

The struggling apprentice: Defining the context and exploring possibilities.

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The particular focus is on innovations and practices in assessing, assisting and developing individual programs for Trade Apprentices who struggle with numeracy concepts.

While this research had, as its starting point, a focus on technical numeracy, the researchers have also attempted to explore and chart in a broader context, the ripple effect of change that accompanied each case study, each providing opportunities to reveal the consistent change in the culture of relationships between apprentice, employer, vocational teacher and the Learning Support Unit. This exploration engaged the researchers in exposing the many discourses that discipline the various contexts of learning support, the workplace and the vocational sector, revealing each discourse having an ideological filter on the notion of skill. By exposing these filters and examining ideologies the researchers are able to leverage change; sometimes these changes are small, sometimes large, but never insignificant.

This paper is an attempt to record the work of the Learning Support Unit at Tropical North Queensland Institute of TAFE (Technical and Further Education) (TNQT). This is a journey of exploration that grew out of a need for meaningful data to demonstrate the efficiency of the Unit. Historically the Unit struggled to present more than anecdotal evidence to support and recognize its value as an effective intervention technique for improving the completion rates of apprentices. While there was data that could prove the number of students who accessed learning support, and anecdotal evidence of success, there was no hard data showing how and where the Unit actually made a difference?

The work of the Unit is featured in two papers in this publication of which this is the first. The first paper attempts to capture and explain the importance of relationships in developing a support program for an individual, in particular apprentices and trainees (as the process is the same for both, this paper chooses to use the term apprentice). In exploring the nature of relationships the research embraced a multidisciplinary approach to theoretical understandings. What developed was an exploration of ideas to try and understand what makes a difference to an individual who is struggling and what systems can be devised to track the points of change. This paper outlines the theoretical understandings the research team members are using, discarding, revisiting and questioning as they construct new pathways and new understandings. The second paper partnering the first examines the processes that evolved from the discussions, examines the development of generic benchmarking tools and how they can be used to develop individual learning pathways, and reports on the trialing of the process at pilot sites and provides case studies of how the theory and development of process and program can be put to practical use.

The nature of teaching and supporting individuals is eclectic and flexible by nature. However, there always seems to be a tension between the 'one size fits all' of training packages and the notion of learner centered training. Trying to capture the real work of teachers in a meaningful and systematic way provides insights for others to explore and trial. There is, in this research, no attempt to provide a 'one size fits all' approach to learning support. There is only the hope that by revealing one practioner's journey something useful will be added to another's toolbox.

The importance of context and the research.

The notion of critical trade shortages globally and in Australia is recognized by the Australian Government, and considerable funding has been allocated to 'reinvigorate' the sector in a more controlled collaborative approach. At State and Territorial level reviews of the sector are underway or as in the case of Queensland are now completed. In Queensland the changes to the way TAFEs will do business has yet to be realized, the Queensland model promises significant reform, and while the TAFE system is a relatively stable edifice it is affected by these changes in Federal and State government policy. The national training agenda, with competency based training, training packages,

workplace trainers and assessor models of delivery, and a compliance methodology serviced by layers of auditing and the State reforms to training and education, has created an environment that is pressurised and in a constant state of challenge.

Queensland Skills Plan (Queensland Department of Employment and Training, 2005) recognizes the fundamental changes to the labour market and the nature of work in rapidly changing economies and deliberately seeks to engage in the globalised Knowledge Economy. Social change is directed through Smart State and Smart Vocational Employment and Training (SmartVET) policies that purposely set out to engage industry and community in creating and sustaining an economy that is flexible, creative and innovative. Set within the Smart VET policy are skills formation strategies which map knowledge ecosystems, identifying and seeking solutions in the growing problem of skills shortages through training and upskilling the workforce, human resource management, industrial relations and the acknowledgement of the role of industry in finding solutions through change in organizational cultures. Implicit in this direction is the understanding that engagement in the knowledge economy, by the very nature of knowledge, is to become involved in a process of continuous adaptation, continuous change.

The contextualised apprentice.

The apprentice is situated within a very unstable environment. Globalization and downturns in local economies can directly effect the term of an apprenticeship. Also, behavioral or learning problems, ESL and cultural differences which vary from individual to individual can affect completion. The apprenticeship model is a model of variables, of social, economic, language and cultural impacts that may or may not have an effect that may or may not change suddenly (Figure 1). The issues are exacerbated at TNQT because of the diversification of the region geographically, socially and culturally.

The research noted early the distinction between the meaning of *apprenticeships*, as the vocational choice, and the *apprentice*, the acquirer of skill. Apprenticeships are part of the knowledge economy, they are part of the economic wellbeing of the state, and the apprentice is the person who sets out to gain mastery of a specific set of often transient skill sets. How effectively the apprentice masters the skills and embraces the notion of *life wide learning* will determine his/her place within the knowledge economy.

Due to the nature of the apprenticeship model in Australia, trainees and apprentices are 'signed up' through a third party, the New Apprenticeship Centers (NAC's). NAC staff do not need specific industry knowledge or educational credentials to qualify for the role of determiner of an apprenticeship. The decision to sign up an apprentice may be based on an agenda that does not necessarily prioritize literacy or numeracy skills. This is not a criticism of NAC staff, it is a recognition of a systemic flaw in the signing up of apprentices.

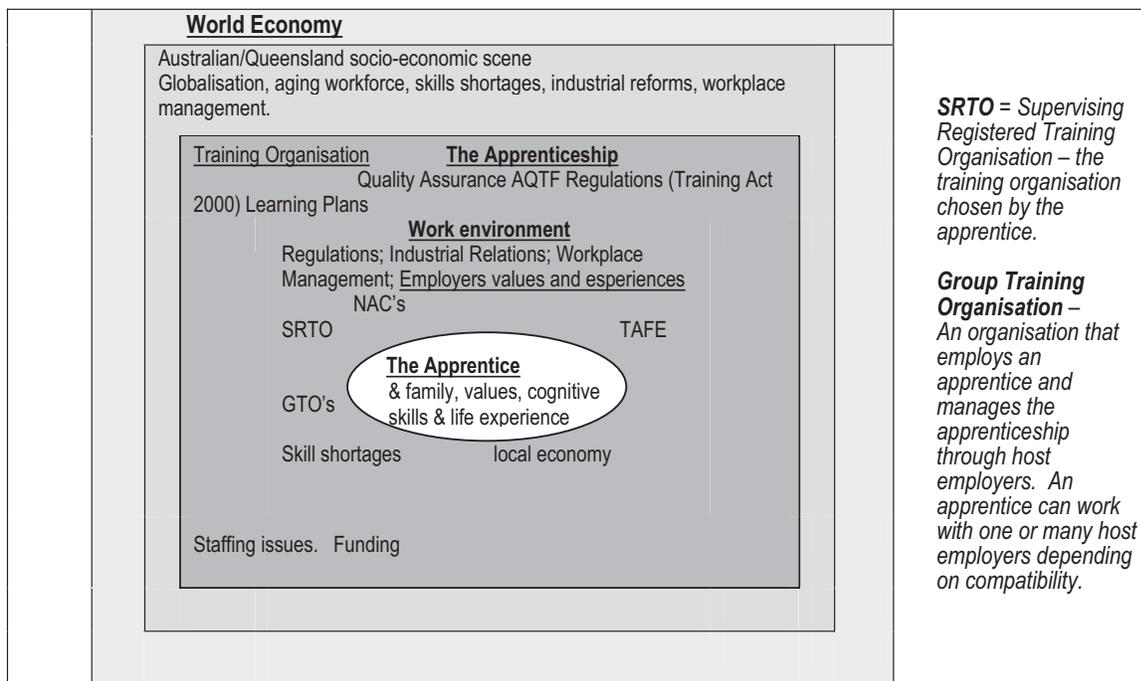


Figure 1. The apprentice in context.

The training component comprising of “on the job” and “off the job” component is the responsibility of a Supervising Registered Training Organization (SRTTO). The Employer may be the initiator of the apprenticeship or may be a host employer working with a Group Training Organization which provides opportunities for apprentices to be moved to other worksites to gain wider experiences or to avoid unemployment should a firm be experiencing a down turn. Apprentices who, attend their ‘off the job’ component or “Block Training” at the TAFE, and, are experiencing difficulties completing aspects of their “on the job” training are referred to the Learning Support Unit for assistance. The apprentice can, at times, be in the second year of their apprenticeship before they arrive at the Learning Support room.

Learning Support Unit

The Learning Support Unit of Tropical North Queensland TAFE (TNQT) is situated in Far North Queensland. Geographically (TNQT) is the most Northern Institute of TAFE in Queensland and delivers vocational education and training programs across a 268,000 square kilometre area of north-eastern Australia, covering an area 15.5 per cent of Queensland. TNQT services some 13,000 clients annually from eight campuses with approximately 2% of the student population accessing Learning Support.

At TNQTAFE there is a culture of continual exploration, seeking out innovative methodologies to reduce the barriers of distance and isolation, using flexible delivery and technology to bridge geographic and social isolation. Similarly within individuals the distance between introduction to a mathematical concept and its eventual acquisition can often be described as a journey, overcoming barriers, of being alone in a strange land with few familiar signposts. Trainers and students alike face the challenges of new learnings, social gaps and distances in culture and language. As new learnings, new technologies are acquired; changes take place within organizations and individuals.

The Learning Support Unit is an intervention technique, seeking to change a viewed outcome. By assisting an individual grasp a concept a change in that person occurs. As the individual changes there is often a ripple effect with change occurring in other individuals and within organizations. The Unit has begun to explore new ways of tracking change and has identified the principles of Appreciative Inquiry as a methodology that allows the isolation of successful strategies, the identification of possible changes and extrapolating that change from the particular to the universal.

The Unit consists of one teacher, several part time tutors and some content area specialists. Some tutors are permanent and some, particularly the content specialists, are hired on an “as needs” basis. As a response to the requirements of the Australian Quality Training Framework (AQTF) the Unit has developed a process to identify the literacy and numeracy skills of incoming apprentices and trainees. A range of pre-course literacy and numeracy indicators have been developed targeting concepts for specific training packages.

When each apprentice begins a course at TAFE these indicators are completed and forwarded to the Unit where, if identified as struggling with literacy or numeracy concepts, he/she is contacted by the Unit. If the apprentice agrees to the assessment and intervention by the LSU an individual learning plan is developed. The learning plan requires input from the student, employer, trainer and specialist literacy teacher. It could include a combination of strategies:

- Self paced remedial materials
- Alternative assessments
- In class support
- Out of class support
- Referral to diagnostic specialists

The assessment tools created and used by the Unit were developed to align with the National Reporting System (DEST, 1999) and had to be accepted as relevant and authentic by the apprentice and trade teachers. The assessment also needed to include numeracy and literacy tasks that were as contextualized as possible, for example using the language and activities apprentices from the various trades could expect to be used in their training package. The numeracy assessment for a hairdresser and a boiler maker may require an understanding of ratios; however, the context of the task would be entirely different. The assessment tasks try to emulate a situational math activity at the same time providing the space for the learning support teacher to apply some diagnostic analysis for the individual.

Developing a broader perspective.

As the work of the Unit was being examined the role of relationships was exposed as support processes and tools for assessment were being implemented. This was an unexpected consequence as the researchers began to recognize the significant role played by personal relationships within the social, cultural and personal lives of apprentices who were struggling to complete their apprenticeships. The team began to map the connections, between those who seek and those who to provide, learning and technical support and the relationships all have with the workplaces that employs them.

As the research team began to discuss stories of success and failure the patterns were often found in those training plans that included the intervention of the learning support teacher in the training room, the learning support room and at the workplace. It was also evident that the facilitation role of the learning support teacher was not adequately captured in the collection of data that constituted the reporting framework. The research team also recognized that there was insufficient data available to use as a planning tool to assist with the allocation of the Unit's finite resources.

Initially it was thought that the development of a database, to collect information on each apprentice, how they scored in the assessment tasks and progressed through their first year of contact with the Unit, was a way of measuring success. The database would provide information that would target the language literacy and numeracy (LLN) concepts that presented the most challenge to apprentices. The relationship with stakeholders and the collection of data began as separate observations and tasks, with the collection of data initially seen as the prime leader of the project's aims. However, as the project progressed the research team began to recognize that to succeed there needed to take a broader perspective to include the provision of support, the use of data, and the development of support tools and mechanisms.

A multi-disciplinary approach evolved, sustaining the view that a support plan that has, as its focus, an individual, is not sufficient in itself; and a broader view of organizational change has to be enlisted in any attempt to maximize the assistance given to the struggling apprentice. There is no shortage of data concerned with the failure of apprentices to complete their apprenticeships. Inherent in this data lies an implicit 'deficit model' of the apprentice. The support role can easily fall into the simplistic view of providing interventions which 'fix up' the apprentice without the need to further explore some of the systemic barriers that hinder an individual's success.

The research team began with the apprentice and mapping the discourses of the individual (Gee, 1996). Discourses were identified as the embodied practices of contexts which individuals inhabited. Apprentices who negotiated the discourses of school, workplace, and social clubs were more confident in accessing learning support. Apprentices who were limited in their range of discourses because of social isolation, learning difficulties, or because they were unfamiliar with English and came from a different culture struggled more, and were less likely to initiate requests for learning support. It was recognized early that apprentices did not arrive at learning support as individuals with a problem to solve; they brought with them the hope of self, family, peers, and the weightier expectations of employer/s, Group Training Organizations, New Apprenticeship Centers, vocational teachers, and the regulatory requirements of their apprenticeships. They bring with them a socially constructed notion of work and of skills, and a virtual milieu of discourses, each wrestling to dominate competing contexts.

The examination of the Unit and its progress towards revealing, influencing and navigating these relationships continues to provide room to discuss new and innovative approaches to the development of learning programs for an individual and a complimentary change in the broader community. These innovative approaches are outlined in the second paper *The Struggling Apprentice: Reflections on practice in supporting trade apprentices who struggle with numeracy concepts* (this publication).

Aim and Purpose of Study.

The initial aim of the study was to document the processes practitioners undertook to develop a precourse literacy and numeracy indicator and learning plan for each apprentice and to record the success or otherwise of the plan. This process involved negotiating with vocational teachers, industry and literacy specialists. The purpose of the study was to provide a performance measure of the learning support offered to a client, answering the question 'Does this intervention make a difference?' and to substantiate this claim with quantitative and qualitative data. A database that would track students from the initial pre-course literacy/numeracy tool, include the results of first year block, provided the quantitative, the qualitative data included the individual's activity within a training plan and recorded changes in attitudes towards the support structures from both apprentice and vocational teacher.

However, the initial aim and purpose really failed to capture the whole picture. While it was simple, neat and focused, it failed to adequately chart what was happening as data was being collected. The case studies themselves had begun the process of change. As case studies were examined, intended and unintended consequences followed the initial assessments and the instigation of training plans, a chain of events that could not be captured neatly onto a database. Change had begun with the introduction of a notion of researching the processes of the Learning Support Unit, raising the questions 'how do we know we have the right assessment tools?' 'How do we track how many students complete assessment tasks and which concepts are the most difficult?' The reflective process kept changing the picture, what had begun as a description of a workplace had become a kaleidoscope. Managing the changing patterns insinuated itself into the research.

While the development of a database seemed a logical first step to providing a powerful tool for analysis of progress and the targeting of resources, it was not the change agent. It was the qualitative data, the stories and their effect on the systems they encountered that opened the research team to new possibilities. The team decided to enlarge the project to include the larger picture and in doing so looked for a 'better' methodology than the original action research approach.

Methodology

The research is framed by action research principles, in particular appreciative inquiry, (Cooperrider & Srivastva, 2001), in an attempt to chart the influence of change on the present system of support. Initially the research team had decided on using the familiar action research methodology. However, the team soon discovered that this was directing the research into a problem solving approach which frustrated the desire to capture what was happening in the broader community. As case studies were collected and the observations, conversations examined, it soon became obvious that new ideas and opportunities were being identified and acted upon and these needed to be included in the study to make it an authentic snapshot. The notion of Appreciative Inquiry presented a challenge to the team but also an opportunity to 'see things differently'.

Appreciative Inquiry originated in the field of organizational dynamics and began to appeal as a more appropriate tool as it allowed the team to describe the complex and sensitive competing social issues that presented in the multidisciplinary approach. Appreciative inquiry, as a method of changing social systems, is an attempt to generate a collective image of a new and better future by exploring the best of what is and has been. The basic process of appreciative inquiry is to begin with a grounded observation of the "best of what is", then through vision and logic collaboratively articulate "what might be", ensuring the consent of those in the system to "what should be" and collectively experimenting with "what can be" (Bushe, 1995).

The researchers used small reflective forums to examine a range of theories from different disciplines and used case studies as a method of examining the ripple effect of change. Guest speakers from different disciplines were invited to discuss different theories and models. Case studies provided platforms from which to view new insights within the multi level approach taken in developing individual learning plans. From these conversations and observations came an understanding that a multi level approach drew in different theories which acted as filters, sometimes enhancing understanding, sometimes revealing with clarity, barriers that exist within organizations, within belief systems and within the Unit itself. The researchers kept reflective journals which were also used as basis for discussions, and as a method of tracking the internal conversations as well as the external.

Underpinning theories and models.

The multi disciplinary approach in the design of the research project lead to four main topics of conversation, once an apprentice identifies a problem with a concept,

- What are the best assessment tools to use?
- What is the nature of work for the apprentice?
- What skills does the apprentice need in order to be deemed competent and in the larger scheme of things?
- How can this activity become a catalyst for change beyond the learning environment?

The literature review began to reflect the complexity of the task and was sectioned into four parts. The first examined the constructivist theory underpinning the numeracy assessments and the value of using Marr, Helme & Tout's (2003) holistic assessment model; the second examined some of the research and theory surrounding the nature of

work and skills. Then the theories of organizational change and leadership were explored, including theories of reflective practice, and finally the rationale for choosing appreciative inquiry as a methodology.

Constructivist theory

The definition of numeracy as a social practice is framed by constructivist theory. The pedagogical implications for the Unit meant there were often uneasy compromises made between the desire to provide authentic cognitive experiential tasks and the limited time available. While the apprentice/student may need concrete operational activities in order to gain a concept the Unit was not geared up sufficiently to provide the situational math that reflects the problem solving nature of workplace mathematics (FitzSimons, 2001). The challenge for learning support and “vocational practitioners is to move away from the modular system of delivery to build a mathematical literacy organized around big mathematical ideas instead of traditional content strands” (van der Kooij, 2002, p. 236).

Holistic Assessment

Understanding that there were different paradigms in the frame complicated the issue but certainly added weight to Cooperrider and Srivastva’s (2001) assertion that no model or schema was ever stable. It was noted by the researchers that teachers only employ the cognitive theories they know of, and that are proven to work for them. For example, while numeracy is embedded in constructivist theory, in the action of doing, restricted time may lead to a teacher reverting to traditional methods of explaining concepts in a variety of ways, using a method of hit and miss to find the one explanation that ‘turns’ on the light for the student.

The assessment of the apprentice and the development of appropriate tools for assessment used as starting points the National Reporting System (DEST, 1999) and Marr, Helme & Tout’s *Rethinking Assessment* (2003). As educators, the project team began collecting and discussing the training packages and the underpinning concepts (the language, literacy and numeracy concepts) essentially from a cognitive standpoint. As the questions were fleshed out, it soon became apparent that there were paradigm conflicts that frustrated the initial Appreciative Inquiry question of “best of what is”. Was the cognitive standpoint the best place to start?

The jigsaw model of Marr, Helme and Tout (2003) provided a valuable framework that worked for the assessment of the individual; however, the model also laid bare the systemic barriers that frustrated the incorporation of holistic assessment principles into the initial assessment. The workplace or Block is a time poor environment, time is limited and prevailing workplace and vocational attitudes preferred a simple test. Was it possible to maintain a constructivist numeracy ideology, to provide a supportive learning environment in a limited timeframe? How does the learning support teacher provide space for the student to attain *agency* in a concept?

However, as the study progressed, through reflective forums, it became apparent that a jigsaw metaphor has limitations. The notion of *ecosystems* as a metaphor brought with it a broader platform, as part of a strategy for organizational change.

Theories of Skills and Work.

The conversations began to reveal a growing awareness that there was no clear definition of what was meant by the term *skill*. There were different assumptions about the meaning of the word. Certainly there was a clear understanding from the view point of the Unit. However, as other voices were brought to the conversations, employers, trade teachers etc, it seemed that there were different paradigms at work. Mournier’s (2001) theoretical understanding is perhaps one of the most powerful learning’s in the research so far. The *Three Logics of Skills in French Literature* revealed the nature of these paradigms. Mournier’s (2001) analysis of skills, underpins research by Buchanan & Schofield on the nature of work and industrial relations. Buchanan’s report *Beyond Flexibility* a study of the linkages between work and skills offered a powerful model to explain the existence of ‘*gapland*’, that space between what is and what should be (Busche 1998). Investigating the existence of gaps brought to the conversations the theories associated with change management and leadership.

Theories of Organizational Change

The culture of any organization is revealed in structured and deliberate diagnosis (Schein 1997) and the researchers begun to map the assumptions and behaviors of the Learning Support Unit and then sought out the collective viewpoints of the internal and external participants of the unit. The Unit began the process of charting subcultures in an attempt to build new and more ‘heroic myths’ moving the Unit away from the collective perception of being

problem solvers to resourcers and facilitators of change. The team began the process by engaging external observers to assist in revealing team dynamics.

The researchers also acknowledged that involving colleagues in professional development was not always a catalyst for change in culture; it was part of the solution but not the whole solution.

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