

**Apprenticeships through the BCITO: a
pedagogical analysis of the learning materials
used and the context in which they function**

A report submitted to the BCITO and funded by Ako Aotearoa

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Executive Summary:

The Building and Construction Industry Training Organisation (BCITO) is the “organisation appointed by the Government to develop and implement industry qualifications for the building and construction sector” (<http://www.bcito.org.nz/about/>).

This study provides a pedagogical analysis of the needs of apprentices participating in BCITO qualifications, primarily the National Certificate in Carpentry, and the package of learning materials they use. The questions under consideration were:

- 1) Is the package being used appropriately?
- 2) Is the package an appropriate tool for the training and support of apprentices?

The study was conducted in two parts:

- a series of site visits with training advisors which included observation and short informal interviews with apprentices and employers/supervisors;
- an analysis of the learning materials which made up the theory component of the learning package.

Observation and interviews during site visits revealed the diversity within the apprentice group. Some apprentices were experiencing difficulties in their learning and others were finding the process easier to deal with. Factors that were likely to have an impact on apprentices' learning experiences were:

- Age and maturity – younger apprentices or those with less maturity in relation to learning found it hard to organise and complete their course work.
- Educational experience or ability – apprentices who had not done well at school or who struggled with literacy tended to find course work hard to complete appropriately.
- Other support – problems with course work were often ameliorated if there was support (e.g. a parent) available to the apprentice.

Apprentices were asked to comment on the learning materials. Their comments were incorporated into the analysis of the learning package. Two modules were studied in depth using Race's (1994) checklist of open learning materials which provides a pedagogical framework for evaluation. The analysis highlighted the following areas that could assist apprentices with their learning:

- Preparation for learning – learning materials should support apprentices in their learning by including detailed help with learning activities, structured teaching and signposting and exercises to reinforce learning.
- Interaction – Learning materials should include interactive components so that apprentices can work with the materials rather than just read them
- Relevance – care should be taken to ensure that learning materials are relevant to the apprentices' work. This may either lead to sections being removed or to alterations that demonstrate the necessity of their inclusion.
- Feedback – fast feedback in the form of self assessment questions will help to reinforce learning. Also turnaround time for assessed work may need to be decreased.
- Assessment – ideally this should be more relevant to what apprentices need to know in the workplace rather than simple reiteration of information provided in the text. If apprentices' own work could be included this would support
- Integration of theory and practice – integration would help to reinforce relevance of the theory and inform practice. It can also improve the quality of assessment and provide better information about apprentices' theoretical knowledge.

Roles of Training Advisors (TAs) and employers/supervisors were also considered. Given the importance of the relationship between the apprentice and his/her supervisor, there seems to be little support for employers in that role. Supervisors' ideas and approaches to training vary

as does the way in which they interact with apprentices. The TA is in an important position in that it is up to them to ensure that the apprentices are getting what they need in order to complete the qualification. Different TAs have different methods of offering support: some focus on the pragmatic requirements of the apprenticeship (completion times, goal setting etc) while others take a much more pastoral view, supporting learning and working to improve motivation.

It is likely then that both employers and TAs will require more specific support and training as part of the development of learning materials within the apprenticeship framework.

Conclusion

1) Is the package being used appropriately?

The Carpentry learning materials are well presented and provide useful information for apprentices undertaking the course. Better utilisation is, however, desirable and possible. Employers and TAs require greater understanding about the learning needs of apprentices and how best to use the learning materials to support apprentices' learning.

2) Is the package an appropriate tool for the training and support of apprentices?

Analysis of the learning materials revealed that although of a very high quality, from a pedagogical point of view, there is some scope for improvement. Improvements are suggested in the following:

- Supporting apprentices in their learning through organisation and information about learning activities
- Providing teaching materials and self assessment exercises to improve active learning and interaction with the content
- Considering relevance of the materials
- Providing faster feedback to reinforce learning and maintain motivation
- Linking theory and practice in both learning materials and assessments to enhance relevance
- Consideration of other technologies to support learning and perhaps improve feedback.

Some redesign work on the learning materials and more specific training of the employers and TAs are recommended.

Introduction

In September 2007 I was approached by the Building and Construction Industry Training Organisation (BCITO) to undertake a small pilot project studying the learning materials used in one or more of their apprenticeship qualifications.

The BCITO offers apprenticeships in a number of areas of the building and construction industry (e.g. Carpentry, Cement and Concrete, Solid Plastering)*. The carpentry package is perceived to be a good quality product and forms the model for other learning packages within the BCITO. The BCITO recognises that the package may not be equally effective for all apprenticeships. It also acknowledges that there has been little research undertaken into the pedagogical underpinnings of the packages offered. To this end, management at the BCITO is interested in answering the two following over-arching questions:

- 1) Is the package being used appropriately?
- 2) Is the package an appropriate tool for the training and support of apprentices?

This report represents the early findings in the process of studying the carpentry apprenticeship package and analysis of the pedagogical issues that require consideration to support apprentices' learning.

Background

What is an ITO?

The Tertiary Education Commission describes industry training as “workplace learning that raises skills and boosts competitive advantage for business”. † Industry training is subsidised by the government of New Zealand through the Industry Training Fund.

Industry Training Organisations help with workplace learning by:

- setting national skill standards for their industry
- providing information and advice to trainees and their employers
- developing appropriate training arrangements for their industry
- arranging training that is appropriate for their industry
- arranging for the assessment of trainees
- monitoring training quality, and
- providing leadership to industry on skill and training needs.

Apprenticeships

Apprenticeships have existed since the Middle Ages and probably before that. Experienced “Master” craftsmen employed young people (usually boys) as relatively inexpensive labour in exchange for providing formal training in the craft.

In New Zealand the concept of apprenticeships was updated in 2000 with the implementation of the Modern Apprenticeship Training Act. This led to the NZ Modern Apprenticeship Initiative which provided work-based training opportunities in a variety of industries. The aim of this initiative was to rebuild trade training, to address skills shortages in a variety of industries and to improve employment outcomes for underrepresented groups in the labour market (e.g. women, Maori, Pasifika and migrant workers).

* See <http://www.bcito.org.nz/> for more information on the BCITO and its work.

† <http://www.tec.govt.nz/templates/standard.aspx?id=470>

Government funding to support Modern Apprenticeships has resulted in a significant increase in numbers: in April 2008 TEC recorded 15,000 Modern Apprentices either in training or having completed their qualifications[‡]

The BCITO

As an Industry Training organisation, the BCITO is limited in the ways in which it can interact with learners. The organisation provides learning materials but does not offer 'on-the-job' training to the apprentices that undertake the qualification. Apprentices are supervised in the field by a qualified trader (Master Builder) who deals with day-to-day learning. Learning is assessed by completion of theory unit standards and a Record of Work (RoW) which are marked by the supervisor. Each apprentice receives support from a Training Advisor who visits them on site, moderates the supervisor's assessment and provides support and guidance for completing further assessment. When the apprentice has completed the theory part of the qualification and provided sufficient evidence in their competence through their Record of Work the Training Advisor will 'sign the apprentice off' and they will be awarded a National Certificate in the specialism of their work. There is no fixed time limit for this but it is generally accepted that the entire process will take between three and five years depending on the abilities and experiences of the apprentice and the type of qualification sought.

The Carpentry Apprenticeship

There are currently more than 9000 apprentices participating in qualifications offered by the BCITO. The carpentry apprenticeship is the most successful and most popular qualification offered, accounting for nearly 90% of the total number.

On undertaking the National Certificate in Carpentry each apprentice is issued with a set of resources: these are generally referred to as "The Box of Books". The box comprises four theory resource folders, a number of good practice guides and guidelines for safety in the construction industry. Apprentices are also given a Record of Work folder (RoW) which provides a structure into which they can enter evidence of experience and competency in the different areas of the learning package.

The theory folders contain 41 separate modules[§] which are based on the carpentry theory unit standards (12997-13035). The introduction material states that "*Each module contains sufficient information for you to learn everything you need to know about the topic in order to meet the requirements of the unit standard.*" (BCITO Theory Resource Package, Introduction, p5). Apprentices are asked to consult other sources on occasions and these are clearly identified in the text.

Although the modules are ordered according to the normal process of a building project, apprentices are encouraged to match their theory study where possible to the work they are doing on site.

The learning package has become a model for other qualifications with varying degrees of success.

Education and learning

There has been an enormous amount written on how individuals learn best. Theories and principles alter depending on the individuals in question (children, young adults, adults) but some ideas are common across all groups:

Experience: individuals need to learn experientially and to make mistakes in order to develop

[‡] (<http://www.modern-apprenticeships.govt.nz/en/>).

[§] Two modules in Volume 2 (20887 & 20888) are elective ones.

Relevance: individuals prefer to understand the reasons why they need to learn something
Problem-focused: individuals prefer to focus on learning in order to answer a specific and immediate need rather than to focus on content
Feedback: learners require feedback in order to learn
Motivation: individuals need to be motivated to learn.

These ideals underpin the literature on teaching and learning. They have led to the development of a great many theories of how to maximise learning in different contexts.

In this report I will consider apprentice learning in relation to these ideas. In order to do this I will be focusing on the following aspects of good practice:

- Are the learning materials relevant for the apprentices undertaking the qualification?
- Are theory and practice sufficiently linked to allow apprentices to understand the relevance of what they are asked to do?
- Are assessments appropriate to encourage and support apprentices' learning?
- Are apprentices provided with appropriate feedback to allow them to develop their understanding?
- Are apprentices suitably prepared for learning on the apprenticeship?
- Do apprentices feel comfortable in their learning situations?
- Are they able to manage their workloads effectively in order to complete the qualification?

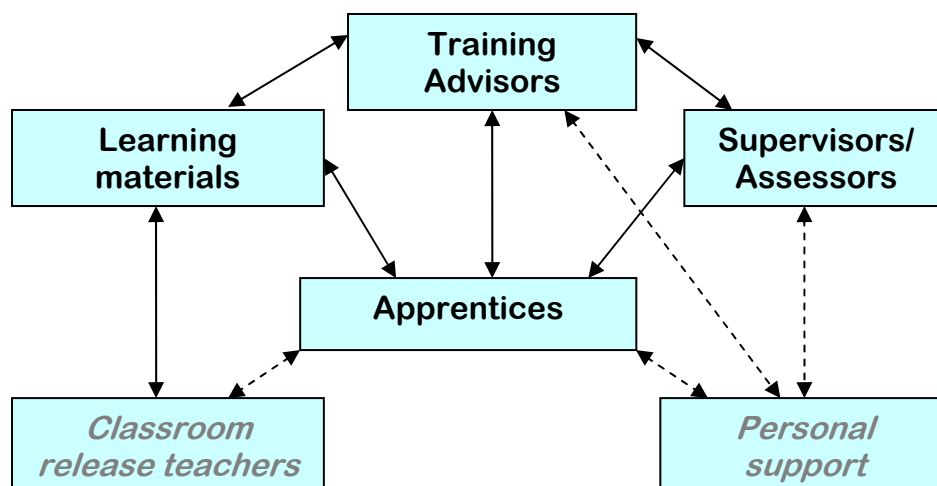
Methodology

The aim of this project is to understand the learning materials and the learning experiences of apprentices undertaking either the Carpentry or the Cement and Concrete apprenticeship. As stated above, the BCITO were particularly interested in the following overall questions in relation to the Carpentry qualification:

- 1) Is the package being used appropriately?
- 2) Is the package an appropriate tool for the training and support of apprentices?

Based on the findings from these questions they were also concerned about issues that might exist in a less successful qualification (e.g. Cement and Concrete).

Initial meetings with the management team at BCITO provided information about the structure of the carpentry apprenticeship. The following diagram shows the different parties involved in the apprenticeship qualification as a whole:



In order to research the different aspects of the apprenticeship, I decided to undertake two separate types of study. The first was a series of site visits in which I met with apprentices, their supervisors and the Training Advisors assigned to them. Site visits included periods of observation and note taking as well as short informal interviews with apprentices and supervisors. The second was a detailed analysis of the learning materials to determine whether they supported the apprentices' learning in the most appropriate way.

Studying the apprentices

Race (1992) suggests that, in evaluating a qualification and its learning materials, it is important to understand who is learning and what their needs are. He describes a method of getting a profile of the learners. During the fieldwork stage of this project I met with a number of carpentry and concrete apprentices. My aim was to find out from them how they learned during their apprenticeships. Informal discussions with apprentices provided me with the information to construct a short learner profile form (see Appendix A) which I then used to structure my discussions in further interviews.

I visited 12 separate sites with Training Advisors as part of their normal site visit schedule. TAs carried out their normal duties and I was able to observe this and then interview apprentices separately. Site visits gave me an opportunity to talk to the apprentices and their employers in a familiar environment for them. Interviews were generally held during break times and so there was little disruption from their work. This generally worked really well.

Interviews took between 10 min and 40 min depending on what else was happening and what there was to discuss. Apprentices and employers were asked a series of questions about their experiences of being on the BCITO apprenticeship and also about the materials that were being used in their teaching and assessment (the box of books). All participants were advised that the information they provided would be confidential and that they would not be directly identifiable in the final report.

Supervisors

During site visits I was also able to discuss apprentice training with the supervisors. Their comments helped to inform the learner profiles and also provided useful information about the package as a whole.

Discussions with Training Advisors

Travelling to and from sites with the Training Advisors gave me the opportunity to understand their role in the whole process. I was also able to elicit some information about the workings of the apprenticeship packages and to observe the different ways in which Training Advisors work with apprentices and supervisors.

The Learning Materials

My study of the learning materials focused particularly on the Theory Resource Package, or "Box of Books". Each of the 41 modules within the package contains information about the unit standard and a series of exercises and assessment worksheets for completion. Apprentices are expected to complete the theory units within the four volumes either through an evening class or independently. Each completed exercise or worksheet is submitted first to the supervisor for checking and then to the TA for moderation and sign off.

As well as questioning the apprentices in detail about their experiences with the theory portion of the qualification, I also carried out an analysis of the materials themselves based on a checklist provided by Race (1994). It provides a series of questions based on good pedagogical practices which can help designers or evaluators to understand the work that they may need to do in order to enhance learners' experiences of working with the materials. The two modules were studied in detail were **13004: Setting out a building**; and **13013: Roof framing**. These modules were selected because they were representative of a useful chapter and a difficult chapter as identified by the apprentices during my interviews with them.

Results

Who are the learners?

The information from the interviews with apprentices was used analysed for basic themes and then collected to produce descriptions of four typical learners. Although the descriptions are not representative of all apprentices they provide a snapshot of some of the different types of people who study through the BCITO. The comments made are all genuine but each description is based on a number of apprentices who were interviewed. These stories are meant to provide insights into some of the needs of apprentices.

The adult apprentice

Ken is a man in his late thirties. He has had a number of careers in the past, including taxi driving and roofing. At the age of 37 he decided to take on an adult apprenticeship. His main reason for doing this was to achieve a better standard of living for his family but he is also interested in the challenge and in developing himself as a person. Financially, things are a bit tight at the moment; his children are young and an apprentice's pay is relatively low in comparison to other jobs he has had. He has no formal qualifications, having left school at the end of Year 11. He is employed by his brother-in-law who is a qualified Master Builder with experience of training other apprentices. He enjoys the freedom of the work and the future opportunities it affords him to work as his own boss and, perhaps, to take on apprentices of his own. He sees himself as someone who can teach and support others in the way that he has been supported by his employer.

Having signed up for the apprenticeship about 2 ½ years ago, Ken is beginning to struggle with motivation to keep up with the book work. He says that he has been working very hard recently and simply does not have the energy to focus on the books at the end of a long day. He finds the assessments relatively straight forward and is happy to ask his employer if he has problems. However, he is behind with the work that he should have completed by this time in the process and, the further behind he gets, the more difficult it is to motivate himself to catch up. The task has just become too large.

He finds the Record of Work (RoW) time-consuming and difficult to compose, although his literacy is reasonably good. He describes a process of working with photos: printing them out, finding the correct place to put them in the RoW and writing appropriate text to describe what he needs to say.

He completed most of the theory on a pre-trade course. The materials were not exactly the same but the assessments were almost identical. He finds the theory books fairly useful for reference, particularly when he is working on his own. However, he finds the language used rather difficult to follow and is concerned by the amount of jargon in the text. He feels that young learners would definitely require classes to help them make sense of the books, although he knows that most of the information is present in the text if you look hard enough.

Asked about the Theory units he comments that he most useful ones have been 'Calculations' (especially the bits about measurement) and 'Framing'. The least useful unit was probably 'Adhesives'. It was fairly pointless; some of the adhesives mentioned are not even used in NZ and whatever you use has the appropriate instructions on the tube/packet anyway.

The hardest unit was 'Roofing'. He has found very little opportunity to use the unit in practice as most roofing these days comes pre-done and really only needs to be assembled.

The main problem he notices with the course as a whole is the length of time between completing an assessment and having it signed off. This is partly due to his employer's workload and the time between visits of the TA. He uses his computer a great deal and would really like to complete his RoW and theory assessments online. The main advantage in this would be that he would be able to get feedback on his written work more quickly, a factor he believes contributes to his lack of motivation. He also believes that he would be able to

manage his RoW more easily if he could make entries and comment on photos directly onto the computer.

He finds the TA extremely efficient and supportive with respect to the difficulties he is experiencing and is grateful for the strategies that the TA has suggested to get him working again. The TA is very understanding, but works hard to keep him on track. He says that the TA has been particularly helpful in building his confidence that he will complete the apprenticeship. He has about a year to go, he thinks, and though he has found it difficult, would probably do it all again.

The successful learner

Mike is a highly motivated apprentice in his early twenties. He has been signed up as an apprentice for about 15 months but is well ahead with his theory work and relatively well up to date with his RoW. He works for an employer who has three apprentices, another signed up with the BCITO and one who is training through Weltec. Before taking on the apprenticeship he completed two years of a university course but dropped out because he did not see a future in what he was doing. He worked on building sites for some time before deciding to do the BCITO Carpentry apprenticeship. He loves the work and the opportunities it offers him to learn new skills as well as the variety within the job.

He has been working steadily through the theory books since he started and is trying to make sure that he completes at least one unit a month. He tends to set aside large chunks of time (perhaps 4 hours) to work on the books rather than working through the units a little at a time. He is happy to work in this way and does not have a problem with the motivation required to do this.

He finds the book work appropriately challenging and not trivial in comparison with university study, though there are many differences between the two styles of learning. He does acknowledge, however, that going to university has given him an advantage over other apprentices in that it has allowed him to develop good study habits and an understanding of how to work with learning materials.

His RoW is extremely comprehensive and he admits that it is hard to find the time to keep it up to date. He wonders if his TA expects more of him than other TAs do (he has discussed this in vague terms with the other BCITO apprentice but has no real anxieties about it because he finds his own work quite satisfying). His written entries are long and detailed and he has taken a number of photos of his work to provide examples. Initially he used a digital camera to do this but lost it on site and now relies on disposable cameras.

Mike has found the theory units quite useful. In particular he liked the units on 'Setting out', 'Reinforcing' and 'Concrete'. His reasons for liking these units are that they contain a great deal of useful technical information and specification and that they include a number of "things to do".

The least useful unit for him was 'Hand tools'. It was a little basic and he had already had lots of experience with the tools. He thought that the unit might be of more use to young apprentices without any site experience but wondered about its value for anyone who had ever done any building work.

The hardest unit was definitely 'Calculations'. Having not done much maths since college, he felt rusty and needed to concentrate hard to complete the assessments. He felt that some of the descriptions were a little complicated and that it was easy to get confused.

Mike's employer has not been as encouraging or supportive as some other employers who have taken part in this study. His colleague has been affected by this but Mike has sufficient motivation to move on regardless. He admits that he does not really enjoy the course work but recognises its value and sees it as something that just needs to be done.

Mike clearly enjoys the experiences he is gaining through his apprenticeship. He talks animatedly about the building he is currently working on and mentions some jobs he hopes to

work on in the future. His enthusiasm for the work means that he is an interesting and engaging apprentice. His relationship with the TA is therefore relaxed and positive and, ironically, this probably means that he receives better support and feedback than some other, less motivated apprentices.

The young learner

Darren is 19. He left school at the end of Year 11 having agreed with his parents to take on an apprenticeship working with his father. He has consistently struggled with the requirements of the work and study and has been close to quitting on a number of occasions. His attitude has changed a little over the last six months or so and now, his father reports, he is much more organised and happier to continue with the apprenticeship.

Darren has particularly struggled with the theoretical parts of the package. He finds it hard to see the point in some of the chapters and wonders why he needs to complete exercises on things he will probably never have to do himself. He uses the roofing unit as an example. All roofing materials now come as ready assembled structures, he states, and therefore he feels it is therefore unnecessary to calculate angles and lengths of rafters.

Darren's Record of Work is reasonably good though his relatively poor literacy makes it a little difficult to read. He has included pictures to illustrate his experiences but does not entirely understand the purpose of doing this. So, his pictures are mostly of him smiling in front of a completed wall and there is no labelling or written information that shows the key features of his work that will demonstrate his understanding.

The struggler

Nick is finding the apprenticeship very tough. He is in his late twenties and did not achieve at all at school. The main reason for this is his basic level of literacy which means he finds it very hard to read the learning materials and to express himself in writing. He prefers working within the apprenticeship scheme because he can choose the times that he does his bookwork and is not tied to a classroom. He enjoys working with his hands and is highly motivated to complete the apprenticeship.

Nick has had some difficulties with the written work. He finds some of the materials confusing and the wording of questions is sometimes too complex for him to understand what is expected. The TA has been helping him to use photos to demonstrate his progress and he finds this a useful thing to do as it saves on writing.

In order to help him complete the assessed components of the package his girlfriend, Bev, has spent an enormous amount of time supporting his learning. She has helped him to complete each theory unit and shown him how to set out his RoW. The TA is aware of the support provided by Bev, and Nick and he joke that she may be entitled to qualify as a Master Builder as well. Nick readily agrees that he would not have progressed so far without Bev's assistance. He does not mention what sort of assistance she provides. Nick's supervisor acknowledges that he is a good worker and expects he will complete the apprenticeship even if it takes him a long time to finish the bookwork.

The Concrete Apprentice

Phil is a concrete worker in his late twenties. He has a fairly sketchy work history having worked as a labourer and in a number of unskilled jobs. He considers himself lucky to have found his current position working for a large concrete casting company. The job requires him to build moulds for precast concrete slabs, lay out the reinforcing steel and supervise pouring of concrete. He is allocated to one workspace and works on the entire process from cleaning and preparing the moulding surfaces to transporting completed slabs to the collection point in the works.

Each workspace has a senior concrete worker (who may be still completing an apprenticeship), a newer apprentice and perhaps a labourer. A foreman oversees a number of workspaces. Most of the skill involved in the process is in constructing good quality reinforcements within the

slab. Apprentices learn how to fasten the reinforcing steel for maximum strength and how to make connection points that will allow for slabs to be fixed together on site. Work is checked for quality before the concrete is poured.

Phil decided to do an apprenticeship in order to increase his earning potential and perhaps to become a foreman in the future. He is not particularly enjoying the apprenticeship qualification however. He finds the unit standards completely irrelevant to his actual job and can not understand why he needs to learn them. The materials he is required to read are extremely complicated and the language contains too much jargon for him to easily understand what is required. He knows other apprentices who have not found the materials quite so hard to work with but he feels that, unless you wish to work in site management, most of what is included is unnecessary.

A further problem exists in that the standards associated with the concrete apprenticeship are extremely expensive to purchase and his company has decided to buy only one set. As a result, it is almost impossible for Phil to get access to the information he needs in order to complete his course requirements effectively. The lack of congruity between Phil's actual job and the learning materials he has means that he does not bother to bring them with him to work. He does not remember very much about what they contain.

Analysis

These descriptions are derived from a number of themes that came out of discussions with apprentices and their supervisors. The themes are listed in the table below. Themes will be explored in more detail in the Discussion section of this report.

Type	Theme	Description
Apprentice	Motivation	Motivation can have an effect on apprentice participation and learning
	Workload	Too great a workload can interfere with learning time and opportunities
	Readiness	Preparation for learning, literacy, numeracy etc can affect apprentices' ability to cope with the qualification
	Active learning	Apprentices generally prefer learning by doing to book work
	Computer literacy	Apprentices with reasonable levels of computer literacy may find Computer Assisted Learning helpful
Teacher	Feedback	Short turn round times for feedback in assessment improves apprentices' learning
	Training Advisor	The role played by the TA may affect apprentices' learning experiences
	Supervisor	The role played by the supervisor may affect apprentices' learning experiences
Learning Materials	Relevance	Perceived relevance of learning materials to apprentices' actual work is very important for learning
	Language	Use of jargon or complex writing may be off-putting for some apprentices
Quality	Integrity	It is important that the work submitted is actually that of the apprentice concerned

Employers / Supervisors

The apprenticeship scheme is primarily work-based training and so every apprentice needs a job in order to obtain the experience they need. I discussed the ways that apprentices found appropriate supervision with the apprentices and their employers.

Generally, apprentices found builders to work with through looking around or by serendipity. Builders told me that they had been approached for employment and to take on an apprentice because they were known to be a good person to work for or because they had had experience with other apprentices. In some cases apprentices were related to or associated with the builders before taking on the job. Occasionally a young person was simply in the right place at the right time and 'fell into' the work. A recent innovation by the BCITO is the "Career Launcher" which carries information about both employment opportunities and potential apprentices with a view to improving apprenticeship opportunities.

It is a requirement that apprentice training and supervision be undertaken by qualified trades people. Most are good builders (for the Carpentry qualification) who have an interest in passing on learning experiences. Supervisors are offered extra support by the BCITO. The Training Adviser works with them to ensure that they are able to provide the support needed for teaching an apprentice. Training is available for assessment and supervisors are also provided with an assessor's guidebook to help them.

The apprenticeship model is based on the idea that apprentices will learn from observing and direct teaching by an experienced practitioner. For many this may be adequate or even a truly valuable experience but the some supervisors do wonder whether they are sufficiently able to teach apprentices rather than simply demonstrate their own practice. The lack of training for the role of teacher is a common issue in many work-based learning environments.

The employers who I met during my site visits had a variety of ideas about how they should teach apprentices and what they should do. Some favoured an extremely hands-on approach where they showed apprentices exactly how to do a skill and were often wary of letting the apprentice tackle it on his own. Others preferred to let apprentices learn from their own experiences. So, after a short demonstration, apprentices would be left to carry out a task alone and then given detailed critical feedback – they might even be asked to take it down and start again. One builder who did this found that his apprentices took a long time to complete the initial task to an appropriate standard but were much clearer about how they had mastered the skill and had a sound basis on which to use that skill in the future. At the other extreme, some apprentices could easily find themselves simply observing others performing tasks, being treated as a labourer for much of the time.

Discussion between apprentices and supervisors varied. In some cases the supervisors were relatively unapproachable and difficult to engage in informal conversation about skills and ideas. In other cases constant discussion between apprentices and with supervisors ensured that everyone's opportunities to understand procedures and learn about skills was maximised. The table below summarises the issues that will require further discussion later in this report.

Theme	Description
Teaching approaches	Employers'/Supervisors' approaches to training their apprentices vary substantially
Assessment skills	There is some training provided for assessment though most assessment is based on answers provided in the supporting materials
Interaction	Employers / Supervisors vary in the ways in which they interact with apprentices
Training	Employers/Supervisors are deemed to be competent to teach because they are qualified tradespeople. Very little training is available for actually teaching apprentices
Finding Apprentices	BCITO's "Career Launcher" is helping to facilitate this.

Who are the training advisors?

I met four different training advisors during my site visits. Although this was not really enough to provide a general view of TAs as a group, I did identify some different features of the role which played a greater or lesser part in each TA's work.

The following table shows some of the different approaches to the work taken by TAs and some of implications I perceived from these.

Focus	Implications
Learning	TAs who focused on apprentice learning tried to provide support that emphasised ways of working, developing skills and motivating apprentices to learn. They discussed apprentices' learning with them and provided ideas to help them with their work. Sometimes they produced extra materials to explain a particularly complex skill, particularly if the apprentice reported experiencing difficulty (e.g. with calculations). They would also provide general study skills and time management support.
Pastoral support	Some TAs focused on helping apprentices to 'get through'. Often this would involve discussing personal issues with the apprentice and offering advice to help them manage their time or to complete their work in the best way for them (e.g. the TA might advise the apprentice to do book work while visiting parents at the weekend because of the problems of finishing it while living in shared accommodation).
Relationships	Some TAs saw their major role as being a relationship builder and manager. They would visit sites and 'have a yarn' with the team, generally talking about the current or previous jobs and supporting everyone involved. This informality can be very useful as it creates a comfortable environment for learning and helps the TA to gauge quickly whether there are any problems
Product	Some TAs took an extremely product oriented approach to their work. They visited sites with the expressed intention of checking workbooks, signing off assessed work and setting goals for future work. Generally seeing themselves as being very thorough, these TAs may not be aware of what challenges apprentices are facing or be able to encourage them to work more effectively. (e.g. apprentices who are behind with their theory work may simply be told what sections to complete by next time but not asked what help they might require to do this).
Quality	Some TAs considered that the most important role they have is one of maintaining quality of the BCITO qualifications. Though important, this is quite a mechanistic view since measures of quality are often based on relatively objective information (completion rates, numbers participating, etc). More subjective measures (such as apprentice learning experiences, quality of skills learnt, teaching approaches used) are more likely to be overlooked.

The Learning Materials

Apprentices are expected to complete the theory units within the four volumes either through an evening class or independently. Each completed exercise or worksheet is submitted first to the supervisor for checking and then to the TA for moderation and sign off. The time frame for this varies. TAs suggest that apprentices complete one or two units each month but there is a great deal of variation in this and some apprentices choose to work on units that are relevant to their work at that time. TAs visit apprentices on site about once every three months and provide feedback on completed units as well as suggestions for future goals. Any work marked by the

supervisor is checked and signed off. The quality of the apprentice's work is also checked. TAs provide advice about how to tackle questions or how to set out the RoW to most effectively demonstrate competence.

The completed checklist is presented in Appendix B. The following are some key issues for consideration which arise from the analysis.

Interaction

There are few opportunities for the apprentices to interact with the learning materials other than for the purpose of assessment. Apprentices read the materials given and then answer questions about that material. Often the questions are drawn directly from the learning materials. This means that learners need only skim through the preceding few pages to find the appropriate section before rewriting the answer into the exercise or worksheet.

Objectives

The learning objectives specified for each module are clearly articulated but do not provide sufficient information about how they might be met. For example, in 13013 the main objective of the module is that apprentices should be able to "*demonstrate knowledge of equal pitch gable, and hip roof construction*". Details of the elements required for this are given but it is not really clear what is required in order to demonstrate knowledge other than to be able to complete the exercises and worksheets. I am sceptical that an ability to answer these questions would be a satisfactory demonstration of knowledge. Objectives may require greater elucidation in order to ensure that appropriate demonstrations of knowledge can be obtained.

Text: tone and style

The learning materials are written in an information-based form. They contain the information required for apprentices to complete the assessments set but there is little or no teaching within the text itself. See Interaction, above.

Diagrams

The diagrams in the units are generally very clearly presented, easy to read and appropriately placed in the text. The lack of teaching information within the text means that it is not clear exactly what apprentices should do with each illustration other than read it. There are no captions on diagrams though this could be because text around them is relatively short and simple anyway.

Study skills help

The theory resource books contain a short introductory chapter which explains the requirements for completing exercises and worksheets and shows how references to other sources are made. Little information is provided to help apprentices tackle the modules. Some Training Advisors do provide this kind of support but many do not.

Assessments

There is no formative assessment within the modules. All exercises are assessed and repeated if they contain errors until they are correct. Once complete they are signed off by an assessor and then moderated by the TA. Assessors are provided with oral questions which they can ask if they have concerns about the apprentices' grasp of the material. It is difficult to ascertain how often these are actually used.

Use of Media

At this stage the learning materials are almost entirely print based. The use of other media such as digital images and computer-based learning and assessment should be explored in the future.

Discussion

The learning resources are well constructed and have been written to cover every stage in the process of building a house. This analysis does not refer to the content of the units other than in the context of the needs of learners. So, no comments will be offered on the inclusion or exclusion of specific topics but structure and methods of learning suggested by those topics will be discussed in some detail.

I have decided to discuss points I have observed in the learning resources according to issues that are referred to as important for learning within the tertiary education literature. Throughout I will refer to specific examples in the learning resources – other examples exist but there is not the space to cover each one here.

Knowing how to learn

One of the main challenges for writers of learning resources is anticipating what is required of the learners who will use them. With such a diverse set of learners, provision that will suit the majority can be quite difficult. Nevertheless, there are some components that need to be considered.

Regardless of age or background, many apprentices will begin their study with little or ineffective experience of being a learner. They may have been unsuccessful at school or simply been keen to do something more practical. Whatever their experience, beginning a course which requires them to work on their own and to plan their study can be a little daunting.

The education literature refers to the learner as being more or less self directed in their learning. There is a push towards increased self-direction in learning across the tertiary sector (either because of increased student numbers, meaning that there is proportionately less teaching time available per student, or simply because self-directedness and a focus on life-long learning is considered to be an important attribute by employers). This has led to an understanding that self-directedness can develop with maturity (Grow, 1991), can be course dependent (Brookfield, 1985) that many learners need to be taught how to be self-directed (Smith, 1990).

The implications for the BCITO apprentices and learning materials are clear. Given the diversity of learners and their relative inexperience with formal learning, apprentices are unlikely to be ready or able to be self-directed. Evidence for this comes from the discussions with apprentices about their learning. Darren, for example, was completely unprepared for learning the theory when he began his apprenticeship. It has taken an enormous amount of support on the part of his father (who has, in fact, taken on a directing role) and the Training Advisor to get him to the half way stage in his apprenticeship. It would appear that Darren has begun to develop some self-directed learning skills and will probably complete the programme. It is interesting to speculate whether inability to develop self-directed learning skills may have contributed to the relatively high drop out rate seen by programmes of this type.

There are a number of things that can affect self-directedness. For Ken, and countless others, motivation is a key issue. Other factors include stress, workload or something else (Kreber, 1998). On the positive side, it appears that Mike was prepared for self-directed learning by his time at university (although it is by no means the case that all university students are self-directed).

So, can we help our learners to become more self-directed? There is a large amount of literature focusing on this and related questions. As mentioned above, self-directedness and ability to engage in lifelong learning is seen as a key attribute by many employers and has therefore become the goal of most tertiary educators (Smith, 1990). What seems clear is that learners need support in becoming self-directed.

In the case of the BCITO apprenticeships, support will either come from the employers, other supporters (such as Darren's father or Nick's girlfriend), from the training advisors or from the

materials themselves. Ideally it should come from all directions but mainly from the learning materials since these are common to all apprentices.

Interaction

The open learning checklist for the BCITO materials suggests that there are insufficient opportunities for interaction between the apprentices and the learning materials. Race (1994) discusses the importance of interaction with resources in his texts on writing and evaluating distance learning materials. He uses self assessment questions (SAQs) as a way of promoting this interaction. SAQs should ask the learners questions about the material they are covering. Ideally the questions should be relevant and 'real'. That is, they should ask the learner to provide an answer that is useful in the context of their learning. Answers should also be available so that learners can get instant feedback on their ideas/processes, but not on the same page so that they have the chance to complete the questions without simply looking at the answers.

Many flexible and distance learning materials ask learners to report on their own experiences when they are working with the texts. Thus, learners may be asked to think of a situation in which they responded in a certain way and to consider why they acted as they did. The authors of such learning materials can't provide specific answers in these cases but can comment on possible answers or discuss alternatives.

Feedback

Feedback is a crucial part of any learning cycle. Theories of learning point to the importance of obtaining useful feedback as fast as possible in order to reinforce learning that has occurred. This is one way in which the system and learning resources could be substantially improved. Learners complete exercises in the theory book but sometimes have to wait a significant amount of time to receive feedback on their work.

Some apprentices felt that on line submission of work would provide one solution to this problem. Assessments could be submitted directly and perhaps assessed automatically to enable a fast turnaround. This solution may only be appropriate for a small percentage of apprentices at this time but as technology improves it is likely that more will wish to take advantage of such a service.

Assessment Questions

The assessment questions used in the resources are surprisingly unchallenging. Often the learners are required only to copy passages of the text into the answer sheet. This does not provide evidence of understanding and potentially may not require any learning at all. It is important to consider how best to measure apprentices' learning so that we can be sure that the learning outcomes are truly being achieved.

The learning objectives for each module should form the basis of good quality assessments. Objectives should state what is meant by "demonstrate knowledge of" in each module. This is one point at which I feel the integration of theory and practice is most important. By using their own work as an example apprentices are in a much better position to be able to explain their understanding and to demonstrate their knowledge.

Relevance

Learning theory also describes the importance of relevance in adult learning. Almost all apprentices commented on the importance of relevance in their learning. Most felt that it was this that they particularly liked about the apprenticeship model. However, they tended to see this relevance only in the practical component of the qualification. Some apprentices commented that they could not see why they needed to complete a theory unit. This was often

because today's technology has made the problems easier to solve or because the theory was difficult to relate to their own work.

This issue was especially pertinent for the Concrete apprentices. They commented on the difficulty that they experienced in understanding the relevance of the theory they were being asked to learn when compared to their day-to-day practice.

Integrating theory and practice

The problems apprentices see with relevance to their own practice could be alleviated by linking theory and practice together. In the case of apprenticeships offered by the BCITO, it seems that many opportunities for integration are missed. Currently, the theory component and RoW are almost completely separate and learners tend to work on them at different times – often seeing no real link between the two aspects of the apprenticeship. This is disadvantageous to the apprentices because it tends to make the theory component relatively dry and often apparently irrelevant. Integration of the two would change the overall look of the apprenticeship resources but should allow apprentices to better understand the theoretical material.

As mentioned earlier in this section, there is enormous scope for using apprentices' own work as the basis of their responses to assessment questions. This would require the reworking of assessments within the learning package but the resulting assessment methods would provide a clearer idea of the apprentices' skills and knowledge.

Uses of technology

Many apprentices use cameras or even their phones when they are on site to record examples of their own work. These are particularly useful additions to the RoW as they allow apprentices to describe what they have done in more detail. This can be especially helpful for those who do not have good literacy skills.

One approach that needs consideration within this model is the possible use of e-learning models for apprentices. Some apprentices already use their computers to store and present their work and the potential for creating a computer-based RoW is obvious. Digital images can be uploaded and annotated, assessments can be submitted for approval online and Training Advisors may be able to use their visits for purposes other than moderating assessments.

This approach would not be suitable for all as some apprentices do not choose to use technology and would find this more problematic than the written documents but, as prevalence of e-learning increases the scope for using computer-based assessment and moderation will widen.

Improving learning experiences for apprentices

The discussions with apprentices and employers suggested that apprenticeships are generally a good way to learn, particularly for individuals who prefer to be active in their learning and who like to learn in context.

However, there are some groups for whom the apprenticeship model as it stands may not be appropriate. In my discussions with young apprentices and those who struggled with literacy or book work, it became apparent that the resources and support were not sufficient to ensure completion. Although I only met apprentices who were still participating in the qualification, it was clear that those who were struggling were only continuing because of a high level of support from trainers or families. Young apprentices who do not have such support and who have not developed their own learning skills may well not complete the qualification.

Younger learners can be helped to develop their own learning skills. Key factors for this group are:

- A clear purpose – learners need to understand exactly what the purpose is for each component of their work.
- Clear structures for achieving outcomes – this may mean that some more explanation is required to show learners how to address problems set for them. This may include discussion points, examples from real situations and explanations or examples of how to set out information.
- A clear link between purpose and outcomes – this comes from the structures mentioned above. Integration of theory and practice can also help to support this.
- Feedback – learners need to feel that what they are doing is right, that it looks OK and that they are progressing appropriately. Younger learners require feedback at regular and frequent intervals as their need for affirmation is generally greater than for adult learners.
- Active participation – many of those who have entered an apprenticeship have done so because it allows them to learn by doing. For these learners the integration of theoretical and practical aspects of the qualification is key.

As has been discussed, the BCITO learning materials may not provide the best learning environment for younger or struggling apprentices.

The five apprentice profiles provide some useful information on which to base a pedagogical analysis. Studies of adult and young adult learning have identified a number of key features that will help to support good learning experiences:

- 1) Relevance – learners should always be able to see the relevance of what they are learning and how it will benefit them in their practice
- 2) Active learning – learners generally prefer to be actively engaged in learning
- 3) Integration of theory and practice – theoretical and practical aspects of a learning experience should be interrelated
- 4) Support/ scaffolding – learners require support that helps them to move forward for themselves. This means that independent learning should be scaffolded through good questioning and well designed learning exercises.
- 5) Timely feedback – feedback on learning is crucial to all learners. The closer to the event the more beneficial the feedback. Feedback can come from supervisors, TAs or be built into the learning materials themselves.
- 6) Preparation for learning – independent learning does not necessarily come naturally to adult learners, particularly if they have not achieved at school. Learners need support in learning and study skills so as to understand how to make the most of their apprenticeship experiences.

The employer/supervisor

There is no one model of a good supervisor. There is a learning relationship between apprentice and supervisor and this is affected by different factors: the motivation of the apprentice, the experience of the supervisor, the abilities of both and the opportunities provided by the environment in which they work.

Ramsden (1992) points to some qualities that might be useful in a good supervisor or teacher

- Interest in and enthusiasm for the material being taught
- Supportive and encouraging person
- Knowledgeable in the field
- Provides detailed timely feedback on work done
- Encourages participation as much as possible.

In the case of the apprentice model used by the BCITO, it is very hard to ensure that supervisors can provide the sort of support that apprentices need. Some are obviously very experienced and provide excellent support for their apprentices. Others may not have the

same qualities and the length of time between visits by the TA can mean that some apprentices will lose their way or be unable to gain enough breadth of experience to allow them to complete their qualification.

BCITO could consider the training that they provide for employers who supervise apprentices. Some training is offered in assessment but it would perhaps also be helpful to provide employers with support on how to offer apprentices an appropriate learning environment.

The Training Advisor

Discussions with TAs revealed a number of different characteristics and approaches to the TA role. As with the employers, there is no single description of a good TA. However, it is important to consider that the main purpose of the role is to ensure that apprentices complete a good quality qualification and that they emerge able to use their knowledge to practice professionally. A learner-centred approach rather than a focus on checking off a list of standards is more likely to lead to the development of skilled professionals who have the motivation to continue to improve their practice even after qualification.

Conclusions

This project was commissioned by the BCITO as the first step to understanding whether the learning materials for the National Certificate in Carpentry are providing good quality learning experiences for the apprentices studying using them.

1) Is the package being used appropriately?

The Carpentry learning materials are well presented and provide useful information for apprentices undertaking the course. Better utilisation is, however, desirable and possible. Employers and TAs require greater understanding about the learning needs of apprentices and how best to use the learning materials to support apprentices' learning.

2) Is the package an appropriate tool for the training and support of apprentices?

Analysis of the learning materials revealed that, though they are well written and researched, they did not necessarily provide the best learning experiences for the apprentices.

Observations of apprentices, employers and Training Advisors suggested that there is probably a need for better learning support for apprentices (particularly those with poor literacy skills) in order to help them to make the most of the learning materials. Improvements are suggested in the following:

- Supporting apprentices in their learning through organisation and information about learning activities
- Providing teaching materials and self assessment exercises to improve active learning and interaction with the content
- Considering relevance of the materials
- Providing faster feedback to reinforce learning and maintain motivation
- Linking theory and practice in both learning materials and assessments to enhance relevance
- Consideration of other technologies to support learning and perhaps improve feedback.

Some redesign work on the learning materials and more specific training of the employers and TAs are recommended.

Recommendations

1.0 Learning materials

Modules should be reviewed to consider the possibility of the following:

- 1.1 Objectives that focus on how knowledge should be demonstrated
- 1.2 Assessments that test these objective appropriately
- 1.3 Modules that include teaching exercises and formative assessment in order to prepare apprentices for assessment
- 1.4 Suitable scaffolding and support for learners to enable them to learn more effectively
- 1.5 Evaluation of wording to avoid over complexity and jargon
- 1.6 Integration of theory and practice to enhance relevance of apprentice learning
- 1.7 The utilisation of other technologies to allow for different demonstrations of apprentices' knowledge.

2.0 Apprentices

- 2.1 Consider ways to support apprentices, particularly younger and struggling ones, to reduce the chances of them failing to complete the qualification

3.0 Employers/Supervisors

- 3.1 Consider how to support employers when they teach apprentices through provision of training, ideas for teaching skills
- 3.2 Reinforce the importance of good feedback for apprentices whether it be on site or in relation to book work

4.0 Training Advisors

- 4.1 Consider providing training for TAs in ways to deal with apprentices in order to best support their learning
- 4.2 Evaluate the role of the TA with a view to their providing greater learning support.

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