down what I remember [of what the tutor said].

Several learners are actively engaged, at least half the class asking and answering questions. Although the trainers are very focused on the unit standards, they emphasise that they sometimes go outside the standards, responding to learners' stories and asking questions about how to manage particular workplace tasks. Students remain in their places throughout classroom sessions. Apprentices choose the same seats every day. Three quarters of apprentices report that they are happy with this traditional layout and approach. Some apprentices found the theory aspects of the course to be of the greatest value.

Theory helped more than anything cos the projects weren't really applicable but the theory was, calcs, people had trouble with those but I don't know how. All you had to do was type in the numbers and get the answer.

Other apprentices agree but query the relevance of some learning content, such as the requirement to calculate weight. One comments:

Actually, something that everyone brought up on the course – [why] are we calculating the weight of bars and glass? I asked the tutor and I suppose I got an answer but it still didn't seem to apply. I understand pricing of a job, but why the weight? It's either the architect's job or the engineer's job. It's already been made. I'm not part of the engineering crew. But that's the only thing. Everything else seemed to apply to the job.

The tests for each day are one-page typewritten handouts. They measure learning from the previous day. One apprentice struggles with theory and calculations and therefore finds the tests difficult. Since "A lot of it was stuff you'd written – what the tutor gave you" and the apprentice does not have clear notes, he finds it difficult to review for the test. However, most of the apprentices are comfortable with the testing procedure:

I had to work pretty hard to cram for each test. You see, you get the information today and the test is tomorrow morning so you have to cram for it.

I think you can tell who does well in the tests because they sat down and went over their notes. The people who didn't do well in their tests didn't do the preparation. Cos it's pretty simple it's easy to pass. All you need to do is go over your notes.

Apprentices are advised on the approach they should take to reviewing their notes for the test:

We were given a good example of going over your notes five times: immediately after class, after tea, before you go to bed then in the morning before you go to class then just before your tests.

One apprentice discusses how it was difficult for him to know what aspects of the previous day's work he should focus on:

They give you 15 minutes before the test to revise. Sometimes three pages and a handout. It's quite confusing, some are really tricky. Things we studied were not in the test, even if he went over majorly, and something he went over ten seconds was.

Tests are assessed by the trainer as they are handed in. Some apprentices are required to re-sit their tests. They are allowed to 're-sit' only once, and if they fail they do not pass that component of the block course. However, this and other course repeats can be attempted during the third block course. While the approach of eventually passing learners has its advantages, the cumulative effect of allowing apprentices to catch up on tests (and projects and reports), and the additional stress it places on him / her in subsequent courses, is questioned by an employer:

But then what happens, does he struggle when he goes to the next course? It said on [XXXX]'s [report] that when he goes on the next course he has to do those two units, so he'll have to be working his arse off in the last block course and what happens if you don't pass?

### *Informal learning and teaching - projects*

Unit standards are strongly emphasised in the practical sessions, with all apprentices working individually to complete the eleven unit standard-related projects in their project books. They generally appreciate the opportunity to practice skills in a learning environment

where mistakes can be made. One commented that this was an exceptional opportunity for him to get hands-on experience:

I suppose that comes down to experience, doing it more and more and in some ways having the *opportunity* to do it rather than the boss doing it all the time.

The project work is self-paced. Trainers expect learners to be independent. They also feel that working one to one with learners is difficult given the constraints of time and apprentice numbers.

The boys are given the project books in the first week and it is up to them to do their own time management.

Time management on the course is an issue in terms of completing the projects. The incentive to improve time management is enhanced by the offer of a reward by the tutors for the first apprentice to complete and pass all projects. Apprentices understand that time management is important:

You have to plan for your job! How prepared you are for the job the less time you will take to do it in the long run I suppose. So you are better off to go into your job prepared. And you know what you can do.

Apprentices explain how they manage time, one demonstrating that he has reflected on how he might improve:

On the course you had just enough time to do all your projects and if you were quick you could finish with like a day or two spare but heaps of people didn't finish. I just looked through the book and did the quickest ones first. And then left the bigger ones to the end. So I ended up with four days to complete the last two assignments and had a day spare.

My first course I did it quite well but in this one my timing was pretty out. In my second week I over-estimated, I should be able to do this many, first week full on, second week laxed out and third week, [expletive] so no I didn't really crank it this time. But next year I know what not to do.

There is a variation in completion rates for projects (at a particular point, one of the apprentices has completed nine while another is up to his fourth). Slowness to complete may be a factor of poor time management, lack of motivation or of learning issues. Most apprentices on the course take the projects very seriously. One voices his concerns about compromising quality:

If they had half the projects in the time I would be able to do them all perfectly. Quality just goes out the window and you just have to get it finished. You can't really sacrifice the projects – each one requires workmanship. There's no time to make mistakes.

An example of time pressure over quality is in the story of one apprentice, who has struggled with a particularly difficult project, and has sought and gained assistance from another apprentice. (Apprentices ask for guidance from peers rather than trainers, possibly because peers are more available.) The helper shows the apprentice, but, as appropriate, does not do the work for him. The apprentice clearly has had very little experience with the tools, and is quite unsure of the steps. Yet he perseveres. Finally, the project is assessed by the trainer, who asks questions that are effective in encouraging the apprentice to think:

The bars are not lining up. Can you see that? Can you see why?

The apprentice knows the problem, and explains it adequately. The trainer marks him down for the poor fitting of the bar, but the total marks enable the apprentice to pass the unit, and so it is 'signed off'. The apprentice has not understood the project well enough to do it independently, yet there is no time for the apprentice to try again.

Apprentices are generally happy with the number and type of projects. One remarks that some are now irrelevant and are being phased out (e.g. leadlighting and mirror tiles). Another comments on what projects they would like to see added to the course:

I suppose for me working in [this location] I work with a lot of aluminium. There has only been a little bit of it on the course. Aluminium framing... If anything I'd like more variety on the course.

Some apprentices complain that the failure to complete projects was a factor of other apprentices' attitude.

I saw a lot of guys dicking around and then they are surprised that they didn't finish all their projects.

Although apprentices have sympathy for those who are genuinely struggling, they become resentful about those who are not, in their opinion, taking the course seriously and working hard.

[What] I don't like about it is how guys go into it thinking they are going to get a free ride. There are guys like me and [XXXX] who worked hard and got a result then there are they guys who didn't work hard but still passed. It sucks. They hadn't even finished. You'd think to pass a course you'd have to finish it.

### *Reports*

After each project, a report must be written explaining the planning and steps that have been taken. The atmosphere in the course is one of mutual support and this is encouraged by the tutors. Still there are variations in completion rates as this task requires concentrated writing. An apprentice explains his approach:

I found it easy to write the reports after I [taught myself] to take a couple of notes while I was making the projects. So as I'm making the projects I quickly make notes of what I did step by step and re-wrote the report at night in such a way that the tutor wanted it.

Although the tutors had provided sample reports in the first year, and the apprentices have notes from that course, they generally find sequencing and explaining each aspect of the process problematic.

Explaining things in detail cos you are used to talking to people who know what you are talking about so you don't have to.

That was hard for me to do those reports. It's just annoying, remembering what you do and writing it down in detail, step one to nine. They told us to do it that way. I failed the terrarium cos the report wasn't there.

This failure is not permanent: there is provision for apprentices to repeat and pass the project unit in the next block course, although this means doing the whole project again as

well as the report. More experienced and able apprentices are frequently observed giving advice, demonstrating and sharing their work with others. However, for some, this support goes a step too far. Claims are made that some apprentices have submitted other apprentices' work as their own:

I wasn't too fussed on it aye? I was working to do my bit and other people were doing that. They come out with the same qualification as everyone else, they just don't know how to do it.

This issue is wider than how the course is delivered – it is linked to problems within the qualifications system as a whole, and needs to be explored separately.

By the end of the course, trainers feel that although there is some change in knowledge and skills, the greatest change is in the apprentices' attitude, which comes about as a result of being thrown together with other apprentices and feeling a certain requirement to measure up. Trainers feel that attitude is the greatest change needed.

### **Implications for literacy and numeracy**

The co-operative learning environment of the block course is valuable in that it creates a positive learning atmosphere which can contribute to learners' success. Because apprentices can and do get help from their peers both in the theory and practical sessions, individual issues with learning may go undetected.

Once trainers are aware of literacy and / or numeracy issues in vocational learning they may either circumvent the issues (leaving the learner unable to be more independent in a new learning situation) or intervene to increase the learner's competence and learning independence. In many vocational learning situations literacy and numeracy issues are circumvented. This can be to avoid exposing struggling learners or because trainers have not had the professional development they need in order to know how to intervene appropriately and effectively. Trainers may see circumvention as the only way to get through a busy programme.

The trainers on this glazing block course tended to favour circumvention of literacy issues mainly because they didn't want to label students, but also they felt that attitude was often responsible for learning failures. Current teaching strategies circumvent literacy and

numeracy issues in that they do not unpack and address underpinning literacy and numeracy competencies. Thus they are not able to support individuals, through literacy and numeracy, to plan time, fully understand theory and calculations and to report on processes. Learners copy, without necessarily understanding, from overhead transparencies. Calculation formulas and practice opportunities are provided but not formatively assessed prior to the test. Peers share reports which are sometimes simply copied and handed in. The literacy and numeracy components of time management and developing sequenced information are not yet unpacked, made explicit and taught.

The trainers show an eagerness to adopt new learning and teaching strategies suggested to them. But it takes time to build literacy and numeracy interventions. Trainers need ongoing support to create, use and interpret appropriate informal assessment, to develop good resources and to extend delivery strategies. JITO is committed to this process, beginning with a formal review of literacy, language and numeracy components of the course. The assessments it has developed during 2008 identify learners who are likely to struggle with literacy and numeracy aspects of learning. Trainers have asked for more feedback from the assessments. They will be supported to interpret these findings themselves and to adjust their programme accordingly per intake. JITO's undertaking to work with trainers to develop these skills should increase the engagement, motivation and learning of apprentices who currently struggle with learning.

### **Connecting the block course to the job**

With one exception, employers and supervisors in this study report that they sit down with their apprentices to discuss their learning and their course reports after a block course. They learn either that their apprentice completed all requirements or did not complete and had to re-do second year work at their third block course. If an apprentice performed outstandingly or struggled with literacy, this might also be noted on the report form. Beyond that, and without reading the JITO training handbook, the employers have little information about the course other than what is reported to them by the apprentice. As a result, employers are generally not as well equipped as they might be to identify connections between the course and the workplace and to support apprentices to apply their learning to their work. One employer acknowledged that he needed to "...become more familiar with what they do."

Overall the apprentices agree that the theory, calculations and project work on the block course are relevant to their jobs.

The block course covers a lot of what we do out there in the glazing. Heaps of it is covered, three quarters of what is covered in the theory is useful. I will go out to a job and I will see something that[’s been] covered in the theory and in the test in the block course - like blocking in hinged doors - I’d never seen it , it’s not in the practical but is in the theory and in the test, so I had an idea how to do it.

The guys in the factory would do a better job if they knew how to do this.

I can relate this to my job. It’s good to understand the whole process and to know how long it takes to do.

I’ve been doing DGUs [Double glazed units] before but the extra knowledge I’ve got from my second course, I’ve got more knowledge about how the DGU are put together....

Two apprentices reflect on and explain the links between the coursework and their jobs:

Mirror [projects are] good for me cos that’s what I’ve been doing quite a bit lately, Installing mirrors. Been able to practice what I learned. The main thing we’ve been doing, using a level, making sure it’s plumb, it works, everything he said I came across. Not really any of the cutting ones.

All the silicone joints that are needed for the projects, and there’s quite a few especially with the terrarium, the table, gave me a chance to practice in a smaller scale. I thought it was really neat being able to work with all the machines that we take for granted. We had to do a whole bunch of holes for example for all these projects and usually when I’m on site it’s already done. I don’t even think about it. I don’t work in the factory so I never get to do it. But because I got to do it on the course I understand it better and I found out that I was really good at working with glass which was really good it adds to my confidence...This year I got to work with running pliers and it made really accurate edges of glass and I was able to get my glass pieces to very specific sizes and that worked out well with my assessments...



## ***On and off-job health and safety***

Health and safety is emphasised in off-job training. Signs are displayed around the walls of the building and near machinery to remind apprentices to wear their safety gear. Apprentices talk about how safety is valued in the first and second course:

Heaps of it done on the course third and first week. And before that a first aid course. Safety is one of the main things down there.

Safety ran through course, there is a safety box on the board – if you get caught not wearing safety gear three times, you go home. You should be wearing boots, gauntlets, safety glasses at all times if you are handling glass. Everyone had glasses on when they were using the machine, but not at the table. [The tutor] tended to hassle you but wouldn't write you up on the board for that. Glass will stab you through the gauntlets.

Safety is stressed to apprentices as they complete their projects on the course and they do observe safe practice where possible. However there seems to be agreement among trainers, employers and apprentices that on the commercial or domestic glazing job, 'by-the-book' safety cannot always be observed and that safety inspections can sometimes fail to understand practicalities and issues. In these situations, steel capped boots are a standard, but aprons, gloves and goggles are not always worn. At one job where gloves are not worn because they make intricate jobs difficult, an apprentice demonstrates how safety is observed by picking up glass between the fingers in order to avoid having the palm against the edge. Another apprentice climbs onto a crowded scaffolding to support co-workers to hold a glass sheet in place, thereby avoiding the safety risk of the panel being dropped. In terms of public safety, workers make every effort to encircle the construction area with tape, but members of the public walk through it to access a shortcut to a café. Apprentices talk about these issues, showing an awareness of proper procedure, but they are conflicted by the need to be efficient, and to support the employer and work team.

Contrastingly, in the factory environment, the routines are not as varied and safe practices are easier to develop, maintain and enforce. Large, permanent safety signage is prominently displayed and apprentice learning on the course is reinforced by supervisors. With very few exceptions, workers wear appropriate gear for the tasks they undertake (usually including footwear, aprons, gauntlets and goggles) and observe safety regulations.

## ***Summary and Conclusions***

The apprentices in this study showed that they had learned something in both on and off job environments and that learning in each environment was linked to the other. The apprentices remembered the block course content as far back as a year ago. They had applied and adapted the skills they learned on the course to the job. They critically reflected on the value of some aspects of the course over others. Although some reported that the course content was not considered to be not a perfect 'fit' in terms of some jobs, everyone commented that they had learned and had the opportunity to practice new skills. They retained safety information and generally wore the appropriate gear, especially in a factory situation. Those out glazing sometimes faced unsafe conditions but felt they were not in a position to change the situation. Overall learners were making new connections, applying learning, reflecting, refining, and transforming their practice.

Successful outcomes depend in part on what learners bring to the learning situation and in part on the circumstances and expectations under which they engage in learning. Where apprentices were very comfortable in the New Zealand trades environment they tended to be more confident about their ability to learn on the job, and in the cases studied, were given more opportunities to practice new skills. The opportunity to work relatively autonomously and to have variety in their jobs helped apprentices to learn and develop pride in their work. It seems that a balance between autonomy and supervision produces the best outcomes. Without supervisory support mistakes may not be picked up or learning could stall. Where the apprentice was less comfortable in the trades environment and there were few opportunities for skills practice at work, there was less of a foundation on which to build skills in the formal block course. In some these disadvantages can be overcome by determination – in others, intervention is necessary. Opportunities to read and complete job sheets, plan efficient routes and estimate time, measure and calculate, and price jobs are all important to building literacy and numeracy skills and need to be provided where possible.

Employers and supervisors tend not to have used the training handbook. In the weeks prior to a new block course, supervisors could work through the trainer handbook with their apprentices, making sure that they understand what they can expect on the course, and preparing them with experience on the job where possible.

In terms of the link between the job and the course, trainers suggested better connections between themselves and mentors and the development of a checklist by mentors which

could inform trainers of recent learning on the job prior to the course. Trainers also wanted to have more connection and a better understanding of the JITO pre-assessment tool.

The course environment was experienced by apprentices as positive and unthreatening and they were comfortable with the well established and varied routines. Trainers encouraged peer support and expected learner self-management. The day was divided into formal class theory, calculations and tests and informal, independent project work. Trainers were interested in improving their own skills to raise the level of learner understanding. JITO is now addressing trainer professional development and ongoing support. Skill areas identified in this research include informal, formative assessment of literacy and numeracy, identification and unpacking of underpinning literacy and numeracy in teaching, explicit teaching of all required knowledge, skill and attitude development and the introduction of small group and paired activities to strengthen peer learning and practice opportunities.

Employers appreciated information received from trainers about apprentice passes, work yet to be completed and issues. They generally discussed the report with apprentices. Employers also appreciated that apprentices had opportunities to practice on machines which may not be available on the job. They also noted that apprentices showed an increase in confidence on their return.

The distance learning modules were generally understood to be primarily the apprentices' responsibility. Since apprentices are unlikely to have engaged in distance learning prior to their apprenticeship, many aspects of this mode of learning may be unfamiliar. Employers and supervisors are usually too busy to be able to maintain a commitment to mentoring and thus support certificate completion on the job and for them it seemed to be a relatively low priority. Yet apprentices who had had any level of mentoring tended to complete their workbooks more quickly than those who hadn't. The apprentice who had been mentored by a person in an administrative position had made good progress until mentoring stopped. There are a number of skills needed in completing workbooks and assessments for which administrators may be in a better position to provide support than tradespeople. These include document organisational skills, time management planning, use of the internet, internet searching and keyword skills, submission and postal requirements and literacy and numeracy support.

### ***Recommendations:***

The recommendations include some that JITO can directly implement, and others where JITO can work with employers and trainers to encourage their implementation. In two instances, JITO has already begun work from this report.

#### *Overall:*

Employers and supervisors need to be convinced of the value of investing time and energy into apprentice learning support. Recommendations are:

- a) That JITO mentoring support should acknowledge the constraints of employers and supervisors and provide acceptable learning support alternatives.
- b) That ongoing support in mentoring is provided to new mentors over a period of a year, to help them recognise and work with learners who are struggling with expectations of the trade, coursework and study (particularly distance learning).

#### *On the job*

It is important that apprentices have the opportunity to practice skills learned on the course, when they are back on the job. The best circumstances for this practice are where the apprentice has a balance of supervision and autonomy in their work, and a variety of tasks, including tasks that involve literacy and numeracy. Recommendations are:

- c) That a workshop is offered to employers and supervisors (or mentors) to familiarise them with the JITO training handbook and course programmes. This will assist them to better prepare apprentices on the job for block course learning.
- d) That employers and supervisors use their knowledge of the JITO training handbook to frequently and incrementally increase apprentices' independence with on the job tasks.

#### *Distance Learning*

Distance learning requires that apprentices undertake a range of self-paced learning and tasks related to distance assessment. Those who have not engaged in distance learning before may struggle not only with the content, but with estimation of learning time, developing a learning plan, identifying support persons, identifying and assembling

resources (e.g. internet use, appropriate trade advice), liaison with JITO etc.  
Recommendation:

- e) That JITO assists employers and supervisors to investigate candidates (e.g. administrators) who can commit to providing this *specific* mentoring support over a period of approximately one year.

#### *On the courses*

The courses ran smoothly, although trainers identified that they could make changes to improve apprentice learning. These changes included strengthening the links from job to course, and improving assessment and teaching strategies. Recommendations are:

- f) That JITO supported mentors work with apprentices to create and provide to trainers a checklist of competencies practiced on the job between courses.
- g) That trainers engage in ongoing professional development in assessment and teaching strategies, with particular reference to literacy and numeracy.
- h) That JITO provides support to trainers to expand course content to include the explicit development of time management skills and literacy and numeracy competencies.



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