ARCHITECTURES FOR APPRENTICESHIP
Achieving Economic and Social Goals

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INTRODUCTIONS
Philipp Gonon and Erica Smith
Chairpersons of the INAP Board

This volume contains the papers of the 6th International Conference of the International Network on Innovative Apprenticeship: *Architectures for apprenticeship: Achieving economic and social goals*, which was held on the campus of Federation University Australia, on September 1-2, 2015.

The papers and keynote speeches offer many aspects for discussion and reflection. This was also the case at the conference itself, which provided two days of topical debates and fruitful deliberations.

The papers covered the themes of Governance, Didactics, Quality of Apprenticeships, School-to-Work-Transition, The Status of Apprenticeships, and Apprenticeships and Social justice.

Apprenticeship today is seen as a promising option for policy makers for providing a training and education opportunity for young people. But also for young people it is appealing to find access to the workplace and to a way of learning which is not just bound or restricted to school. An apprenticeship offers a tremendous chance to find a place in society and workplace. In an increasing number of countries, apprenticeship is also available to mature-aged workers, providing a chance for a career change or re-entry to the workforce.

Apprenticeship is, at its core, a learning concept through practice and solving problems in real life, supported by supplementary schooling and education. Thus it is more than providing people with affordances for learning in the workplace. The apprenticeship model is most firmly rooted in the German speaking countries and regions and is closely bound to history and culture. Out of this tradition two attitudes towards the expansion of apprenticeships have emerged.

One idea is to “export” such a model in other countries. Like German cars, which are renowned in Europe and in the home market, it was taken for granted to bring such goods to other countries. This ‘cut and paste’ attitude, often also demanded by countries who needed to find a quick answer to reforming their Vocational Education and Training systems, was all in all not always successful in the last 40 years, as several evaluations found out. The idea of exporting such a system without being aware of local needs is problematic.

On the other hand it is wrong to think that such a model is not feasible outside the countries with such a home-grown tradition. This sceptical attitude, held by some commentators, is perhaps based on disappointments in the past, and on an over-estimation of nation-specific conditions of education. For sure, in other countries same ideas and concepts have developed differently. On the other hand it is the nature of human mankind that people try to refer to convincing ideas and experiences and are confronted with results, which differ from
the original blueprint. So the very old model of apprenticeship is still alive and will inspire new reforms. It is still an interesting mode of getting qualified for the workplace and the society of today and the future.

The conference itself is a proof of how multifaceted this model works in practice. It is widespread and exists in a lot of variations as a lot of papers reflect.

They point out that the need of mutual knowledge of country-specific developments and research and exchange of experiences is important, and that the learning process and knowledge base of apprenticeship is still developing today and in the future.

We would like to thank our major sponsors: the Department of Education and Training, Australia, and Federation University Australia. We also thank our other sponsors: the National Centre for Vocational Education and Training, and Group Training Australia. Thanks also to Bremen University’s TVET Research Group (I:BB) and the University of Zurich. We would also like to thank members of the Australian Vocational Education and Training Research Association for providing assistance to authors with polishing their English language.
David Battersby
Vice-Chancellor, Federation University Australia

Welcome to Federation University Australia and to the Sixth International Conference of the Innovative Apprenticeship Network (INAP). The University is delighted to host the conference this year in Ballarat, especially as apprenticeship in all its forms is such an important ingredient of the vocational education program at Federation University.

Federation University is Australia’s newest university. It was formed from a merger of the former University of Ballarat (established in 1994) and the Gippsland campus of Monash University in January 2014. It is also one of Australia’s six ‘dual-sector’ universities which mean the university encompasses both Higher Education and Vocational Education. Although a new generation University, Federation University has a very long pedigree and is Australia’s third oldest site of technical and vocational education. The School of Mines and Industries Ballarat (SMB) was formed in 1870, only 19 years after the City of Ballarat was founded in 1851. The city grew quickly in the 1850s in the wake of the Victorian gold rush, and the impressive heritage architecture of the present City is testimony to the wealth that was created here in the 19th century. The SMB was formed to provide the mining industry with high quality technical and engineering staff. The SMB expanded quickly and nurtured a significant amount of innovative scientific research as well as broadening its operation to include a well-respected Arts School alongside its technical programs. In the twentieth century, the SMB became part of the Victorian State VET system and eventually, in the 1970s, a Technical and Further Education College (TAFE). It was the merger of the SMB TAFE with the University of Ballarat in the late 1990s that formed the modern Federation University.

Apprenticeships, and their newer relatives, traineeships, stand at the heart of the Australian VET system. There are almost 350,000 apprentices and trainees in Australian, accounting for nearly 20 per cent of the total number of students in the VET system. Traditional, 4-year trade based apprenticeships account for about 30-40 per cent of the total numbers of apprentices and trainees. These trade apprenticeships have been a constant feature of the Australian training system for over 150 years and enjoy strong support from employers, government and unions and are often enshrined in the Industrial Awards which govern the Australian Industrial Relations system. They also form a major part of the business of Australia’s public TAFE system with over two-thirds of all trade apprentices receiving their institution-based training in a TAFE Institute. Traineeships are a relatively new phenomenon, commencing in the 1980s and accelerating in the 1990s and 2000s. Federal Government funding changes have slowed this growth in recent years. Typically, traineeships are shorter cycle, often 1-2 years, but usually involve the same combination of workplace-based and institution-based training as apprenticeships. They have been very successful at introducing structured, qualifications-based training into many occupations that
traditionally did not support training. TAFE Institutes also enrol many trainees, although the majority are trained by private providers, reflecting the mixed public-private nature of the modern Australian VET system.

At Federation University, apprenticeships and traineeships are a major element of our vocational education and training programs. Apprentices and trainees constitute over 30 per cent of our vocational students, covering most of the traditional apprenticeship areas such as building and construction, engineering, automotive, hair and beauty and commercial cookery. In 2014, the University opened a brand new Manufacturing Skills Centre at the SMB campus in Grant Street, next to the existing state-of-the-art Building and Construction Skills Centre. This new facility enables the University to offer local manufacturing and engineering businesses the highest level of technical training for their apprentices, trainees and their existing workers who undertake short courses there. I encourage you take time during the conference to see the Centre for yourselves.

Finally, I would like to take this opportunity to thank you for coming to Ballarat to attend the INAP conference 2015. I know that many of you have come from all parts of the globe to be with us in Ballarat this year and the University is proud to the host this very significant conference. Apprenticeship is vital to the health of technical and vocational education the world over and INAP plays a critical role in improving our understanding of this global institution and enhancing its role in building the skills that modern nation states require to survive in the 21st century. I wish you every success at the Conference.
Keynotes
Two distinct conceptions of apprenticeship

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Summary: Current conceptions of apprenticeship are often those associated with a novice, usually a young person, being guided in their learning of occupational skills by a more experienced practitioner (e.g. tradesperson). In this conception, the relationship between the more and less experienced individuals is central to how apprenticeship progresses and its effect enactment. Yet, another view of apprenticeship arising from its original meaning and long practiced across human history is highly interdependent, but not associated with close guidance of more experienced practitioners. A key difference is that this second conception positions apprentices as learning in highly interdependent ways with the physical and social environment in which they work and learn, not being directly guided by more experienced practitioner. That is, this learning process is more mediated by individuals, than more experienced partners. This paper discusses the two conceptions of apprenticeship and what they say about contemporary considerations of learning at and for work.

Keywords: Apprenticeship, apprehend, learning, zone of potential development

Apprenticeship on the rise

Apprenticeships and apprenticeship mode of learning are much discussed. It is often proposed as the means by which demanding and complex knowledge can be learned by a novice or student and its applications have gone beyond the learning of occupational knowledge per se. For instance, in the 1990s much attention was given to the concept of cognitive apprenticeships that were used for assisting the development of learning maths and literacy in schools, amongst others (Brown, Collins & Duguid 1989). The particular interest here was that by gaining access to the ways experts think and act, that novices can appropriate these processes and come to be more effective and expert like in school-room related tasks such as maths. These ideas drew upon studies of apprenticeship learning of occupations in work settings and were seen to offer lessons for how effective student learning could progress in school settings (Brown & Palinscar 1989). Central to these ideas is the concept of joint problem-solving between more and less experienced practitioners. That is, by apprentices and more experienced practitioners working together and resolving work tasks and their inevitable problems that both the tasks will be completed and the apprentices' knowledge will be enhanced. Sitting within all of this is the finding from cognitive science that it is the quality of thinking and acting (i.e. such as problem-solving) which leads to rich learning (Anderson 1993). These ideas also were supported by conceptions from Vygotskian-inspired social cultural theory which held that the scope of individuals' learning can be extended by having access to a more experienced partner who is able to open up new insights and possibilities for learning (Newman, Griffin & Cole 1989). This precept was captured in the concept of the Zone of Proximal Development which is attributed to
Vygotsky (Cole 1985). Certainly, none of this theorising would seem out of place in the German-speaking countries where apprenticeship is valued as an important social institution for securing occupational outcomes the young people and for sustaining high levels of skill within the workplace (Deissinger 2000). Within those circumstances the conception of apprenticeship is richly associated with interactions between the more experienced tradesperson and the apprentice. Indeed, such is the standing of apprenticeships that many apprentices in Germany, the German-speaking areas of Switzerland and Austria are guided by a Meister. That is, a skilled tradesperson who has the equivalent of a Masters level qualification in assisting apprentices learn. Moreover, the cultural sentiments supporting these arrangements extends to employers seemingly understanding and valuing the worth of apprenticeships and the importance of them developing occupational skills (Deissinger 1997). This then extends to the community tolerating lower levels of pay to apprentices because they are being given sound occupational preparation.

Given these traditions, it is noteworthy that in other countries apprenticeships are on the rise (i.e. there is a lot of interest in the enactment), but in ways which are quite distinct from these traditions. For instance, in Denmark and Sweden currently they are a range of school based apprenticeships which are being introduced to provide vocational education outcomes for students that will lead to employment in selected occupations (Berglund & Loeb 2013). However, unlike those in Germany and elsewhere are where the majority of the apprentices time is spent in the workplace, in Australia the instance it is about 84% of the indenture that is spent in the workplace, these models of apprenticeship are focused on school-based activities with apprentices being allocated to workplaces on a rotational basis and as an adjunct to school-based experiences, rather than the other way around. Moreover, rather than there being strong associations amongst the workplace, tradesperson and apprentice, in these school-based approaches the apprentices engage with a number of companies and can withdraw from those that do not meet the needs (Grevholm & Lindberg 2013). Similarly, key global agencies such as the OECD and the World Bank are promoting the concept of apprenticeship in countries with developing economies, with the demands that such arrangements are a central to these countries becoming viable and having advanced industrial economic bases. Yet, in those countries there is usually the absence of the kind of institutions and societal sentiments but are so central to what occurs within the German-speaking countries. In some, there are no vocational education colleges with occupationally experienced teachers, workplaces that value and support apprenticeship arrangements or societal structures which tolerate low pay to those who are apprenticed.

All of this opens up to consideration what actually constitutes apprenticeships and whether the kind of model that is now advanced as the orthodox model is that which stands as the benchmark for other approaches to emulate and also the degree by which it is meeting contemporary needs (Deissinger 1997). Such considerations prompt a review of what constitutes apprenticeships and by what measures should these different kinds of arrangements be valued.

The key point made in this paper is that, from its origins, the conception of apprenticeship is quite different than what is proposed in the currently accepted model and one which is now taken as being both orthodox and gold standard. Instead, what is proposed is that originally, apprenticeship was primarily and perhaps still is for many, novices learning through their own actions, mediation and how they engaged independently with the work environment, workplace tasks and others in the workplace. Put baldly, across human history, largely, rather than apprenticeships being based upon a close association and guidance by more experienced practitioner that the focus of apprenticeship traditionally was on the active and
interdependent learning. Seemingly, this has been the case up until relatively recent times: i.e. modernity and the formation of modern nation states in places such as Europe (Billett 2014). Moreover, currently, in countries and circumstances where there is no formalised and legalised provision of apprenticeship education, this mode continues (Marchand 2008). It seems that the kind of model of apprenticeship learning which is now taken as orthodox is a particular product of modernity and the specific formation of institutional arrangements that arose through some modern nation states and with industrial economies, and perhaps even from the post Second World War world.

Given the contrast between the two conceptions is one where close guidance in learning is privileged, and another where interdependence in learning is privileged, other questions arise about how best to human learning and development for specific purposes progress. Assumptions founded within schooled societies are open to question by such accounts. Yet, the specific issues addressed in this paper are to understand these two different conception of apprenticeships (i.e. one institutionally mediated and one more personally mediated) and consider what this means for the initial formation of occupational knowledge (i.e. for people learning an occupation) and also the ongoing development of occupational capacities across lengthening working lives. The presentation will be organised accordingly with an emphasis initially on the original conception of apprenticeship, how that has changed in modernity and industrialised societies its recent manifestations as an adjunct to schooling.

Original conception of apprenticeship

Beyond the introduction provided above, the second section of this paper captures and elaborates the original conception of apprenticeship as a process through which individuals were expected to learn their occupational practice largely unmediated by direct instruction or guidance by more expert others. The original meaning of the term apprenticeships is emblematic of this conception 'to apprehend', and accounts largely from anthropology support such a view (Marchand 2008). Having set out this perspective, some consideration of the zone of proximal development, and repositioning learners’ agency and mediation and considering instead the zone of potential development are advanced.

Current conception of apprenticeship

Subsequently, consideration is given to the model of apprenticeship now being practised in Germanic countries, which appears to have arisen since the formation of modern nation state, and national recovery from the Second World War. Discussion then leads to how these two conceptions of apprenticeship can inform the ways in which initial and ongoing occupational preparation are to be advanced in the future through what is referred to as apprenticeship approaches.

References


Can traditional apprenticeships in the informal economy of least developed countries be integrated as legitimate pathways in formal skills development systems?

Paul Comyn

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Summary: In many developing countries, traditional and informal apprenticeships have been the primary means through which skilled workers are introduced into the communities of practice of a large number of occupations. Whilst they are employment based and include a master/apprentice relationship, they typically lack the features of more formal and structured apprenticeship systems. They generally do not involve a structured program of learning, do not involve inputs from training institutions, are of varying duration and offer poor quality learning outcomes. Regardless, as increasing attention is paid to improving the quality and relevance of vocational training, the challenge of reducing informality in developing countries, the reform of skills systems is increasingly including a focus on formalising informal apprenticeships so they can be upgraded to more legitimate pathways for learning and school-to-work transition. This paper highlights recent efforts undertaken by the ILO to strengthen informal apprenticeships systems and outlines examples of how they can become part of formal apprenticeship systems.

Keywords: Apprenticeships, informality, informal apprenticeships

Introduction

Informal apprenticeships are an important training system in many urban and rural informal economies. They are based on a training agreement between an apprentice and a master craftsperson. In this agreement, which may be written or oral, the master craftsperson commits to training the apprentice in all the skills relevant to his or her trade over a significant period of time, usually between one and four years, while the apprentice commits to contributing productively to the work of the business. Training is integrated into the production process and apprentices learn by working alongside the experienced craftsperson (ILO 2013).

While formal apprenticeships are based on training policies and legislation, agreements in informal apprenticeship are embedded in local culture and traditions, with the incentives to participate on both sides rooted in the society’s norms and customs. These govern aspects of the arrangement including how an apprenticeship is financed, how long it lasts, how the quality of training is assured and what happens if the contract is breached. These rules are enforced by social sanctions, reputation or reciprocity (ILO 2012).

Under such arrangements, costs and benefits are shared. The costs for master craftspersons comprise the investment of time in training as well as, in many cases, allowances, in-kind remuneration (such as meals) or wages; the costs for apprentices comprise their labour and often fees as well. Master craftspersons benefit from inexpensive labour and any fees, while apprentices acquire marketable skills and an understanding of
the world of work. Practices in informal apprenticeship however, vary according to local context. In some East African countries, apprentices are trained in specific skills for a shorter period of time rather than in all skills relevant for an occupation over a longer period, and often pay a fee. In West Africa, more structured systems of informal apprenticeship culminate in graduation ceremonies involving other members of the community. In South Asia, informal apprenticeships often involve child labour with limited learning in narrowly defined occupational roles extending over unreasonable periods of time. While informal apprenticeship systems also exist in other Asian countries and in South and Central America, ILO development work has been mainly focused on African and South Asian countries.

Upgrading informal apprenticeships

The objective of upgrading informal apprenticeship systems is to address their weaknesses and improve their potential to help young people into decent work, thereby contributing to the development of more dynamic economies (ILO 2012).

ILO projects aimed at strengthening informal apprenticeships have recognised the need to capitalize on the existing system. If small business associations exist, they need to play the primary role in upgrading informal apprenticeship. Any outside intervention in informal apprenticeship systems needs to be based on a sound understanding of local practices and of the incentives to participation for both master craftspersons and apprentices. Interventions need to take account of how informal apprenticeships work in practice and of existing linkages between the formal and informal training systems, including small businesses’ experience of government programmes. Understanding the roles of different formal and informal institutions is very important and a necessary first step in analysing existing systems. (See for example JOBS 2010, ILO 2014)

An important strategy for regularising informal apprenticeships is to strengthen the apprenticeship contract. Apprenticeship systems are not fully effective if many apprentices leave the workshop without finishing their apprenticeships, if master craftspersons keep apprentices for very long periods without imparting all their skills, or if the conditions of apprenticeship contracts are not sufficiently transparent. Since contracts are often oral, improvement here could include ensuring that they are concluded in front of reliable witnesses. Contracts should specify, at a minimum:

• details of working time;
• the expected and maximum duration of the apprenticeship;
• the conditions that determine its completion (i.e. the apprentice having acquired all relevant skills);
• the craftsperson’s and apprentice’s respective rights and duties (including the remuneration and/or fees to be paid);
• the duration of a trial period;
• issues of liability (for broken tools etc.); and
• how conflicts or breaches of contract are to be dealt with (ILO 2013).

Various options are available in establishing a socially recognized conflict resolution mechanism. Parents’ associations can act as advocates for apprentices, in particular where parents or guardians arrange the apprenticeship with a master craftsperson, as for example in Benin. If apprentices are older and choose master craftspersons independently, other mechanisms are needed. In these circumstances the conflict resolution role may be undertaken by business associations (as is the case in Zimbabwe), community groups, or trade unions that are trusted locally (ILO 2012).
To ensure that children below working age are not accepted into apprenticeships, awareness of national minimum age legislation needs to be raised among master craftspersons, parents, business associations and other community groups.

Another key strategy for obtaining the commitment of master craftsmen to the reform agenda is to bring new skills into informal apprenticeships. If master craftspersons lack up-to-date skills, this deficiency will be passed on to their apprentices.

Master craftspersons have been trained in many countries, including Kenya, Uganda, Mali, Bangladesh, Pakistan, Nigeria and Tanzania. Particularly beneficial are courses in technical, business or teaching skills. These courses should be short in order not to interfere too much with business operations; and although participants should contribute to the cost (apart from pilot schemes to try new approaches), the charges should not be so high as to deter them from taking part, and so hinder the improvement of the apprenticeship system. Since many master craftspersons may never have attended formal training, special trainers are required to cater for their particular needs, and incentives such as certificates may be required to motivate them to take part (ILO 2015).

As systems for RPL become more established, certifying skills of master craftsmen against nationally recognised NQF credentials is becoming an important strategy of improving the skills of master craftsmen and establishing links with the formal apprenticeship system. In India for example, there is currently a major RPL initiative to certify master craftsmen in the Gems and Jewellery sector alongside efforts to have existing informal apprentices registered under the National Apprenticeship Act.

New skills can also be brought into workplaces that offer informal apprenticeships by forging links with larger enterprises that can offer improved access to modern technology and materials. Apprentices benefit from short courses before, during and after their period of apprenticeship. Brief pre-apprenticeship training can raise awareness about their rights and duties, and about occupational safety and health, and establish basic technical skills. In Zimbabwe, short courses were introduced in the middle of the apprenticeship to provide basics in the theory of their trade; and a training course at the end of the apprenticeship was delivered to provide an introduction to entrepreneurship skills and guidance on how to find employment or get finance to set up their own business. Certification of informal apprentices has been found to improve completion rates and increase the likelihood of master craftsmen in that enterprise taking apprentices at a later date (ILO 2015).

Rotation systems that allow apprentices to move to different workshops during their apprenticeships can also help them to develop a broader skills base. Experience suggests that master craftspersons and apprentices should not be trained together, since their learning needs and social status differ. The importance role of industry associations in assessing apprentices and master craftsmen as part of efforts to strengthen informal apprenticeship systems has been highlighted in recent case studies in India, Columbia and Rwanda (ILO 2015).

As with formal apprenticeship systems, enhancing the quality and reputation of informal apprenticeship pathways is a priority for strengthening informal apprenticeship systems. In some countries, small business associations have introduced skills tests upon completion of apprenticeship to set quality standards within a trade. In other countries, training content within each trade is harmonized by setting skill standards that apply to all informal apprenticeships in that trade. Such standards should be designed with the involvement of master craftspersons and their organizations (ILO 2013).

Once set, standards can be converted into logbooks or checklists of competence, to be
signed by both master craftspersons and apprentices, to monitor how training progresses. The logbooks should be verified as a minimum by a designated expert from a reliable institution who visits the workplace regularly, for example a representative of a government agency, a training centre, a business association or an NGO. Ideally however the logbooks are fully integrated with the national system of occupational standards and qualifications so that the certification outcome of informal apprenticeships have the potential to match those of more formal learning pathways.

Schemes along these lines are currently being piloted in countries including Bangladesh, Senegal and Togo. Combined with assessments and certification at the end of apprenticeship by a credible organization, skill standards and logbooks can enhance the recognition of skills and thus improve young people’s chances of finding a job on completion of their apprenticeships.

The profile and status of informal apprenticeship can also be raised by strengthening the role of master craftspersons as trainers, for example by introducing criteria that acknowledge their role. Other means of raising the profile of informal apprenticeship include setting up information campaigns, awarding prizes (to both apprentices and master craftspersons) for successful apprenticeship practice, or including informal apprenticeship as an option in vocational guidance in schools and employment services. Another option being explored currently in Bangladesh involves the workplace being approved as an assessment site by the national regulatory body so that workers, including apprentices and master craftsmen, can be assessed by a recognised training organisation.

Clearly intended outcome all these initiatives is to have informal apprenticeships recognised by the national training system as a legitimate pathway the skills development. Several countries, including Benin, Gambia, Ghana, Bangladesh and Tanzania, have recognized the importance of informal apprenticeship in contributing to the national skills base. This recognition is enshrined in policy documents on education and training, some of which also include provisions for measures to upgrade the system. (See for example MOE 2010)

Observation of the implementation and impact of these measures will provide valuable evidence on the most effective mechanisms to legitimise informal apprenticeships as a valuable pathway skills development. Formal acknowledgement of this kind has the potential to increase the scope, financial support and efficiency of the informal apprenticeship training system in these countries over the long term. In some countries however, legal contradictions need to be addressed. While artisan codes (in, for example, West Africa) define the status of apprentices and master craftspersons, and recognize oral apprenticeship contracts, labour codes originally drawn up to regulate formal apprenticeship in larger enterprises call for written contracts along with other requirements that lie beyond the reach of small businesses offering informal apprenticeship. In South Asia for example, whilst countries such as India, Pakistan, Bangladesh and Sri Lanka all have normal apprenticeship systems based on legislation, archaic restrictions on enterprise size have also contributed to the ongoing strengths of informal apprenticeship systems because many informal enterprises employ less than the minimum number of employees required in a workplace eligible under these apprenticeship acts (Smith & Brennann-Kemmis 2013). Effective legislation to bring the two systems closer together needs to build on current practices and be designed in close collaboration with key stakeholders.
Conclusion

Whilst it is important to acknowledge the weaknesses of informal apprenticeships in developing countries, it is equally important to recognise the potential they provide to increase scope and relevance of formal training. In many parts of the world there are moves underway to either extend the scope of formal apprenticeship systems by merging with apprenticeship regimes, or by strengthening informal apprenticeship systems so they deliver nationally recognised skills outcomes. Through efforts such as these traditional apprenticeships in the informal economy are increasingly being valued as legitimate pathway is skills development systems.

References


Let me take you on a journey into the not-so-distant future; you wake up in the middle of the night, get out of bed and go to the kitchen, open the fridge and cut a piece of cheese. You cannot get to the cheese because your running shoes send a signal to the fridge that you had not run your prescribed five kilometres today. What we see here is that the environment can be programmed in a specific way, depending on the objectives: get thin, athletic, muscular etc. It can be programmed so that it will help you concentrate, shutting off all distracting factors.

The question, therefore, is how will technological innovation, automation and digitisation impact the learner, student, lecturer, teacher and the content in the future?

Introduction

When considering the Architectures for Apprenticeships achieving economic and social goals, one cannot discount the myriad of man-made injustices which plague the future of the current and emerging workforce. The question we are grappling with is both simple in its formulation yet complex in its deliberation.

It is simple because we are looking at a construct we are familiar with, one that has seen success time and time again, one that has not only set the tone of the industrialised world, but has made it a formidable economic force.

The role of the artisan cannot be discounted when we consider the successes of developed and developing industries across the world. These successes, however, have resulted in a forever-changed cultural fabric; it has made the world smaller but with it has emerged profound social and economic inequality. The complexity in the deliberation of the needs of a 21st century workplace lies at its heart the composition of a credible, responsible and engaged workforce that will take on the challenges of the current day and preserve the futures of the next generation.

This paper aims to briefly discuss the current global conditions in which artisans need to compete. It also discusses the requirements for their success going forward.

The world we live in: Situation analysis

Global warming and climate change are likely to lead to shortages of food and drinking water. In the period 2000 and 2013, South Africa has seen its population increase by 25% with only 13% of its land identified for new developments in the agricultural industry. Of this 13%, only 3% is considered to have high farming potential (Von Bormann & Gulati 2014). With such narrow margins of possible growth in the agricultural sector, South Africa, like other developing nations, then falls prey to CPI (consumer price index) affected price hikes and related taxation on food imports in order to meet domestic demand for food products. Being food secure means that members of a household have access to enough food at all times to support an active, healthy life. A study by the Human Sciences Research Council (HSRC) in 2013 reported that more than half of South Africans did not have regular access to enough food, and at the time, the proportion of the population at risk of hunger was
rising. In conjunction, South Africa cannot be considered “water-secure” either. Even though water services in South Africa are of a high standard – particularly in urban areas – there is potential for a national water crisis which in turn will have a negative impact on the country’s social and economic status. Furthermore, water pollution is continuously reported while various industrial sectors (manufacturing, mining and agriculture sectors) continue to be seen as the greatest contributors to a potential water shortage. Therefore, when considering skills planning for 2030 and beyond, it is vital to take these issues into account, particularly issues from green skills to support policy legislation on water conservation and purification methods (Hedden & Cilliers 2014).

In an effort to reduce poverty, the South African government has directed almost 60% of its spending towards social wages according to the 2013 Millennium Development Goals. This may have been a short-term measure to address poverty; however, social grants have been instrumental in reducing poverty levels. Between 2006 and 2011, Statistics SA reported a decline in poverty. However, almost half of the population, close to 23 million people, is poor (Statistics SA 2014). In addition, education has been identified as a key component to alleviating poverty and as such the role of the Sector Education and Training Authorities are deemed vital for the implementation of programmes which seek to address industry skills shortages and provide training for development (Statistics SA 2014). SETAs in South Africa have a dual imperative; an economic imperative on the one hand and a social imperative on the other.

Issues of declining food and water security are juxtaposed by the ever-increasing gap between rich and poor. Abject poverty is a reality in Africa and developing nations, but even in developed nations, there are social sects plagued by poverty despite their very developed economy. The comforts of a secure livelihood have become somewhat of a mirage for many and will continue to be nothing more than an illusion for an ever-increasing global populace. According to a newspaper article published in 2014, the South African government has managed to reduce poverty through its fiscal policies. However, the GINI Co-efficient, which measures the gap between rich and poor, still remains high at 0.69 (Donnelly 2014). In order to reduce the gap between rich and poor, the government is contemplating higher taxes; however true economic growth and more efficient public services are required to beat the twin challenges of poverty and inequality (Donnelly 2014). South Africa’s tax system is somewhat progressive and government spending is highly progressive, meaning that the country’s rich bear the brunt of taxes which are redirected by government to the benefit of the poor by raising their incomes. In this light, it is plausible to state that South Africa is becoming somewhat of a socialist state driven by capitalist behaviour. However, these practices, noble in their intent, do not present a real solution. Johann Rupert, multi-billionaire owner of jewellery brand Cartier made a somewhat controversial statement regarding inequality, in reaction to the fact that the top 1% of the global population now owns more wealth than 90% of the global population. In his statements, he surmises that robots are replacing workers and that this artificial intelligence will fuel mass unemployment. He warns that society will have difficulty in coping with structural unemployment and the envy that comes with it, will lead to warfare. Society is changing very rapidly and one must prepare for these changes (Roberts & Mulier 2015).

Controversial as they may be, the sentiments expressed by Johann Rupert cannot be ignored. Despite socialist interventions by the government, most people are at a loss in terms of their livelihoods. The central arguments in socialism versus capitalism debates are about economic equality. Socialists are opposed to economic inequality and believe it is government’s responsibility to reduce this through programmes benefitting the poor.
However, South Africa is a heavily industrialised society consumed by capitalism which is solely focused on profit. Therefore, attempts that have been made for a more socialist society have failed. If anything, the statistics indicate the problem has been exacerbated over time, leading to a dichotomous economy and a dichotomous populace. This dichotomy produces on the one hand, a labour market of highly skilled, highly consumerist workers while on the other hand, a less skilled impoverished labour market, resulting in and entrenching the notion of a first and second economy.

In addition, rapid advances in technology have impacted every aspect of society, business and government in the digital era (Pearlson & Saunders 2013). Globalisation has become a reality as advances in internet technologies have culminated in connected global business, citizens and governments. Technology has thus broken the physical geographic and time barriers and connected people into one global village.

In education, for example, the concept of “global campuses” is becoming a reality more than ever before. Global campuses connect learners from all over the world and provide a platform for online learning without one being physically present in the university. It is “learning without borders”. Information and Communication Technologies (ICTs) are increasingly being used as strategies for promoting “social justice” by increasing access to education and information to the previously disadvantaged members of society (Regnedda & Muschert 2013).

It is, however, important to note that access to technology still remains a significant challenge, especially in developing countries where the majority of people still lack basic essentials such as healthcare, food and clean water. The digital divide has further resulted in the widening of the gap between the rich and poor as poor people continue to be deprived of the wealth of information, including education (online learning) that has been made possible by connectivity.

Advances in technology have had a huge impact on the global manufacturing industry. Technology has become one of the strategic tools for growth and survival in the face of stiff competition caused by the globalisation of markets where businesses are competing in the face of threats from new entrants, changing consumer tastes, consumer and supplier bargaining power and maturing shrinking markets in the developed world.

To compete with global manufacturing giants such as China, developing countries like South Africa are starting to embrace advanced manufacturing through innovation, research and development in this sector. This has, however, brought with it the need to develop a technologically literate and skilled workforce to drive the advanced manufacturing industry. Technical skills alone are no longer adequate as the 21st century workforce needs the relevant technology skills to effectively drive the advanced manufacturing industry.

Furthermore, the adoption of advanced technologies has been criticised for negatively affecting employment by rendering certain jobs redundant. On a positive note, new jobs requiring a highly skilled workforce have been created, hence it is important to ensure the 21st century workforce continuously evolves with technology through continuous formal and informal learning. To strike a balance between increasing profitability through adopting new technologies and social responsibility in the form of employment creation, industry needs to invest in developing their workforce for the 21st century manufacturing industry and beyond to ensure job retention.
Building an engaged ethical citizenry

The maturity and decline of consumer markets in most developed countries has seen the rest of the world turning to emerging markets such as Africa and Asia. Africa is characterised by an explosive population growth, a youthful market and an emerging optimistic consuming class (McKinsey 2012). Africa’s consumer market is expected to grow by more than US$400 billion in 2020 (McKinsey 2012). In South Africa and the rest of the African continent, Entitlement, Greed, and Consumerism have been termed the Three Big Evils. This problem is, however, not unique to South Africa and Africa but the world over is confronted by these challenges. In South Africa, the continued decline of the manufacturing sector and the rapid growth of consumer services and the financial sector is clear evidence of growing consumerism in South Africa. This is against the background of an increasing gap between the rich and poor the world over.

Poverty, inequality and other social injustices are increasingly dominating the agendas of many governments. The scarcity of resources calls for the need to pay closer attention to addressing such injustices. Education is increasingly being recognised as one of the mechanisms for addressing social injustices as it empowers people with social, economic, environmental and political knowledge that is critical for sustainable development. In South Africa, Technical Vocational Education and Training has been adopted as one of government’s strategies for empowering the future generation with artisanal, entrepreneurial and other skills as well as knowledge for growing crucial sectors such as manufacturing. Through proper educational mechanisms, a responsible, ethical workforce is possible. However, it does require a shift in mindset as well as a shift in the mode of teaching. Both teacher and learner together need to embark on a journey of learning and re-learning to remain relevant in a rapidly changing world.

In South Africa, as well as globally, we need to be less focused on binary thinking and inform this trend with continuous epistemological research to develop our knowledge base. Epistemology refers to the study of knowledge or the search for truthful knowledge (Truncellito n.d.). As technology is continuously changing, so should our knowledge base and in doing so also create an engaged society. It is, therefore, crucial to inform already acquired knowledge with continuous research to ensure we are up to date with the times.

The notion of keeping up to date with the times is quite a loaded expectation in that it is not something tangible - one will never really be “on the ball” or “ahead of the game” when it comes to skills and skills development initiatives. We can, however, ensure that the education system is geared toward a futurist mindset. In order for this to happen, the system must produce a labour market comprised of persons with skilfulness and not just skills. Skilfulness implies nimbleness and dexterity, the ability to apply knowledge across various contexts in a lively manner. And it is for these reasons that the T-shaped learner should be the product of the education system going forward. A learner and indeed a labour market entrant, who can take ownership of his/her craft and continually morph and adapt to the ever-changing playing field in terms of new-technologies and modalities of work, is crucial to innovative development. This education system must by its very nature have teachers and lecturers able to impart skilfulness and thus themselves have a T-shaped mindset.

Meeting economic and social goals

The workplace is ever-changing, and rapidly so. Perhaps what is needed is a global TVET collegiality with standardised curricula for the trades, incorporating a new ideas or innovation component to foster the re-learning and continuous engagement with what is actually
happening in industry, not only at local but at international level. One cannot discount the fact that many traditional trades have been vastly altered in modern times. Take the blacksmith for example, making and repairing horse shoes in the early 17th century; those skills have become obsolete but the basic principles of knowing what is needed from the metal, the strength needed for the load it will carry, its resilience in various terrains, are all aspects which require further enquiry and a way of thinking beyond the mere craft at hand.

WorldSkills is a good example of where we should be going in terms of this collegiality. WorldSkills is an organisation that refers to itself as the global hub for skills excellence and development and improving the world through the development of skills. Through international cooperation and development between industry, government, organisations and institutions, they promote the benefits of and need for skilled professionals through grassroots community projects, skill competitions and knowledge exchange.

Today, WorldSkills represents more than 45 skills in 72 member countries and regions, all working together with youth, educators and industries to prepare the workforce and talent of today for the jobs of the future. They see themselves as a movement working within the six key areas, namely research, skills promotion, career building, education and training, international cooperation and development and skills competitions. Skills competitions are held around the world to showcase and inspire world-class excellence in skills and introduce youth to a variety of skilled careers.

The collegiate would also foster competence across a variety of scenarios within trades to ensure that the artisan can handle various situations as well as innovate in the areas that are new or require dexterity of skills and not learned in a classroom. This would also need partnerships both local and international to support T-shape of both academic staff and learners across the world.

The WorldSkills competition could lead to the emergence an International curriculum for the various trades thus leading to the International student.

References
SECTION 1

GOVERNANCE AND STAKEHOLDERS
1.1. A history of apprenticeship and trade training in Victoria, Australia

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Summary: This paper offers a brief re-viewing of the history of apprenticeship and trade training in Victoria, Australia. The paper uses Green's model of skilled work to frame up the discussion. The historical narrative has been constructed from secondary sources and is presented as four distinct historical periods. The first period is described as involving low regulation, the second as disputed regulation, the third as consolidated dual regulation and the fourth as shared responsibility under national regulation. Two vignettes of trade training are also included. The first shows the beginning of trade training in Plumbing at RMIT and the other the introduction of self-paced competency based training in Sheetmetal trade at Richmond TAFE. The paper concludes that the history of apprenticeship and trade training in this state confirms the resilience of apprenticeship and the oscillation around the economic and political interests of the various stakeholders and industrial parties.

Keywords: Apprenticeship, trade training, state regulation

Introduction

Apprenticeship involves an industrial agreement for the purpose of learning a trade. It has both an industrial and an educational dimension. Because of these two dimensions this paper follows Green's model of skilled work (Green 2013) and the notion of two articulated markets as a way of framing the history of apprenticeship and trade training in Victoria. This historical narrative is drawn from secondary sources (Brereton 1970; Callow 1988; Fomin 1991; Murray-Smith 1966; Murray-Smith & Dare 1987; Roebuck 1987; Scofield 2000; Smith 2006) and organised into four distinctive periods. These consist of colonial settlement up to 1896 when British laws for apprenticeship are loosely utilised across the state (Scofield 2000). The second period is bound by the jurisdiction over apprenticeship shifting to the Wages Boards (Brereton 1970; Fomin 1991). The third period is one of regulation and stability under the Apprenticeship Commission (Roebuck 1987) and the fourth period is of apprenticeships and trade training being the focus of national regulation and reforms (Brown & Rushbrook 1995; Smith 2006). When considering technical education across Victoria, Murray-Smith (1966) uses the metaphor of the 'mutation gene'; this is also an apt description of apprenticeship and trade training. The paper concludes that the history of apprenticeship and trade training in Victoria is one that involves the shifting sands and ongoing debate and conciliation of stakeholder interests. This represents oscillation between the free markets and free choice of laissez faire economics and politics on the one hand and state regulation on the other.

Green's model of skilled work

Green (2013) argues that a skills framework consists of interactions occurring between two articulated markets. The first involves skills utilisation and deployment and the second
skill formation. The demand for skills comes from both employers and workers. Employers want to deploy the skills of workers in particular ways within specific work organisation and technologies. Workers for their part want access to skills because these give increased mobility, security and higher wages. They do this by developing the required skills that the employers want and they rely on training and experience for their development. For their part, the employers need to ensure the skills they require are available and so they too have an interest in skill formation.

Employers and enterprises are in other markets and many fiercely defend their participation in free and open markets and actively resist government regulation. Many employers want the right to purchase just those skills that they require. Workers though want options and opportunities beyond particular companies and their way of working. Pockets of organised labour acting on behalf of workers emerge as advocates for relatively broad and deep skill development and utilisation.

**The history narrative**

Much of the history of apprenticeships and trade training across Australia is state, trade and even institute specific. The historical narrative of apprenticeship in Victoria is argued in this paper to span four distinct periods. The first is from European settlement through the proclamation of Victoria as a separate colony in 1851 up to the Factories Act of 1896. This first period is one of ‘very low’ regulation. It is also the period that saw some collapsing of craft trades and the introduction of large factories and larger scale production. At this time almost any young person working in industry was being called an apprentice (Scofield 2000). There was no formal stipulation of what needed to be taught and fragmentation within the trades ushered in narrowing skill sets and a challenge to the traditional breadth of skills. This narrowing of the work brought a corresponding narrowing of the experience on-the-job with many apprentices being reduced to merely ‘improvers’. The narrowing also brought criticism of the standard and quality of tradespeople being produced.

Various Factories legislation were introduced from 1864 to 1896 (Brereton 1970; Scofield 2000). The Masters and Apprenticeship Act of 1890 tightened significant aspects of apprenticeship. In 1889 the Trades Hall attempted to get agreement from the government that apprentices who were not adequately trained should be eligible for compensation from their employers (Brereton 1970, Fomin 1991). Unions continued to stake their claims and attempted to control apprentice numbers through specifying ratios of apprentices to journeymen though this number varied across the different trades. While the Working Men’s College in Melbourne offered Trade and Technical classes to apprentices starting in 1888, there was still no compulsion for apprentices to attend trade school (Callow 1988; Murray-Smith & Dare 1987).

**The second period**

This period spans from the Factories and Shops Act of 1896 up to 1927. This is a period marked by ‘disputed regulation’. The Factories Act placed apprenticeships under the jurisdiction of the Wages Board. A new Factories and Shops Act was passed in 1896 with the first six Wages Boards were established. By 1900 a further 21 Boards had been authorised to oversee wages in various industries and trades. The Wages Boards took control and oversaw the apprenticeship system (Brereton 1970; Fomin 1991; Scofield 2000). They became a third party in the employment and training contract and could issue their own indentures to apprentices in their particular industries. Many employers found it difficult to comply with them, and the Wages Board found it difficult to enforce beyond a desirable
recommendation.

The Fink Royal Commission into Technical Education in 1901 recommended legislation to specify the length of apprenticeship, the appointment of supervisory committees and the provision of technical education classes for the early years of apprenticeship (Brereton 1970; Fomin 1991; Scofield 2000; ITCV 1986). In 1907 the First Apprenticeship Conference made a string of similar recommendations. One of these was for the formation of a Commission to oversee and administer apprenticeships. In 1913 related legislation was put to the state parliament but was rejecting, leaving the regulation of apprenticeships under the appropriate Wages Board. A Second Apprenticeship Conference was convened and recommending the strengthening of the powers of the Wages Boards (Brereton 1970; Fomin 1991).

The report of the Third Apprenticeship Conference was released in 1922. The recommendations mirrored those of the First Conference with another call for the formation of an Apprenticeship Commission (Brereton 1970, Fomin 1991; Scofield 2000). In 1927 after it was defeated in the state parliament in 1924, and again in 1925, the Apprenticeship Bill was finally passed with the Bill reflecting the recommendations of the First and Third Apprenticeship conferences.

In terms of trade training during this second period, in 1905, the apprentices at the Victorian Railway workshops at Newport were provided with training through day release classes. In 1913 after personally donating funds to the foundation of Sunshine Technical School, McKay sent all his apprentices at Sunshine Harvester Works to attend their training classes during the day (Scofield 2000).

Vignette 1: Plumbing Trade Training at the Working Men’s College

The Plumbing Department at the Working Men's College started in 1888. The College Council employed Mr James Dewar as a Plumbing and Gasfitting teacher (Callow 1988; Murray-Smith & Dare 1987). Dewar remained teaching and as Head of this Department for the next 40 years. Significantly, he set up the teaching spaces, wrote the syllabus and held exhibitions to showcase his students work.

Training remained optional and in 1899 a four year Plumbing course commenced. Public safety requirements associated with Plumbing led to the requirement for plumbers wishing to work on MMBW controlled systems being required to sit and pass an examination and become licensed. The licensing requirement gave the Plumbing program direct relevance and importance. A new and improved teaching workshop was completed and opened in 1905. The first Education Department Syllabus was prepared by Dewar in 1914 and in 1928 Plumbing was proclaimed a trade and the corresponding compulsory trade training course begun. The new course was also written by James Dewar (Callow 1988; Murray-Smith & Dare 1987).

The third period

This third period was one of ‘consolidated dual regulation’ over employment contracts and training arrangements. Regulation and administration of apprenticeships across the state passed from the Wages Boards to the Apprenticeship Commission. The Apprenticeship Commission of Victoria ensured that apprentices were appropriately indentured, registered and trained (ITCV 1986; Pead 1981; Roebuck 1987; Scofield 2000).

In 1928 Plumbing and Gasfitting became the first proclaimed trade. A proclaimed trade needed to satisfy six points. First the occupation had to require a substantial degree of skill and accompanying knowledge. Second, the skill and knowledge could only be acquired through working on-the-job and through long consolidation and practice. Next, the occupation was
recognised in the community as distinct and practiced by a significant number of workers. Entrants to the occupation needed to follow a systematic period of training and they needed to be taught all the skills and knowledge associated with that job. Finally, there needed to be a prospective pool of between 10 to 15 apprentices each year (Pead 1981; ITCV 1986). Once the trade was proclaimed, a Trade Committee was formed to determine the length of the apprenticeship and of the trade schooling (Pead 1974). Attendance at trade school was made compulsory and a condition of indenture. With this came the requirement to establish and provide apprenticeship trade classes. Initially, many trade training classes were offered as one half day and two nights of two hours, each week.

In 1948 the federal Labor government established an entitlement for apprentices to attend an 8 hour daytime training class (Scofield 2000). The post-war boom saw full employment and the increasing demand for skilled workers. These skill shortages were answered with additional migration and access to training and apprenticeships. Block training for some apprentices was introduced and trialled in 1955.

In 1968 the federal government sent a tripartite mission to Europe to study and report on training in the Electrical and Engineering trades. Areas of significance and recommendations were released for broader consideration as the Tregillis Report (Tregillis 1969; Rushbrook 2010; Smith 2006). Shortly after came the introduction of modular training, pre-apprenticeship training, accelerated training and a much expanded Group Apprenticeship scheme. The first trades to trial modular training were drawn from the powerful metals, engineering and manufacturing sector and included Fitting and Turning, Boilermaking, Motor Mechanics, and Panel beating (Pead 1981). With modular training came the requirement for each apprentice to complete all the training requirements in each and every module. Therefore this marks the introduction of the first rendition of competency-based training. Also part of module based apprenticeship training was a debate amongst educators around the move to a Minimum Acceptable Standard (MAS) (Pead 1981).

In 1974 the federal government review established Technical and Further Education (TAFE) through the Kangan Report (Kangan 1974; Rushbrook 2010; Smith 2006). Federal funding was allocated but this report is remembered more for its philosophy and agenda setting than its actual achievements. A sudden change of federal government saw the agenda crumble with subsequent cuts to government spending. In 1975 the Victorian government repealed the Apprenticeship Act and the Apprenticeship Commission to establish the broader Industry Training Commission of Victoria through the Industry Training Act.

**Vignette 2: Sheetmetal Trade Training at Richmond TAFE College.**

The trade of sheetmetal was proclaimed in 1938 (Pead 1981). The syllabus for this trade training was written under the supervision of the Trade Advisory Committee. This course like many other trade training programs ran with only minor revisions for the next thirty years. In 1970 the Sheetmetal Trade Standing Committee was formed. This committee had ten members of which seven were teachers and three industry representatives. The following year a sub-committee of the Trade Standing Committee was formed to review the syllabus (Syllabus Committee). Following a survey of the industry stakeholders in 1971, the syllabus was re-written in a modular format and implemented in 1973. In 1972 the Apprenticeship Commission was pushing for the introduction of self-paced learning.

In 1974 Richmond College adopted a philosophy to develop the concept of mastery self-paced learning and the individualised movement of learners as an extension of the implementation of modular competency based training. The Sheetmetal syllabus is rewritten again in 1976-77 using Behavioural Objectives following the Instructional Systems Model. In
1978 the Trade Standing Committee ratifies the new syllabus as the Sheetmetal Department at Richmond College relocates to purpose-designed refurbished teaching and learning facilities. The new facilities allow for the free flow of apprentices from one learning area to another as they require. In 1979 the Sheetmetal syllabus is implemented in performance terms as self-paced mastery learning (Brown 1994). In 1987 the syllabus is re-accredited merely with an updating of its cover. A few years later the Sheetmetal Department like others around the country implements the National Metals and Engineering Course (NMEC).

The fourth period

Central to this period is the broad agreement between the industrial parties and the various federal and state governments to transcend the Australian constitution and take vocational education national. The national training reform agenda (NTRA) was implemented across the country. The main training initiative associated with the NTRA involved the national introduction and adoption of competency-based training. Competency standards were developed by a network of national Industry Training Advisory Boards and these standards became the basis of training programs (Brown & Rushbrook 1995). This move sidelined teachers from the process of curriculum design and development and moved them to become implementers of curriculum, designers of pedagogy and the agents of assessment.

In 1996, the next rendition of competency based training was instigated with the introduction of Training Packages. These were developed by Industry Skills Councils. State governments instigated user choice purchased the ability of Registered Training Organisations to provide training using these Training Packages. Smith (2006) has called this move to Training Packages a shift in the locus of power away from TAFE and curriculum to industry and workplace-related performance outcomes.

The Expert Panel on Apprenticeship criticised existing apprenticeship arrangements and called for significant reforms (DEEWR 2011). Most notable amongst its recommendations was this Panel’s call for a more ‘shared responsibility’. Current approaches to training involve negotiating training plans within apprenticeship contracts between employers, apprentices and training providers. Under these arrangements learning and competency can be achieved and formally recognised through an agreed mix of learning and assessment occurring on and off-the-job (Guest & Brown 2015). Importantly, apprenticeships have severed the link to time based training and moved to competency completions.

Conclusion

The history of apprenticeships and trade training in Victoria is one where the stakeholders and industrial parties struggle for positions of market advantage. Settlements are reached at different times but new reforms that tighten or loosen regulation are never far away. From the first period of low regulation to disputed regulation in the second period, to consolidated dual regulation under the Apprenticeship Commission in the third period, and onto ‘shared responsibility’ under national regulation in the most recent period - apprenticeship has exhibited its agility to transform with changing conditions. One reason why apprenticeship remains resilient is because learning through a combination of the experience of authentic work practice and training within a dedicated pedagogical space remains a very powerful way to learn - despite it being a problematic relationship, and way to earn. Those who undertake apprenticeships need to be confident that the reduced earning capacity and work relationship that they endure during apprenticeship remains an investment in their access to higher pay and job security after they complete.
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1.2. Exploration and practice of modern apprenticeship training with school-enterprise dual system: A case study of Guangzhou Industry & Trade Technician College

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Summary: This article is about a case study of school-enterprise dual system in Guangzhou Industry & Trade Technician College (GZITTC). GZITTC has explored a modern apprenticeship called school-enterprise dual system fit for skill development in China by drawing on German dual system. GZITTC piloted 13 school-enterprise dual system classes and carried out substantive teaching by selecting famous business representatives as cooperative enterprises. It has been proven that the implementation of school-enterprise dual system has strengthened the effectiveness and relevance of skill development.

Keywords: School-enterprise dual system, modern apprenticeship, work & learning integration, case study

Introduction
School-enterprise cooperation is a crucial part in the current reform and innovation of the vocational education mode and skill development. It is also the general trend and direction of the development of vocational education in China. Due to previous inappropriate school-enterprise cooperation orientation and unclear collaboration philosophy in China’s vocational colleges, the activities of school-enterprise cooperation were rudimentary, focussing exclusively on the provision of internships for students and industry practice for teachers. Enterprises did not appreciate the importance of planned skill development and were unengaged in a substantive manner with vocational schools. Apparently, school-enterprise cooperation like this failed to serve skill development effectively and efficiently. Nowadays vocational colleges in China are exploring a new school-enterprise cooperation mode adapted to the needs of China’s economic development and skill requirements. GZITTC has further explored approaches of modern apprenticeship within a school-enterprise dual system since 2013, and piloted 13 school-enterprise dual system classes.

The connotation of school-enterprise dual system: Modern apprenticeship in China
Currently, most European and Latin American countries are active in developing a modern apprenticeship mode suited to their national characteristics, such as dual system in Germany, modern apprenticeship in the United Kingdom, and new apprenticeship in Australia. The dual system is characterised by formal vocational school training in tandem with workplace experience (Thomas & Silke, 2005, p. 313). Modern apprenticeships emphasise the combined responsibilities and advantages of both school and enterprise learning. They have played a positive role in promoting the development of national economy, the reduction of
youth unemployment and the establishment of school-enterprise cooperative education.

GZITTC has explored a modern apprenticeship called school-enterprise dual system suited to skill development in China by drawing on German dual system. The school-enterprise dual system is a new mechanism of integrating skill development with use of enterprise personnel. In the past, apprenticeship training in China has primarily viewed the school as the main source of learning. This new approach more fully integrates the mechanism and resources of college and enterprises. This mechanism follows the pattern of training and use of personnel. It is also supported, coordinated and guided by the government. The core idea is to make learning objectives clearer, learning means more diverse, motivation more adequate and make learning outcomes more obvious. The intention is to optimize human resources and improve the efficient allocation, and promotion of economic and social development. Furthermore, this system promotes both students’ career and enterprises development, and cultivates the students’ sense of belonging to the enterprise. The main characteristics of school-enterprise dual system are as follow: colleges and enterprises jointly develop enrolment plans, training programs, professional development, curriculum systems, teacher selection, teaching, management committee, examination and evaluation. The characteristics of both school-enterprise dual system and modern apprenticeship are school-enterprise collaboration, to better manage work and learning coordination. The school-enterprise dual system is a beneficial exploration of the modern apprenticeship. It can also be regarded as “Chinese version” modern apprenticeship.

Case description: The exploration and practice of school-enterprise dual system in GZITTC

Selecting famous industry representatives as cooperative enterprises

During the exploration of school-enterprise dual system, most of the enterprises that GZITTC selected to cooperate involved respected industry organisations which are well-known and have the following: a skilled workforce, advanced technology and equipment, along with advanced management features. In addition, GZITTC selected enterprises that: recruit college graduates, provide consistent employment and send workers to college for training; enterprises that took part in integrated curriculum reform; emerging enterprises that represent current industry development.

Making sure the students play the roles of dual identities

GZITTC and enterprises worked together to control the quality of students during the establishment of school-enterprise dual system pilot classes. Enterprises arranged for staff to visit the training college to inform apprentices about the importance of corporate brand, organizational culture, personnel requirements, and working conditions. This active involvement of enterprises attracted a large number of student enrollments. GZITTC also arranged for students to visit the enterprises to further enhance their understanding of the enterprise. Interviews were conducted by GZITTC and enterprises to select students for the pilot classes. A number of high quality students with high scores were selected to enroll. GZITTC, enterprises and students signed contracts to ensure the students understood their dual identities as students and employees. This clarified the cooperative positioning of enrolling students in the same way as recruiting employees, recruiting employees in the same way as enrolling students. Students were aware that going to college meant going to enterprise.
Constructing a work & learning integrated, college & enterprise alternating curriculum pattern

Taking integrated curriculum as the core of curricular system and incorporating the typical work tasks in the vocational field as the carrier, GZITTC and enterprises jointly drew up personnel training programs and teaching plans, and developed core curriculums. In terms of teaching arrangement, the school curriculum and the enterprise work tasks were carried out alternately and connected effectively. The enterprises offered a few key work positions for students to implement integrated on-the-job learning delivered by both GZITTC and enterprises staff. The integrated curriculum was the foundation to carry out school-enterprise dual system apprenticeship cultivation. School-enterprise dual system makes the implementation of integration curriculum more in-depth and effective. At present, the ratio of class hours between college courses and enterprise tasks is 6:4.

Establishing a dual-body flexible teaching management mode

GZITTC and enterprises jointly established a dual-body flexible education management mode, and set up an organizational structure of teaching quality management and monitoring. It is clear that both college and enterprises are the main bodies of skill development. The responsibilities, rights and benefits of both parties are clarified and specified by agreements between GZITTC and enterprises. Both parties participate in every step of training; they jointly carry out and manage teaching. It is manifested mainly in: the period of learning in college, the respect for college training; the period of internship in the enterprise, enterprise management of skill development.

Building a school-enterprise interactional team of teachers

GZITTC and enterprises jointly established a high-quality education team to teach and manage pilot classes. Teachers from GZITTC consisted of professional leaders, integrated core teachers and distinguished teachers, as well as part-time teachers from cooperative enterprise which consisted of internal trainers, technical directors, and human resources managers. This team of teachers was both capable and qualified for teaching tasks. Their teaching philosophy endorsed the integrated curriculum philosophy.

At present, there were 44 full-time teachers from GZITTC and 36 part-time teachers from enterprises which took part in the pilot classes. The student surveys revealed satisfaction rates on full-time and part-time teachers were 94% and 96% respectively.

Adopting competence-oriented school-enterprise co-assessment teaching evaluation measures

All the pilot classes adopted formative assessment, summative assessment and vocational ability evaluation. Evaluation measures consisted of student self-assessment, teacher-student mutual evaluation and assessment with enterprise representatives. The assessment mode is in line with the integrated curriculum standards of the Ministry of Human Resources and Social Security. The Ministry highlights two key points in the evaluation: that the content of the evaluation involves true duties as in a real working environment, in which enterprises carry out the inspection and give students comprehensive evaluations; attention should be given to the students’ professional ability, and evaluation of their vocational ability. This reflects the German approach, referred to as COMET (a German assessment program of students’ professional competence and professional identity) which emphasises the occupational competencies such as professional knowledge, teamwork ability and communication of students in the key positions.
Conclusion: The effectiveness of school-enterprise dual system

Strengthening the effectiveness and relevance of skill development

The formation of pilot classes develops multi-level cooperation between GZITTC and enterprises, and provides various forms of apprentice support in their skill development. On one hand, students from pilot classes get in touch with enterprises earlier, which accelerate the learning of enterprise production technology while overcoming the separation between the school and enterprise requirements. On the other hand, it cultivates the students' sense of identity in the enterprise culture effectively through enrolling students in the same way as recruiting employees; meanwhile, it cultivates the pertinence of the apprentices' professional skills effectively through the experience of the recruitment process. In recent years, GZITTC graduates have been praised by enterprises which have resulted in high demand for graduates. Unsurprisingly, next year's graduates are already booked by enterprises in advance. Competition between enterprises to attract graduates is fierce with many setting up scholarships in order to attract graduates. Graduates are now distributed in hundreds of large and medium-sized enterprises such as Guangzhou Honda, Guangzhou Toyota, Dongfeng Honda Engine Co., Ltd., Kwong automobile trade, Guangzhou Aircraft Maintenance Engineering Co., Ltd., Guangzhou Metro, Guangdong Sinotrans, S.F. Express. The average employment rate amongst graduates since 2013 is currently 98.4%, with 83.59% still working in the trade they graduated from, and employer satisfaction rate was 92.57%.

Spawning world-class skilled personnel

The practice of school-enterprise dual system has transformed both the form and level of skill development within China. This system is also more closely aligned with international approaches. The school-enterprise dual system presented here has already shown positive outcomes on the international stage. GZITTC has taken part in WorldSkills competitions since 2011. Prior to this piloted school-enterprise dual system, only two competitors won the prize of medallion for excellence at that time in 2011. Later in 2013, four competitors trained by GZITTC in the new system were awarded a bronze medal and three medallions for excellence. GZITTC has created a record number of WorldSkills skill projects and the best score in China's vocational colleges. This year, five competitors from GZITTC will represent China in WorldSkills Sao Paulo 2015. All of these confirm the advantage of the modern apprenticeship with school-enterprise dual system mode. It is believed that school-enterprise dual system will be further optimized in practice within the next few years. It is hoped that even more world class top-skilled talents will be fostered by GZITTC and even China with this system.

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1.3. Associations between adaptation of German-style vocational education models and impact on apprenticeship pathways in regional American labour markets

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**Summary:** Developed economies have, for a generation, battled endemic skills gaps and high youth unemployment. Yet these employment market failures do not afflict Germany: it remains a high-value export oriented economy, with high wages and low youth unemployment. What impact could the adaptation of features of the German training model in a foreign market have in addressing these twin problems? The authors applied a qualitative research design to investigate a strategy initiated by a group of German industrial firms operating in the American south, to address local training quality and workforce participation issues. The findings indicate that, through establishing a multi-sector partnership that redesigns training packages consistent with German accreditation standards, stakeholders were able to devise collaborative programs that changed perceptions and local market demand for apprenticeship programs. In determining the key features of the initiative, the authors identified transferable lessons for policymakers seeking to address skills gaps and elevate vocational training career pathways.

**Keywords:** German VET system, system adaptation, dual certification, qualitative research

**Introduction**

Skilled workforce development continues to be a crucial issue affecting jobs and growth in major industrial economies, which perennially battle two endemic workforce participation problems: youth unemployment and the middle-skills gap. Harvard’s U.S. Competitiveness Project estimates American manufacturing has 650,000 skill-based jobs that it cannot fill (Pankratz 2014), with projections that this number could grow to over 2 million in the next decade, led by demographic trends.

This constitutes a major missing investment and employment market, which creates significant social and economic opportunity costs. This skills gap manifests as a vicious circle for both employers and prospective employees. Unable to fill entry-level positions, firms cannot confidently make long-term production capacity investments. Potential future employees, faced with uncertain employment pathways are also reluctant to pre-commit to training for a career in a specialised trade.

The U.S. apprenticeship training pathway is highly successful in raising earnings for workers, and productivity for firms (Lerman 2009). However, whilst offering a clear path to a stable career, the operating scale of formal apprenticeship programs in the U.S., at 0.3% of the workforce, is small in comparison with German (and Australian) rates of 4.0% (Lerman 2013).
At a time of widening wage growth and work insecurity concerns, why do skills gaps, unfilled positions and structurally high unemployment persist? What is limiting the expansion of the apprenticeship training pathway, and what can be done to increase it?

The authors analysed the impact that adaptation of the German certification standards has had on the interest in apprentice positions, key features of this process, and the transferable learnings for employers.

**Methods and research design**

The methodology applied throughout this research utilises a combination of qualitative methods. This research evolved from a fellowship granted to the lead author to investigate new approaches to addressing youth unemployment in Australia.

During the exploratory phase, narrative inquiry and expert sampling techniques were undertaken, including interviews with German and American vocational education thought leaders. As the research question and design was determined, the research was initially executed using critical case sampling techniques and semi-structured interviews with key informants within academic and policy spheres in Germany and the U.S. The insights and examples provided led to a second stage of qualitative interviews with key informants: executives within major German industrial firms, industry advocacy bodies, and educational partnerships operating in Tennessee and North Carolina.

The sample consisted of a dozen interviews with information rich informants. Informants were interviewed once, for a duration of one to three hours. Finally, field research was undertaken in both locations. Data relating to this research was thematically analysed using a conventional content analysis approach, and codified into the solutions and conclusions documented.

**The German VET system**

Throughout the last 20 years, industrial economies have been transformed from manufacturing to service based economies. Yet in Germany, industrial manufacturing remains central to its economy. Germany trains and retains the world's most skilled workforce, and has led the UNIDO Competitive Industrial Performance Ranking since 2000. Its youth unemployment rate, at 7.2%, is the lowest in the industrialised world (Eurostat 2015), one-third of the U.S. rate and half that of Australia. Importantly, the country’s education system esteems formal apprenticeship qualifications: 55% of German high school students chose a vocational training pathway upon graduation (OECD 2014)

Germany’s superior economic and employment outcomes are significantly attributed to the integrated dual vocational training model, which combines on the job practical training (usually paid) with a theoretical vocational school education. The *Duales Ausbildungssystem* delivers consistently superior results for training program completion, employee retention and productivity.

To understand the extent to which key features driving these superior outcomes are transferable to foreign educational systems, the authors surveyed skills programs in the U.S initiated by German industrial firms, seeking to respond to skilled labour and training quality concerns by developing multi-sector partnerships to adapt and implement German-standard vocational training programs.

**Role of the German American Chambers of Commerce (GACC)**

In Germany, the Association of German Chambers of Commerce and Industry (DIHK) has the regulatory responsibility to set VET training and certification standards. It plays an active
role in market facilitation and mediating training markets to ensure programs reflect projected future labour needs. Membership of a Chamber is mandated, and a board of representative stakeholders, who act together in the common interest, makes operational decisions.

The German American Chambers of Commerce (GACC) fulfills a similar role for U.S. subsidiaries of German firms in advocacy and certifying training and apprenticeship programs. Through regular surveying, the GACC was aware that persistent skills availability and hiring problems had become its members’ primary business continuity risk. In 2010, when a group of member firms approached the GACC with a proposal to redress skills issues, the response was immediate.

Members sought help establishing a program to train workers to quality standards identical to the German VET network requirements. On behalf of members, the GACC quickly initiated discussions with educational authorities in multiple U.S. states to establish or adapt training programs to meet DIHK accreditation standards.

Since 2011, under its ‘Skills Initiative’ program, GACC has been establishing multi-sector partnerships across the U.S., following a three-stage strategy to improve training and recruitment outcomes:

1. Bring together a multi-sector geographic cluster of firms which recognizes that they have a skills problem.
2. Work through a structured process with member firms, to determine skills gaps in the local labour market profile, and skill areas of the curriculum needing further quality improvements for accreditation.
3. Build collaborative alliances between the companies and local community colleges that can deliver the quality academic training employers’ want and need in their employees.

A GACC representative interviewed indicated the most difficult part of this process was building collaborative alliances with local community colleges: “Community college leaders don’t always ‘get it.’ They don’t always think that serving the training needs of local businesses is part of their educational mission.” This strategy provided the GACC with a comprehensive understanding of the skills gaps and employment needs of local firms, enabling the presentation of an accurate, compelling case to educational authorities about the size of the partnership opportunity.

**Partnerships in operation**

In 2013 the authors conducted granular field research at the first two GACC-facilitated collaborative alliances in Chattanooga, Tennessee and Charlotte, North Carolina. Its purpose was to: observe the training programs in operation; investigate how the recalibrated curriculum was being marketed to prospective students; and determine the impact this concerted focus to attract young people in apprentice programs was having on local enrolment numbers, and the prestige of the apprenticeship career pathway.

As a sign of commitment to the partnership, the GACC seconded representatives from Deutsche Gesellschaft für Internationale Zusammenarbeit to North Carolina to work with stakeholders in developing implementation strategies to manage the qualification adaptation and revision process.

Both partnerships have both been successful in fostering advanced skills development in their local areas. Employer confidence and certainty in local training quality resulted in firms previously reluctant to engage in promoting apprenticeship pathways devising and executing a range of marketing activities in order to inform school leavers and potential employees of available skilled career pathways. To screen and attract qualified candidates into study, many employers included a conditional job offer upon graduation, and a clear
pathway towards a bachelor’s degree in engineering or business administration.

The key components of the marketing outreach include open days and tours of high
school groups and access to pre-apprenticeship summer internships. Benefits included
access to student scholarships and tuition reimbursement upon subject completion, paid
training during the programs’ second half. Specific program features and individual benefits
for the apprentices include regular attitudinal performance reviews, mentoring over the
course of studies and, upon graduation, receipt of a qualification from the GACC and local
authorities.

Lessons and results
Having the GACC initiate discussions was significant. Advocating collectively about the size
of the problem and impetus to act, it was able to engage policymakers and educators, and
encourage them to act systemically to revise a training package, and support its agenda
through facilitating DIHK qualification accreditation, in a way an individual firm may not be
able to achieve.

Methodically clarifying the scope and size of skills needs, and obtaining upfront
commitment from employers to offer apprenticeships pathways to employment was also
crucial. With the quality issue addressed firms, reluctant to offer employment pathways
before the partnership, reported an increased willingness to hire and train apprentices,
and an increased willingness to expand promotion of career pathways available through
apprenticeship programs to school leavers.

The GACC initiative, in building partnerships to encourage the establishment of U.S.
Programs meeting German DIHK standards, have, where operating, had a significant impact
on improving enrolment in vocational training programs and reducing middle skills gaps and
youth unemployment rates, and provided participant firms with a powerful pipeline for filling
workforce needs across a spectrum of specialties and positions.

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1.4. Governance and financing of dual VET: Foundation of an evaluation framework and findings of a comparative research in five European countries

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Summary: In the past few years, initiatives in European policy making have been characterised by a renewed interest in concepts of vocational education and training that build upon the formal connection of workplace training and classroom teaching and which are commonly known as ‘dual VET’ or ‘apprenticeship’. In 2013, CEDEFOP has awarded a project on governance and financing of TVET in five European countries (Italy, Latvia, Portugal, Spain, and Sweden) to a consortium led by Bremen University. Within the frame of this project, three major objectives have been addressed, that are (1) a definition of favourable governance structures and financing arrangements (2) a review of the realisation of the governance model in different country settings and (3) developing visions and strategies for advancing the governance structures. The authors of this paper will focus on the elaboration of the governance model and the methodological design of the study.

Keywords: Governance model, apprenticeship, governance evaluation tool, action research, Italy, Latvia, Portugal, Spain, Sweden

Introduction

In recent years, initiatives in European TVET policy making have been characterised by a renewed interest in concepts known as ‘dual VET’ or ‘apprenticeship’ (cf Deitmer et al. 2013). The key feature of these types of training is learning that alternates between a workplace and an educational or training institution. In addition, the programmes are part of formal education and training, which also means that they lead to an officially recognised qualification. Apprenticeship in the narrow sense of the term means that on top of these characteristics learners have the status of employees who receive remuneration, and a training contract exists between the learner and the enterprise. If these additional characteristics are not in place, the training programmes in question count as ‘other dual VET schemes’ rather than apprenticeship.

The successful establishment of apprenticeship depends on various socio-economic and institutional factors. Apart from the overall structure of the national economy, the interaction between the various actors and stakeholders involved in dual VET has to be considered in particular. Patterns and mechanisms of accommodating interdependence and coordinating activities in complex networks such as the education and training system, which are

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referred to as ‘governance’ (cf Benz et al. 2009), are a success factor for the sustainable implementation of dual VET. Another crucial aspect is the financing of this particular type of vocational education.

The presented study is focusing on these success factors and aims to identify appropriate governance structures and financing arrangements for apprenticeship and dual VET with a view to developing policy options for countries wishing to establish or expand such training schemes.

**Methodology**

The research project has been designed as dynamic action research, in which experts and relevant national stakeholders were actively involved and contributed in carrying out the assessment. The methodological basis for this evaluation was a comprehensive literature review and a series of stakeholder workshops in which representatives of governments, employers, employees and independent experts have reviewed and discussed the various dimensions of governance and financing structures of TVET with the help of a specific evaluation tool. The objectives of the study were linked to three subsequent project steps and can be described as follows:

*Definition of favourable governance structures:* The general objective of the study was to study VET governance structures and financing arrangements in view of establishing or expanding apprenticeship or dual VET. This means that the epistemic interest was directed at the analysis of VET governance structures in order to identify conditions that are supportive for the realisation of dual VET. To this end, a normative model of ‘appropriate’ governance structures and financing arrangements was developed, which served as the framework for the evaluation.

*Evaluation of existing governance structures:* The extent to which a set of favourable governance structures was actually realised in a given national context was subject of the empirical investigation based on stakeholder workshops in the five selected countries according to the evaluation tool and evaluation criteria developed in the first part of the study. All discussions and estimations have been recorded and documented in an evaluation summary.

*Development of visions and strategies for expanding apprenticeship:* Based on the outcomes and analysis of this first round of stakeholder workshops different national scenarios for future governance structures and financing arrangements have been elaborated and presented to stakeholders for further elaboration and discussion. Like the evaluation exercise from the previous step, this step has as well been carried out in a collaborative effort with national VET stakeholders in accordance with the action research approach adopted for the study.

**Results**

*An integrated framework to analyse VET governance structures and financing arrangements*

The systemic and institutional arrangements that shape the implementation of dual VET have been analysed with the help of various conceptual approaches such as ‘governance structures’ (cf Bertelsmann Stiftung 2009; Rauner et al. 2010), ‘feedback mechanisms’ (cf Cedefop 2013) and ‘skill formation regimes’ (cf Thelen 2004; Busemeyer and Trampusch 2012). As these three concepts relate to each other their characteristic analytical categories have been analysed and synthesised into an integrated conceptual model.
<table>
<thead>
<tr>
<th>Main criteria</th>
<th>Sub-criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consistent legal framework</td>
<td>A single act for VET or a single/coherent legal framework for VET (with several laws complementing each other) Centralisation/concentration of legislative competences at national level or national level responsible for overall legislative framework/guidance for VET and regional/local levels specifying the details Legal framework/mandatory regulations for cooperation of learning venues The status and rights of apprentices are regulated by law</td>
</tr>
<tr>
<td>Balanced allocation of strategic and operational functions</td>
<td>National level responsible for strategic functions and long-term objectives. Local level responsible for operational functions. Definition/setting training standards, curricula and occupational profiles at national level. Definition of specialisations at the local level. Learning venues have autonomy to implement training programmes/training plans. Freedom of apprenticeship contract</td>
</tr>
<tr>
<td>Involvement/integration of the various bodies</td>
<td>Adequate definition (in the legal framework) of the responsibilities of various stakeholders involved (enterprises, educational institutions, supervising bodies, institutions empowered to award and recognise qualifications, etc.) Official or officially recognised status of providers and supervising bodies Institutional framework for VET dialogue (with involvement of government, educational institutions, social partners, researchers and learners) Social partners participate in designing curricula, standards and occupational profiles, assessing learning outcomes and ensuring quality of apprenticeship/dual VET Coordinating and/or moderating role of one institution Institutionalised cooperation of learning venues</td>
</tr>
<tr>
<td>Quality assurance and development/innovation strategies</td>
<td>Regular evaluation of curricula and occupational profiles Regular assessment of learners’ professional competence (systematic analysis/competence diagnostics as opposed to examinations or trade tests) Research on training quality and its improvement Regular monitoring of demand for and supply of apprenticeship places Adequate qualification standards and a system of initial and continuous education for VET teachers and trainers</td>
</tr>
<tr>
<td>Outcome orientation</td>
<td>Outcome orientation: Mandatory objectives and benchmarks (overall objectives) for apprenticeship and dual VET defined in law Educational standards (competences to be acquired by learners) defined in occupational profiles and curricula Examinations oriented towards learning outcomes Possibility of recognising learning outcomes acquired outside regular training programme following strict equivalence criteria</td>
</tr>
<tr>
<td>Input orientation</td>
<td>Input orientation: Activities of the bodies involved determined by certain norms and rules (regulations on entry requirements for training programmes or access to certain occupations, regulations on company permission to train apprentices etc.) Completion of a specific/mandatory curriculum is a prerequisite for awarding a qualification</td>
</tr>
<tr>
<td>Adequate financing arrangements</td>
<td>Government covers the costs of school-based learning Companies cover the costs of work-based learning Apprentices receive moderate wages, which reflect the level of their productivity and increase progressively Returns generated by apprentices are at least equal to the wages and other training costs (cost-effectiveness of work-based learning)</td>
</tr>
</tbody>
</table>
The widest and most comprehensive of the three concepts, the ‘skill formation regime’, which encompasses the entire process of developing human capital within a national economy (cf. Busemeyer and Trampusch 2012, pp. 3-4), can be interpreted as the result of successive extensions of the other two concepts, in other words as an extended governance model. Based on these theoretical considerations a model was developed which describes ‘appropriate’ governance structures that can be expected to support apprenticeship and dual VET. This ‘normative model’ is an advanced version of the model developed by Felix Rauner and colleagues for the evaluation of governance structures in countries with well-established dual VET systems (cf. Rauner et al. 2010; Rauner & Wittig 2013).

The criteria of the normative model elaborated within the project are summarized in table 1. Each of the main criteria can be interpreted as a continuum between two extremes, making it possible to view the state of affairs in a country as a position along this continuum. To illustrate a current set of governance and financing arrangements in the participating countries of this study, the project team elaborated a governance equalizer for apprenticeship based on an earlier work by Schimank (Schimank, 2007). The governance equalizer allows for a comparison of the situation in a given country with the ‘ideal’ or favourable’ situation in terms of the main criteria, thus allowing for a ‘gap analysis’ and the identification of priorities for change.

**Figure 1: Governance equalizer showing the ‘ideal’ configuration**

The Governance equalizer is a visual representation of the ‘optimum’ arrangements for apprenticeship in the narrower sense. The theoretically desirable state with regard to the first criterion is a high degree of coordination or consistency, which is why the slider bar control in the picture is near the top end of the scale. The second criterion requires a well-balanced distribution of functions between the national and local levels. In the case of the third criterion the normative expectation is that all sub-criteria should be realised to the fullest possible extent, i.e arrangements for the VET dialogue should extend to all stakeholder groups. With regard to the fourth criterion it can be argued that on the
one hand the system should be dynamic so as to allow for continuous innovation, but on the other hand it would not be desirable if the pace were too fast (e.g. if occupations or curricula were changing at very short intervals). Therefore the mark indicating the ‘ideal’ situation is placed near the ‘dynamic’ position but still at a distance from the very top. The equilibrium of outcome and input orientation, which is the benchmark for the fifth criterion, is also represented by a position halfway between the two extremes. Finally, the beneficial state of affairs in the area of financing arrangements is that all stakeholder groups are contributing.

**Selected results of the country evaluation**

In the course of the country evaluation, stakeholders and researchers collaboratively assessed the existing governance structures and financing arrangements according to the conceptual framework described above. According to the findings, the establishment and/or expansion of apprenticeship in the narrow sense of the term is possible in some of the countries while in others a more feasible option would be to focus on other types of dual VET, i.e. training schemes in which learners also alternate between a workplace and a training institution but do not have the status of employees. But the discussions with stakeholders made it also clear that even though the countries are committed to expanding dual VET, they do not always aim to establish apprenticeship (see Table 2).

**Table 2: Mapping of the development options**

<table>
<thead>
<tr>
<th>Dual VET types aspired to</th>
<th>Feasible dual VET types (medium-term perspective)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apprenticeship</td>
<td>Apprenticeship, Italy, Spain</td>
</tr>
<tr>
<td>Other dual VET schemes</td>
<td>Sweden, Latvia, Portugal</td>
</tr>
</tbody>
</table>

An example of a country in which apprenticeship in the narrower sense is feasible and also considered desirable by stakeholders is Italy where a variety of apprenticeship schemes already exists. Evaluation results are shown in the figure below.

**Figure 2: Governance equalizer for Italy**
In Italy, governance structures fall short of the ‘ideal’ conditions in some respect but could be developed so as to allow for a sustainable expansion of apprenticeship. The legal framework is fragmented due to the presence of different apprenticeship sub-systems existing. The most problematic criterion seems to be the allocation of strategic and operational functions. Here, the system over-emphasizes local autonomy. On the other hand, it is close to an equilibrium of input and outcome orientation. The strategy options developed by stakeholders aim at expanding the apprenticeship schemes by a moderate centralisation of strategic functions and a simplification of administrative structures.

Portugal is an example of a country where apprenticeship in the narrower sense does not exist. The systemic structures are such that ‘other dual VET schemes’ would be a more promising approach when it comes to expanding dual training.

**Figure 3: Governance equalizer for Portugal**

As the Figure 3 shows, the legal framework is fragmented and consists of a variety of acts, many of which relate to labour market policy rather than education and training. The involvement and integration of the various bodies is weakly developed as the institutional framework shows a strong fragmentation and a lack of arrangements for the cooperation of learning venues. The costs of VET are not shared between the state, the enterprises and the learners but covered in principle by the public sector alone. Accordingly, the development perspectives elaborated in cooperation with Portuguese stakeholders do not involve a shift towards apprenticeship but concentrate on incremental improvements of the existing dual VET structures.

**Conclusions and perspectives**

Evaluating governance structures and financing arrangements for dual VET on the basis of an action research approach was widely regarded as an important contribution to safeguarding an adequate skills supply through high-quality training, but at the same time considerable efforts (conceptual clarifications and refinements of the methodology) were required from all parties concerned. A benefit of this comprehensive discussion is the availability of a model
and a range of evaluation tools that can be expected to work in different country settings.

The empirical findings suggest that that there is an enormous gap between the existing structures and an ‘ideal’ mode as documented by the illustrations of governance and financing equalizers for the five countries analysed. This particularly refers to the main categories 1 and 6, in other words to the legal framework, and to the financing burden that is not really shared among the different actors but largely subject to a public responsibility. Both issues are crucial for a modern apprenticeship system.

Another insight is that there can also be a gap between the strategy options and the ideal framework. In this case an introduction of apprenticeship in the narrower sense is not likely in a medium term if there is a lack of political will or the prevailing structures would not allow for a successful implementation in a medium perspective. A central recommendation of the project team is to continue the dialogue started in the partner countries’ stakeholder groups in order to build on the present results.

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1.5. Insights in governance of vocational education from a historical perspective

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Summary: International exchange in vocational education and comparative research in this domain usually are grounded on contemporary structures. However, the example of 19th-century Saxony reveals, how close the structural problems of these times were in respect to those of today in many developing countries. Nonetheless, history is mostly ignored in gaining advice for today's problems. To achieve a deeper understanding of what once has happened in the Kingdom of Saxony, one needs at least to get an impression of the wider societal circumstances, both economic and political. These grounds well prepared, one will be able to learn a lot of the process of implementation of vocational education in Saxony in respect to the latest efforts of implementation or improvement of vocational education in developing countries.

Keywords: Development co-operation, Saxony, Second German Empire, vocational education in industry and handicraft

The government of vocational education, its enhancement in developing countries, and the former Kingdom of Saxony

Implementing vocational education in a developing country always comes along with the question of how to implement governmental structures to this. It appears to be particularly difficult in countries, where school-based vocational education and training have already been established. However, development co-operation is interested in the development of apprenticeship structures in order to take the labour market as backbone of vocational education. This appears to be very difficult. Nonetheless there have been earlier examples of implementation processes, which gives new justification to carrying out research on the conditions of those historical successes. One of them is the Kingdom of Saxony.

Sources and literature analysed

Looking back to these developments it is rather surprising that there is just a very small number of publications dealing with questions of vocational education of that time in the Kingdom of Saxony. The dynamism of the industrialisation and the Saxon economy in general, the dynamism and resoluteness of the Saxons to establish a schooling system for vocational purposes is impressive. This is to be found in many documents from the public archives which show a vivid discussion, starting in the 1830s in (open) letters, newspapers, and curricula and minutes of the former institutions of vocational education.

It may seem necessary to justify why to look at Saxony this time, Prussia having been the leading force in the Empire, not only in a political and in military sense. Besides the Ruhrgebiet being the industrial heart of Prussia at that time, there is the simple fact that
legislation and policies in the Empire followed largely those in Prussia. Historic analyses focussed on that country. There are also quite a number of publications on the developments in vocational education in the Kingdoms of Baden and Wuerttemberg, enhanced by striking prominence of Ferdinand Steinbeis (†1893). His success in propagating the importance of vocational education is outstanding, and it did in fact influence many more governments within the Empire (see the volume edited by Bonz et al. 1994). But there is no advice in looking out for a VET champion if there isn’t any. If there is one, no advice is needed.

Given this, this contribution needs to be considered both as one of the very first steps on historical research on vocational education in this region and as one of the first to consider an anachronistic meliorative approach in comparative research. For this reason, a great deal of the research was carried out in the archives of the State and those of the cities and the universities of Leipzig, Dresden and Chemnitz (in detail confer to Bank et al. forthcoming, in German). The outcomes, however, are not only of theoretical interest but can be made fruitful for the enhancement of governance of vocational education in third countries: At that time, Saxony was very much what we would call today a developing country.

The historical developments in technical vocational education

The process of industrialisation changed the world of work in Saxony with an elementary power: In 1895 58% of the labour force in Saxony was employed in the different industries (average in the Empire 39%; Kaemmel 2006). New and different qualifications were required, new vocations emerged, with new requirements to the vocational education of the apprentices and the workers.

Vocational education in its societal context in the Kingdom of Saxony

The Kingdom of Saxony was characterised by two nicknames in its German context. The first was ‘Land der Handelsschulen’ (country of trading schools. At the turn of the century there were 45 of them in Saxony; Zieger 1900). The second, and by far more common one was ‘Rotes Königreich’ (‘The Red Kingdom’), which qualified the political profile of the country. Both nicknames, however, had their roots in the advanced industrialisation of the country. For there was a broad proletariat, there was a correspondingly strong hotbed for left-wing political radicalism. The social status of the labour force in the end of the 19th century was just as weak as it was in other German countries and European nations. The other nickname shows that the implementation of the system of vocational education ended up successfully.

At the foundation of the Second Empire in 1871, the Kingdom of Saxony was a comparatively highly industrialised state, relying on flourishing small and medium-sized companies. Its economic activities were based primarily in the textile industry and in the production of machinery, while its traditional strengths in mining kept on going. Additionally, large production plants were established in particular in the urban areas.

Later on, during the times of high industrialisation and until the outbreak of WW I, the branches of electronic technologies, car manufacturing, optical, fine mechanical, and chemical industries boosted economic growth. A great many of saxonian products were sought and bought, not only within the Kingdom, but also on national and international markets. Therefore, a strong demand on the labour market let the population grow quickly.

Workplace learning between craftsmanship and industrial vocational education

Naturally enough, the rapid industrialisation did produce its effects on structural change in handicraft, too. Industry and trade were liberalised in 1861, regulations concerning
apprenticeship eliminated (Gewerbefreiheit, in Gewerbeordnung des Norddeutschen Bundes: Industrial Code of the Federation of States in Northern Germany). The traditional apprenticeship rooted in the power of the former guilds. Consequently, apprenticeship in handicraft was weakened at the beginning of the period of investigation.

The leaders of industry, however, failed to recognise the importance of an apprenticeship, specifically designed for their purposes, because many journeymen left the handicraft sector for a better pay in industry. Beginning in 1878 with the amendment of the ‘Reichsgewerbeordnung’ (Industrial Code of the Empire) the standards to apprenticeship had been re-defined and the guilds re-established together with the Chambers. The active co-operation in the re-regulation process and, above all, by organising the examinations, the craftsmen and their representing institutions were awarded with the power of definition of what was to be a ‘good’ apprenticeship (Meyser 1998, 171). But the offer of qualified labour was insufficient to meet the needs of the new industrial firms. Thus, a new variant of the systemic didactical locus arose: It was the workplace learning at the industrial plant. In the SME-structured economy, there were natural organisational and financial hindrances, not to mention quarrelling ministries and systematic political obstruction driven by the meanwhile well-established schools of further education (Fortbildungsschule).

**Schooling institutions for technical vocational education: The Fortbildungsschule**

In Saxony more than a single approach for schooling in vocational contexts did exist. Some earlier types of schools were changed in their curricular approach, and changed their character from a general to a technical and vocational schooling institution. This started with Sonntagschulen (non-religious Sunday Schools) and led in the end to their transformation into Fortbildungsschulen (schools of further education). There were two types of Fortbildungsschule, the first being of general purpose as a kind of continuation of the Volksschule (compulsory general school, grades 1-8). The second was a vocational variant of the former, it achieved its formal acknowledgement by the King in 1880. Both versions existed in parallel until the end of the Kingdom.

Particularly in the larger urban areas, under liberal leadership local citizens founded entirely new schools. This was, for example the case of the ‘Gewerbschule’ in Chemnitz, founded in 1836 after a royal permission of 1832. This school, assumed the vocational education in industrial professions on behalf of the Industrieverein (Industrial Association). Although new, this institution relied on the very popular Sonntagsschule, and on the Zeichenschule (School for technical drawing), already founded in the 18th century.

**Lessons learnt**

During the time of the Second German Empire, in production contexts, industry rivalled handicraft in three ways: (1) as part of the second economic sector, (2) on the labour market, and, from the early 20th century on, (3) in organising workplace learning as part of apprenticeship. It had proved that the regulations designed for apprenticeship in handicraft did not meet the demands of apprenticeship in industry. Today, when working on curricular design of new professions and vocations, it should be clear that each sector needs specifically defined regulations. This is perhaps most obvious in the case of the sector of service.

In respect to the development of a vocational education system in developing countries of greatest interest is probably the fact, that most of the schools with vocational tasks, just like most of the curricular reforms, have been initiated by the owners of the SMEs themselves, often against the conservative opposition of the Kingdom. By taking over the initiative and
not waiting until the state taking the action in founding vocational schools, they proved their attitude of both entrepreneurship and citizenship.

They were wise enough to recognise the need for a well-educated staff that was not only trained to function but educated to understand and control what they were doing. In a sense, they acknowledged that organisation development is interdependent with personnel development and cannot be separated from this (Bank 2004).

All in all, the kick-off for the dual apprenticeship – before it was to be called the ‘Dual System’ – only could happen a number of conditions given:

(1) Successful vocational education relies on specific preparation (after elementary school). (2) The active labour needs to be continually trained. (3) Any apprenticeship system must be founded on the traditional structures of vocational education and its curricular (timely) order. (4) Policy borrowing or curriculum copying can be quite helpful in the beginning – but just for getting started. (5) Teacher need to be educated to high academic standards themselves. (6) Responsiveness in the media must be achieved. Matching these historical findings against latest research carried out on development co-operation in the domain of vocational education by Walther & Filipiak (2007). One must add: (7) Any development project does not end at its end but need conceptual support (and sometimes financial subsidies) for a longer period. (8) The young people, presumed to be the apprentices, must be fully integrated and their opinions need to be respected.

Quite contrarily to this, in many countries – some industrialised, some still developing – try in vain to establish dual vocational education systems. In none of these cases, companies do not participate actively in apprenticeship nor its curricular design. The history of the Saxon companies reveals the key character of taking the responsibility for vocational education in their branches.

References


1.6. The governance framework for VET school-enterprise cooperation in China at the local level

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Summary: Based on a 2013 national survey and 2014 case study, it is clear that in China local governments have made efforts to develop a governance framework for VET school-enterprise cooperation to bridge the school-to-work gap. This paper will examine three dimensions of the governance framework: institutional frameworks, organisation frameworks and funding frameworks. The aim of the institutional frameworks is to integrate vocational education into industry development strategy. A VET organisation network provides the platform on which stakeholders can effectively participate in vocational education. While, special enterprise-school cooperation funding provides finance assurance for enterprise-school cooperation.

Keywords: Institutional frameworks, organisation frameworks, funding frameworks, enterprise-school cooperation

Introduction

The lack of laws, regulation and operational system has been seen as an important reason for the gap between the educational experience in vocational schools and enterprise practice (Zhao Z. 2013). In recent years, Chinese national and local governments have taken many measures to construct a governance framework to remedy this deficiency. In China, there is significant regional autonomy feature in VET governance. Under the guidance of national legalisation, local government, especially at municipal level, have substantial autonomy in VET governance (Liu C. 2003). Therefore, Chinese local governments have more direct influence on vocational education than the national government. Moreover, successful local government governance experiences are usually adopted by national government and thus become successful models for other places. Therefore, changes in Chinese local governance frameworks, to some extent, can influence trends at the national governance.

The aim of the research was to investigate VET reforms in China at the local level analysing the roles of stakeholders and cooperation mechanisms in VET governance frameworks to identify those which are effective in improving the quality of vocational education to meet the needs of enterprises.

Methods and research design

The research was based on a two stage empirical study. The first stage consisted of a 2013 national survey, based on a written questionnaire, focusing on the gap in cooperation between vocational schools and enterprises by use of the questionnaire method in 2013. The questionnaire examined cooperation legislation, the nature, intent, and management of cooperation. The researchers received 117 responses from enterprises in 8 industries and 304 responses from vocational schools.
The second stage of the work, undertaken in 2014, was based on the results of the survey, and comprised the identification and analysis of 589 cases of enterprise-school cooperation. The analysis looked at four dimensions of cooperation: the purpose of the cooperation, governance systems, organisational models and effectiveness. This made it possible to describe trend in governance reform of enterprise-school cooperation at the local level in China.

Results
The 2013 investigation showed that there is an obvious gap between the vocational education experience and enterprise needs. Enterprises are less enthusiastic about school-enterprise cooperation than are vocational schools. Enterprises are more willing to offer internships to vocational school students than to participate in vocational education program design, curriculum development, teacher training and so on. It is a concern that enterprises determine the contents and standards according to their manufacturing planning but that they do not assist with the development of clear standards for learning to help students to transfer successfully from school to work.

The survey also showed that imperfect legal systems, the absence of stakeholders input and the lack of cooperation system are the main governance causes for the gap.

The 2014 case study showed that local governments have initiated many innovations and reforms to develop new governance frameworks to bring all stakeholders together, clarify their roles and responsibilities and to design systems for ensuring effective involvement of stakeholders in cooperative programs. This will enhance the integration of workplace practice into vocational school learning.

Develop strategic and institution framework
Local governments have tried to construct a consistent institutional framework in two ways: strategic integration and legislation. The first approach involves the integration of VET development strategy into local development strategy and may include the co-location of vocational schools and enterprises in regional industry innovation parks to improve knowledge transfer between colleges and enterprises building the capability of vocational education to meet the needs of industry.

In the second, regulatory, approach many local governments, for example, Ningbo, Hangzhou, Shenyang, Chongqing, have created laws and regulations to define the roles and responsibilities of stakeholders. Ningbo initiated the first Chinese regulations for VET enterprise-school cooperation in 2009 based on China’s 1995 Vocational Education Act. These regulations define VET enterprise-school management systems, the responsibilities of enterprises and vocational schools, the cooperation funding mechanism and the operational systems of public training centres.

Establish governance organisation framework
Local government has developed many governance organisations in different levels to establish cooperation systems to support stakeholders to work well in their respective roles (cf. Table 1).
Table 1: Different governance organisations in local

<table>
<thead>
<tr>
<th>Governance organisation</th>
<th>Stakeholders</th>
<th>Responsibility</th>
<th>Governance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local VET Sector Joint Committee</td>
<td>government sector, finance sector, human resource sector, education sector, etc.</td>
<td>develop regional regulation, determine regional VET development strategy and plan,</td>
<td>local level</td>
</tr>
<tr>
<td>Industry Steering Committee</td>
<td>government, industry union, enterprise and vocational school</td>
<td>estimate skill-labour demands, determine skills standard, publish cooperation information</td>
<td>local level</td>
</tr>
<tr>
<td>Vocational Education Group</td>
<td>industry union, enterprise and vocational school</td>
<td>integrate enterprise and vocational school resources, etc.</td>
<td>local or industry level</td>
</tr>
<tr>
<td>Vocational School Broad</td>
<td>enterprise and vocational school</td>
<td>determine regional VET development strategies and plans</td>
<td>school &amp; enterprise level</td>
</tr>
<tr>
<td>Vocational School Steering Committee</td>
<td>enterprise and vocational school</td>
<td>design programs, develop curriculum, develop workplace learning equipment and facilities</td>
<td>school &amp; enterprise level</td>
</tr>
</tbody>
</table>

The operation of these organisations is worth discussing in more detail. The local VET Sector Joint Committee is responsible for the coordination of local government sectors to develop regional regulation, determine regional VET development strategy and overcome institutional obstacles to cooperation. Some municipalities, for example Hangzhou and Shenyang, have set up Industry Steering Committees comprising delegates from government, industry unions, enterprises and vocational schools. Their responsibility is to determine vocational school teaching content and standards according to enterprise skills needs.

The Vocational Education Group has also been a useful organisation for supporting enterprise-school cooperation in China (cf. Figure 1). For example, Hangzhou established 19 Vocational Education Groups. Dalian plans to set up Vocational Education Group networks to cover more than ninety per cent of its vocational schools and fifty per cent of its large to medium sized enterprises by 2020. In Vocational Educational Groups, enterprises and vocational schools are combined into one organisation operating under the same one management system which effectively reduces the cost of enterprise-school cooperation and integrates enterprise workplace practice standards into the vocational school learning experience.

**Figure 1: Number of newly established Vocational Education Groups each year from 1992-2013**
At the school level, enterprises may directly participate in the design of vocational program and curriculum development to effectively blend work-based practice into the school learning experience though Vocational Education Board and Vocational Education Steering Committees.

**Development of funding frameworks**

In China, tax reduction and finance subsidies are a common means by which local governments encourage enterprises to participate in vocational education. Moreover, enterprises are required by law to allocate training funds as a proportion of the total wages. In some places training funds may be used to support the costs of enterprise-school cooperation.

In addition, many local governments have established special enterprise-school cooperation funding. This funding consists of two parts: special funding and reward funding. Special funding supports cooperation by compensating enterprises for direct and in direct costs incurred, developing public workplace practice centres, subsidizing teacher training and workplace practice teacher employment, supporting Vocational Education Group development, etc. The reward funding is used for rewarding enterprises which have made a significant contribution to vocational education. For example, Hangzhou’s enterprise-school cooperation funding reached 134 million yuan in 2012.

**Concluding**

Local governments in China have made many attempts to develop the governance frameworks for enterprise-school cooperation. However, these attempts are undeniably fragmented and have not produced a consistent governance framework due to inadequate governance systems at the national level and immature industry unions. As Rauner has shown a consistent national legal and governance framework for VET enterprise-school cooperation will more effectively improve school to work transitions (Rauner, 2010). Therefore it will be an important next step in China to take what has been learnt from successful VET enterprise-school cooperation at the local level and to apply this experience at the national level to develop consistent effective VET enterprise-school cooperation supporting many more young people to successfully transition from school to work.

**References**


1.7. Irish apprenticeship system reform 2013 to date

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Summary: The Republic of Ireland reviewed its apprenticeship system in 2013 and is implementing recommended reforms. These will change the system statutory basis, governance, occupation range, and qualifications levels. The number of apprentice occupations will increase significantly and Awards may be at any National Framework of Qualifications (NFQ) level, from Level 5 (upper secondary) to Level 10 (PhD degree). This paper describes the reform process, the preliminary outcomes and implementation.

Keywords: Ireland, apprenticeship, reform, degree

Introduction

There have been concerns about the collapse in Irish apprenticeship numbers which began even before the Global Financial Crisis of 2007-2008. One response has been the review of apprenticeships which took place in 2013, to address the fall in numbers and other issues. This paper outlines and analyses the process of reform and the changes that have been agreed upon.

Background

Irish apprenticeship is regulated by law and responsibility lies with the Department of Education and Skills (DES). Only 26 ‘pre-reform’ trades existed, in construction, electrical, engineering, motor and print families. The female population of apprentices was 35 out of a total population of just 8,000 in 2014. Thus gender imbalance was just one of the system challenges which also included governance, labour market matching, and the cost of managing the system. An OECD report in 2010 recommended a review of apprenticeship, identifying the high cost of Irish apprenticeship.

Figure 1 shows annual new apprentice recruit numbers from 2000-2014, and the collapse of numbers. The Figure shows a dramatic downturn from 2006 to 2011 with some small improvements from 2010 onwards but with 2014 figures still less than one-third of 2006 numbers.

Methodology and results

The reform process for Irish Apprenticeship is described below. The review methodology is outlines and its outcomes analysed with reference to the ILO Model Apprenticeship Framework Principles (Smith & Brennan Kemmis 2013). The current status of ongoing reform is described.
**Figure 1: Annual apprentice recruitment, by trade family**

**National review of apprenticeship**

A Review Group was established by the Minister for Education and Skills* and reported in December 2013. The Review received 69 written submissions and 25 oral presentations. Submissions can be seen at [http://www.education.ie/en/Press-Events/Events/Review-of-Apprenticeship-in-Ireland/Submissions/](http://www.education.ie/en/Press-Events/Events/Review-of-Apprenticeship-in-Ireland/Submissions/). The submissions are considered to be widely representative of Irish stakeholders and are analysed in Table 1 below.

**Table 1: Submission Origins**

<table>
<thead>
<tr>
<th>Respondent Type</th>
<th>Document Numbers</th>
<th>% of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employer Organisations</td>
<td>14</td>
<td>19%</td>
</tr>
<tr>
<td>Individuals</td>
<td>13</td>
<td>18%</td>
</tr>
<tr>
<td>Education/Training Providers</td>
<td>12</td>
<td>16%</td>
</tr>
<tr>
<td>Individual Employers</td>
<td>11</td>
<td>15%</td>
</tr>
<tr>
<td>Trade Unions/Associations</td>
<td>7</td>
<td>10%</td>
</tr>
<tr>
<td>Professional Bodies</td>
<td>6</td>
<td>8%</td>
</tr>
<tr>
<td>Foreign Submissions</td>
<td>4</td>
<td>5%</td>
</tr>
<tr>
<td>Education/Training National Agencies</td>
<td>3</td>
<td>4%</td>
</tr>
<tr>
<td>Government Departments and Enterprise Development Agencies</td>
<td>3</td>
<td>4%</td>
</tr>
</tbody>
</table>

There was substantial agreement among major stakeholders, that apprenticeship should have an agile/flexible non-prescriptive statutory basis with inclusive governance, with new industry-led occupations developed, and entry standards appropriate to curricula, with transparent progression. Employers’ training capacity requires pre-vetting and monitoring. State funding for off-the-job provision should continue. There was broad agreement that awards should be at all National Framework for Qualifications (NFQ) levels above L4, with a competence-based final examination. Overall there was strong support for the apprenticeship learning pathway, with theory grounded in practice, and for long-term branding and awareness campaigns.

**Main review recommendations**

The Review Report (Department of Education and Skills 2013) is wide-ranging, recommending strategic and detailed reform.

Key strategic recommendations were:

**Definition of apprenticeship:** Apprenticeship is a structured education/training programme, formally alternating workplace and off-the-job learning, which prepares the participant for specific occupations, with national NFQ qualifications at any level above L4. Apprentices are employed under an approved contract of apprenticeship. Training is substantial in depth/duration (minimum 2 years), in a real job, and workplace training exceeds 50%.

**Legislation redesign:** Apprenticeship legislation should be an enabling framework only, facilitating agile, flexible modes of delivery, encouraging innovation and speedy adaptation while maintaining protections for learners.

**Governance:** Employers should lead apprenticeship, working collaboratively with the community of practice and education/training. Inclusive governance frameworks should facilitate FE and HE apprenticeships.

**Apprenticeship Council:** An enterprise-led Apprenticeship Council should be established representative of stakeholders. Its main functions are advice on the structure and provision of nationally needed apprenticeships, including new occupations, promoting progression, recruitment, research/evaluation, and generic employer conformance criteria.

**Progression:** Apprenticeship must offer transparent progression routes to higher levels within the occupation, specialisms or cross skills, and to other higher education levels.

In June 2014, DES began implementation of the recommendations (DES 2014) and appointed a new Apprenticeship Council. A public call for new trades was issued. New legislation is scheduled for drafting in early 2016.

**Results**

The Apprenticeship Council has been established. 86 new occupational proposals have been received (see Table 2) and are being evaluated. 50 proposals were outside traditional engineering/building fields. Employers/Associations made 41 proposals and training providers made 45.
Table 2: New Occupation Proposal Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing, Engineering</td>
<td>24</td>
</tr>
<tr>
<td>Built Environment</td>
<td>12</td>
</tr>
<tr>
<td>Tourism, Sport</td>
<td>10</td>
</tr>
<tr>
<td>Financial Services</td>
<td>10</td>
</tr>
<tr>
<td>Arts, Craft, Media</td>
<td>8</td>
</tr>
<tr>
<td>Information Technology</td>
<td>6</td>
</tr>
<tr>
<td>Transport Distribution, Logistics</td>
<td>6</td>
</tr>
<tr>
<td>Business Administration, Management</td>
<td>4</td>
</tr>
<tr>
<td>Agriculture, Horticulture, Marine</td>
<td>3</td>
</tr>
<tr>
<td>Natural Resources</td>
<td>2</td>
</tr>
<tr>
<td>Sales, Marketing</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>86</strong></td>
</tr>
</tbody>
</table>

The National Qualifications Authority (QQI) has also issued generic NFQ levels 5 & 6, Professional Award Type Descriptors facilitating apprenticeship professional awards in the continuum of all professional awards. (See Table 3)

Table 3: Proposed Award Levels (some span more than one level)

<table>
<thead>
<tr>
<th>Award Level</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Recommended Award</td>
<td>5</td>
<td>6%</td>
</tr>
<tr>
<td>Level 5 (upper secondary)</td>
<td>9</td>
<td>10%</td>
</tr>
<tr>
<td>Level 6 (advanced certificate)</td>
<td>20</td>
<td>23%</td>
</tr>
<tr>
<td>Level 6 (higher certificate)</td>
<td>31</td>
<td>35%</td>
</tr>
<tr>
<td>Level 7 (ordinary degree)</td>
<td>14</td>
<td>16%</td>
</tr>
<tr>
<td>Level 8 (honours degree)</td>
<td>5</td>
<td>6%</td>
</tr>
<tr>
<td>Level 9 (masters degree)</td>
<td>4</td>
<td>4%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>88</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>
Analysis

Table 4 aligns the new Irish model with the ILO report ‘Towards a model apprenticeship framework’ (Smith & Brennan Kemmis 2013).

The analysis illustrates in what ways the Irish system aligns with each of the principles, and the progress towards the implementation of each of the principles.

Table 4: Alignment of new Irish system with ILO apprenticeship model

<table>
<thead>
<tr>
<th>ILO Principles underpinning a model apprenticeship system</th>
<th>Conformance: New Irish System</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wide Occupational Coverage</td>
<td>Yes: Expanding system</td>
<td>In Progress</td>
</tr>
<tr>
<td>Female and Male orientated occupations</td>
<td>Yes: Expanding to female occupations</td>
<td>In Progress</td>
</tr>
<tr>
<td>Open to Wide participation</td>
<td>Yes:</td>
<td>Clearer Progress needed</td>
</tr>
<tr>
<td>National Government Structures</td>
<td>Yes:</td>
<td>In existence</td>
</tr>
<tr>
<td>Stakeholders</td>
<td>Yes: All major stakeholders involved</td>
<td>In existence</td>
</tr>
<tr>
<td>Quality Systems- Training Providers</td>
<td>Yes: National quality system</td>
<td>In existence</td>
</tr>
<tr>
<td>Quality Systems- Employers</td>
<td>Yes in principle Registration exists but monitoring is limited.</td>
<td>Apprenticeship Council to formulate policies</td>
</tr>
<tr>
<td>Simplification</td>
<td>Yes: coherent system, national qualifications, linked to EQF, ECTS</td>
<td>In existence</td>
</tr>
<tr>
<td>Incentives</td>
<td>1-Public funding for training providers, 2-Agreed wage rates for apprentices, 3-currently no funding for enterprises</td>
<td>1- In existence 2 &amp; 3-Further negotiation needed</td>
</tr>
<tr>
<td>Provisions for Apprentice</td>
<td>Yes:</td>
<td>Apprentice Council to develop</td>
</tr>
<tr>
<td>Support for employers and apprentices</td>
<td>Yes: but without cross enterprise systems</td>
<td>Apprentice Council to develop</td>
</tr>
</tbody>
</table>

Conclusions

The reform of Irish apprenticeship are aimed at creating a flexible modern system, supporting social, technical and economic growth if commitment to reform is maintained. Its conformance with the Model Apprenticeship Principles indicates that the reforms are in line with good practice among countries.

The expansion of apprenticeship formation to many fields is hoped to strengthen opportunity, equity, access to long-term employment, and expand opportunities for Ireland’s growing youth population.

The extension of apprenticeship formation, to degree and post-graduate levels, is key to ensure Ireland’s labour-market competitiveness in high technology and traded services. It may increase higher education entry by children of skilled, semiskilled and unskilled workers,
currently the most under-represented HE groups of all socio-economic classes (McGuiness et al 2011).

References
1.8. Stakeholders in the German and the Swiss VET system and their role in innovating apprenticeships

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Summary: This contribution compares stakeholders’ roles in Germany and Switzerland when it comes to promoting innovation in the dual apprenticeship system. In both countries the relevant stakeholders who represent the various occupations and, in a more narrow sense, the social partners actively shape apprenticeship reforms. They represent the area of public educational policy, besides governments, political parties and the public, who, in both countries, appreciate the decisive role of apprenticeships for youth education, employment and social stability. Thus, the justification of reform measures and broad consensus of different stakeholders is decisive in order to keep apprenticeship systems alive.

Keywords: Apprenticeships, dual system, VET comparison, higher VET, the changing institutional context of VET, VET policy

Introduction

VET reforms in Europe

Most countries in Europe are nowadays reforming their VET systems. Especially German-style VET is seen as a “good practice” (cf. Deissinger 2015, Gonon 2014). However, most projects aiming at implementing such an apprenticeship underestimate the decisive role and interplay between the different stakeholders as system variables. Even in Germany and Switzerland, the reform agenda for VET and motivations to maintain the quantitative and qualitative importance of the traditional apprenticeship system are under permanent scrutiny. The coordination of different reform interests require compromises, which are bound to a culture of mutual agreements. At the same time, the environment of the dual system, i.e. the apprenticeship system, has changed, as demographic change and academisation exert pressure on traditional pathways into employment (Deissinger & Breuing 2014).

Reform agenda and actors in Germany and Switzerland

In Germany, chambers, employer organisations and trade unions represent these major actors, which are responsible for various functions in the apprenticeship system beyond the narrow sphere of governmental regulation, above all when it comes to modernisation of training courses. Recently apprenticeship offers declined and youngsters and their parents prefer more and more academic tracks, and some authors call this “academic madness” (Nida-Rümelin 2014).

In Switzerland, the “organizations of the world of work” (including branch organisations, social partners), alongside the federal and cantonal authorities, play an important part in the
VET system as the relevant actors in transforming vocational education. Especially trade associations and occupational interest groups have a strong impact on reforming the VET system. In Switzerland, too, the public quest and commitment for apprenticeships is decisive to keep the system running.

The most important reform in both countries is to encourage firms offering apprenticeships. Besides it is also important to convince parents and youngsters that apprenticeships are still and will remain career openers. That is why, in Switzerland, hybrid qualifications, in contrast with Germany, are seen as an important way to keep firm-based training and apprenticeship attractive.

The justification approach to VET

In the following we sketch the value background of the stakeholders or actors in both countries. These actors come up with certain values and claims, which have to be integrated in the field of VET learning and teaching. The stakeholders, i.e. actors, rely on values, which have to be justified in the phase of reforming the system. That is why they promote certain aspects of vocational learning. The following table is inspired by the work of Boltanski & Thevenot (2006) and has been applied to the field of VET policy.

Table 1: Justification-related concepts concerning the issue of quality in the context of vocational education – as vocational education presents itself (see Gonon 2015 forthcoming)

<table>
<thead>
<tr>
<th>Values</th>
<th>Justification</th>
<th>Translation into curricula and vocational learning</th>
<th>Actors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Political world</td>
<td>Equal rights and chances, social autonomy</td>
<td>Citizenship and economic education</td>
<td>National educational policy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Teachers’ associations</td>
</tr>
<tr>
<td>World of industry and trade</td>
<td>Occupational efficiency, “Employability”, Efficiency</td>
<td>On-the-job learning, Occupational subjects</td>
<td>Professional associations</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Employers, Employees</td>
</tr>
<tr>
<td>World of inspiration and personality development</td>
<td>Individual development, creativity &amp; innovation</td>
<td>Mother tongue and society, languages (arts)</td>
<td>Parents Teachers’ associations</td>
</tr>
</tbody>
</table>

Methodology

The methodology is built upon the justification approach and theoretical assumptions which lead our content analysis. Our comparative paper looks at the topical reform discourse and the specific culture of apprenticeships in the two countries by focussing on those stakeholders that “bear” the system. The paper draws its insights from the VET policy debate and from both national policy documents and national and international expert publications in the field of VET. The approach is a content analysis. A strong focus is given to the new environment of the VET system nowadays.
Results

The value of VET, progression to higher education and the function of higher VET qualifications – a comparative view on Germany and Switzerland

In both countries endeavours exist to strengthen dual VET models, but on different levels. Whereas in Switzerland the initial training has been strengthened by offering hybrid pathways for completers leading into higher education, the German reforms aim at hybridising the higher vocational and professional education system. Dual higher VET, e.g. “vocational academies” (Deissinger 2000) and universities of applied sciences, now offer dual tracks (partly based on company-training and partly involving studies), which are being pushed also benefiting from the “Bologna reform”. German and Swiss reformers justify their measures through stressing the values of economic growth, citizenship and personal development.

The problem that has arisen in Germany is that this is not really a way of strengthening traditional apprenticeships. There are four areas of “tertiarisation” which have the potential to jeopardise the dual system in the long run: (1) new Bachelor courses at universities with a strong employability character; (2) vocational schools which are attended by students not for employment qualification purposes but in order to obtain a higher school qualification; (3) the above-mentioned “vocational academies”, now called “dual universities”; and (4) overarching the whole problem, the general academisation of school education, focussing on easier transition to upper secondary education and on comprehensive models of school education on the level of lower secondary education (years 5-10).

At the same time, employers and trade unions do not become tired to underline their interest in stabilising the dual system in the face of a growing demand for skilled employees in the German economy.

In contrast to Germany, firms and associations of employers, but also statist actors and political parties in Switzerland, have aimed at strengthening the initial training by providing more academic options. This policy is based on a broad consensus of all stakeholders, with the conviction underlying that the apprenticeship system is a “success story”. Nevertheless it has some practical implications for firms and apprentices: the hybrid programs are too overloaded and firms and apprentices have to cope with practical problems of coordination.

Although Germany and Switzerland stand for the training model called the “dual system”, they differ in some interesting facets of their initial training systems, including mechanisms helping people to progress from VET to higher education, since, in both countries, new options in the field of higher VET and progress to higher education are being offered and established although their structural realisation is remarkably different (Deissinger et al. 2013; Gonon 2013).

In both countries the importance and value of VET is based on consensus by all relevant stakeholders. The main argument hereby is that apprenticeships have so far successfully opened and should continue to open career paths in industry but should also have some kind of link with higher education. Against what could be called “academic fallacy” and increasing “meritocratic thinking” (for Switzerland cf. Strahm 2014, for Germany Nida-Rümelin 2014; see also Goldthorpe 1996), the importance of a highly qualified workforce, trained in non-academic fields, and the future of this kind of skill formation have become major topics and concerns in both societies.
References


Deissinger, Th. (2000): The German “Philosophy” of linking academic and work-based learning in higher education – The case of the “Vocational Academies”. In: Journal of Vocational Education and Training, Vol. 52, No. 4, 609-630.


1.9. Research and practice on ‘Tripartite Collaboration’ of innovative apprenticeship

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Summary: This paper introduces an innovative apprenticeship training model which is based on tripartite collaboration of the school, enterprise and industrial base (Industry Association) and was chaired by the proposer. The key points of this paper are about the organizational structure based on “one council and three committees”, the responsibilities of the stakeholders, the method and relationship of tripartite collaboration, the implementation measures of teaching organization of engineering and theory alternation. A set of apprenticeship assessment system based on four dimensions of personal accomplishment, mentality of practitioner, professional experience and job skills is presented in this paper.

Keywords: Innovative apprenticeship, stakeholder, tripartite collaboration, four-dimensional evaluation

Introductions

The booming economy of China has raised the demand for technical talents; the government encourages “the development of innovative apprenticeship pilot of the joint admissions and training by the union of school and enterprise”. At present there are many innovative apprenticeship pilots in China (Scoot 2008), comparative analysis shows that whether the pilot program is sustainable or not is up to whether the scale and quantity of the talents demand of the enterprises participating in the pilot can keep relative stability and is also up to whether the apprentice training model is representative for industry.

On the one hand, for the large number of small and medium enterprises (Boreham, Samucray & Fischer 2002), the demand for technical talents is large, but the individual need of a single enterprise is not big and durative. At the same time, due to the limitations of the scope of its production, its cultivation of the apprentice will inevitably be difficult to meet the needs of other enterprise. On the other hand, the apprentices will acquire job skills in the enterprise’s real production environment, while they creates value for the enterprises, this makes a considerable part of the enterprise willing to participate in the innovative apprenticeship system.

The author is hosting a pilot program of innovative apprenticeship in Guangdong Province China, trying to find out common interests between different sides to establish an interest-share community of innovative apprenticeship system, solving the demand for talents of the small and medium enterprises individually, and exploring a new training model of tripartite cooperative apprenticeship system.

Methods and research design

1. The construction of the tripartite collaborative framework

In our pilot project, a tripartite composition community of interests had been formed by the
school, enterprise and national base (Industry Association), in accordance with the principle of “profit driven, win-win for both production and training”, the responsibilities of all parties are clear, and a Cooperation Council had been formed according to their respective functions and duties. The Council consists of the training committee, the teaching committee and the examination committee (Rauner & Smith 2010).

The “Teaching Committee” is taken charged by the school while the enterprise and industry association play auxiliary roles, its responsibilities is to ensure education property of the apprenticeship training, paying attention to basic quality of apprentice cultivation and training of professional migration ability, and to ensure that the training process is not mere simple employee training, and to ensure the training does not pay too much emphasis on short-term interests of the enterprises.

The “Training Committee” is taken charged by industry association, while the school and the enterprise play auxiliary roles; it takes its own advantage to ensure an industrial universal apprentice training standard (Guanjing & Shiweipin 2014; Liyujing 2013).

The “Examination Committee” is taken charged by enterprise, while the school and the industry association play auxiliary roles; their responsibility is to ensure that the apprenticeship can meet the requirements of the enterprise, and to make a career planning for every apprentice (Cuifazhou 2014).

2. Innovation in apprenticeship training model based on tripartite collaboration

2.1 Restraint and incentive mechanism based on tripartite training contract

Tripartite agreements must be signed between student, enterprise and school to make their responsibilities, rights and interests clear (Cuifazhou 2014). Students (with parents) must sign an apprenticeship agreement with the enterprise to obtain apprenticeship status. The students have dual identity of the student plus apprentice, and gain right of apprentice from enterprise (Zhaozhiqun n.d.); for the apprentice with the abilities to post, working conditions will be granted accordingly, matching salary is also paid according to their abilities; as the “quasi employee” the apprentice should take the corresponding responsibilities of the enterprise staff. Undue emphasis on the rights and obligations of any party will lead to the uncertainty of cooperation (Wangyu 2015).

2.2 Tripartite collaborative communication mechanism of “shared responsibility”

In accordance with the principle of “school draft the goals, enterprises draft the jobs, industry base draft the standards”, the three parties made division of labour, developed apprenticeship training objectives, ensured the realization of the training objectives through the tripartite communication mechanism established.

2.3 The teaching & operation mechanism based on the alternation of “segmented training, alternation of working and learning”

In the training process, learners will study in schools and enterprises, industrial parks in turn. Three parties collaborate with each other in various stages, as a uni-group of tripartite joint teaching team to achieve the teaching and training goal.

The courses are divided into the school theory courses and enterprise project courses, and scheduled alternately according to the cognitive law and the rules of practical skills learning; the proportion of enterprise project course is gradually increased by semester.
3. The establishment of multi participation assessment system

3.1 Evaluation standard model

Difference from traditional school education, the evaluation criteria of innovative apprenticeship should be all-round and multi angle (Zhaozhiqun & ChenJunlan, n.d.). A four dimension of evaluation model is established according to the professional quality and comprehensive skill requirements of industrial enterprise. Evaluation items and their weights of the dimensions are also set up quantitatively according to the technical characteristics and the nature of the industry. The aspects of the assessment are shown as figure 1.

Figure 1: The four-dimensional model

3.2 The evaluation subject and the implementation process

The evaluation subjects are composed of the school, the training centre and the enterprise representative, with task to check whether the apprenticeship had achieved the stage goal of study. The first stage of the examination of the apprentice as a professional image of the technical staff is composited mainly of the intention of practitioners, professional presentation and the spirit status. The second stage of the examination will concern professional technical skills (engineer skills) which is composited mainly of the learning ability, technology and project specification; The third stage of the examination will pay attention to apprentice’s competency ability (qualified for the post of engineer), including resume, present technical project, career planning, working knowledge professional experience and job skills (INAP Commission 2012).

Results

1. The tripartite cooperation training model of innovative apprenticeship based on the Industrial Park (third party) help improvement of apprentice ability structure. It is an effective solution with the industrial applicability to satisfy the talents demand of small and micro enterprises.

Since the beginning of 2010, jointing National Application and Demonstration of the Digital Home Industry Base (a typical high and New Technology Industrial Park), Guangzhou
Institute of Railway Technology had carried out three pilot programs of innovative apprentice training in intelligent home field with total 76 apprentices. At present there are 36 apprentices studying in the Digital Home Industry Base, our tripartite model had been recognized commonly in Guangzhou.

Figure 2 shows the relational graph of our “Tripartite Collaboration” of Innovative Apprenticeship.

**Figure 2: Innovative apprenticeship model of GTXY**

2. The competitiveness of apprenticeship is significantly higher than the students of ordinary vocational education.

The comparison includes professional image, post competency, employer satisfaction and employment competitiveness, shown as table 1.

**Table 1: Comparison of result between apprentice and ordinary students**

<table>
<thead>
<tr>
<th>Evaluation indicators</th>
<th>Professional Image</th>
<th>Post Competency</th>
<th>Employer Satisfaction</th>
<th>Employment Competitiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apprentice</td>
<td>70</td>
<td>90</td>
<td>75</td>
<td>87</td>
</tr>
<tr>
<td>Ordinary Students</td>
<td>65</td>
<td>50</td>
<td>60</td>
<td>79</td>
</tr>
</tbody>
</table>

**References**


Zhaozhiqun & ChenJunlan (n.d.): The construction of the innovative apprenticeship is an important supplement to innovative Vocational education system.
1.10. Modern apprenticeship as a supplement to the school based vocational education system in China

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Summary: Massive vocationalisation of secondary school in China has been aimed to improve transition from school to work and further studies. However, effective realization of this policy depends on the quality of the proposed vocational pathway. In China, school-enterprise cooperation is considered as a key quality factor for the development of vocational education system. This paper reports on the study of “Modern Apprenticeship”. The results demonstrate that “Modern Apprenticeship” is an effective institutional arrangement for integrating the process of learning and work, and providing effective mechanism for participants to share the cost and benefits of vocational education. Modern Apprenticeship can be an effective transfer pathway to solve problems of school-enterprise cooperation, to meet the needs of the economy and society’s development.

Keywords: Modern apprenticeship, school based vocational education, China

Institutional barriers to skilled personnel training

China has been focusing on a school-based vocational education system, including vocational schools on the upper secondary school level, and vocational and technical colleges and universities on the higher education level. Despite dramatic quantity expansion in the recent decade, the quality and qualification of skilled personnel still fall short to meet the needs of economic, technological and social development. One of the most important reasons is that a purely school-based vocational education approach does not satisfy the demand for truly skilled personnel in production and service.

In the first decade of 2000, China became a “global workshop”. In an age of informatization and automatization, traditional work organization is replaced by more flexible, holistic and solution-oriented professional tasking. This posed new challenges for the availability, recruitment and training of highly qualified skilled personnel. Surveys show that most companies in Chinese modern industry do not deliberately seek school educated staff with higher academic degree, but rather appreciate the well experienced employees who are capable in planning, decision making and analytical thinking in the work and business process (Yang et al. 2009). Such positions and tasks require more work experience and knowledge, especially so called “Work Process Knowledge” (Boreham et al. 2002), which can only be acquired in real work process in production and service. It seems too weak to identify, evaluate and promote Work Process Knowledge learning totally dependent on the school-based vocational education system. The approach of “school-enterprise cooperation” (xiao qi he zuo) and “work in company – study in school/college combination” (gong xue jie...
he) could be an effective solution.

In recent years China has put greater efforts on school-enterprise cooperation in vocational education. In 2005, the State Council has published the Decision on Vigorously Developing Vocational Education (GuoFa No.[2005]35) and decided to “adopt an approach of work-learning combination and school-enterprise cooperation to strengthen interaction between schools and enterprises” (State Council 2005). Vocational schools and colleges are also doing a lot of attempts in the practice. But despite painstaking efforts of all institutions involved in vocational education, China has not yet established a long-term sustainable school-enterprise cooperation mechanism in the overall sense.

Current situation of apprenticeship

The rediscovery of the value of modern apprenticeship has been one of the most significant trends in vocational education in recent years, and has prompted an array of research and development projects (Rauner & Smith 2010; Zhao et al. 2011). The core concept of modern apprenticeship is school-enterprise cooperation.

China is probably one of the few big countries in the world that didn't establish official apprenticeship system. However, there is certain kind of apprenticeship tradition, for example the practice of “half work half study” program. On one hand, the core concept of modern apprenticeship is deeply rooted; on the other hand, informal apprenticeship exists continuously, phenomenon of external and internal institution of apprenticeships exist nationwide (Kasper & Streit 2000).

Apprenticeship as an external institution

Despite the absence of a formal apprenticeship system, China does have regional or sector-specific apprenticeship schemes. The Ministry of Labour (MoL) and many local authorities for example have issued apprenticeship-related documents and regulations to implement different variant forms of apprenticeship. In 1998, the former MoL issued the Notice on the Establishment and Implementation of “Master-Apprentice” Scheme. The “master-apprentice” scheme is actually an extended version and partial practice of apprenticeship, compared with external institution (formal system), it is still at an initial phase:

- No standardized implementation mechanism;
- Limited sector coverage, and low level of cooperation by enterprises and schools;
- Lack of interaction between policymakers (e.g. labour, education and economy authorities) during the policy making process;
- Low institutional level, existing policy including guidelines, notices, measures and programs, but there are no high-level related legislation.

Just like the MoL in his “Communication” summarized: The old apprenticeship had been replaced by the vocational school education; Apprenticeship had lost its official recognition (legal status). It was recognized as a priority need to renew the recognition of the value of apprenticeship and to focus on the qualification of highly skilled talents (Ministry of Labour 1998). But the needs has not cause enough attention, so there was no specific action or support from society.

Apprenticeship as an internal institution

In the sense of internal institution (informal system), apprenticeship is widely practiced today, and it has made significant contributions to qualification of skilled personnel. In economically underdeveloped remote and rural regions particularly, apprenticeship was
generally accepted by people through unwritten rules and implied norms for trainer eligibility, apprentice eligibility, economic relationship between trainers and apprentices.

The survey identified the features of apprentice in Beijing:

- Male preference (56.7%);
- Low school years and academic requirements (59% no requirements, 40% middle and high school education);
- No strict occupation/specialty requirements (89%);
- No work experience required (88%);
- Minimum wages roughly equal to the income of vocational schools graduates (50% of them nearly RMB 1000 - 1500 per month);
- Apprenticeships offered mainly focus in the field of Metalworking (26.9%) and Maintenance and Assembly (33.8%), e.g., machinery, instruments, real estate and merchandising
- Apprenticeships mostly offered by private SMEs, with company size holds inversely proportional to the number of apprentices needed (Chen 2011).

Although statistical data do not reveal the reasons why companies offer apprenticeships, one thing is certain: the vulnerable group can acquire skills through apprenticeships, and at the same time lots of SMEs are willing to offer apprenticeships. This holds a striking resemblance to situations in the UK during the early 20th century (Clarke 1999: 34). Why such apprenticeship has deeply effect among people’s needs? It reflects people’s expectations toward vocational education and training or employment preparation.

**Measures needed to be taken in establishing modern apprenticeship**

According to the National Medium- and Long-Term Educational Reform and Development Guidelines of the Chinese government, more work should be done to “establish and improve a government-led, industry-guided and enterprise-participating educational mechanism, to develop school-enterprise cooperation regulations, and to promote the institutionalization of school-enterprise cooperation” (Ministry of Education 2010). The Decision of the State Council on Accelerating the Development of Modern Vocational Education (State Council 2014) identifies pilot programs of modern apprenticeship as an important initiative to promote training model innovation. Under this context, there is an increasing number of schools and colleges carrying out various forms of pilot experiments in modern apprenticeship. “Modern Apprenticeship” has become a hot topic in the development of the vocational education system in China.

Recent attempts by the Ministry of Education (MoE) and the Ministry of Human Resources and Social Security (MoHRSS) to establish modern apprenticeship is far from satisfactory. Compared to traditional educational structure, modern apprenticeship has many new features, e.g., more stakeholders, innovative and standardized operating mechanism, wider coverage (including students of vocational schools and colleges, graduates of universities), it integrated apprenticeship into the school-based system and third-party training agencies (or intermediaries). The establishment of modern apprenticeship requires experiments on the following two aspects:

**Institutional characteristics**

Institution to guarantee the implementation of modern apprenticeship should be designed at

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* The construction sector does not appear. This is probably due to the fact that it recruits mainly migrant workers, who are being recruited by other channels, e.g. by advertising them at the access gates to construction sites.
national level to assure:
• Coordinated and consistent laws and regulations should be established across the country in all sectors.
• Make sure apprentices’ unique legal status as both “quasi-employees” and “students”.
• High public acceptance and attractiveness of apprenticeships.
• Satisfaction of enterprises’ needs.

**Relevant organization service and operating mechanisms**

Relevant organization and service bodies should be established at the national, local and sectorial level, including:

• To set up dedicated/specialized bodies, responsible for interdepartmental collaboration and stakeholder coordination.
• To develop standard courses which closely link to occupational qualification standards to ensure nationwide recognition of apprentices’ learning outcomes.
• To delegate more authority to trade associations with respect to apprentice eligibility management, instruction arrangement, advisory services and school-enterprise dispute resolution (INAP 2013).

The government should issue policies in favour of vulnerable youth. Ambitious actions could concern the most needed fields, i.e., manufacturing industry and traditional service sectors, where large numbers of new generation migrant workers and informal apprentices are concentrated. It is also desirable to carry out pilot projects in hi-tech industries, e.g. existing national hi-tech industry innovation promotion bases.

**Pending issues**

Even if research shows that apprenticeship is cheaper than other types of training, in fact, companies need to make additional effort, and some of them worry about potential problems, for example if they lose the staff they have trained to their competitors. Modern apprenticeship is based on the close collaboration among a company, a workshop, an institution, and a “training provider”, which can be a vocational school, college or training centre. It should be clear, each party’s responsibility in the collaboration. In order to achieve the desired goal, a quality assurance system should be established. Study on modern apprenticeship was supposed in future to solve the following tentative problems:

• Establishing policies and measures are mainly on the local and provincial level. But the organizational complexity is a serious problem (high number of companies, varying ownership structures, weak employer organizations, prevailing short-term and monetary orientation, vertically and horizontally differentiated public administration, education and training providers inexperienced with “real” modern apprenticeship, complex regulatory system). Without a strong instrumental support structure which is recognized by the authorities, island solutions may not spread over to establishing apprenticeship as a systemic avenue or career path leading youth from education through training to employment.
• Authorities, e.g. the State Council and related Ministries have formulated public statements, which call for closer collaboration among education and training institutions and enterprises. Information is spread scarcely and there is no technical assistance package available for those companies willing to embark on apprenticeships. No specific services offered for students and their parents to understand the connotation and significance of the apprenticeship.
The government has launched several investment programs and incentives for companies. However, these measures seem to be unilateral actions, instead of being negotiated with the partners in the economy. Is the regulatory framework conducive for the expansion of apprenticeship? How to introduce the policy of tax reductions and other types of incentives for SME’s engaging in apprenticeships, it needs the involvement and commitment of the executives and staff of companies and branch organizations.

In order to make the apprentice able to adapt to the challenges of a modern economy, which is gradually upgrading to higher levels of sophistication (higher value-added in the design, production and marketing process), there must be a group of technical organizational agencies available outside, like the Chamber of Commerce and Industry etc. It is a huge challenge to develop and establish these institutional infrastructure (Risler & Zhao 2014).

References


1.11. Development and definition of National Occupational Standards (NOS) as the curriculum basis for Vocational Education and Training (VET)

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Summary: One primary goal of Vocational Education and Training (VET) systems is to provide trainees with the right qualifications to meet the needs of the labour market. VET program development faces the challenge of obtaining relevant labour market and occupation requirements. For these purposes different approaches are used throughout the world. The use of “National Occupational Standards” (NOS) for VET curriculum development is one possibility to overcome this challenge. But a high NOS quality is a prerequisite for a high quality of VET program development. In this research study the German classification of occupations is analysed under specific NOS aspects and compared with a range of international approaches. The first phase of the study reported here examines quality aspects of different occupational classifications and standards. The recommendation is to use this source as an additional contribution for the development of VET curricula in order to improve the link between the world of work and VET and thus the VET quality.

Keywords: Occupational Standard; occupational classification; labour market information; VET curriculum design; Job requirement

Introduction

VET qualifications and curricula in most countries are associated with qualification standards. They are defined in national and European qualification frameworks (NQF, EQF) and also within the International Standard Classification of Education (ISCED). Around these standards, and especially VET qualifications and curricula, there is a more or less a continual discussion about their content, quality and relevance. The important question is what sources and bases are used to define VET qualifications and develop VET curricula. It is well known that the main objectives of VET are to prepare individuals for employment and to minimize occupational skill mismatch. Therefore labour market and skill needs information are significant reference points for VET curricula in order to influence and optimize the function of VET systems. The ongoing challenge to a “work oriented” VET curriculum development process is therefore to improve the research methods to obtain both qualitative and quantitative labour market and occupational information which are relevant for VET qualification standards (cp. e.g. Mansfield 2001; Petersen 2013).

Internationally VET research uses different methods and concepts to find out and monitor in a VET view relevant information and data of the work and employment system (cp. e.g. ETF 1998; Rauner 2005). Some of these methods and concepts are labour-intensive and costly, and other approaches often lead to insufficient and unsatisfactory results, for example
Sauter (2005). For this reason we examined a new approach to make better use of qualitative and quantitative labour market information. Such information includes the national and/or “International Standard Classification of Occupations” (ISCO), all statistical data about the labour market and occupations, where they exist and, especially, the “National Occupational Standards” (NOS). Occupational standards are used as VET development resource in many countries but are based on different definitions (cp. CEDEFOP 2009). One of our interests is to evaluate the strengths and weaknesses of these approaches and the quality of their results in order to find an optimal NOS concept for VET purposes.

Methods and research design

In many countries classification of occupations, statistical occupational data and occupational standards are widespread but their national concept, definitions and quality are different. On one hand the “International Standard Classification of Occupations” (ISCO) published from the “International Labour Organization” (ILO) has existed since 1923 and acts as a reference for many national classifications. On the other hand exists in addition to ISCO no international concept or ILO definition of “International Occupational Standards” (IOS).

Basically the different occupational classifications, data and standards around the world are of interest in a comparative analysis. But in this explorative study only a sample of the following classifications and standards are analysed and compared: German classification of occupations (KldB 2010), Standard Occupational Classification (SOC) and the Occupational Information Network (O*NET) of the United States, International Standard Classifications of Occupations (ISCO-08) and the Occupational Classification Systems of Australia/New Zealand (ANZSCO) (cp. ABS 2006; USBLS 2013; USDOL/ETA 2015; BA 2011).

Results

Common to most classification systems is the definition of occupation as a “set of jobs whose main tasks and duties are characterised by a high degree of similarity” (e.g. ILO 2012, p.11). By means of the two occupational dimensions “skill level” and “skill specialization” occupations are aggregated on different levels. The logic these criteria follow differs between national classifications, and this was what we found in the investigated examples too. In many classifications it is also increasingly common that additional detailed information is supplied to “define” each “unit group” (e.g. ILO 2012). Such information includes, for example, beside a short description the main tasks and duties, and skill needs are stated for that unit occupational group, concluding with some example job titles (see Table 1). The extent and quality of this information and definitions varies between the analysed national classifications and standards. But the relevant questions to these relatively new information and definitions are how the information quality is and how fare we can the occupational information and definitions understand as national occupational standards?

Table 1: Occupational information of different occupational classification systems

<table>
<thead>
<tr>
<th>Germany KldB 2010</th>
<th>US SOC 2010</th>
<th>ILO ISCO-08</th>
<th>AUS/NZ ASZSCO</th>
</tr>
</thead>
<tbody>
<tr>
<td>occupations within specialisation, level</td>
<td>generalized occupation name</td>
<td>generalized occupation name</td>
<td>generalized occupation name</td>
</tr>
<tr>
<td>short description</td>
<td>short definition</td>
<td>short description</td>
<td>short description</td>
</tr>
<tr>
<td>typical tasks, duties, knowledge and skills</td>
<td>example job titles</td>
<td>Main tasks and duties</td>
<td>indicative skill level</td>
</tr>
<tr>
<td>example job titles</td>
<td></td>
<td>Example job titles</td>
<td>main tasks</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>example job titles</td>
</tr>
</tbody>
</table>
The new German KldB 2010, for instance, classifies all occupations on aggregation level 1-4 consequently only in terms of their “skill specialisation”. But at aggregation level 5 with the most detailed classification groups “Berufsgattungen”, these groups are two times classified with “skill specialisation” and with four “skill levels” too. Occupations of this aggregation level correspond to similar “unit groups” of ISCO. Generalised occupational names, for example “Occupations in building electrician”, designate these “Berufsgattungen”. And to all “Berufsgattungen” the new German classification include also new additional occupational information (see Figure 1) as opposed to older versions which were limited only to the occupational names (cp. BA 2011). But these information’s named and looks not like occupational standards.

The U.S. O*NET database provides many additional categories like tools and technologies, abilities, work values, wage and employment trends etc. The SOC is limited to a short description (cp. USDOL/ETA). ASZCO adds a skill level requirement expressed in terms of the usual amount of formal education, previous experience or any other special requirements (cp. ABS 2006, p. 6).

The following example of ISCO-08 represents additional occupational information of the international unit group “Building and related Electricians” (level 2 skilled workers) which corresponds to the German “Berufsgattung 26212 Berufe in der Bauelektrik” (BA 2011, p. 349).

### Table 2: “Building and Related Electricians” Unit Group (ILO 2012, p. 299)

<table>
<thead>
<tr>
<th>Unit Group 7411</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building and Related Electricians</td>
</tr>
<tr>
<td>Building and related electricians install, maintain and repair electrical wiring systems and related equipment and fixtures.</td>
</tr>
<tr>
<td>Tasks include -</td>
</tr>
<tr>
<td>(a) installing, maintaining and repairing electrical wiring systems and related equipment in various buildings such as schools, hospitals, commercial establishments, residential buildings and other structures;</td>
</tr>
<tr>
<td>(b) examining blueprints, wiring diagrams and specifications to determine sequence and methods of operation;</td>
</tr>
<tr>
<td>(c) planning layout and installation of electrical wiring, equipment and fixtures, based on job specifications and relevant standards;</td>
</tr>
<tr>
<td>(d) inspecting electrical systems, equipment and components to identify hazards, defects and the need for adjustment for repair;</td>
</tr>
<tr>
<td>(e) selecting, cutting and connecting wire and cable to terminals and connectors;</td>
</tr>
<tr>
<td>(f) measuring and laying out installation reference points;</td>
</tr>
<tr>
<td>(g) positioning and installing electrical switchboards;</td>
</tr>
<tr>
<td>(h) testing continuity of circuits.</td>
</tr>
</tbody>
</table>

*Examples of the occupations classified here:*
  - Building repairs electrician
  - Electrician

Referring this ISCO information to the German VET standards, the provided classification information e.g. to the occupational tasks has not the occupation quality like within the current German training regulation for instance of an “Electronics technician for building and infrastructure systems” (cp. BMWi 2007). Cost calculations, self-reliant work planning and customer relations and advice, for example, are missing within the occupational tasks in this VET standard. At this stage the new additional occupational information and definitions are not sufficient as an occupational standard but could serve as one reference or starting point.
for further analysis.

Beside this qualitative occupational information, various statistical data are based on occupational classifications. The quarterly reported employment statistics in Germany supplies quantitative data down to the level of each occupational group (BA 2013). The VET development process could benefit from this data for example to consider more and better the quantitative distributions and changes in professions or also new or underrepresented company specific occupations.

Occupational classifications are developed based on various data sources. Labour and employment departments of Governments, supported by various agencies and expert groups, developed these classifications. For example, the O-NET data collection program has established a continual update process by surveying job incumbents and business experts (USDOL/ETA). ISCO-08 is based on various national classifications (ILO 2012 p.9). All national classifications implement procedures for coding corrections and minor updates on a short term basis. A complete revision is scheduled every 10 years on average. However, for VET development purposes, the ongoing of labour market requirements is fundamental. In addition, prospective information of future requirements is also of interest. All the classification systems studied are limited in the extent to which they satisfy this demand. In general, only current occupational information is supplied. Considering this constraint a special focus is required on quantitative changes within existing groups as well as further analysis of new reported occupations.

Conclusion

Although classifications of occupations and occupational standards were primarily not intended as a basis for VET development, the analysed examples present valuable qualitative and quantitative labour market data and occupational information. The description of main tasks and duties, and sometimes skill needs, justified on different levels within the work and employment system fits to the German concept of work-oriented VET curricula. But some limitations of the provided classification data and occupational information are identified. Beside additional tasks and duties, descriptors for qualitative work experience and competence descriptions need to be added. Therefore it is recommended to use this occupational data and information as a starting point for further analysis in order to complete the complex development process required of VET standards.

The international practice of strong occupational stakeholder involvement and the ongoing evaluation of occupation incumbents secure the quality of the occupational data and information. These practices are also recommended for updating the German classification process. By using these approaches the German classification of occupations could, in the future, include and act as a real national occupational standard (NOS) too.

In summary, the advantage of company and independent occupational performance data and information, combined with quantitative labour market statistics, is worthwhile to evaluate. The data could serve as input within the formal process for developing or renewing the VET standards and curricula for training occupations.

References


1.12. Why apprentices drop out in Australia and the policy implications

Phil Loveder

National Centre for Vocational Education Research (NCVER), Adelaide, Australia

Summary: This summary paper is based on the summary research report by Alice Bednarz published by NCVER in 2014, Understanding the non-completion of apprentices; a review that draws together existing data and research on why apprentices do not complete their training. Of the 200,000 currently undertaking a trade apprenticeship in Australia it’s estimated that half drop out. Why? It is not so much to do with the rates of pay but more to do with their overall experience of the work and how they are treated by their boss or colleagues. In this talk we present some of the reasons why apprentices don’t complete their training and what can be done to address the attrition rates.

Keywords: Apprentices, non-completion, policy implications

Introduction
Completion of qualifications is considered to be the ‘new battleground’ in Vocational Education and Training in Australia with concerns by governments and industry over purported low levels of completion (CISCO 2015). Despite their traditionally close linkages to industry needs approximately half of all apprenticeship contracts in the trades are not completed.

In this context, this summary draws together existing research on why apprentices do not complete their training. The issue of non-completion is considered from multiple angles, including apprentice’s self-reported reasons for non-completion, the impact of employer characteristics, and apprentices’ and employers’ satisfaction with the training provider. The report is based on findings from surveys undertaken by the National Centre for Vocational Education Research (NCVER) and other national surveys, industry studies and research papers.

Methods and research design
The aim of this review was to collate the existing research on the reasons why apprentices do not complete their training. The focus is on understanding the non-completion of trade apprentices, as attrition in these areas is generally viewed with particular concern.

Results
The extant research finds that rather surprisingly, low rates of pay or the payment of a ‘training wage’ is not the major reason for non-completion in many cases; but rather the picture is rather more complicated. Reasons most commonly cited include:

• Employment-related reasons are the most commonly cited reasons for not completing an apprenticeship. These include experiencing interpersonal difficulties with employers or colleagues, being made redundant, not liking the work and changing career. By contrast, issues with the off-the-job training are the least frequently cited reasons for not
completing an apprenticeship.
• There is a large difference in completers’ and non-completers’ satisfaction with their employment experience overall. The majority of completers (80%) are satisfied with the employment experience overall, compared with just 42% of non-completers. This provides further evidence that the employment experience, rather than the off-the-job-training experience, carries greater weight in whether an apprentice stays or goes.
• There is conflicting evidence on the importance of wages. Most studies find that low wages are not the most common reason for non-completion, but they are nonetheless one of the top few factors. An increase in wages alone is unlikely to solve the problem of low completion rates, since multiple factors are often to blame.
• Apprentices generally leave their apprenticeship contract early on: 60% of those who leave do so within the first year.
• The influence of the employer cannot be overstated. Employers with the highest completion rates are generally larger, experienced employers with well-organised systems for managing and recruiting apprentices. Employers with lower completion rates tend to be smaller and have less experience.

These findings suggest a number of ideas for future policy developments, such as encouraging more rigorous recruitment practices; providing greater support for smaller, less-experienced employers; providing greater mentoring and supervisory support for apprentices, particularly in the early stages of their apprenticeship; and considering alternative apprenticeship models, specifically those that reduce the pressure on employers.

References
SECTION 2

TEACHING AND LEARNING IN APPRENTICESHIPS
2.1. Competence measurement in South Africa: Teachers reactions to feedback on COMET results

Helen Brown

Manufacturing Engineering and Related Services Sector Education and Training Authority (merSETA) Melville, Johannesburg, South Africa.

Summary: The South African COMET project has recently completed a second COMET Test series for the welding, mechatronics and electrical occupations over 810 participants. Tests tasks relevant for the South African TVET system were developed and validated at the beginning of 2014 and the large scale test was implemented towards the end of the same year. This paper explores teachers’ reactions to the feedback of COMET test results of their students.

Keywords: COMET, vocational competence development, competence diagnostic system, vocational teacher commitment; work process learning; didactics (teaching and learning).

Introduction

The decision to participate in a large scale competence diagnostics exercise was initially informed by the rapid revival of apprenticeships in South Africa (2008-9). Whilst the apprenticeship system was being revived against tried and tested governance processes, there was a new qualitative imperative which sought international benchmarking of levels of vocational competence acquired during the apprenticeship. The COMET competence model was selected as measurement model based on sound psychometric criteria (Martens & Rost 2009). The COMET project matured through its first pilot phase (2011), and the results of this first study raised – among others - three major findings. Firstly that the only teaching site that achieved a measured holistic shaping competence amongst a small percentage of apprentices was using a reflected work process learning and teaching methodology. Secondly, that a large proportion of public-college-based vocational learners’ test scores were an indicator for a predictive probability that the majority of learners will not be able to achieve the required competence level of a skilled worker according to international standards. The third finding indicated a stagnation of competence development during course of training (Rauner et al. 2012).

The imperative for a competence diagnostic system was thus realized and a program was approved to embed the practice and understanding within the South African TVET system with the mandate to inform improvements in teaching and learning systems.

The second large scale COMET test was therefore completed in November 2014. In the post test phase of this project, vocational teachers started to express their interest in the COMET project results and the project’s potential as a theoretically sound and empirically tested competence model that may facilitate deeper insights into the strengths and weaknesses of their teaching/training. This interest was supported by a visit to each
COMET test teaching site where the results of the tests were discussed with teachers in more detail to gain deeper insights from teachers’ experiences. Each visit realized some new observations to be incorporated in the final results.

Other research priorities from this test series are elaborated in separate contributions and will include:

- An investigation into the vocational learning approach based on the COMET model for developing competences in a South African context;
- The potential of the COMET competence diagnostics model for the assessment and development of occupational competence and commitment, in Technical Vocational Education and Training;
- The potential for COMET to improve the trade test pass rate.

**Methods and research design**

COMET tests were administered in September 2014 on a set date in at five public college sites, three company based training academies and two private technical training schools. Of the 810 COMET test participants, fourteen teachers were included. Test motivational questionnaires and occupational commitment questionnaires were also administered immediately after the test on the same day. Rater training commenced in October 2014, and rating of all tests was completed in November 2014. Feedback to teachers of individual test results commenced at each test site in February 2015.

The feedback sessions were conducted using a focus group discussion approach. Each focus group was made up of teachers from a particular test site to enable deeper consideration of complex teaching and learning issues. This open format with groups of teachers was also designed to encourage dialogue around the individual test results. The intention of this type of feedback session is to record unique observations that could be incorporated into the overall findings of the 2014 large scale study still in the analysis phase. Each site visit was conducted with a loose agenda including the following topics:

1. Review of the primary 2011 COMET test findings. Such findings included information shown in Figure 1 and 2 below:

**Figure 1 & 2: (Rauner, Hauschildt, Heinemann, Piening, 2012)**

- Finding 1: There is a Stagnation of competence development during the course of training
- Finding 2: Test takers were highly motivated and the majority found the task interesting and useful.
2. Advice on how teachers should manage the report back of results to their students. Instructions requested teachers not to distribute test results with a score less than 10 points; those test takers who did not receive a result were to be given the same cover letter thanking them for their participation with encouragement to share information with their peers and participate in the learning tasks offered by teachers in the future. Each participant receiving a report also received a summary of the average score for all test takers of the same occupation.

3. Confirmation of top ten ranking student scores for each occupation tested; Summaries of student comments from the motivational questionnaire, unique to each test site.

4. The relationship between teacher competence and their learners (Rauner, 2014), indicating that teachers often transfer their problem solving horizon to the learners.

Figure 3. (Source: Rauner, Dec 2014 TTPRIS Conference South Africa)

(5) Need for Quality Assurance:

Learners and teachers: A strong relation when it comes to COMPETENCE

Each feedback workshop was recorded for purposes of analysis and comparison.

Results

The feedback workshops stimulated useful discussions between teachers. Teachers were generally motivated to interrogate the content of the feedback and find ways to teach more cooperatively amongst each other and in partnership with industry. The most notable observations in these discussions were common amongst more than 70 percentage of teachers. They are described below in order of interest:

1. Teacher cooperation and learner behaviour:

Teachers concurred that they were not able to predict the top COMET test performers amongst their learners. They were more often surprised to learn who top COMET test
scorers were. This commonly lead to a joint reflection on learner behaviour during both theoretical and practical teaching sessions. Most teachers concluded that students with top COMET scores generally asked more questions about the topic being taught, they also took longer to complete practical assignments and in many cases the student had a more mature identity with the skilled work of the occupation being taught.

Some suggestions made by teachers:

Technology theory teachers need to find ways of cooperating with their practical workshop instruction counterparts, by way of linking theory to practical tasks taught – some examples would be to jointly implement COMET learning tasks, first as a group assignment and then individually, as a means to developing conceptual problem solving skills linked to real problems encountered in the world of work;

Practical assignments and theory classes should be complemented with a visit to a local company that would be able to expand on how the concept/product/assignment fits into a broader work process, how industrial customers set standards for quality and cost, importance of safety considerations and what criteria the company uses whe selecting new skilled workers – i.e., making factory tours valuable to the learning process requires much preparation on the part of the teacher and the learner.

2. “Teaching to the test”:

Teachers commented that in many cases, the students who scored top marks against the taught curriculum were not top COMET scorers. Further discussion on this topic lead to teachers reflecting on their teaching method based on preparing for the test against a set curriculum, rather than teaching that would enable deeper problem solving abilities in the broader workplace context of the occupation. “Teaching to the test” was seen as a gain in the student pass rate at the cost of the students’ learning & development that would support a more successful college-to-work transition.

Some suggestions made by teachers:

Consider the flexibility of a three year vocational qualification as opposed to three one year qualifications; do not recognise colleges’ performance for short term “work-placements”, but rather for proven and sustained employment by means of an apprenticeship/learnership contract either during or post the full NC(V) qualification as an indicator of successful college-to-work transition; Consider a 6-12 month bridging programme for engineering related NC(V) courses.

3. Not enough time for practical mastery:

Teachers conceded that they often emphasised the theory of the occupation over practical mastery and that this should be addressed in the curriculum design, with more emphasis on workshop practise, work-integrated learning and problem solving.

Some suggestions made:

In the case of the NC(V) programme, support the curriculum with e-learning and e-self-assessments that free up formal class time in favour practical mastery of the occupation; increase scope and depth of practical assignments; use industrial experts from local companies to assist in the original scope and assessment of practical assignments; keep college workshops open on a twelve to fourteen hour roster (with controlled access) to support student access to practical hours for individual mastery.
4. Value of occupational problem solving skills recognised:

Teachers were motivated to further develop COMET teaching methods in the classroom supported by simulated practical task alignment to real work processes. Teachers were motivated to cooperate in a community of COMET practise. On the contrary, teachers agreed that it would be very difficult to implement COMET teaching practise where there is no evidence of teacher collaboration.

Some suggestions made:

Implement a COMET Teachers Certificate; Consider a Continuous Professional Development (CPD) points system for vocational teachers that’s quick and easy to implement; teachers earning CPD points should not lose commensurate teaching hours in the regulated weekly requirement; CPD points should be incorporated into the DHET prescribed college funding model, as should post-qualification indenture into sustained employment of students.

It must be conceded that these observations have a number of limitations. Firstly, whilst focus groups have some advantages in the qualitative analysis of data, the observations still need to be considered in the context of deeper analysis of the data from the large scale COMET test held in 2014. Secondly, the vocational teachers represented in this exercise are a small sample of the total population of vocational educators. Thirdly, all the variants of teacher instructional practise are not included in the focus group discussions and may therefore require additional research enquiry. Finally, these observations nevertheless attempt to inform the work of educational scholars committed to strengthening qualitative improvements in the South African TVET system.

References


2.2. Research on the modern apprenticeship based on the talents training mode of the national skill master studio: The construction of the Lingnan Industrial Art Inheriting Base

Ye Junfeng, Luo Wei

Guangzhou Light Industry Technician College, China

Summary: A new talent training model of the master studio with “Four in One, Dual Drive” (joint efforts by the four parties of government, industry, institutes and inheritors; with the two cores of core professional skills and core professional competence) at its centre has been established. This has been done by inviting the masters of arts and crafts of the national skill master studio to teach and participate in curriculum development of cultural heritage. Aided by the crafts industry association, the Institute has set up the Department of Lingnan Arts Industry, integrating work and study for trainees. The Institute actively explored ways to train highly skilled craftspeople based on the Master Studio, creating a training system for professional competencies in the arts and crafts industry, with operational quality evaluation criteria in the assessment of academic achievements of apprentices (students). Under this system, apprentices (students) learn to produce and create typical traditional arts and crafts via close observations and simulation of the masters and systematic curriculum studies. The roles of teachers and masters are changed in this new teaching staff that combines two roles. The notion of the modern apprenticeship is enriched by the craftsmanship embodied by Luban, the great Chinese craftsman, incorporating the traditional concept of “craftsmanship” into its talent training.

Keywords: Master Studio, Modern Apprenticeship, craftsmanship

Introduction and background

The “modern apprenticeship” is currently one of the hottest topics in the reform of China’s vocational education. Guangzhou Light Industry Technician College (hereinafter referred to as the Institute) has made a valuable attempt on the talent training mode for inheritors of intangible cultural heritage with Lingnan features. In addition, the Institute also established an intangible cultural heritage handcrafts research institute to develop the curriculum for inheritance of intangible cultural heritage. By doing these, a new modern apprenticeship mode based on the talents training in studio has formed with the core concept of “Four in One, Dual Drive”, or the joint efforts by the government, industry, college and inheritor, and two drives of core professional skill and core professional competencies. 14 skills-building master studio arts and crafts industry in the South Department, appointed national, provincial arts and crafts masters (hereinafter referred to as the master) and non-genetic order of 54 people, the development of non-genetic inheritance skill Institutes of curriculum development, establishing government, industry, colleges, and other inheritors of “four in one, dual-core driver” (dual-core as the core and the core professional skills of practitioners
ability) as the central concept of the studio personnel training Modern Apprenticeship new model. Through policy support from government, and joint cultivation by the Institute, trade association and enterprises, situational teaching in the studio and enterprise evaluation criteria for highly skilled craftspeople, the Institute has actively explored ways to train highly skilled people and invited masters to teach in institute. It has set up a professional training system for arts and crafts talents and established the operational assessment standard for the academic achievements of the apprentices (students).

The way the apprentices (students) learn to make traditional crafts through face-to-face teaching by masters and systematic curriculum system has drastically changed the situation of the separation between theory and practice, between knowledge and ability as well as between teaching site and real work situation. By offering the students a real working environment where they can learn traditional culture and make handicrafts, the studio has greatly improved the independent learning ability, professional ability and entrepreneurial ability of the students. Meanwhile, it also helps them develop good professional ethics and behavioural habits and objectively improves the quality evaluation standard of the apprentices (students). It stimulates students' interests in learning if their works gain social or market recognition by presenting in different kinds of arts and crafts exhibitions, By all these measures, the modern apprenticeship cultivation mode for the arts and crafts talents through the collaboration of “production, learning, research, sale and exhibition” has been created.

Methods and research design
The research methods of documentary research and field research were used in this study: Documentary research was used in the objective classification, sorting and comparison of various research on apprenticeship and the skill master studio in order to propose a hypothesis on the talent training mode of the master studio; Field research was undertaken to observe the studio scene where both master and apprentice are present and conduct interviews with the master instructors and outstanding apprentices in order to study the practice and process of talent training of the master studio and the feasibility of adopting the evaluation mode of highly skilled talents in the industry. The acquisition of vocational qualifications of technicians and senior technician and the satisfaction rate of enterprises in the trade towards the trainees were researched in a sampled study to ensure the validity of the research results. Observation and interviews were specifically used in the survey, mainly in interviews with master instructors and typical outstanding apprentices (students) to get a thorough understanding of the dual role of the master both as an expert in practice and an instructor, and to extract typical tasks and the implementation of teaching, laying a solid foundation for the study of teaching practice, quality evaluation criteria for apprentices (students) and other issues. Observation is mainly aimed at teaching mode teaching studio effect with the Institute, to help the research team found merit in teaching workshops that exist in a timely manner to determine the research strategy. Informal and formal structured interviews were used to ensure the authenticity of information and to study the process of teaching by instructors and learning by students respectively, the effect of teaching of related content. The interviews were first conducted in groups, followed by random, individual interviews.

Findings
The new talent training of the master studio exhibits itself in the follow aspects: carrying out actual projects through master-apprentice coaching and cooperation, situational teaching of creating works in the workshop, on-the-job professional skill training with an emphasis on the
actual professional competencies. The institute is responsible for the transfer of professional knowledge and skills, focusing on the development of theoretical and professional skills. The institute and the master studio jointly conduct an integrated work-study teaching to achieve the goal of developing the general skills and professional skills. The institute, in conjunction with the master studio, conducts educational tasks, while setting up an institute-enterprise cooperation committee. Masters from the industry are invited to staff the committee. In addition, contracts relating to the training are signed, to specify the division of labour in teaching between the institute and enterprises (the college and the master studio), and the coordination of the number of places for students in the master studio. Arts and crafts industry experts also participate in the program setting, formulating goals for talent training, curriculum development, teaching organisation, teaching evaluation etc. The student signs an agreement with the institute and the master studio a year ahead of graduation, and gets on-the-job training. Through the joint efforts by the teachers of the institute and the masters, training programs, training objectives, curriculum development, implementation of teaching, teaching evaluation are conducted, building a team of teaching staff that combines the two roles of instructors and masters. The notion of the modern apprenticeship is enriched by the craftsmanship embodied by Luban, the great Chinese craftsman, incorporating the traditional concept of “craftsmanship” into its talent training, seeking the convergence of the craftsman’s pursuit of excellence and humanistic spirit, highlighting the craftsmanship concept in China’s modern apprenticeship, and ultimately achieving the goal of training highly skilled talents with originality.

Table 1 on the following page summarises the components of this program, and the functions which each component serve.

References
<table>
<thead>
<tr>
<th>Construction Content</th>
<th>Construction Objective</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Construction of master studio infrastructure, and an authoritative team for the master studio</strong></td>
<td>1. Construction of 14 master studio in arts and crafts</td>
<td>Achieve the integration of creation, production, and apprentices, sales, cultural shows</td>
</tr>
<tr>
<td></td>
<td>2. Apply for a national master studio</td>
<td>Production, apprentices, the development of talent training standards for Si Tuning national skill master studio for Canton enamel</td>
</tr>
<tr>
<td></td>
<td>3. The formation of a team of masters with core skills, the introduction of 54 masters in arts and crafts in campus activities and teaching heritage</td>
<td>Invite arts and crafts masters, senior artisans and senior technicians into the campus as visiting professors at the heritage base to offer lectures and develop curriculum</td>
</tr>
<tr>
<td></td>
<td>4. Joint teaching and creation by art teacher of the institute and masters to develop the teaching staff in arts and crafts</td>
<td>Subject development, curriculum development, industry research, textbook development, research on the modern apprenticeship</td>
</tr>
<tr>
<td><strong>2. Construction of talent training system for arts and crafts industry</strong></td>
<td>“Four in One, Dual Drive” arts and crafts talent training system</td>
<td>Arts and crafts talent training system research</td>
</tr>
<tr>
<td></td>
<td>2. Carry out cooperation on talent training with Guangzhou Arts and Crafts Association to jointly develop teaching plans</td>
<td>Carry out strategic cooperation with industry associations in the cities of Guangzhou, Foshan, and Zhaoqing in training highly skilled talent to provide personnel for the jobs in the industry chain</td>
</tr>
<tr>
<td></td>
<td>3. Carry out master-apprentice inheritance, teaching activities, society activities</td>
<td>Lectures, heritance, creation of works</td>
</tr>
<tr>
<td></td>
<td>4. Carry out cultural exchanges and skill exchanges, generating social effects</td>
<td>Participate in various skill show and expo to the whole society</td>
</tr>
<tr>
<td><strong>3. Construction evaluation and training courses for highly skilled talent in arts and crafts</strong></td>
<td>1. Relying on industry, in-depth research, deepen exchanges and cooperation with industry associations in Guangzhou, Foshan, Zhaoqing, and improve the evaluation system for highly skilled talents in arts and crafts, building evaluation criteria for occupations in the arts and crafts trades</td>
<td>Develop evaluation criteria of highly skilled talents in crafts sculptures, embroidery, painted ceramics, paper cutting, production of precious metals and similar types of work for enterprises, and implement project evaluations</td>
</tr>
<tr>
<td></td>
<td>2. Carry out skills training and evaluation programs for technicians and senior technicians to improve the construction of the training system</td>
<td>Training and assessment of senior workers, technicians and senior technicians industry in great demand in the industry</td>
</tr>
</tbody>
</table>
2.3. Me siento bien en mi centro de formación – I feel good at my training institution: Results of an international competence assessment in nursing

Ursel Hauschildt

University of Bremen, TVET Research Group (I:BB), Bremen, Germany

Summary: Competence measurement in health care professions according to the COMET methodology has started with a first project in Switzerland 2012, followed by a European pilot project in the frame of the Leonardo da Vinci programme with a participation of training providers in Germany, Norway, Poland and Spain (2013–2014). This contribution summarises challenges and major findings of an international comparison in competence assessment considering contextual data.

Keywords: Competence measurement, commitment studies, health care professions, cross-country comparison

Introduction

Health care education in Europe is by far not offered according to a uniform pattern. On the contrary there is a big variety of ways and traditions to learn or to study health or elderly care (BMBF 2014). In many countries nurse education is only offered at tertiary level while in some countries health care education is traditionally trained in a dual vocational education program. In terms of duration or according to the entry qualifications for study or training programs, the situation also widely differs from country to country and according to the different programs offered. On top of that, duties and responsibilities of nurses or workers in care professions are not all the way the same in Europe. Due to such differences in the organisation and provision of health care education, a comparative study on its outcomes, i.e. the competences of learners is a very exciting field of studies.

Methodology

Two projects based on the COMET competence and measurement model (cf. Rauner et al. 2009, 2013) have been conducted under the managerial direction of the University of Bremen*: A national (Switzerland) and an international one involving four European countries: Germany, Norway, Poland and Spain. While the European project has come to an end recently, the Swiss project team has just started a follow-up project based on the experiences made in the first project phase. All partner institutions with the respective study or learning opportunities, numbers of persons involved in competence tests are listed in Table 1.

* The Swiss project has been operated at IBB, TVET Research Group while the European project (COMCARE) supported by the Leonardo da Vinci Programme was conducted under managerial direction of aib, Arbeitswissenschaftliches Institut Bremen. The author also would like to thank all members of the COMCARE research team: A. Bruflot, B. Christiansen, T. Deichmann-Sørensen, M. Dlucik, R. Fischer, U. Griebel, T. Heinemann, W. Jaworowski, I. Kuznica, H. Matthias, M. Rodriguez Monforte, I. Pérez Pérez, A. M. Plana, M-R. Rifá Ros, E. Sánchez Ruiz, J. Schumacher, B. Słowik, Th. Tschage and S. Zinndorf
Table 1: Participants of COMET projects in health and elderly care in Europe

<table>
<thead>
<tr>
<th>Country</th>
<th>Project partners / Institutions</th>
<th>Programs offered</th>
<th>Test persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>(1) Krankenpflegeschule am Brüderkrankenhaus St. Josef, Paderborn and (2) Schule für Gesundheits- und Krankenpflege am Katholischen Klinikum Koblenz-Montabaur, Koblenz</td>
<td>3-year apprenticeship in health care Gesundheits- und Krankenpfleg/r</td>
<td>96 apprentices (3rd year)</td>
</tr>
<tr>
<td>Norway</td>
<td>Oslo and Akershus University, College of Applied Sciences (HiOA), Oslo</td>
<td>3-year Bachelor study program in health care BScN (180 ECTS)</td>
<td>106 students (3rd year)</td>
</tr>
<tr>
<td>Poland</td>
<td>Cardinal August Hlond Upper Silesian College of Pedagogical Education in Myslowice</td>
<td>1 and 2 year programs leading to health care assistant qualifications like medical carer, or assistant for disabled people (one year), or to the qualification of an elderly care assistant (2 years)</td>
<td>87 learners 2nd semester (1-year) or 3rd semester (in a 2-year program)</td>
</tr>
<tr>
<td>Spain</td>
<td>Ramon Llull University, Blanquerna Faculty (Private University) Barcelona</td>
<td>4-year Bachelor study program in health care BSc Nursing (240 ECTS)</td>
<td>81 students (3rd year)</td>
</tr>
<tr>
<td>Switzerland</td>
<td>(1) Höhere Fachschule Gesundheit &amp; Soziales, Aarau (2) Bildungszentrum Gesundheit Basel (3) Berner Bildungszentrum Pflege’ Bern (4) Höhere Fachschule Gesundheit, Luzern (5) Bildungszentrum Gesundheit &amp; Soziales, Solothurn (6) Zentrum für Ausbildung im Gesundheitswesen Kanton Zürich, Winterthur</td>
<td>3-year HF programs (Higher vocational education) leading to a Diploma</td>
<td>435 students (different years of training)</td>
</tr>
</tbody>
</table>

Testing learners in health care professions
In a first step, the COMET competence model was introduced and adapted to the needs of the health care sector (see Figure 1). In a second step test and learning tasks according to the COMET competence model had been developed, pre-tested and verified for main tests in nursing.

Test assignments and rating
The format of test assignments in COMET tests is based on occupational practice and according to three fundamental requirements:

1. The degree of complexity must be set at such a level that contextual understanding – and not just a collection of distinct skills – can be measured.
2. Open-ended test assignments are necessary, since specialists must choose between alternative solutions when performing occupational tasks.
3. The content of test assignments must be characteristic and representative of the occupation in question

The assessment of such open-ended test assignments is made on an anonymous basis, i.e. two teachers (‘raters’) assessing independently one anonymous learner’s solution. This

* For a detailed introduction to the measurement model and its psychometric verification see Rauner et al (2013).
is done with the help of a rating sheet consisting of 40 different items that operationalise the eight COMET competence criteria as (Figure 1). Before an assessment, teachers are trained in a specific rater training seminar in order to secure a high degree of inter-rater reliability.

In addition to the COMET competence test, all learners/students had to fill in a questionnaire on contextual questions reflecting on their specific training situation. This interrogation addressed the learner’s estimation on the teaching and training quality but also included scales measuring vocational identity, occupational and organisational commitment. Those scales were based on a verified test instrument (cf. Heinemann & Rauner 2007; Hauschildt & Heinemann 2013) but adapted to the vocabulary needed in nurse education.

Results

First of all, the fact that competence assessment in the domain of health care profession in an international comparison was feasible is a very encouraging result. The efforts that have to be taken to ensure a high degree of common understanding among the project participants (national consortiums including teachers and trainers) were however very high. Figure 1 summarises average and country specific assessment results. The spider diagrams show average competence profiles reflecting the eight different competence criteria. In comparison to all other test takers, best results have been obtained at the Spanish test site (Ramon Llull University). Differences in the learners performance were among others significant in competence criteria like K4 (efficiency/effectiveness) or K6 (social and environmental requirements).

Figure 1: Average test results (COMET Switzerland and COMCARE, 2013 and 2014)

<table>
<thead>
<tr>
<th>Average Competence profile of all test takers (COMET 2013 CH and COMCARE 2014)</th>
<th>Average Competence profile of test takers in Spain (COMCARE 2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average total score (all): 45,8 (N=805)</td>
<td>Average total score (Spain): 58,0 (N=81)</td>
</tr>
<tr>
<td>Average results COMECARE Germany Ø score: 51,9 (N=96)</td>
<td>Average Results COMECARE Norway Ø score: 48,6 (N=106)</td>
</tr>
<tr>
<td>Average results COMECARE Poland Ø score: 45,4 (N=87)</td>
<td>Average results COMET Switzerland Ø score: 41,6 (N=442)</td>
</tr>
</tbody>
</table>
When interpreting the data collected in both projects, it is essentially important to keep in mind that the data base referred to a relatively small number of participants located at a maximum of two test sites per country which is by far not representative for a country specific situation. Nevertheless the results provide very fascinating insights into the strengths and weaknesses of teaching and training programs offered in Europe.

*What makes the difference: The Spanish Case*

To some extent the contextual data about the participants and their estimations on the respective study programs or apprenticeships delivered some useful suggestions. Compared to test takers at other test sites, students at the Spanish Ramon Llull University were very (or more) content with:

- the general learning environment and their training institution
- the match between practical and theoretical lessons
- their teachers overview on work reality
- the level of requirements and general quality of training
- the image/reputation of their profession and
- the expected salaries after successful completion of their studies.

In order to illustrate these findings, Figure 2 summarises one of these issues.

**Figure 2: Selected contextual information. (COMCARE 2014 and COMET Switzerland 2013)**

![Graph showing the percentage of students' feelings about their training institution/university](image)

The high degrees of contentedness of students at the Ramon Llull University in almost all domains of their training are supported by the survey on vocational identity, occupational and organisational commitment which is documented below.
Table 2: Vocational identity and commitment // mean values (all scales sum up to 24)

<table>
<thead>
<tr>
<th>Country</th>
<th>Vocational Identity (mean value)</th>
<th>Occupational Commitment (mean value)</th>
<th>Organisational Commitment (mean value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>20,64</td>
<td>19,26</td>
<td>16,47</td>
</tr>
<tr>
<td>Norway</td>
<td>18,91</td>
<td>19,56</td>
<td>14,43</td>
</tr>
<tr>
<td>Poland</td>
<td>15,65</td>
<td>13,24</td>
<td>14,27</td>
</tr>
<tr>
<td>Spain</td>
<td>20,01</td>
<td>20,31</td>
<td>17,21</td>
</tr>
<tr>
<td>Switzerland</td>
<td>18,73</td>
<td>19,34</td>
<td>15,5</td>
</tr>
</tbody>
</table>

Outlook

The efforts that have to be taken in order to guarantee a proper usage and understanding of all test instruments are extremely high in international comparison projects. Without adequate funding and personal resources it is almost impossible to get such ambitious projects underway. On the other hand, the benefits resulting from mutual learning are extremely high although they are more difficult to measure and require studies designed for a longer term. The results from the European test, especially the very successful example provided by the Spanish Ramon Llull University will for sure offer learning opportunities for those involved in shaping future structures in health care education.

The next step of the research would be to consider more tests sites in the respective countries as well as a balanced mix of bachelor programs and apprenticeships.

Moreover, it would be interesting to analyse learners performances in COMET competence tests in comparison to their general test performance in their training institutions or universities in order to find out to what extent the training and test concepts corresponds to the principles of a holistic problem solving approach.

References


2.4. Teaching and learning research in master studio apprenticeship training

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Summary: Students can learn a lot from authentic working world, but sometimes it is hard to find suitable enterprises to support dual apprenticeship training in China. Apprentices are trained as production line workers in some large enterprises. At the same time, in some small enterprises, students lack study opportunities and their professional competencies can’t develop appropriately. What are the best ways for providing students with an authentic work experience in school? Should vocational schools set up factories on campus? In China, many vocational colleges build master studios and get tasks from society to train students. They hope students can get working experience and professional competency on campus. This research mainly explores how to design course from authentic enterprise work task in a master studio in vocational schools. The research questions mainly focus on three aspects: The relationship between working tasks and teaching task, how students develop their comprehensive professional competency and how students shape their professional ethics.

Keywords: Master Studio teaching and learning, studio based course, apprenticeship training

Introduction
Skills-based vocational education is receiving unprecedented attention from the central government as China seeks to improve the image of perceived “cheap” made-in-China products. Enterprises demand for highly skilled workers and vocational colleges should fit the needs of enterprise and society.

It is well known that students can learn a lot from authentic working world. All vocational colleges are encouraged to train students in authentic working place. But in China, it is not always easy for vocational schools to to find out ideal enterprises to support dual apprenticeship training. In some large enterprises, apprenticeships are trained as production line workers. At the same time, in some small enterprises, students lack study opportunities and their professional competencies can’t develop very well. To solve this problem, more and more vocational colleges are exploring building a master studio to train student apprenticeships. The aim is train students with authentic work task in campus. It is a new reforming practice. In master studio, authentic work tasks are introduced

* This research was supported by Guangzhou 121 Talent Echelon Project, research leader: Bamei Yang, Corresponding author:Bin Bai, baibin@bnu.edu.cn
into teaching and learning. The technical master is both enterprises’ high skill master and schools’ teacher. They have great working experience and they also work for enterprises. In the master studio, students’ learning tasks are at same time producing tasks in enterprise.

Researchers selected Guangzhou Technician Institute in Guangdong province as a case study, and this study focuses on the following three research questions:

**Research questions**
- The relationship between working tasks and teaching task in master studio
- How students develop their comprehensive professional competency
- How students shape their professional ethics in master studio

**Research Methodology**

*Participant Observation*
In this research, observation method is used to estimate non-visible factors, to ensure that complementary or compensatory methods suited for also understanding the non-visible aspects of this research issue are taken into account. Researchers stand by the students who operate the machines in the workplace. Researchers observe how masters supervise them and give them advice and how they deal with different work tasks.

*Semi-structured and in-depth interviews and case study*
Qualitative semi-structured interviews and case study methods are also applied in this research. Researchers interviewed 3 studio masters and 10 students. The longest interview’s time was 2 hours and the shortest was 40 minutes.

These cases and interviews results are analysed by qualitative software Novivo 10.0 and conclusions are drawn by the analyzing results. Researchers also collected and analysed 10 students’ working blog and teaching and learning material from 3 studio masters.

**Findings**

1. **Studio Masters transform authentic work tasks into learning tasks**

All learning tasks which were collected by studio masters are from the true tasks of enterprises. To ensure the teaching contents with open mind, development, comprehensive and representative, the selecting principles used in the studios are as following:

- According to the students’ level of cognition and competency level. The difficulty and complexity of the work tasks must fit the students’ level. If the task is too simple, it can’t help the development of competency. If it is too complicated and difficult, student will be frustrated and no enthusiasm and interest in learning.

- All learning task are from true work tasks in manufacturing product. In the production process, students can understand the real work content of enterprise production and its requirements. Additionally, participation in the full process of the project enables students gaining experience with the work pressure and enterprise standards of new technology.

- The working task is designed with characteristic openness, complexity and integrity of project is helpful to develop students’ creativity. The complexity production process in the project is helpful to develop the logical thinking and systematization of knowledge. The integrity is helpful to advance the comprehensive vocation ability of student.
2. Student apprenticeships can develop comprehensive competency

The design of learning tasks foster students' comprehensive professional competency. In the process of completing real tasks, students get in touch of enterprise production and develop customer relationship in the supervising of studio mater. In water supply control system assembly and debugging project, students professional competency is developed in different stages.

<table>
<thead>
<tr>
<th>Field</th>
<th>Task</th>
<th>Professional ability</th>
</tr>
</thead>
</table>
| Frequency conversion   | Prepare for raw materials     | * The accurate accounting of the materials  
                          | * Familiar with Component type, check and confirm device |
| constant pressure      | Assemble products             | * familiar with production process  
                          | * Skillful in using tools  
                          | * According to the requirements of the operating instructions for the operation |
| water supply control   | According to the technological | * Be familiar with different specifications and types of components  
                          | system                                             | *assemble complete, self-test |
| Assembly and debugging | Debug                         | * Familiar with various tools  
                          |                                               | * Familiar with working principle and debugging methods of product |
|                        |                               | * According to the Debug file to debug the technical index  
                          |                                               | * rule out various faults in the debugging process |

Teachers constantly re-design the projects to correspond with the increasing complexity and specificity of tasks for teaching. In addition to professional knowledge and skills, the design of the studio teaching content pay much more attention to the development of related knowledge and skills, such as computer skills, English language skills and communication skills, etc. Studio masters cultivate students' summarizing ability by letting students write the learning summary. In this process, students get the opportunity to reflect their learning process. Students are also engaged in a process of observation between teachers and employees, which helps students to develop their communicational competency.
3. Students’ professional ethics are shaping in master studio

It is important to improve personal work characteristics. In the research process, researchers always find that the studio masters emphasize “Work for a right personality before beginning your career”. Studio masters pay much more attention to cultivate good characteristics such as respecting for teachers and parents, modesty, prudence, confidence, bravery and so on. In the working process, studio master always show good models to students. Students learn to how to communicate with different people. They are self-conscious to entertain guests when visitors come into the studio. Students are all active in room cleaning and tiding daily study ended. In the learning process, students humbly ask the teachers or other students when they have difficulties. Researchers found that it is very important and effective for students to gain confidence and courage through this process.

Professional ethics is essential for a worker. Studio masters instill it in the teaching process. Professional ethics include responsibility, team spirit, hard-working spirit, etc. Researchers found the education of professional ethics is also a part of the teaching content. In the teaching process, teachers are strict with students in work accomplishment and work attitude. At the same time, students all work very hard and treat work with sense of seriousness.

References


2.5. School-based technician training under the framework of modern apprenticeship: experiences from a pilot program in Guangzhou

Donglian Gu

Guangzhou Vocational and Technical Teaching and Research Office, Gangzhou, China

Summary: It is difficult to promote modern apprenticeship in developing countries when imperfect vocational education laws, regulations and institutions regulate enterprises. Under this circumstance, this pilot project in Guangzhou tried to train technicians via school-enterprise cooperation with schools taking more responsibilities. Research findings show that three problems should be concentrated on and solved in technician training: the selection of enterprises and learning positions, the evaluation of learning contents and the recognition of identity of trainees.

Keywords: Modern apprenticeship; technician training; school based vocational education, China

Introduction

With the technological, economic and social development and the transformation and upgrade of industrial structure, China has a great demand in high-skilled personals inclusive technicians (ji shi). However, the shortage of high-skilled technicians remained unfulfilled in recent years. On the contrary, the situation got much worse. There would be two main possible reasons: one is that technician training today is too dependent on the internal training of large and medium enterprises, and the other one could be that high-skilled workers need to pay enormous self-efforts on post.

Even though some large and medium size enterprises have the capacity to train technicians, enterprises lack willingness to do so. They would rather employ technicians cultivated from other companies by providing much better salary and career paths. In this situation, technicians can only succeed through individual efforts and opportunities from environments. As the learning process can take a long time, technicians may meet lots of difficulties and obstacles. As the current situation may continue, the supply of technicians from schools will not meet the demands of the labour market.

As lots of Skilled Worker Schools (ji gong xue xiao) in the city of Guangzhou have been upgraded to Technician Colleges (ji shi xue yuan), these colleges started to explore the models and methods of technician training. This paper introduces a teaching-learning reform experimental program titled “School-Enterprise Dual System - Technician Training Research”, which started since 2011 (according to Chinese government regulations, Technician Colleges are only allowed to train preliminary level technicians). The pilot program was led by Guangzhou VET Teaching and Research Office. Five Technician Colleges in Guangzhou participated in the program. The study aims at integrating the resources of colleges and enterprises, applying the advantages and meeting the demands of both colleges and enterprises, and building a school-based technician training model based on Modern Apprenticeship.
Methodologies

The program focused on exploring the effective methods of technician training (Modern Apprenticeship) under current context. The main research fields are practical path for technician training, courses development and delivery, teaching-learning organization and management and learning performance assessment and evaluation.

In the program a series of new type of training courses as well as related learning resources were developed and implemented. The pilot program also focused on enhancement of the professional competences of teaching and instruction staff, confirmation of the assessment and evaluation methods for the professional qualification of technicians. Through the cooperation of colleges, enterprises and government authorities, the project was “successfully” organized and conducted. The “success” is reflected in the following aspects:

With investigation and analysis at the workshop at industries, the colleges learnt the working fields and professional roles of technicians in enterprises, clarified the qualification standards and demands from industries, established professional positions target groups, and found the main tasks.

The researchers of the program organized practitioners, vocational education experts and teachers from technician colleges to join the workshop titled as “Preliminary Technicians Cultivation”. It identified the present situation of preliminary technician training, analysed the problems and development directions, and lastly determined the specific requirements of technician enterprise/society certificate test criteria.

Based on the research above, the pilot program carried out many expert interviews regarding experimental majors, extracted typical work tasks (professional task) and the corresponding vocation’s operational capability requirements.

In regards to the updated National Vocational Qualification Standards, the pilot program developed work-integrated courses, and finally generated the enterprise-oriented professional technician training program.

During the implementation of the program, colleges and enterprises co-developed corresponding courses and related learning resources. The “output/results” of the program were examined cooperatively by the occupational certification authorities and the technician colleges. That means, the evaluation criteria developed by the pilot program satisfied the needs of enterprises and society.

Research Results

Cultivation Model

According to different requirements and demands, each experimental major must cooperate with respective enterprises and industries. Based on different employment requirements, colleges and enterprises jointly determined the scale of enrolment, recruited students, developed courses and provided related resources. Also, colleges and enterprises jointly provided teachers, built practice and training facilities, implemented courses and applied evaluation, etc. Examples of experimental Majors cultivation models are shown in the following table.
Table: Examples of Experimental Majors Cultivation Models

<table>
<thead>
<tr>
<th>Majors</th>
<th>Features</th>
<th>Cultivation Targets</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNC Installation, Adjustment and Maintenance</td>
<td>According to Modern Apprenticeship cultivation model, students can directly work and study in enterprises. In the second year, students sign labour contracts with the enterprises. Enterprises offer salary, subsidies and provides work insurance. After graduation, students stay in the corresponding enterprises. In other words, employment can be realized at the moment the students enter the schools.</td>
<td>Technician</td>
<td>3 years</td>
</tr>
<tr>
<td>Molding Tool Design and NC Control Technology</td>
<td>The “2+2” technician cultivation model means that students study in campus for two years, and then work and study in working place the next two years. During this process, students sign the labour contracts with the enterprises.</td>
<td>Technician</td>
<td>4 Years</td>
</tr>
<tr>
<td>Information Technology</td>
<td></td>
<td>Technician</td>
<td>4 Years</td>
</tr>
</tbody>
</table>

Teaching Organization:

The instruction of technicians would be implemented by colleges’ and enterprises’ qualified workers. Depending on different stages, enterprises technicians and senior technicians will be invited to instruct the program. The enterprises should ensure that students implement actual work tasks, and are instructed by practical advice. In the process of training, enterprises should combine the key working technique, main manufacturing technology and practical manufacturing problems into teaching contents. The enterprises also integrate work into the teaching contents and provide consistency in the program. In addition, enterprises should apply the evaluation model of COMET vocational competence model to guide the implementation and evaluation of teaching organization (Rauner et al., 2009). On the other hand, students’ teaching evaluation includes process assessment and summative assessment. The teachers can assess students by observing students’ working process and grading students’ work and study logs. What’s more, students are asked to write the work and study logs daily to review by the enterprises’ qualified workers, as the workers can extract valuable work achievements from students’ daily work and study logs. The workers can also have regular check on the logs, instruct students and grade on the performance.

Evaluation:

Because each experimental major may have different organization ways and respective enterprises have different degrees of participation and influence, it resulted in that only students from CNC Installation, Adjustment and Maintenance took part in the National Vocation Qualification Examination hosted by the government authorities.

With the help of related government authorities, this program establishes the technician certification process that is oriented by vocational competency. The certification test takes the National Vocational Qualification standards and the working requirements of enterprises into consideration. It also focuses on working requirements in the enterprises practical
scenarios and professional ethics as well as vocational knowledge. Compared with other similar programs, this program significantly increases the social and industry recognition of the evaluation.

Conclusions

1. School-based technician training model (based on Modern Apprenticeship) can cultivate students to gain the National Vocational Qualifications assigned by government authorities and to get the recognition from high-tech enterprises so that students could truly earn the positions as technicians.

2. The National Vocation Qualification Evaluation, which is implemented by government authorities, colleges and enterprises, can narrow the gaps between de-contextualization National Vocation Qualification Examination and the requirements of practice work. As a result, it helps to improve the recognition of National Vocational Qualifications.

3. As China is lacking relevant vocational education laws and mechanism, schools/colleges need to take more responsibilities to establish school-enterprise cooperation model. The model aims at specific majors, fulfils the requirements of enterprises, co-develop enterprise-oriented technician training programs and build the “admission-recruitment” integrated system.

Prospects

1. Choice of learning places in enterprises. For schools/colleges, it is very important to choose the cooperative enterprises. Schools/colleges are lacking relevant experience and influence in the selection of potential enterprises and work places. In the future, the pilot program will continue to work on helping colleges and enterprises cooperate on these matters.

2. Learning contents selection: With upgrade in industries and globalization of economy, the working contents of modern enterprises become increasingly complex. Relevant theoretical content and requirements of skills sets are no longer transparent. Neither colleges nor enterprises have enough knowledge or influence to design a new process. Relevant teaching materials and technology literatures are mostly written in accordance with traditional study pattern. As a result, they are lacking connection with the practical work flow. Therefore work-study integrated learning cannot be achieved by using the old method. Colleges and enterprises should realize the situation and cooperate in the learning program.

3. Identity Recognition: Students have problems to reconcile with their identities in industries, self-management and as “producers, learners and researchers”. Meanwhile, student’s legal status in enterprises would have great impacts on professional and organizational recognition. If these problems remained unsolved, they could become major reasons for high dropout rates.

References

Improving the dynamics of feedback through deploying mobile technology-enhanced learning during pre-apprenticeship

Selena Chan

Christchurch Polytechnic Institute of Technology, Christchurch, New Zealand

Summary: This paper reports on a series of projects deploying Windows Surface RT tablets into trades learning environments. The video capability of the tablets were used to improve the learning of skills and dispositions across a range of trades. Videos were then used to form the basis for students to provide peer feedback. In turn, trade skills and dispositional learning was accelerated with students learning important aspects of judgment pertinent to their trade. Recommendations, as derived from the projects, are provided to assist with the deployment of this form of mobile learning.

Keywords: Situated learning, mobile technology, peer learning, feedback

Introduction

This paper provides an overview of the findings from a series of projects on situated technology-enhanced learning (STEL). The projects introduced Window Surface RT tablets into workshops and workrooms to enhance learning on ‘pre-trade’ programmes. Pre-trade programmes in New Zealand (NZ) range from 16 to 40 weeks in length and prepare people for entry into apprenticeship. These programmes are formalized structured programmes to complete level 2 or 3 certificates. In the past, it was difficult to introduce technology-enhanced learning (TEL) into practical workshops. Shifting pre-trade students from their familiar workshop environments to computer suites was often logistically difficult due to limited availability and access. The introduction of mobile computers, in the form of tablets, accompanied with access to the internet via WiFi networks, provided the opportunity to introduce TEL into practical workshops. Hence, STEL combines principles of situated learning with TEL to assist the learning of trade skills, knowledge and dispositions (for a more thorough discussion of STEL, see Chan, Fisher & Sauer 2014).

STEL was envisaged to be a means to improve digital literacy amongst pre-trade students; provide ease of access to a range of multi-media content to cater for students’ multiple intelligences; allow for the collection of evidence of students’ progressive skill attainment; and replicate the authentic deployment of technology within industry. Over the course of the last four and a half years, project teams worked on the following:

• improving skills learning, including dispositional/attitudinal ‘service orientation’ (e.g. learning to become front office receptionists);
• learning of complex practical tasks (e.g. fitting and turning; barista/coffee making);
• dealing with the spatial world (e.g. reading and drawing plans with fitters and turners);
• connecting theory to practice (e.g. electrical concepts); and
• understanding aspects of a temporal nature (e.g. automotive engineers, electricians, baristas).
Tablets were deployed during and after learning activities (i.e. for effective use of peer, self and tutor feedback) and to collate evidence for assessments (i.e. construction of eportfolios). The digital multimedia capabilities of tablets were used to

• provide access to pre-recorded or located content to undertake project and inquiry-learning;
• support differentiated learning so more able students were able to accelerate learning and students requiring additional support had access to learning content as required;
• record learning activities for later collation into eportfolios;
• record learning activities for peer and or teacher feedback;
• record evidence for completion of assessments.

Artefacts or evidence of learning are captured through archival of written work; photos, audio files or videos of students’ work or the work of others to provide platforms for later reflection and discussion (i.e. formative assessment) or as evidence of learning (i.e. summative assessment). Feedback processes included face to face feedback; annotation of written work or annotation of photos or plans with written notes or sketches; and annotated videos with voiceover or sketches. Of note, in all the projects is the importance of dyadic learning and the contribution of feedback towards improving learning.

Learning a trade
Learning a trade is complex (Billett 2014; Lucas, Spencer & Claxton 2012), requiring the learning of a range of skills, application of knowledge/understanding and deployment of appropriate dispositions (Chan 2013). Learning the skills, knowledge and dispositions to prepare people for work involves both inter and intra-psychological processes (Billet 2014), with individuals’ learning inter-woven with contributions from socio-cultural and socio-material influences (Fenwick, Sawchuk & Edwards 2011).

Technology is useful in improving the learning of complex skills through the provision of opportunities to capture practice as it occurs. Self-capture of learning activities engages learners and provides evidence learners are able to examine. Videos, for example, capture the minutiae of skilled performance, the ephemeral nature of some processes and the unspoken gestures of, for example, guests and receptionists inter-relations. Annotated written descriptions, photos of products in the process of manufacture, audio files of machinery ‘noise’, annotated plans and sketches etc. all provide artefacts for extension of explanations by teachers, discussion, feedback and reflective learning with self, peers or teachers, and the collation into documentation of learners’ skill acquisition, knowledge application and development of occupation specific dispositions. Of importance, is the opportunity for learning to occur, through the sharing, critique and feedback on artefacts and/or performance.

Importance of feedback
Feedback is held to be one of the main contributors to successful learning (Hattie 2012). The feedback loop includes processes of feed up (i.e. where am I going), feedback (i.e. how am I going?) and feed forward (i.e. where to next?). Although feedback itself often occurs, feed up and feed forward are not always delivered. Hence, it is important to prepare learners, who are acting as peers, to provide all the stages of the feedback loop. Feed up is important to ensure learners are on track with their learning. Feedback provides learners with pointers on the execution of the learning process. Feed forward is perhaps the most useful as it offers suggestions to learners on what requires further practice and suggestions for improvement.
**STEL and feedback**

STEL provided the means to capture learning as it progressed through learning activities occurring in workshop environments. Tablets could be used to take photos or videos of artefacts or were used to record written calculations, drawings or notes as learners worked through practical activities. The tablets were then used to display the artefacts for feedback. In some activities, feedback was recorded on tablets as feedback progressed, using voice or sketches/written annotations. These records of feedback could then be used to track learners’ skill progression or as exemplars for other students.

**Research method**

The projects reported are mixed method studies, framed by participative action research (PAR) as the overarching methodology. The objective of the implementation was to improve the quality, effectiveness and specificity of each discipline/learning approach to enhance feed up, feedback and feed forward at task, process and self-regulation levels (Hattie 2012). The efficacy of developed rubrics, to support STEL via peer feedback, were evaluated through a series of PAR iterative cycles.

Six projects were run, with all now completing at least a fourth iteration. The total number of student participants from across the six projects was 279 and eleven teachers were involved. All students completed an evaluative questionnaire, customized to reflect the learning outcome to be achieved. In general, questions centred round the efficacy of the STEL learning activities and students’ preparedness to engage and, where relevant, peer feedback activities. Teachers were interviewed at the start and end of each iteration. The researcher maintained a reflective diary, collecting impressions through the various projects during interactions with students as they proceeded with STEL learning activities, project meetings with teachers and workroom observations. Data analysis consisted of thematic analysis, drawing out themes from each iterative cycle to contribute to the next PAR cycle.

**Report of findings**

The findings reported in this paper are the main thematic threads common to all the projects. Each project generated a range of context specific outcomes and examples are reported in Chan et al. 2014, Chan & Leijten 2012; and Chan, McEwan & Taylor 2013.

Accelerated skills learning through deployment of STEL was augmented by opportunities to improve self and peer inter-relational communication and problem solving skills. Through all the projects, feedback approaches were the keys to successful learning. The different learning and discipline specific contexts for feedback required the development of ‘rubrics’ (based on Gan, 2011) to enhance feedback for pre-trade learners. Additionally, rubrics were constructed to assist pre-trade learners to relate learning to applied occupational practice. Principles of mimetic learning (Billett 2014) and occupational and workplace specific requirements (Tanggaard & Elmholdt 2008) were incorporated to ensure authenticity of learning and /or assessment activities.

Tablets were selected as they had proved to be more user friendly to trades students who often had mixed profiles for digital literacy skills (see Chan et al. 2014). Tablets were also ideal for the feedback process as the larger screen size, when compared to phones, allowed for viewing of intricate manual, machinery or interpersonal interaction activities. A series of rubrics to assist the process of feedback on the artefacts gathered were developed. Rubrics were constructed to account for learning outcomes, quality standards to be met and assessment processes.
The developed rubrics evolved towards discipline and learning activities specificity reflecting the specialized nature of the learning of occupational skills, knowledge and dispositions. Rubrics were developed for peer to peer feedback and tutor to individual student feedback.

Discussion and recommendations

The following recommendations were synthesized through thematic analysis of data collected from evaluative questionnaires, student focus groups, teacher interviews, researcher journaling and the literature relevant to STEL.

1. As reported in Chan et al., 2014, the preparation of the teacher and students are keys to successful implementation of STEL. Teachers who were confident with using tablets to improve students’ learning were able to maximize the possibilities for STEL towards a range of learning objectives. Students’ capability in using the tablets and its software operating system increased the range of artefacts collected for portfolios and improved facility with offering feedback to peers.

2. The use of videos of practice and prior preparation of students to implement feedback processes, accelerated learning of a range of complex practical and challenging dispositional skills.

3. The identification of learning objectives to best implement STEL was a key to ensuring pedagogical purpose underpinned the use of tablets.

4. Rubrics prepared to assist feedback processes became opportunities for students to also learn the skill of judgment specific to the industry they were preparing to enter.

5. Usability issues with technology and any selected apps, required resolution before tablets are used in learning activities. Therefore, projects now include an orientation session for students to the use of the tablets in a range of activities mirroring the learning activities to be accomplished, before using tablets in actual learning activities.

6. Where peer feedback was deployed, students were also provided with an orientation session on the feedback cycle.

7. The range of artefacts collected, in particular videos of practice, provided the opportunity to build repositories of ‘best practice’ for use with future classes as ‘models’ for new students to aspire towards.

Conclusion

This paper reports on the results of and recommendations for deploying STEL with clear learning outcome objectives to improve the learning of trade skills, knowledge and dispositions for ‘pre-trade’ students. In particular, customization of feedback processes assist novices to commence their journey of learning a trade and becoming a trades person. Recommendations were formulated through the evaluative data gleaned from students and teachers. These recommendations are proposed to support STEL for pre-trade students.

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2.7. Skilled trade worker to a teacher of high school youth:  
a little bit of luck and a lot of courage

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Summary: Program participants’ experiences and an examination of what it means  
to tackle a second or third career requiring attendance in the alien environment  
of the university is the focus of this study. For most, attending university was an  
unlikely possibility when they completed high school, or not, and continued to  
the skilled trade workforce. Transition from the oft-called blue-collar skilled trade  
labour market to the professional white-collar environs of teaching embodies the  
heart of this discussion; the classed occupational and educational structures and  
the individuals who are transcending them, albeit, not easily.

Key words: Teacher education, skilled trade, vocational education

Introduction

Select participant experiences of the Alberta Ministry of Education’s (referred to as Alberta  
Education) Career and Technology Studies (CTS) Bridge to Teacher Certification Program  
form the foundation of this discussion. These individuals have a skilled trade certification  
(e.g., journey ticket), industry experience, additional formal post-secondary education, and  
the desire to complete a Bachelor of Education (B.Ed.) degree program. The program intent is  
to provide monetary support to attend university (Note: B.Ed. degree entrance requirements  
are the same for those who are not part of this program) with a subsequent and established  
plan for school district employment as specialized teachers of Alberta Education’s (2015)  
high school CTS and vocational education curricular areas. This program of studies is  
designed to encourage secondary education students (i.e., grades 10 to 12) to learn skills,  
knowledge, and technology, which they can use in their daily activities and/or transfer to  
other curriculum topics. Secondary education students are enrolled in the CTS content areas  
for two main reasons: exploration and development. Explorations and deeper developments  
are designed for youth to consider current and future education, work, career, occupation,  
and leisure opportunities.

Research design

Statistics and other quantitative data regarding teacher recruitment, retention, and education  
practices as well as qualitative research methods are essential aspects of the overall  
research design for the larger study.

Pertinent literature (e.g., scholarly journals, books, government reports, school district  
documents, etc.) is also reviewed for the larger study. Relevant literature sources are  
incorporated into this discussion. Participants are/were part of the Alberta Education’s CTS  
Bridge to Teacher Certification Program, which involve enrollment at the University of Alberta  
in the Faculty of Education B.Ed. degree program and a formal sponsored relationship with  
any one of Alberta’s school districts. The key data collection methods for this segment of
the larger study are face-to-face and/or telephone audio-taped and transcribed interviews that vary from 30 minutes to one hour (i.e., to date 17 interviews). Data analyzed are the interview comments of three participants who detailed their experiences as they transitioned from the skilled trade workforce to university and, for two of the three individuals, into the secondary school system as fully certificated teachers in the province of Alberta. The B.Ed. degree presents these individuals with the same obligations, privileges, and responsibilities as all kindergarten to grade 12 certificated teachers in Alberta, a province in Canada. What is most striking in this research study are the student experiences and the associated tensions of habitus and the countering of expectations because of the participants’ persistence, resilience, and optimism. Participants’ experiences include rural and urban degree program practicum placements and certificated teaching positions. Post-secondary accomplishments for the three participants are western Canada skilled trade employment, apprenticeship programs, and journey ticket certifications in their respected occupations (i.e., carpentry for two, and baker for one). In addition to these life and education undertakings, one participant earned an American state university degree, another completed an Alberta two-year diploma and an additional journey certification, and the third acquired one more western Canadian ticket. Of the three, one is in a master’s degree program, and the other two are considering the graduate degree as the next step in their educational journeys. Participants’ experiences are situated and studied with a view of Alberta’s political, social, geographical, economic, and classed occupational and educational structures, and the concepts of habitus, persistence, resilience, and optimism.

Findings and discussion
The original objective of the larger study is to develop strategies that contribute to a framework to advance Career and Technology Studies (CTS) teacher recruitment and retention, which supports the province of Alberta’s Education Sector Planning, Ministry of Education (i.e., Alberta Education) initiative to increase teacher workforce in specialty areas (e.g., CTS) and dual credit (e.g., high school apprenticeships), and to propose strategies to improve the present practices for CTS pre-service, post-B.Ed., and graduate teacher education. This segment of the study that makes up the content of this discussion examines the experiences of three Alberta Education’s CTS Bridge to Teacher Certification Program participants. These individuals have completed a skilled trade apprenticeship and gained in-depth industry experience, and, most importantly, have an expressed desire to earn their B.Ed. degree and to teach in Alberta’s secondary school system. The program intent is to provide monetary support to attend university with a subsequent plan for school district employment as specialized teachers of secondary students who are interested in trade-related CTS areas and potential dual credit apprenticeship routes. Program participants are currently completing, or have fulfilled the requirements of the University of Alberta, Faculty of Education B.Ed. degree program. Student experiences and the associated tensions of habitus, persistence, resilience, and optimism are embedded in classed occupational and educational structures that continue to pervade the students’ lived experiences. Underlying these elements are the identity transitions from skilled trades/crafts person to learner, and then to teacher.

Classed occupational and educational structures
Teachers of CTS and vocational education as with other content areas are valued for the inspiration, knowledge, skills, and possibilities that they bring to and share with their students, and other stakeholders such as parents/guardians, colleagues, school administrations,
government, and community members. Teachers work within an employment culture, ideally, of collaboration and strong and healthy learning environments. Similar, the paths to the teaching profession, that is, their previous work and education as well as teacher preparation education form the foundation from which teachers can draw on. The CTS and vocational education space is one that is richer by the real, imagined, or otherwise lived experiences of student, teacher, school, and community. This observation is especially evident when individuals with valued skills and experiences decide to counter the norm and take that first step and walk through the university doors with the explicit intent to earn a B.Ed. degree. A participant states:

“So when I started working with students [as support staff] … I started to see that there was different ways of expressing those intelligences and that I am not an idiot and I could understand things and so could they. I think from running a [commercial] kitchen to being in a classroom … It just seemed like a natural progression.”

Individuals tend to view class within the context of their everyday lives, which, in turn, is firmly coupled to learning and the opportunities that learning has for them (Field & Morgan-Klein, 2013). Part of the struggle for many students who traditionally do not enter a degree program is that the university structure itself is not welcoming and is resistant to include learners who do not align with what is considered the typical student. Thus it is prudent to shift the orientation of post-secondary systems; however, “especially at the university level, [these systems] are steeped in tradition and are highly resistant to change” (Kirby 2009). Awareness amongst the CTS Bridge to Teacher Certification Program organizing team, along with monies from Alberta Education, which alleviate some of the financial pressures of attending university, institutional support was an integral component to help transition the individuals into this alien environment, the university. “I felt like if there was anything that I needed I could go to … the people that organized the program and the people within my cohort and just ask for support and they would support me” is an observation articulated by one participant. Another participant notes that, “I mean the learning curve was up and down but you never felt like you couldn’t turn to somebody”. Embedded in the program design is the aim to promote the participants’ identity as full and functioning members of the university community, as learners and university students.

**Habitus: A counter story of persistence, resilience, and optimism**

The three individuals confirm that attending university was not part of their life plan; they did not ever imagine going to university. They cite a number of reasons, as noted above, for example, two participants believed that they did not have the ability to go to university. An integral concept underlying these reasons and subsequent choices can be attributed to what Bourdieu (1990) calls habitus. He argues that habitus is situational; we are born to lived realities that are difficult to change. Essentially, we live as we are taught, and those who we live with teach us. With these teachings, our dispositions are aligned to our everyday social environments and any changes have the potential to cause strife and disorientation (Lehmann 2013). “I wasn’t happy with my current position … wasn’t happy with the fulfillment I was getting out of work” comments one participant who, by chance, met with a high school teacher and was told about this program. Financial and institutional support made it possible to pursue a B.Ed. while at the same time meet family and financial commitments. Further, Lehmann (2013) highlights that “feelings of inferiority” (p. 3) are not unusual for students from working-class backgrounds who attend university. A study participant agrees that “Okay this is a humbling experience; I am wandering around the hallways looking for room 352 … It’s a humbling experience and a lot of people don’t like to feel that vulnerability. But it
exists …” The counter story, the one that pushes against the situational, lived, and inherited habitus, is clearly demonstrated by these individuals’ persistence, resilience, and optimism: Evidence of dedication despite its difficulty (persistence), commitment to overcome adversity with strength of conviction that one can achieve this goal (resilience), and believing in oneself that the hoped for will happen (optimism) (Merriam-Webster 2015). Walking through the doors of the university is exactly what these individuals could not imagine: “I didn’t do well in school … I hadn’t had any success in school, other than trade school which … it’s school but university is kind of a different thing”. Another participant comments, “what high school taught me was that I wasn’t good at anything, that I wasn’t smart enough to go to university”. It is disheartening to hear these words. Yet, these individuals have consciously and deliberately cultivated strategies and techniques that position them as learners (Field & Morgan-Klein 2013; Lehmann 2013) in a university context: “That was a big stress for me; learning how to be a student again was a bit of a hurdle to overcome”. The accomplishment of these individuals, two successful B.Ed. completions and one soon to be, demonstrate that they have navigated the daunting academic, social, and cultural milieu of the university.

**Closing comment**

Participants’ enthusiasm and unwavering commitment to achieve their B.Ed. degree despite occupational and educational obstacles as well as situational, lived, and inherited habitus is inspiring. Transitioning from skilled trade/crafts person to a teacher of high school youth, and shifting one’s personal and vocational identity from skilled trade work to learner and to teacher, does require a little bit of luck and a lot of courage.

**References**


2.8. Pre-apprenticeships towards apprenticeships using practice-focused learning

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**Summary:** Workplace learning has become a key focus of learning driven by changes to technologies, skill demands and by economic factors and for apprentices and pre-apprentices preparing and training for the workplace brings its own challenges. With recent trends of vocational training it has become common practice to commence student education and training through programmes that are designed to provide the relevant underpinning knowledge and practical skills prior to entering the workplace. This paper is based on early qualitative research for an EdD study that focuses on pre-apprentice and apprenticeship models of training with a view to gaining a better understanding of the pedagogy of practice-based learning principles and styles. Through analysis of collected data the early results of the study indicate that there is a need for tertiary providers to provide courses that incorporate practice-focused training initiatives to enhance apprenticeship training programmes both off job and on job.

**Keywords:** Pre-apprenticeships, apprenticeships, practice-focused learning

**Introduction**

This paper is based on my progress and early findings of a study on apprenticeship and pre-apprentices that were engaged in training programmes at a tertiary institution in New Zealand. The primary focus of the study was to investigate potential benefits gained for students, lecturers and industry when using practice-focused learning models delivering programmes in engineering trades at certificate level in vocational education and training (VET) at a New Zealand tertiary institution. The findings of the study have the potential to inform discussions on the ways in which learning prior to and in the workplace might be more effectively facilitated and managed.

In New Zealand there are at least three methods of training that pertain to engineering trade training and the most prevalent is the traditional apprenticeship contract of training-a contract between an individual and an employer and a training organisation. The training for an apprentice will occur at his or her place of work and concurrently at an institute of technology. The second method of training is through a traineeship where the trainee is employed in industry and all of the training is conducted at their place of work. The third method of training that is becoming a preferred option is through pre-apprenticeship training programmes where students study full time, but also spend time at a workplace through either work placements or by work experience activities.

Workplace learning has become a crucial focus of education driven by changes to technologies, skill demands and by economic factors. This research will focus on apprenticeship and pre-apprentice models of training with a view to gaining a better understanding of the pedagogy of practice-based learning principles and the different contexts of learning through
on-job and off-job learning. A significant component of this research attempts to determine how practice-based models of learning support the initial preparation and the further development of essential knowledge and skills for work and in work in engineering trade disciplines.

For the purposes of this research, ‘practice-based learning’ is understood as the engagement of students in learning activities through collaboration with a tertiary institution, industry partners and workplace learning. This engagement includes, although is not limited to, industry based placements and work based learning programmes that are integrated with the formal curriculum at a certificate level. Practice-based learning is the type of learning that occurs from real work in real work experiences. According to Raelin (1997, p.572) ‘this approach recognises that practitioners in order to be proficient need to bridge the gap between theory and practice’

Pre-apprentice programmes are particularly useful in providing students with the relevant underpinning knowledge and practical skills prior to being an employee in a workplace. Pre-employment courses have become a preferred method of training by students and employers, due to apprentices being more prepared and work ready by the time that they enter into employment (Callan 2008).

Methods and research design
The research approach was through a qualitative study using case studies that involved semi-structured interviews, focus groups and questionnaires to answer the research question. The study centred on programmes delivered at a New Zealand Institute of Technology, in the area of trades and technology fields covering four specific courses in automotive and electrical engineering.

In social science research, according to Neuman (2003), there are alternatives that indicate three approaches to social research that represent different ways of looking at the world that observe measure and understand social reality. The three approaches specified are positivism, interpretive and critical social science. For this research in practice-based learning, an interpretive social science research approach was utilised, to gain an understanding of what was significant and relevant to the participants in the study. The interpretive approach adopts a practical orientation and is more concerned about how people interact and is defined as “the systematic analysis of social meaningful action through the direct detailed observation of people in natural settings in order to arrive at understandings and interpretations of how people create and maintain their social worlds” (Neuman 2003).

The primary focus of the study was to investigate potential benefits gained for students, when using practice-based learning models delivering programmes of study in a vocational field. The nature of the study and the research questions fit well into the characteristics of empirical qualitative enquiry that is part of case study research. As indicated by Yin (1984) the case study method involves using numerous sources and techniques when gathering evidence.

The main research question for the full research project was: How does practice-focused learning support the initial preparation and the further development of knowledge and skills for work and in work? The associated question for this paper was: How are current features of practice-based learning models considered effective or ineffective?

Nature of pre-apprentices and apprentices
There were four case studies involved in the study:

• Group 1 – pre-apprentice students studying towards the National Certificate in
Electrical at level 3.

- Group 2 – pre-apprentice students studying towards the National Certificate in Automotive at level 3.
- Group 3 – year 2 electrical industry students at level 3.
- Group 4 – year 2 automotive industry students at level 3.

Two case studies were conducted to cover students that were studying full time on engineering pre-apprentice programmes at Manukau Institute of Technology (MIT) where the students are required to carry out ‘on job’ work experience and the other two case studies covered students working full time and studying part time. All the students were working towards the final National Certificates in engineering qualifications at level 3 on the New Zealand National Qualification Framework.

Groups 1 and 2 students were full time students studying in Electrical and Automotive pre-apprentice programmes. The programme duration is for 1 year and during that time students were engaged in practice-focused learning activities both at the Institute and also at the workplace with industry engaged in the engineering trades.

Students in Group 3 and 4 were students working in industry. Their training included ‘off-job’ training at a tertiary institute (MIT) through studying at evening classes, distance learning and block courses where the education and assessment is carried out by lecturers.

A detailed interview protocol included a questionnaire for the students involved in the case study to gain some background information of the students in terms of age, ethnicity, previous qualifications gained, current study and work experience history with apprenticeships and/or traineeships. All student interviews were conducted in small focus groups of 3 or 4 as a more appropriate method to gather their feedback and all interviews were taped with permission. This method was used for all the student groups at a time and venue that was suited to the participants and the same questions were asked at all the focus groups. The purpose of the focus group interviews were to allow those involved in the programmes to describe in detail their perceptions and interpretations of their experiences in practice-based learning.

For this paper the research data was analysed for common themes to gain a comprehensive comparative analysis between the four cohorts of students engaged in the study.

**Results**

The initial findings of the study focused primarily on the early results on the student focus groups pertaining to the research question: How are current features of practice-based learning models considered effective or ineffective?

This section discusses some of the positive themes that emerged from the research study relating to features of practice-based learning models used in the delivery of current courses at a New Zealand Polytechnic.

**Pre-apprentice focus groups**

The pre-apprentice student focus groups were carried out first and the themes that emerged from the data gathered indicated that pre-employment courses were an ideal method of gaining practical hands on training in the trade sector that they would be eventually progressing into. Students felt that the learning that they had undertaken was extremely valuable as the learning that they had gained was practically orientated.

- Gained considerable value from the training and skills gained away from the workplace and found that what they were able to gain from their training programme they were able
to use more effectively at the workplace.

- Through hands-on practical experience prior to entering the workplace was beneficial as it gave them some reassurance of the skills required and tools and equipment needed at the workplace.
- Practice-based learning activities that occurred away from the workplace was useful through learning the basics through practical projects.

Some features of the pre-apprenticeship training that emerged that appeared to be more difficult to achieve and posed some challenges for both the trainees and stakeholders was in the area of work experience. As the work experience component required students to find and arrange their own placements, it proved difficult for many of the students and as a result they spent a lot of time trying to source the workplace to attend.

**Apprentice focus groups**

Further focus groups carried out were the apprentice cohorts and the data gained from the apprentices and their comments relating to their training at the workplace gave a valuable indication as to how the training actually is in reality. Comments indicated a mixed response showing some positive and satisfying training but in contrast there are indeed several changes that will need to be made to provide for improvements related to good training practices. Some of the findings are listed below:

- Being an active apprentice was very satisfying.
- Working and attending block courses—through working at the workplace and gaining on-job learning at the workplace was identified as a preference to that studying on a full-time basis.
- Scope of work does not always cover the unit standards that are part of the training requirements to meet the National Certificate.
- The training available at the workplace may not be sufficient and subsequently leads to issues of completion.

**Conclusions**

The pre-employment courses that the students entered onto have proved to be a preferred method of training, rather than becoming an apprentice direct at the workplace with little or no training prior to starting on the job. When students have opted for a pre-employment programme they have the advantage of gaining their off-job training component in a much quicker time frame than apprentices or trainees that are fully engaged in full time work.

There is a need perhaps for improved training relationship plans available for the apprentices and maybe a more regulated system where the training industry organizations work closer with the tertiary sector. It also seems that for a large number of apprentices to gain access to off-job training is difficult as some employers will not provide paid leave from work in order to achieve this.

**References**


2.9. Learning as an apprentice: a comparative study on affordances for vocational learning in school and work life apprentice education

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Summary: This comparative study comprises apprentices who are becoming construction workers and shop salesmen’s within two different apprenticeship systems in a Swedish context. Particularly in this paper, the aim is to study how affordances for vocational learning can be viewed through these educational contexts. The data collection includes interviews and documents related to respectively educational system. The findings show that there are similarities between the two apparent different educational systems. One conclusion is that workplace demands overcome the criteria in the steering documents. Consequently, there are apparent constraints between stated goals and the affordances offered by workplaces in both educational systems. Hence, they both develop vocational competencies according to workplace demands that correspond to workplace activities.

Keywords: Upper secondary apprenticeship education, vocational education and training (VET), employed apprentices, work-based learning

Introduction

The construction industry in Sweden has a long tradition of apprenticeship education (Berglund 2009), while education through upper secondary apprenticeship education (USAE) is a new pathway of learning for some vocations (Lagstrom 2012). This ‘new pathway’ is apparent in the Business and Administration programme that does not have a tradition of apprenticeship education. As Olofsson (2008) and Olofsson & Wadensjo (2011) infers, USAE is a result of an education-political ambition in Sweden. To develop knowledge on how workplaces can offer affordances for learning (Billett 2001b), it is important to study these educational settings. Since learning in workplaces can be seen as a continuously ongoing activity (Billett 2006) and constructed in a social environment (Lave & Wenger 1991), the affordances for vocational learning is constituted within participation in workplace activities. Thus, Billett (2001a), argues that the support and guidance provided in the workplace is important for all aspects of learning. This opens up for the idea that learning and guidance is important to understand and thus it is an ongoing activity that can be enhanced or constrained by the affordances provided in the workplace. As a consequence of the requirement for support and guidance in the workplace, as suggested by Billett (2001a), workplace affordances can support or constrain the learners movement towards full participation in the workplace community.

To demonstrate how vocational competences can be developed and understood, we aim to analyse how affordances for vocational learning is provided in the two different educational
apprenticeship contexts. Specifically, in this paper, we will conduct a comparative analysis, comprising USAE students and apprentice education at work after graduating (i.e. employed apprentices. The employed apprentices have all graduated from a vocational programme and the upper secondary apprentices are educated within the Swedish national school system as VET students. Through participation in the Business and Administration programme, the students are training to become shop salesmen’s. The employed apprentices comprise former vocational students in the construction programme that conducts their mandatory apprentices’ time after graduation. These educational contexts represent the two different apprenticeship systems, which will be further presented under Apprenticeship education by employment and Upper secondary apprenticeship education.

**Apprenticeship education by employment**

Becoming a construction worker in Sweden with a professional certificate is mainly undertaken by participating in and completing an upper secondary vocational education in the profession. To gain a professional certificate, the graduated student has to go through a mandatory time as an employed apprentice and complete a total of 6800 hours. The pathway to a professional certificate can vary from person to person dependent on mainly two aspects. First, if all courses related to the construction programme are passed the student/apprentice will be credited with 2500 hours. The 2500 hours is then noted into an education e-book that is provided by the Swedish Construction Industry and Training Board (SCITB), which contains categories of main tasks in the construction industry. Another important document is the description of goals that are stated by SCITB and displays competencies that a worker with a professional certificate should have. Every student who graduates from upper secondary school is also credited with another 300 hours by SCITB as ‘goodwill’ for well performed school education. Second, the students can also be credited with more hours if they have worked at a construction site during holidays. By completing, i.e. working, a total of 6800 hours the apprentice can apply for a professional certificate for construction workers.

**Upper secondary apprenticeship education**

In 2008, the USAE pilot project was introduced and became permanent in the 2011 curriculum for the upper secondary school (GY 2011). This apprenticeship education implies that students who want to learn a vocational profession, within the frames of upper secondary school, are able to choose between the older and quite established school based upper secondary vocational education and this ‘new’ apprenticeship system. In this system, the students are guaranteed that at least half of their three years long upper secondary education is located in one or several workplaces. The system ensures that apprentices participate in mandatory theoretical subjects, e.g. Mathematics, History, Swedish and English in an upper secondary school and vocational subjects through participation in workplace activities. The vocational subjects are undertaken at workplaces and assessed in a close collaboration with school according to the curriculum and course syllabuses. The USAE is steered by the curriculum for upper secondary school and does not include any kind of employment. In this system and the participants have student status during their education (SFS 2010:2039).

**Aim and research questions**

The aim of this research paper is to study how affordances for vocational learning can be viewed through two different educational systems, comprising apprenticeship education in a Swedish context. One system is guided by the 1994 national curriculum for non-compulsory school and the other is guided by goals stated by the Swedish Construction Industry and Training Board (SCITB). To address this aim, following questions are to be answered: i) How
do steering documents in these educational systems support and/or constrain affordances for vocational learning? and ii) What are the main similarities and differences between these two apprenticeship systems?

Research approach

The data collection is made within two different projects and consequently the sampling procedures will be presented as two different cases. The data collection is inspired by the idea that interviews are a usable method when data is collected in an authentic environment i.e. in workplaces (c.f. Atkinson & Hamersley 2007).

The apprentices who were chosen for the study on employed apprentices were based on a previous study on upper secondary students in a construction programme (Fjellstrom 2014). The sampling procedure was based on apprentices who are working in the construction industry. This procedure reduced the original population (n=15) into 12. The interviews were conducted in spring 2015 and were between 30-55 minutes long.

In the study of the USAE, 15 interviews, both individual and group, were done at five schools and at ten workplaces during spring 2013. A total of 20 USAE students participated in the interviews that lasted between 30 - 70 minutes. This study was a part of a follow-up project that was initiated by the Swedish National Agency for Education.

Findings

The results show that there are similarities between the two apparent different educational systems. The educational setting i.e. the workplace are driven by workplace activities that guide and support the apprentice to become an active participator. Goals stated in course syllabuses or description of goals is not the focus for either employed apprentices or USAE students. As learning and work can be seen as interdependent (Billett 2001a), learning through participating in workplace activities is the action that constitutes both employed apprentices as well as USAE students learning. Hence, USAE students will be assessed and graded from goals stated in the course syllabuses while the employed apprentices are assessed by co-workers and supervisors. This opens up a debate on how workplace goals and demands can correspond to educational systems and the importance of boundary crossing between education and work (Akkerman & Bakker 2012; Tanggaard 2007). Thus, the employed apprentices also have learning goals, but as the result indicates, the apprentices are unaware of these goals. Instead, perceived learning goals and activities are related to required demands in the specific workplace. Consequently, the employed apprentices relate their learning goals to workplace demands rather than stated goals in the description of goals that are provided by SCITB. On the other hand, the students in USAE are being assessed through workplace demands while graded towards goals in course syllabuses.

Conclusion

Learning can be seen as an integrated activity in workplaces. As this study shows, the affordances for learning in these different educational systems are dependent on the apprentices’ access to workplace activities. Thus, the educational systems, which should be guided by steering documents, is instead guided by workplace demands i.e. workplace curriculum (c.f. Billett 2001a). Guidance by workplace demands is an obvious similarity despite the apparent differences in steering documents. Hence, the employed apprentices are supposed to contribute to the production at the worksite while being educated, this is not the case for USAE students. Instead, their participation in workplaces should be related to educational goals in steering documents. As this study shows, workplace demands seem
to conquer educational goals. Hence, workplace demands does not necessarily exclude learning, instead it supports learning which can be seen as a pathway into the community of practice (Lave & Wenger 1991).

References
SECTION 3

WHAT MAKES A HIGH QUALITY APPRENTICESHIP
3.1. Working process knowledge acquiring and working tasks research: a case study of technician apprenticeship training in Guangzhou Technician College

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Summary: Working progress knowledge (WPK) plays a critical role in higher skilled-worker and apprenticeship training. But what kind of working tasks can shape working process knowledge and how they promote the acquiring process is still unclear. By few months’ observation, semi-structured and in-depth interview, researchers discover the secret in one Robotics Engineering factory.

Keywords: Work process knowledge, influencing factors, apprenticeship training

Introduction
As work process knowledge is an essential element in apprenticeship training, this research focuses on the process during which work process knowledge is acquired and its working tasks. The research was based on a technician apprenticeship project, which was set up by Guangzhou Technician College and GSK CNC Equipment Co., Ltd. (GSK) jointly.

Apprentices in Robotics Engineering Headquarters were divided into groups and worked in five different work units, these were: machining of robot parts, robot cabinet assembling, robot testing, experimental manufacture of robot cabinet and debugging of the robot. Apprentices rotated jobs every three to six months, working in different positions in a cycle.

Research question
Work process knowledge is knowledge about the whole labour process within the organization, including reflection on practical and theoretical knowledge that might be useful for work (Fischer et al. 2004). The research focused on how enterprise apprentices acquired work process knowledge in working tasks.

Research methodology

Observation
In this research, observation method was used to estimate non-visible factors, to ensure that relevant complementary or compensatory methods for understanding the nonvisible aspects of this research issue were also taken into account. Researchers undertook 40 observation sessions which were recorded and documented. Observations included identifying how working tasks were designed, how apprenticeship acquire working process knowledge in different work tasks.
**Semi-structured and in-depth interview**

Qualitative semi-structured interviews and case study methods were also applied in this research. Researchers chose students and masters as cases and researchers interviewed five masters eight times each and 10 students 15 times each.

**Work analysis**

Since the process of the WPK acquisition is most often tacit, sometimes observation and interview may not be enough while researching. Thus work analysis was also used in this research. This included knowledge diagnosis which encouraged workers to think aloud on the job, and looking for “disruptions” by asking the apprentices what the problem was, why it happened and how it was solved.

**Research findings**

The following points are recommendations resulting from our preliminary research findings:

Work tasks which contain certain questions can promote apprentices’ WPK acquisition. Work tasks with contain certain questions can promote apprentices’ WPK acquisition. Non-standard elements machining is a typical work task of this kind.

Firstly, tasks which contain certain problems can promote apprentices’ reflection. Based on this reflection process, apprentices construct work process knowledge by integrating the theoretical knowledge and the practical working situations. Thus, work tasks with certain questions provide ideal contexts for apprentices’ learning, as the more questions that are involved, the greater help they are to apprentices’ WPK acquisition. During this process, reflected working process knowledge is shaped in the brain and apprenticeship professional competencies are developed.

Secondly, work tasks with a certain degree freedom can help apprentices acquire WPK. In the production process, non-standard elements machining leaves a certain degree of freedom for apprentices compared with the post of mechanical function tests for robots. Apprentices were given full opportunity to think independently while completing the work task. They can explore different kind methods and ways to find out the solutions about non-standard elements. During this process, apprentices develop self-learning competency, which is a necessity factor for the acquiring of work process knowledge. Therefore, work tasks with a certain degree of freedom can promote the construction of WPK.

Thirdly, rotational work tasks with a certain replacement frequency can promote the shaping of working process knowledge. Researchers observe 5 apprenticeships in an assembly workshop. Apprenticeship are arranged to produce machining of the non-standard elements of robot.

Since most of the time and vigour needed to be spent on the first work-piece in the post of robotic parts processing, after the completion of the first work-piece, processing was almost completed; apprentices just needed to run the program repeatedly and check the accuracy at intervals. No matter whether the quantity of the tasks was 10 or 100, there were no significant differences in the construction of WPK. The working tasks have no further role for apprentices to develop their professional competency. Apprentices don’t like long time repeating the same job. Accordingly the suggestions of researchers, work contents are changed every 3-5 days. Then, researchers find that apprenticeships have higher interests to involve the work and they can acquire more work process knowledge in the same period of time.

In this research, how apprenticeships can acquire working process knowledge has close
relationship with the characteristics of the working tasks. Work tasks with contain certain questions can promote apprentices’ WPK acquisition. Researchers find that it is hard for apprentices to acquire working process knowledge in simple, repeated working tasks. The tasks should be designed with a certain degree freedom. And in enterprise, apprenticeship should be arranged to rotate their work within a certain frequency.

References
3.2. On motivations, predicament, and countermeasures of the modern continuation of China’s handicraft apprenticeship

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Summary: This paper explores the two motivations for the continuation of China’s modern handicraft apprenticeship. Firstly, handicraft is defined as activities making useful and decorative objects completely by hand or by using only simple tools. It contains a great deal of tacit knowledge. Secondly, there has always been a market for arts and crafts traditionally. However, its survival and development face difficulties in today’s modern society. Specifically the long term future of a handicraft apprenticeship lies in the difficulty to recruit apprentices into this field, due to the fact that a handicraft apprenticeship often is steeped in tradition and lacking innovation in the market place. There is also limited marketing to promote the products. To solve these problems, the countermeasures this paper presents are to explore a high-end market and to elicit cooperation with vocational schools to develop handicraft courses.

Keywords: Handicraft, apprenticeship continuation, motivation, predicament and countermeasures

Introduction

Handicraft are activities which involve techniques and arts, such as embroidery, writing brush making, and shadow puppet production, creating useful and decorative objects made completely by hand or by using only simple tools. Usually the term is applied to traditional techniques of creating items (whether for personal use or as products) that are both practical and aesthetic. Those made by mass production or machines are not handicraft goods. Handicrafts often convey cultural and/or religious significance. Nowadays, Chinese handicraft inheritance is mainly undertaken through an apprenticeship (Trzcielinski & Karwowski 2012).

Throughout history, handicraft has been a very active trade in China, while an apprenticeship is the main model for handicrafts production. However, the survival of handicraft through an apprenticeship is facing a dwindling number of young people choosing to enter this area. As a result, a concern arises as to the realisation that some kinds of handicraft may become obscure or extinct within a few years. In attempting to address this issue, there is a need to identify which types of handicrafts are facing extinction. There is also a need to reflect as to what made them dynamic previously, what the fundamental reason behind their recession is, and what countermeasures could be taken to address this issue.

Methods and research design

An insight into the motivations of China’s handicraft apprenticeship inheritance is embodied in a number of specific cases. The following cases explore the differences between historical stages and handicraft inheritance of a number of handicraft products.
1. **Writing brush making**

Writing brush making has a history of over 2000 years. As a traditional handicraft, it is still full of vigour nowadays. The general manager of Yuliangying pen store in Xinjiang county of Shanxi province commented that the process of writing brush making involves a great deal of tacit knowledge, “Its whole process relies on a worker’s experience and savvy. Some people still couldn’t make qualified writing brushes although they have been trained for five years. Writing brushes need to be neither too flexible nor too stiff. Too flexible will make writing hard, while too stiff will make writing rough and harsh. So it is necessary that we should put into the brush elastic materials. However the key is what type of materials and how much should be put into it. Apprentices couldn’t learn these knowledge from a teacher, they can only master it from practice.” (Gao Hui 2011)

What this case highlights is that the development of a complex skill and tacit knowledge is difficult to express in words but is one of handicraft’s obvious characteristics. To master the skill, apprentices need a long-time and careful understanding through practice. This kind of knowledge cannot be mastered by teaching it in class. When tacit knowledge is not involved, and handicraft production can be mechanized, like in the case of pen making and other modern writing instruments, the worker’s learning will be less complex, and therefore not requiring an apprenticeship. Therefore tacit knowledge is the motivation for the continuation of the Chinese crafts industry and its apprenticeship inheritance.

2. **Silverware handicraft**

There are more than one thousand silverware workshops in Xinhua village where the author observed the production process of approximately twenty shops in different blocks. In–depth interviews with a number of workers from four different shops were also conducted by the author in preparation for this paper.

The interviews revealed that in the Heqing Xinhua ethnic village of Yunnan Province, almost every silver shop has a production venue and related equipment for silver processing, such as, molten silver furnace, hammer, pliers, table, spray gun, welding gun, crucible, and gauges. The craftsmen said that silversmithing includes at least seven processes: melting, forging, cutting, rough processing, finishing, welding, pickling. The whole process is determined by how much silver to melt, how to control forging timing and how much crude silver to fill. All of this, relying heavily on the artisan’s observation, experience and inspiration, can assist in carving a range of beautiful objects. Overall, this village is characterised by the observation that “every household has its unique technology and workshop, and the whole village works as one industry” (He Xiaobo & Ma Xuetao 2013). It also reflects the main characteristic of handicrafts as a personalized creation, containing a long investment in time to develop the tacit knowledge required to create such objects. So, it is reasonable to inherit such skills through an apprenticeship.

3. **Ceramic production inheritance**

The ceramic major of some vocational colleges such as Jingdezhen Ceramic Institute are heavily influenced by market demand. If the market demand is weak, some majors in the program may be cancelled. Then, an apprenticeship would be the main mode for this type of handicraft inheritance. If there is no market demand, the young person would neither to be enrolled into a college nor become an apprentice. Therefore it is possible to conclude that strong market demand is an indispensable premise for handicraft apprenticeship inheritance.
4. Historical perspectives

Case 1: The inheritance of Jiading yellow grass weaving.
In 1980s, yellow grass weaving promoted the economic development of Jiading district of Shanghai City. However with market and lifestyle changes, the weaving handicraft lost its market share rapidly. Then workers went to other industries, and the younger generation didn’t want to learn it. In 2008, this craft was listed as an intangible cultural heritage craft (Chen Jingjing 2012).

Case 2: Manual shoemaking.
With the development of the shoe factory, traditional manual cloth shoemaking has become obscure. The limited craftsmen left commented that there is barely anyone left to make shoes by hand for the market, while young people are now less eager to learn such a craft. It is nearly impossible for them to pass on these masters’ craft skills.

5. Shadow puppet making
Shadow puppet making is an ancient craft. In a phone interview undertaken by the author with the Director of Huan County Longying Cultural Business Development Co. Ltd. of Gansu Province, the director commented that laser shadow puppet engraving has impacted on manual shadow puppet market to some extent. For example, in a session of the Lanzhou Spring Festival temple fair culture, handmade shadow sold for about one thousand yuan, but the false shadow sold for twenty thousand yuan. The so-called false shadow is laser engraved. He stated: “We can tell the difference between manual ones and laser-engraved ones at one glance. The leather quality of the laser-engraved ones is inferior to that of hand-made ones, which are made of mixed leather. Weighing them by hand, the fake ones are very light.” But the ordinary consumers are willing to buy the fakes, for a price cheaper and the fake versions seem to be meeting the needs of the public but are not suitable for collecting (Lei Yuan 2011).

This case reveals that some traditional handicrafts can be mechanically produced. Although with lower quality, mechanized products meet the popular demands. While handmade handicrafts are generally more expensive than mechanized ones it is causing their market to become much smaller than before.

Results
Through undertaking a survey and comparison of the previous cases, two main motivations were found to have kept handicraft apprenticeship alive amid the rise of school vocational education. Firstly, handicraft involves a great deal of tacit knowledge that can only be taught through practical experience over substantial periods of time. Secondly, handicrafts still have market demand for quality, and market demand is an essential prerequisite of the handicraft apprenticeship inheritance concept. As in the case of Italian shoemaker Ferragamo, its shoes are purely handmade, its business is thriving and one pair of shoes can sell 4000 yuan in China. It has a good market strategy and is promoting itself to the high-end market (Hu Yulyu 2013).

Nowadays handicraft inheritance via apprenticeship faces many difficulties. The most notable is that fewer young people are interested at entering an apprenticeship. Another main issue is that the market value of handicrafts is underappreciated, which leads to a struggling handicraft industry. Finally, handicraft is not a trade steady and secure enough to appeal to young people. More people are driven to find work in large-scale mechanized production
plants. Mechanized production technology and knowledge can be taught by teachers of vocational colleges, which render an apprenticeship unnecessary and dispensable. In order to attempt to reverse this inheritance predicament, a new approach to revive the handicraft industry needs to be explored.

Therefore in order to maintain the high quality of an apprenticeship for the continued inheriting of China's traditional handicraft, we need to reinvigorate the handicraft industry. Firstly by expanding the handicraft market; in this way it may be possible to attract more young people to join handicraft industry. In addressing this issue, we could highlight the value of handicrafts and explore the high-end market demand as a tool for increasing market share. Secondly stronger relationships with VET institutes also are needed in developing craft courses, so that young people might be willing to learn handicrafts in classes.

Consumers have a varied taste for handicrafts. As long as handmade products meet their personalized demands, craftsmen need not worry about the sales. This requires masters to teach and cultivate their apprentices in aspects of awareness of marketing and innovation. Handicrafts are often durable, exquisite and in high quality. By the time handiwork gains the recognition and appreciation of high-end customers, apprenticeship inheritance may not be an issue any more.

VET colleges can play an important role in apprenticeship development, and thus promote the development of the handicraft industry. It is advisable for VET institutes to set up electives in pottery, painting, weaving and as such, while employing master craftsmen as teachers in these courses (Liu Chang 2013). In this way, it will not change the apprenticeship nature of handicraft inheritance. VET institutes provide teaching venues, facilities and apprentice students, while master craftsmen offer lessons through lectures and demonstration. All in all, adjusting the inheritance pattern to adapt to the changes of the social environment is conducive to the protection and promotion of handicraft inheritance.

References
3.3. Using apprenticeship as a whole-of-workforce training strategy: What are the effects on training quality?

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Summary: This paper provides two case studies to illustrate the use of traineeships (a form of apprenticeship in Australia) as a strategy for training all new recruits to significant operational positions in companies. The two companies and occupations selected for the paper are call centre workers in a cable television company, and bus drivers in a State-owned bus company. The case studies were undertaken as part of a major national project on what are called ‘Enterprise RTOs’ (Registered Training Organisations), companies which are registered as training providers to deliver and assess training that leads to qualifications for their own workers. (Enterprise RTO Association, 2009). The point of special interest is that the employer is also the training provider for the traineeship, hence it is responsible for the training in its entirety. The research project was funded by the Australian Research Council.

Keywords: Apprenticeships, traineeships, employer training, quality

Introduction

This paper reports on some findings from a research project into a relatively new development in Australian vocational education and training: the offering by enterprises, as training providers, of nationally-accredited vocational education and training (VET) qualifications to their workers. The research was undertaken within Enterprise Registered Training Organisations (enterprise RTOs), which are companies or other non-educational organisations that have been accredited to offer qualifications, primarily to their own workers (Smith & Smith 2009). Within their organisations, they have set up specialist training arms. These arms are required to exhibit the same characteristics, and adhere to the same regulatory framework, as specialist training providers, including public TAFE (Technical and Further Education) colleges. There are around 250 enterprise RTOs (Enterprise RTO Association 2009); this number has remained fairly constant over the past decade.

Some companies (and not only enterprise RTOs) offer traineeships to large numbers of their workers. In Australia, traineeships are a form of apprenticeship that was established around 30 years ago; they are similar to traditional trade apprenticeships, providing on and off the job training and the award of a national qualification. They tend to be shorter than traditional apprenticeships, typically one to two years, and are often in industry areas which have not previously had accredited training. There has been some controversy around the availability of government funding for this purpose (e.g. Schofield 2000), although it is no greater, and often less, than that for traditional apprenticeships. In some industry areas, traineeship qualifications have been used for initial training for ‘shop floor’ type occupations with large numbers of workers, with companies reporting that the availability of such training is a good recruitment and motivational tool (Smith, Comyn, Brennan Kemmis & Smith 2011). Most employers partner with a training provider for the purpose of providing the traineeship.
The research question for this paper is ‘Why do employers choose to offer ‘mass’ traineeships to their workers, what steps do they take to maintain quality in the delivery of the qualifications, and how successful are their efforts?’ The enterprise RTO project enabled this question to be examined specifically with relation to employers who offered qualifications themselves, and therefore provided the entirety of the training contract (both on and off the job training). Engagement with the national traineeship and apprenticeship system meant that there was greater regulation around the training, beyond the normal regulation associated with being an accredited training provider. There was access to certain financial benefits, to offset some of the costs of training, although these have diminished over the years (Guthrie, Smith, Burt & Every 2013). It has been pointed out (e.g. by Smith & Smith 2009) that training in enterprise RTO carries a risk that the training will be too company-specific, and this might be expected to be an additional risk where a traineeship is involved. The project offered an opportunity to begin to gather initial information on the matter in a systematic way.

Research into quality of traineeships in general has found those who do complete their qualification achieve relatively good employment and related outcomes. On the basis of analysis of national statistics, they are highly satisfied with the quality of their course (83%), and they are as satisfied as longer duration apprentice/trainees and all other graduates (Bowman, Stanwick & Blythe 2005). This study identified (from a systematic literature review) two matters that adversely affected outcomes: employer support and commitment to the training; and lack of co-ordination between all the parties involved in a traineeship. A study by Smith et al. (2011) on high quality traineeships also found that these two matters affected traineeship quality.

Methods and research design

Nine case studies were carried out as part of the larger project on Enterprise RTOs, which was funded by the Australian Research Council. For each case study, the following were targeted for interview on site during the visit.

- Manager of the company’s Registered Training Organisation
- Human resource manager
- At least one trainer
- At least one senior line manager in the operational area
- At least two workers enrolled in the relevant qualification

In addition some of the case study organisations were able to secure responses from their workers to an on-line employee questionnaire about their training. The research took place between 2011 and 2013.

The two case studies examined for this paper not only provided qualification-based training for their own workers, as did all nine organisations, but also engaged with the national traineeship system. They were the only two of the nine enterprise RTOs that did so.

Table 1 below shows the organisations, and the occupations and qualifications covered by the qualification. Cable TV was a Pay TV company which had around 2500 workers, most of whom were involved with call centre work relating to subscriptions by customers. The call centre had several sections including sales, customer service queries, technical queries and so on. Bus Co operated the bus service in a city of over four million people and was a State government instrumentality; 5000 people were employed, of whom 3500 were bus operators. In both organisations, all new workers to these occupations, which formed the largest single group of workers in each instance, were recruited directly into traineeships.
Table 1: Case study sites

<table>
<thead>
<tr>
<th>Organisation (pseudonym)</th>
<th>Traineeship qualification name</th>
<th>Occupation</th>
</tr>
</thead>
<tbody>
<tr>
<td>'Cable TV'</td>
<td>Cert III in Customer Contact</td>
<td>Call centre operator</td>
</tr>
<tr>
<td>'Bus Co'</td>
<td>Cert III in Driving Operations (Bus)</td>
<td>Bus operator</td>
</tr>
</tbody>
</table>

The interviews covered a range of issues, but this paper focuses on training structures and arrangements, and the quality of training delivery and assessment.

In total, 11 people were interviewed at Cable TV and six people were interviewed at Bus Co in relation to the traineeship qualification. At Bus Co, the interviews took place at two sites, the head office and a bus depot. Each interview took between 30 and 60 minutes and interviews were taped, with permission, and transcribed. The on-line survey was completed by 33 workers at Cable TV and 13 at Bus Co. This survey examined the trainees’ satisfaction with their training.

The interviews for each company were analysed and written up as case study reports for the larger project. For this paper, data relating to the paper’s research questions were extracted from the case study reports and analysed together with selected data from the on-line survey.

Results

Why the organisations chose this form of training

At Bus Co, the enterprise RTO had been in place for about 12 years and although relevant managers had now left, it was stated that the organisation valued the RTO because it enabled the training to be of high quality and the assessment was rigorous compared with some independent training providers. The external regulation enabled the trainers to insist upon high standards. There was no external funding, but there was a financial concession in that the State government had a policy that employers did not have to pay a payroll tax for apprentices and trainees. This was an incentive for the bus drivers to be engaged as trainees, rather than simply receiving the qualification. TV Co had set up its enterprise RTO after bad experiences with external training providers. There were two major reasons for operating as an enterprise RTO: to enable training to be customised, flexible, and high quality; and to help TV Co become an ‘employer of choice’. Funding associated with traineeships was helpful but had diminished over the previous few years as Federal and State governments had successively restricted access to funding.

Training structures and arrangements

In both case studies the training was very heavily weighted towards the ‘front end’. Initial training lasted six weeks at TV Co and three weeks at Bus Co. In this time the workers had their formal induction, health and safety training, and learned some basic operational and systems skills. In both cases, the workers then went into their allocated work areas and continued their training there. At both organisations, there were detailed training manuals for the initial training, and also detailed training plans of what was to happen at each stage of the traineeship thereafter.

For the bus operators, they were allocated to a bus depot and at each depot there was
a designated and qualified trainer known as a Bus Operator Training Level 2 (BOT 2) who supervised all new bus drivers. The BOT 2s provided the training for the bus driving licence and other trainers (BOT 1s) provided training in skills such as customer service and ticketing. Some further training was provided centrally, and other training was 'done in a bus', as one interviewee put it. The traineeship concluded with an assessment at about 18 months. At TV Co, the trainees remained in the one building as all of the call centre operations were in one place. They were allocated to different sections, and for two weeks received further training in the 'live environment' with somebody else listening to their calls to step in if the trainee encountered difficulties. In the nature of call centre work, trainees were rarely released for further central training. There were occasional workshops on particular issues, but the trainees appeared to be a little uncertain about whether these workshops were part of their traineeship qualification or not. The trainees also had training workbooks including written assessment tasks, that they had to complete. Trainees' performance was monitored by their section managers who were able to liaise with the trainers where there were remedial training needs. While trainees reported that they often encountered the trainers informally and were able to ask questions, the only formal mechanism for ongoing contact with a trainer was a 15-minute contact which the State government traineeship funding rules required every three months. The qualification was normally completed in about twelve months.

**Quality of training delivery and assessment**

In interviews, the managers and training staff all stressed the importance of practical application of the training. They felt that many learners would find it otherwise difficult to understand the concepts without practical application, and that because most of the learning was done as part of working, trainees could more easily master the skills. They all felt that it was important for the quality of training that the trainers were in the working environment and not only seen to have credibility, but also continually updated their understanding of what they were delivering in their training. Managers and trainers valued the role of the national qualifications in ensuring that assessment of learning had to be rigorous. From the online surveys, the workers seemed satisfied with the training offered. 100% of Bus Co trainees agreed or strongly agreed with the statement: ‘Overall, I was satisfied with the quality of training’. At TV Co, 39% strongly agreed and 46% agreed, with 15% saying they neither agreed nor disagreed. In each case almost 100% said they would recommend the training to others, and there was over 90% agreement for TV Co, and 100% agreement for Bus Co, that trainers understood their learning needs and treated the trainees with respect. Similar percentages agreed that trainers had a thorough knowledge of the area although there was an 83% ‘strongly agree’ response for Bus Co compared with 58% agreement at TV Co. There was overall satisfaction that assessment was a fair test of skills, although, again, 61% strongly agreed at Bus Co and only 38% strongly agreed at TV Co.

The interviews showed that, especially at TV Co, there was some uncertainty about which elements of training were associated with the traineeship and therefore the qualification. TV Co’s RTO staff seemed to pride themselves on the fact that checking on achievement was done through normal call monitoring processes and ‘We keep it invisible’ as the RTO manager said; ‘It’s just part of what they have to do as a job requirement’. And so, one learner who had completed her traineeship said:

> I just felt like nothing was really happening with the Certificate III. It kind of just all came up all of a sudden, and I got my certificate. But I felt like I didn’t really do anything to earn it. Because I was just doing my job, and they don’t really mention it - it's kind of just in the background - that you’ll get your certificate.
At Bus Co, the practice of follow-up centralised training seemed to be valued. A trainer said:

When you come into a class, you’re re-establishing what you’re supposed to know, build onto it a bit more. If they’re doing something that’s contrary to what they’re supposed to be doing, you can lead them back the right way.

Trainers in both companies tried hard to maintain the quality of the training, but to some extent they all reported being diverted from pedagogical matters by needing to monitor the administrative progress of the learners through their formal traineeship.

**Conclusion**

There seemed to be many benefits of this type of training. ‘Mass’ traineeships meant that the whole of the workforce in the designated occupations – the majority of workers in the organisations- received standardised training that was assessed to national standards. The matters of concern raised by Bowman et al (2005) - employer support and commitment to the training; and lack of co-ordination between all the parties involved in a traineeship – were clearly not in question in these two case studies, since all parties involved with the training were in the same organisations, and there was constant communication between the trainers and the managers in the organisations. However there were some concerns about quality, particularly in TV Co where the training was more ‘hidden’. Survey responses and interviews suggested that some employees were not altogether happy with their training and would have preferred it to be more formalised. There is a potential lesson for enterprise RTOs offering traineeships that the training should be more visible and explicit, and less embedded within work.

**References**


3.4. Efficacy of CBQ (Cost Benefit and Quality) as an advisory tool to optimise cost-effectiveness and quality development of in-company apprenticeship training

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Summary: The South African government continues to make many financial attempts to boost the quality of vocational education and training (VET). However, poor quality outcomes fail to inspire employer’s confidence because industry needs people who can be productive in the workplace immediately and there is a gap between industry expectation and VET graduate capability. The national skills strategy of the country acknowledges that the low productivity in the workplace is partly due to inadequate training. The paper presents and confirms that when CBQ is applied in a systematic manner during the apprenticeship duration it is effective as an advisory tool to optimise cost-effectiveness, benefits and quality of in-company apprenticeship training. CBQ is proving to be a powerful tool in South Africa to broaden the understanding of trainers in evaluating the impact of their training both in terms of competence development and benefits for the company.

Keywords: Cost-effectiveness, quality development, advisory tool

Introduction
The national skills development strategy of South Africa recognises that the country is still challenged by low productivity in the workplace, slow transformation of the labour market and a lack of mobility of the workforce, largely as a result of inadequate training (NSDS III, 2011). This is despite government's many attempts to boost vocational education and training through high financial expenditure; as such the poor quality outcome for VET graduates does not inspire employer confidence because industry needs people who can be productive in the workplace immediately.

Employer decisions to meet productivity demands either through employing qualified staff or by training its own artisans is based on assessing the cost-effectiveness and efficiency of either option. The decision as to which option will be most economical can be subjective. Without an evidence-based comprehensive mechanism it is difficult to evaluate whether developing own workforce through apprenticeship training is cost-effective and produces productive workforce of good quality, as opposed to employing qualified staff.

Methods and research design
CBQ is an online self-evaluation instrument to measure costs, benefits and quality of the in-company component of apprenticeship training. It was developed by the University of Bremen and further adopted to suit the South African context within the frame of a research
initiative launched by the merSETA (Hauschildt and Brown 2011). Net Cost or benefit is evaluated taking into account:

(Time of in-company training of an apprentice $\times$ degree of apprentice’s productivity compared to skilled/fully trained workers $\times$ salary of a skilled worker) – (Staff costs of trainees + staff costs of trainers + operational costs + other costs).

Quality is evaluated using the following 6-quality criteria: reflective work experience, professional level of learning which is based on the quality of work tasks, autonomous learning evidenced by the ability to fulfil complex work tasks, learning in the business process, vocational commitment and professional competence (Hauschildt and Brown, 2011).

The paper investigates whether the CBQ method is effective as an advisory tool when applied in a systematic manner during in-company apprenticeship training to optimise quality development and benefits for employers. The study is based on the case study in South Africa.

The research takes the form of a longitudinal study analysing in-depth 10 case studies observing change (s) in cost, benefit and quality of apprenticeship as units of measurement and possible explanation thereof. The company managers or staff responsible for apprenticeship training who are going to work with the CBQ method need to have a pre-understanding of the contextual issues of cost-benefit and quality of training offered by their companies. This level of pre-understanding is documented by the help of guided interviews and questionnaires. After an initial analysis of quality, costs and benefits of in-company training provided in their companies, the assessment results are discussed while contextual information for the interpretation of their company data is given by the research tool and the research team. All data of the status quo of their in-company apprenticeship training forms the baseline for a later comparison.

Participants reflect on the analysis offered by the CBQ tool as it points to strengths and weaknesses of training offered; possible measures for further quality improvement can be derived from the outcomes of the CBQ analysis provided that company managers or staff responsible for the shaping of in-company training understand the contextual factors. This understanding is measured and documented in a second evaluation following a similar structure. After approximately one year, costs, benefits and quality of training are assessed in the participating companies once again in order to observe changes in results after applying the lessons learnt.

This paper selects only a sample of cases and provides an in-depth analysis of how company managers and staff responsible for the shaping of training processes in their company have used individual CBQ results to identify potential areas of improvement in the structure and design of apprenticeship training. From the data comparison and the information gained out of the two series of semi-standardised interviews it can be concluded whether (and if so to what degree) changes have been introduced that have a direct linkage to the CBQ tool and its quality as an advisory tool.

Results
The summary of results point to the usefulness of CBQ as an advisory tool whereby apprentices contribute productively to the employer during the apprenticeship, optimising benefits and quality development.
Figure 1: Comparative benefit-quality results from advisory use of CBQ

Figure 2: Comparative quality results

Figure 1 and 2 illustrate some probable degree of the changes in cost-effectiveness and quality and linked to CBQ advisory tool using an example of a welding case in one company. The company receives subsidies for conducting the training and has a total number of six apprentices. When the company was first introduced to the CBQ, the apprentices in this trade were spending only about 44% of their training time during the training in the workplace
and this is quite low if the apprenticeship is to yield higher quality and returns for employer. Ideally, this time should be as much as 80%. Likewise, the level of tasks they performed was pitched at skilled level was as low as 25%, the rest was pitched at semi-skilled and low-skilled level. Apprentices spent about 36% of their time in vocational schools. Moreover, in terms of quality there are other areas of skill development to look at such as professional learning, autonomous learning and reflective learning as the potential focus areas for improving the organisation and design of training programmes. Initially the apprenticeship training was running over a two-year period.

The post-advisory results on the right hand side of figure 1 and 2 depict how the changes in the structure of design and structure of the company apprenticeship training has optimised its cost-effectiveness and quality. A period of more 12 months lapsed between getting the first results of CBQ to identify areas of improvement and the second case to see the effect of the changes on the performance of the apprenticeship training. One of the (strongest) changes evident in this case (when it did another case in 2014) is that the duration of the apprenticeship increased from 2 – 3 years. The results confirm that the power of the tool is visible when advisory is done on medium to long-term, in this case three years (Hauschildt and Brown, 2011). Both cost-effectiveness and quality development improved significantly and this is attributable to some combination of the following changes; training time in the workplace increased from by 22% to 66%; time spent in the vocational schools dropped by more than half to 15.4% and the company optimised cost-effectiveness since first year as the apprentices were contributing more productively. The complexity of task also intensified as well as independent learning. Quality improved and the outcome could be evidenced by the professional development. Reflective still presents further opportunities for optimisation.

Conclusion
CBQ is proving to be a powerful tool in South Africa to broaden the understanding of trainers in evaluating the impact of their training. It introduces the dimension of factoring in productive contribution of apprentices when measuring the cost-effectiveness and quality of apprenticeships. Though the trainers acknowledge the productive contribution of apprentices during training duration, however, this dimension seems to be overlooked when analysing the benefits of in-company apprenticeships which plays a determining role in the planning processes of taking on new apprentices. Moreover, the paper confirms that CBQ when applied in a systematic manner is effective as an advisory tool to optimise cost-effectiveness, benefits and quality of in-company apprenticeship training.

References


SECTION 4

ECONOMIC INVESTMENT AND BENEFIT OF APPRENTICESHIP
4.1. A qualitative assessment of the United Services Military Apprenticeship Program (USMAP)

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Keywords: Military, training, apprenticeship, navy, marines

Introduction

The United Services Military Apprenticeship Program (USMAP) accounted for nearly one in four Registered Apprenticeships in the United States as of 2013. The 2008–13 rise in USMAP from 51,000 to nearly 88,000 apprenticeships offsets part of the sharp decline in civilian apprenticeships over the same period. Currently, about one in four enlisted Sailors and one in fourteen Marines participates in USMAP. One of the program’s major accomplishments is that it has registered about 100+ occupations with the Office of Apprenticeship (OA) in the United States Department of Labor (USDOL) that are related to civilian fields.

This paper presents the findings of the first study of USMAP. The study involved an analysis of USMAP data, interviews with key staff members involved with USMAP operations and 11 focus groups at Navy and Marine Corps bases with USMAP apprentices, USMAP completers, and USMAP supervisors.

This study provides a qualitative assessment of how well USMAP program is meeting various objectives. The study’s research questions include:

• Does completing an apprenticeship bring gains to participants while they remain in the Navy or Marine Corps?
• To what extent does USMAP simply document the skills and experience service members routinely attain in the military and to what extent does USMAP involve increasing or broadening the skills of apprentices?
• How well do apprentices and supervisors understand the purposes of USMAP? Are sufficient resources devoted to communications?
• Does USMAP communicate effectively with private employers to show how they can benefit from hiring apprenticeships completers in specific fields?
• Why do the completion rates of USMAP appear low? What special problems arise in completing a military apprenticeship that do not arise in the civilian sector?

Description of the United States Military Apprenticeship Program (USMAP)

In order to maintain an effective fighting force, the military provides service members with intensive classroom training before gaining experience and working in their military occupation. Like other employers who register their apprenticeship programs, USMAP gains registration for various occupational programs partly by submitting work processes that describe the skills apprentices will learn on the job and off the jobs (usually in classrooms).

The training regimen can be employer-specific and can replicate what workers were learning before the apprenticeship became registered. In principle, USMAP might serve several goals. USMAP can offer an independent benchmark against which to judge the
adequacy of standard military occupational training for service members to reach journeyman status. It can document work experience on specific tasks more fully and thereby improve information to officials of the Navy, Marine Corps and Coast Guard. USMAP registration could stimulate additional training if the work processes include more skills (or more time on existing skills). Given USMAP’s role in documenting skills and potentially expanding skills, completion of an apprenticeship can serve as a more reliable signal of skill and responsibility than standard classroom and work-based training. Another potential benefit is to help translate the skills learned in the military into a civilian context. By documenting skills and increasing skills that are commonly part of a civilian occupation, USMAP could help service members make successful transitions to civilian careers.

USMAP has been successful in registering 100 occupational areas, allowing service members to certify skills that yield a certification from OA. With a small staff located in Pensacola, Florida, USMAP keeps track of the progress of apprentices, transmits the names of completers to OA, and sends the completion certificates to completers. Whether the OA external benchmarks simply document or also expand the training commonly provided by the Navy, Marine Corps and Coast Guard is an open question. So, too, is the potential use of apprenticeship certifications in performance reviews and as enhancing civilian job opportunities for those leaving military service.

Methods and research design

A research team from the Urban Institute and L & M Policy Research interviewed several USMAP officials and conducted separate focus groups with USMAP participants, USMAP completers, and USMAP supervisors. The team visited the administrative headquarters of USMAP in Pensacola, Florida, and interviewed key staff members of the Navy and Marine Corps. The focus groups took place at the Navy bases in Norfolk, Virginia, and San Diego, California, and Marine Corps bases at Camp Pendleton, California, and Camp Lejeune, North Carolina. Eleven focus groups were conducted with a total of 76 participants. These locations were chosen because they would represent Marines and Sailors on the East and West Coasts and because they had the largest number of USMAP participants. Marine and Navy participants were selected because they make up 98 percent of USMAP participants.

In undertaking the analysis, the L&M-Urban team interviewed key staff members involved with the USMAP program operations, administrators of USMAP, officials at organizations helping veterans find jobs, the individual coordinating the relationship between USMAP and the Office of Apprenticeship, and a researcher at the Navy War College.

The research team conducted focus groups with Navy and Marine Corps service members at four military bases—Naval Station Norfolk, Virginia; Naval Base San Diego, California; Marine Corps Base Camp Pendleton, North Carolina; and Marine Corps Base Camp Lejeune, Jacksonville, North Carolina—to garner their perceptions of and experiences with USMAP. The team conducted 11 focus groups in the four locations—4 with service members who are currently participating in USMAP, 3 with service members who have completed at least one USMAP apprenticeship, and 4 with supervisors who oversee USMAP participants.

Results

How well does USMAP meet potential objectives?

Service members generally report that completing an apprenticeship brings little gain to participants while they remain in the Navy or Marine Corps. Earning an apprenticeship
certificate can offer a slight advantage for promotions, but neither the Navy nor Marine Corps appears to view USMAP completers as substantially more qualified than others assigned to the same specialty who did not participate in USMAP.

One reason is that USMAP mainly documents the skills and experience service members routinely attain in the military. All service members attend classes to prepare for their occupational assignments and all are coached as they transition to working in the field. To complete their apprenticeships, service members mainly document the mix of work experiences on various tasks that are part of their normal assignment. In some cases, they add hours of specialized work experience beyond their normal assignment. Judging from the focus group reports, the amount of added work experiences varies but is rarely more than 10-20 percent of their overall training.

Apprentices and supervisors display only a limited understanding of the purposes of USMAP. Perhaps because of too few resources allocated to USMAP, service members are provided with very limited or no orientation to the program. Often, potential apprentices are told that USMAP can be beneficial and that the only cost is writing down the hours devoted to various tasks they are performing in any event. Little or no information is provided on exactly how USMAP certifications are relevant to promotion or to civilian employers. Supervisors generally expressed a lack of orientation as well. However, a few supervisors reported extensive efforts to ensure high credibility for apprenticeships by rigorously checking that apprentices demonstrate skills in each task area specified by Work Process Schedules (occupational standards).

A critically important gap in USMAP, probably because of a lack of resources, is the program’s limited communication with private employers to show how they can benefit from hiring apprenticeships completers in specific fields. The virtual absence of communication with private employers weakens USMAP’s ability to adapt skill standards to meet demand in the civilian sectors. The absence of close civilian employer links is especially striking, given that the main value added of USMAP is to document skills in occupational specialties that are used widely in the public and private civilian sectors. One incentive for civilian employers to establish apprenticeships in fields related to USMAP occupations is the GI Bill benefits available to veterans. USMAP could encourage USMAP participants (including noncompleters) to use their GI Bill benefits to complete these civilian apprenticeships.

Finally, while we lack longitudinal data, completion rates look low. In FY2013 and FY2014, about 18,000 completions took place or about 9,000 per year. Entrants in FY2010 and FY2011 amounted to 67,000 or about 33,500 per year. Using these annual figures, one finds just over one completer for every four entering about three years earlier. Focus group comments indicate that weak initial communication, the limited use of completions for moving up within the service, few private employer links, and administrative barriers probably all contribute. Among the administrative barriers reported by USMAP participants were exiting the military prior to completion, changes in duty stations, deployments outside the country, and transfers outside their rating or MOS. In addition, our focus groups reveal that some service members enroll but never actually participate in the program, this could also lead to low estimates of completion rates.

**Policy implications**

Notwithstanding the challenges faced by USMAP, the program is well-placed to serve a critically important purpose, if sufficient resources were forthcoming. Veterans and employers both cite the difficulties that arise in translating skills and experience gained in the military to civilian employers (Harrell and Berglass 2012). USMAP could play a significantly larger role
in verifying how the skills that service members learn in their military occupation applies to civilian occupations. Currently, even most service members and supervisors have a weak or no understanding of the program, partly because USMAP has few resources, most of which are dedicated to running the program.

Providing an orientation to service members about the program as they leave school and reach their first duty station would allow them to sign up for the program immediately upon learning about it. When learning about USMAP, service members should be taught about apprenticeships in general and about the benefits of completing an apprenticeship. Many service members in the focus groups did not know what an apprenticeship was, how USMAP related to civilian apprenticeships, or the link between USMAP and civilian careers. Outreach should include information on the requirements and goals of USMAP.

USMAP should be incorporated into the transition protocol to help service members make the transition to civilian employment. The normal program for transitioning service members into civilian life (Transition GPS) and USMAP administrators can work more closely to inform counselors and service members about what it means to hold the DOL certificate (i.e., journeyman certificate issued from DOL is equivalent to that of a civilian apprenticeship); and to explain how service members can better present their apprenticeship experience in a résumé, interview, or application. Another critical step is improving the connections between USMAP and employers. USMAP should be able to serve as an intermediary between employers and service members providing the contact information for service members who have completed relevant apprenticeships to employers. Currently, USMAP lacks the resources to reach out to employers and officials report that confidentiality rules limit their ability to link former apprentices with employers.

References

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Summary: In general benefit of dual VET apprenticeship is evident. Austria, Germany, Switzerland perform better in Youth employment than countries without similar systems. But, what is the ratio, motivation, consideration of companies to offer dual VET apprenticeship? In several branches and industries the investment is high, with uncertain return on investment, other branches like tourism need young people for apprentice in "learning by doing" processes, but cannot count on continuous cooperation. Main thesis in this paper from Austrian perspective is that financial cost-benefit-ratio is not the only, probably not the most important factor for apprenticeship in companies. Motivation is highly influenced by basic principles and corporate philosophy aspects, by traditional historic backgrounds and long-term quality and qualification considerations, which are criteria to survive in local and global competitiveness. Benefits for government and society are effects of these company attitudes. This aspect should be considered in educational, employment and economic policies.

Keywords: Cost-benefit-ratio, added value for company, added value for society, tradition and historic influences

Introduction

Huge evidence exists about the all-over benefit of VET apprenticeship systems for countries economic health in general. In times of economic crisis since 2008 in Europe and in the world those countries that run VET education systems based on apprenticeship principles perform significantly better in employment – especially for Youth – than other.

Austria (AT) is one of these countries with an apprenticeship system, similar, but not equal, to Germany (DE) and Switzerland (CH). Two examples for systemic differences: In AT apprentices starts in an average age of 15-16y, in DE more than 19y; in CH the relation between VET as apprentice or in school is 10 : 1; in AT it is 50:50. But, in all these three countries VET dual apprenticeship plays a major role for 40 – 70 percent of Youth, for companies, trade and industry and for society.

Several partners are involved into VET app in Austria, like in a “matrix” – individuals – apprentices, entrepreneurs, teachers, parents… – organizations – enterprises, schools, additional training institutions – and governmental bodies, at national and federal provincial level.

One of the most interesting – and crucial – questions is: How could it work to continue, even to increase, willingness to invest in apprenticeship education in a competitive, cost-pressing, crisis phase?

Questions concerning costs and benefits cannot be answered in one single dimension.
That meets different dimensions and levels, at least as mentioned in the following paragraph.

First, a short overview about the governance structure of VET dual apprenticeship training in AT.

**Figure 1: Key partner apprenticeship system Austria Source: IBW**

Who invests? Why?

Most investment for apprenticeship in AT comes from companies, additional investment for school and funds comes from national and federal provincial government. The investment by companies is depending on the willingness of a company to make a contract with an apprentice for several years, on a legal base, with full responsibility to fulfil a VET curriculum, to reach a professional profile and to support attending public VET part-time school of apprentices.

The company has also responsibility for personal development of young people, mostly in the age between 15 and 20 years. Part of this contract is the obligation to cover all costs of that, including a monthly earning for the apprentices, also during the attendance at school of apprentices, mostly one and a half day per week or about two months a year.

There must be a strong motivation as base for such a contract with regard to economic, educational and/or social aspects.

The conditions for this motivation to educate and train apprentices differ in a wide range between various branches and companies conditions for apprentice education behind this general legal background differ in a wide range.

In short, the main difference is based on training conditions in different professions and companies.

Some professions, like e.g. toolmaker, electricians or mechatronics in industry, are trained in in-company workshops, with full-time trainers, without added value at least during the first two training years, often with additional in-company training courses, both occupational topics.
and general education, basic competences, foreign languages etc.

In other professions, like in tourism, learning processes happen by doing, but, apprentices bring added value for the company beginning with the first day of their apprenticeship training, despite the fact, that the company invest in instruction and teaching processes.

This and other differences are not only a result of the size of companies (see e.g. Mühlemann & Wolter 2014), they are caused also by other influence factors like organization of production and service processes, working methods within or outside of plants and company areas, contact to clients, also by traditions and conditions of professions and branches – in industry e.g. it is the interest to continue cooperation between graduates and companies, in gastronomy e.g. years of travel follow after apprenticeship, often worldwide, as an element of quality and personal and professional development both individual and of the branches.

Methods and research design

It is obvious that much more research based evidence concerning costs and benefits exists in Germany and Switzerland than in Austria. Examples are the huge Database of “Swiss Leading House – Economics of Education” of University of Zurich (e.g.: Strupler & Wolter 2011) and Research and Outcomes of the German BIBB – Federal Institute for Vocational Education and Training.

In Austria the most recent comprehensive research results are from 1997 (Lassnigg & Steiner 1997), except some remarks on the surface in relevant publications (e.g. Dornmayr & Nowak 2014) and in sector specific documents (e.g. IV 2013).

The more exist qualitative documentations and publications concerning apprenticeship in Austria – with short remarks to the aspects of financing and funding (e.g. bmwfw 2014, pg. 15; Dornmayr & Löffer 2014 pg.14 ff.).

This leads to the question, are clear calculated costs in relation to clear calculated and visible monetary benefits in fact the most important reasons for background for motivation and acting in the area of companies to run programmes for apprenticeship training?

The main thesis of this methodology and research background, out of the Austrian perspective is, the most essential factors for willingness of companies to offer youth the option for VET in apprenticeship are basic principle aspects, as a part of a corporate philosophy, explicit or implicit, experiences and business attitudes, based on long term cultural and historic developments, with a perspective into the future, which reaches much longer forward than corporate strategies or business plans could look ahead.

This thesis should be proved with different approaches as there could be 1) study of relevant documents of scientific institutions, government, social partners, companies etc., 2.) evaluation of experiences within cooperation and projects of companies with external partners concerning apprenticeship 3) face to face interviews with responsible actors and stakeholders 4) excerpt and interpretation of international comparisons regarding education and employment by EU, OECD, ILO etc, like PISA, PIAAC, OECD Skills Strategy etc. 5) Collection of typical cost-benefit calculations in companies out of different branches 6) Comprehensive interpretation of governmental and societal cost and benefits of apprenticeship 7) reflections and conclusions together with concerned people out of educational, employment, governmental area regarding relations of costs and benefits of apprenticeship for individuals, companies, governments and society.

Outcomes and results of research are not only of scientific interest. All engagement and effort should strengthen the evidence base to find the right steering leverages to increase willingness and motivation for apprenticeship at all necessary levels.
Results

In the last years no comprehensive research in this area in AT, comparable with “Leading House” in CH and BIBB or Bertelsmann in DE, was undertaken. Recently interest on that topic is increasing again, and first results are available.

*Individual*: risk of unemployment for apprentices is less than average.

*Companies*: investment differs in various branches: in industry investment for a three year VET app is approximately € 80.000 – € 105.000, added value within VET app in company € 10.000 – € 20.000. In other branches like trade, tourism, service a broad variety of cost-benefit structures exist.

*Government*: costs for an apprentice/year max. € 5.605 / year, against € 9.528 for a VET student in school or € 17.270 for a student in a so called “Überbetriebliche Ausbildung – ÜBA” (IV 2013). Direct benefit for government in comparison with schooling for all apprentices is at least ca. € 120.000.000, if 10 % of apprentices more are trained in “ÜFA” additional cost would be ca. € 36.000.

*Society, economics*: cumulative effects results by less (youth) unemployment, higher gross value added by Youth in several branches, through learning by doing, qualitative aspect like decisions of companies to stay and/or invest in AT by the reason of high qualified skilled people etc. In comparison with countries with equal welfare status, but other VET system, and the differences in youth unemployment between these countries, a huge societal benefit is evident, mostly caused by investment of companies with additional effects for government and society.

It is also evident that these investments are not only caused by financial considerations, but often based on long term traditions and historic developments and on responsibility, not only from companies, also from branches, to educate the young skilled people by their own. This background is essential for all international and cross-border activities to implement such systems in other countries.

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SECTION 5

SCHOOL TO WORK TRANSITION AND YOUTH EMPLOYMENT
5.1. Creating pathways to enhance college to work transition using COMET competence diagnostic model to assess and develop occupational competence and commitment in Technical Vocational Education and Training (TVET).

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Summary: This paper sets out to examine the levels of occupational competence and the impact thereof on TVET student readiness for transition to the world of work in the Conceptual-age. Holistic problem solving underpinned by creative thinking, shaped in an apprenticeship/dual TVET delivery, is a key element in this study. Central to the debate around high youth unemployment is the issue of student occupational competence levels to access the opportunities created by government policies and strategies. This challenge is addressed by analysing the impact of a reflective, conceptual thinking, work-based learning approach. Concepts such as novice to expert paradigm, conceptual thinking and functional to holistic competence serve as catalysts to improve articulation of students to the workplace. COMET psychometric measurement applied in this study provides solid empirical evidence regarding a lack of holistic problem solving skills needed for college-to-work transition.

Keywords: Apprenticeship, college-to-work transition, youth employment, occupational competence and commitment

Introduction

TVET is seen as an important public policy tool to support economic growth and poverty alleviation. It is instrumental in the transition from school to decent work and adulthood; increasing productivity of existing workers and steering the unemployed into work; assisting in reconstruction after conflict and disasters and promote social inclusion (UNESCO 2013). The significance for a well-defined occupational competence assessment tool to quality assure TVET is accentuated in this statement of the Southern African Development Community (SADC) region and the United Nations Educational, Scientific and Cultural Organisation (UNESCO).

To effectively enter the world of work students must be equipped with conceptual thinking to break through established specialised patterns towards the finding of meaning in an integrative work environment. Daniel Pink refers to the importance of synthesis, finding innovative, enduring solutions and inductive reasoning (Pink 2006). The COMET three-dimensional model has the possibility to assess and develop these critical elements needed for students to enter the workplace. COMET is a psychometric model used for the assessment and development of occupational competence in TVET (Rauner et al. 2013).

According to Stuart, author of the South African National Skills Handbook, graduates in engineering and science, predominantly from TVET colleges are provided with the knowledge
and some practical training, but then left without work experience and ultimately unemployed (Prinsloo 2011). The interrelatedness of theory and workplace apprenticeship is vital for the development of occupational competence towards improved employment prospects.

The transfer of training to the workplace is complicated and complex. The adaptation to a changing environment is influenced by the nature of the transfer (Subedi 2011). Logical, critical and analytic thinking is inevitable.

The average age for South Africans was 25 years in the 2011 national census, with just over one third under the age of 15 (Jordaan et al. 2012). The Quarter 4, 2014 Labour Force Survey pitched unemployment for youth between the ages 15 to 35 at 36.1% (Statistics South Africa 2015). TVET need to transform into centres of excellence, responsive to socio-economic needs to strengthen economic and human capacity.

Methods and research design

Participants comprised of 813 students and artisans from 6 TVET Colleges (8 – campuses) and 5 private Training Academies in Engineering. (Male – 62.4%; Female – 28.4%; No response – 9.1%). 49.4% of students ranged between ages 20–25.

Research questions posed in this study seek for the relationship between variables as measured entities, being occupational competence levels as the dependent variable and student holistic problem solving skills as the independent variable:

Would the implementation of the COMET competence diagnostics model in TVET effect higher quality assessment for the development of occupational competence and commitment?

The following measuring tools were applied:

- COMET competence diagnostic assessment and development tool.
- A questionnaire comprising of 30 items measuring the impact of Assessment Feedback on occupational competence development.
- COMET Occupational Commitment and Motivational questionnaire.
- Qualitative focus group interviews with TVET students.

Study programmes selected are Mechatronics, Millwright, Welding and Electrical. Test Task validity was established. COMET Large-Scale Open Test Task assessment was conducted. It measures the occupational competence to solve complex problems based on the respective curriculum, holistically. Occupational competence levels were rated and analysed. The management of institutions involved in the study was informed regarding the nature of the study during site visits prior to the actual study. Raters were identified and trained.

Results

Occupational competence levels measured indicated that qualifications do not guarantee the development of occupational competence amongst students. The typical applied curriculum appears not to be sufficient in preparing TVET students for the transition from College to Work. 31% of the 813 students obtained a total score below 5 and were therefore excluded from the final analysis. Students in the dual system apprenticeship programme (DSAP) exposed to a real work situation acquired higher occupation competence levels in comparison to sole College based peers (NON-DSAP) as illustrated in Table 1.
There is no significant difference in holistic competence levels over years of training – Year 1 – 3.6; Year 2 – 2.7; Year 3 – 2.0; Year 4 – 3.3. A modularised, applied curriculum appears to lead to stagnation of competence development and in the process hampers the creating of pathways from college to work. 54.6% of students found the test tasks rather difficult but useful (Very Much – 63.3%; Much – 18.4%) and over 92.2% of test takers expressed the desire for this type of test tasks to become part of their training. 71.7% of students indicated that they put very much effort in doing the test tasks. 63.4% indicated that they feel very much closely related to their occupation. Students were committed to doing the tasks – 73.5% indicated that they concentrated at a very much level and 71.1% places very much effort into it.

**Figure 1: Student performance on COMET criteria for holistic problem solving**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>DSAP Score</th>
<th>NON-DSAP Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional Competence</td>
<td>25.7</td>
<td>14.5</td>
</tr>
<tr>
<td>Processual Competence</td>
<td>17.1</td>
<td>13.8</td>
</tr>
<tr>
<td>Holistic Competence</td>
<td>14.3</td>
<td>11.2</td>
</tr>
<tr>
<td>Nominal Competence</td>
<td>42.9</td>
<td>60.5</td>
</tr>
</tbody>
</table>

Scores as percentages

K1-Clarity/Presentation
K2-Functionality
K3-Use value
K4-Cost Effectiveness
K5-Business/Work Process
K6-Social Responsibility
K7-Environmental Responsibility
K8-Creativity
Kf-Functional Competence
Kp-Processual Competence
Kg-Holistic Shaping Competence
Student responses during the focus-group semi-structured interviews provided valuable substantive information for the qualitative statistical data on holistic problem solving and occupational competence levels. The main themes are as follows:

- Challenges experienced during COMET large-scale assessment are due to the fact that students are used to assessment types where they merely reproduce and apply what they have learnt as opposed to COMET assessment requiring holistic problem solving strategies and thinking.
- TVET courses without workplace based learning are not equipping students adequately for the workplace.
- Feedback after assessment should be more than scores to improve student performance.
- A dual system is essential for the development of work readiness, but it must be well planned and organised with a clear memorandum of understanding inclusive of all stakeholders.
- TVET occupations have the potential to improve student’s quality of life because of the possibility for self-employment as well as the need for Artisans in South Africa and Internationally.
- With COMET assessment you need to understand how to solve problems in the real world.
- Qualities needed by students to survive the workplace are Teamwork, Adaptability, Dedication and Commitment, being Observant, Listening skills, Discipline, Workplace experience, Thinking out of the box, Creativity, Integrity, be able to see Opportunities, good Interpersonal and Personal relations and Happiness.

Empirical quantitative as well as qualitative findings from the study support the research question. Firstly, insight in the TVET student holistic problem-solving paradigm is gained and reflected in the occupational competence levels. Secondly, educators are equipped with qualitative data to study the impact of TVET delivery on work prospective. Finally, it directs policy makers regarding the position of TVET in relation to sector expectations.

This disparity between poor levels of occupational competence and high levels of vocational identity and commitment as well as motivation indicates a disjuncture between student perception and curriculum outcomes. Students lack thinking and problem solving skills to survive the workplace demands of the Conceptual Age, which will probably complicate the transition from college to work. Their concept of qualities needed for the workplace is vague and indicative of a lack of understanding of the dynamics and demands thereof. TVET should focus on workplace trends such as Flexibility, Virtual work spaces, Improved quality of life for individual and company prosperity, Mindfulness, Whole Brain thinking, Sense-making, Social intelligence, Transdisciplinarity and the ability to think globally but act locally (Sodexo 2015).

The 21st century workplace requires workers that can deliver beyond mere functionality. Pink refers to the demands of the Conceptual Age workplace in terms of six high-concepts impacting the mind: 1. Not just function but Design – referring to creativity and being emotionally engaged; 2. Not just argument but Story – persuasion, self-understanding, communication; 3. Not just focus/specialisation but Symphony – seeing the big picture, holistic solutions; 4. Not just logic but Empathy – social wellness, relationships; 5. Not just seriousness but Play – humor and fun to improve overall wellness; 6. Not just accumulation but Meaning – significance, transcendence, spiritual fulfillment (Pink, 2005). The COMET model as illustrated in Figure 2, is based on holistic problem solving rooted in eight criteria and work process knowledge which exceeds the know THAT (knowledge) to know HOW and
know WHY, is well positioned to address the transition from the Information Age-dominated by the accumulation of knowledge, information and technology to the Conceptual-Age workplace.

**Figure 2: Criteria for the complete (holistic) solution of professional tasks – Work process knowledge.**

The COMET assessment and development tool provide the data and methodologies needed for creating pathways to enhance the student’s transition from College to the 21st-century Workplace.

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5.2. Application and contrastive analysis of the different apprenticeship training modes for automobile majors: Taking Guangzhou Communications Technician Institute as an example

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Summary: This paper aims to examine the role of apprenticeship system in the transition of vocational school graduates from campus life to workplaces by comparing and analyzing the employments and performances of two groups of Auto majors with and without apprenticeship experience, and to compare different apprenticeship modes of several well-renowned automobile manufacturers in China so as to find out their strengths and problems as well as possible solutions.

Key words: Apprenticeship; different modes; automobile majors

Background
With the slowdown of economic growth in China, graduates of all levels of educational institutes have to experience fiercer competition and greater pressure in the job market. At the same time, nonetheless, more technical talents are needed in enterprises as a result of the transformation and upgrading of industrial structure. In order to cultivate qualified employees for the enterprises and make the students more marketable, apprenticeship system has been introduced into some vocational schools in some better developed regions of China.

The talent cultivation modes fall into two major types in the vocational schools of China, some of them with the apprenticeship system while others without. Since vocational schools tend to collaborate with various enterprises under different modes of management, the specific apprenticeship training modes confronting students of different schools are of considerable differences as well. The writer works in a vocational school located in Guangzhou, a comparatively well-developed city in China. Based on a follow-up investigation among students of this school, namely, Guangzhou Communications Technician Institute, this paper explores the transition of these students from campus to workplaces. All the students investigated are majored in Automobile. As it is a popular major widely established in many vocational schools of China, the investigation is of significant representativeness.

Methods and research design

Research preparation
From August 2013 to December 2014, the writer had conducted a following-up investigation among 1731 Automobile majors who were about to graduate from Guangzhou Communications Technician Institute. 871 of the students had undergone apprenticeship in an auto manufacturing enterprise while the other 860 had not. The investigation aimed to find out the number of employments of each group of students and situation of job stabilization among them after formal graduation.
2. Transition of students to their career life with and without apprenticeship experience

Table 1: Sample data table

<table>
<thead>
<tr>
<th>Training Models</th>
<th>Number of Students</th>
<th>Number of Employments</th>
<th>Proportion (%)</th>
<th>Number of Students Without Job Change</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apprenticeship</td>
<td>871</td>
<td>854</td>
<td>98.05</td>
<td>762</td>
<td>89.23</td>
</tr>
<tr>
<td>No Apprenticeship</td>
<td>860</td>
<td>817</td>
<td>95.00</td>
<td>653</td>
<td>79.93</td>
</tr>
</tbody>
</table>

As for the potential labor market, the vehicle population of Guangzhou had reached 2.7 million by the end of 2014 and that of the Pearl River Delta had approached 10 million. The latter is still increasing by 10 percent per year. At this rate, every year over 50 thousand posts are open to auto professionals in the Pearl River Delta, which accounts for the high employment rate of Auto majors, which is on average 96.53%. The strong demand in labor market for auto professionals, on the other hand, leads to increased employment opportunities and thus decreased loyalty to one work unit.

The table above illustrates that students with apprenticeship experience, compared to another group of the investigated students, have a higher rate of being employed and lower rate of job hopping, which shows apprenticeship plays a significant part in developing career identity and loyalty.

3. Students’ transition to their career life after different modes of apprenticeship

Guangzhou Communications Technician Institute has collaborated with auto enterprises including BMW, Audi, Peugeot-Citroen, Honda, Toyota, Hyundai and GAC Motor to carry out apprenticeship training among students. Refer to the following table for specific sample data.

Table 2: Apprenticeship training of auto majors

<table>
<thead>
<tr>
<th>Name of Enterprise</th>
<th>BMW</th>
<th>Audi</th>
<th>Peugeot-Citroen</th>
<th>Honda</th>
<th>Toyota</th>
<th>Hyundai</th>
<th>GAC MOTOR</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Students</td>
<td>136</td>
<td>50</td>
<td>87</td>
<td>185</td>
<td>112</td>
<td>50</td>
<td>92</td>
<td>159</td>
<td>871</td>
</tr>
<tr>
<td>Number of Employments</td>
<td>136</td>
<td>50</td>
<td>85</td>
<td>182</td>
<td>110</td>
<td>48</td>
<td>90</td>
<td>153</td>
<td>854</td>
</tr>
<tr>
<td>Proportion (%)</td>
<td>100.0</td>
<td>100.0</td>
<td>97.70</td>
<td>98.38</td>
<td>98.21</td>
<td>96.00</td>
<td>97.83</td>
<td>96.23</td>
<td>98.05</td>
</tr>
<tr>
<td>Number of Students Without Work Change</td>
<td>114</td>
<td>45</td>
<td>75</td>
<td>181</td>
<td>108</td>
<td>35</td>
<td>78</td>
<td>126</td>
<td>762</td>
</tr>
<tr>
<td>Proportion (%)</td>
<td>83.82</td>
<td>90.00</td>
<td>88.24</td>
<td>99.45</td>
<td>98.18</td>
<td>72.92</td>
<td>86.67</td>
<td>82.35</td>
<td>89.23</td>
</tr>
</tbody>
</table>
In terms of auto brands, Japanese cars of Honda and Toyota have occupied a high proportion of the total number of vehicles in Guangzhou. BMW, as a manufacturer of intermediate motors, always ranks first in the list of vehicle population. Hence, these three enterprises have a comparatively large number of apprentices and employments of students, both of which exceed 100.

It can also be inferred from the above data that students with apprenticeship experience have a higher proportion of being employed. All of the investigated students who have been trained in BMW and Audi get employed. Those who have been trained in Hyundai have the minimum proportion of employment, namely, 96%. However, it is another case with job stability. Students working in Honda and Toyota have the highest rates of sticking to their posts, both of which exceed 98% while those working in BMW have a rate of only 83.82%. The difference will be further analyzed in the next part of the paper in light of the different training modes of these enterprises.

4. Research analyses

Apprenticeship helps students to get employed after graduation, which has been demonstrated in various researches as well as in this paper. Nevertheless, uniform standards regarding the apprenticeship system are yet to be established in China. Even more, the practice of apprenticeship varies from major to major, and from one enterprise to another. Figure 3 shows the different apprenticeship training modes of enterprises cooperating with Guangzhou Communications Technician Institute.
The two German enterprises, BMW and Audi, have applied the dual-system apprentice training model. It is a comparatively well-developed training mode where apprentices study in school for one month and work in the enterprise the next month before they come back to school. Beside, during enterprise time, apprentices are accessible to the training of different posts over several stages. Thus, they are more likely to understand the operation process of enterprises, and through repeated switch-over to school education and enterprise practice, they can adjust the contents and methods of school study in accordance with the enterprise requirements, which helps them to develop required expert knowledge and skills as well as vocational capabilities. Hence the higher proportion of employment among students with apprenticeship experience in BMW and Audi. As for apprentices in the rest enterprises except Peugeot-Citroen, they have been trained in a continuous mode for a certain period of time and the proportions of employment of these students are all lower than 98.5%. Therefore, if seen from employment, the discontinuous school-enterprise-school apprentice training model of Germany is more favorable.

As for working stability, students trained in BMW and Audi are more likely to change their jobs. In other words, those students have weaker sense of career identity and loyalty, which has much to do with the discontinuous training mode they have gone through. Apprentices of the two Japanese auto enterprises, Honda and Toyota, are with the greatest job stability, which conforms to the lifelong employment system of Japanese enterprises and the enterprise culture in which career identity among employees is stressed. From the two groups of data, students who have been trained in Hyundai have the smallest rate of being employed and the least stability degree, which is closely associated with the brand influence of Hyundai itself and its apprentice training mode.

Results
Under the collaboration between Guangzhou Communications Technician Institute and auto enterprises of BMW and Audi, the apprentices switch regularly between school education and enterprise training. When trained in one of the enterprises, they are required to go through several training programs for each stage. The last program, for instance, always turns out a conversation with the boss of the enterprise for at least 15 minutes, during which every apprentice is supposed to make a summarization of his/her own experience in the enterprise. Programs like that help apprentices better understand the enterprises and obtain direct support from their bosses and get employed finally. On the other hand, due to the
discontinuousness of this training model, students have to adjust their status frequently, which is prone to cause low loyalty to one enterprise as students are willing to pursue other careers with different challenges. This, of course, has little influence over the development of students’ professional competence, but may inflict a loss on the enterprises as not all of the apprentices they have trained work for their benefits in turn.

Undoubtedly, different apprentice training modes have an influence over career identity and loyalty. The writer plans to conduct tests of professional ability (KOMET) and professional psychology among the young people who have just begun their career life, and to follow up the data samples to work out a relationship model between apprenticeship training modes and the sense of career loyalty and identity so as to help the young achieve a more smooth transition from campus to workplaces and to help them in their professional development.
5.3. Higher apprentices’ transition from school to work: Case analysis on the education of technicians in Guangzhou Technician College, in China

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Summary: From 2010-2012 Guangzhou Technician College carried out a pilot project to support higher apprentices’ transition from school to work. Of the 14 higher apprentices who trained at the Guangzhou Machine Tool Plant six graduated with technician vocational qualifications and were employed by Guangzhou Machine Tool Plant. The pilot project suggests that some reform is needed to spread the apprenticeship model in China. First, the apprenticeship and the formal education system should be integrated. Second, the rights and obligations of enterprises in apprenticeships should be defined. Third, an education framework for apprenticeships should be established. Fourth, the apprenticeship should be pitched at the higher level of vocational qualifications.

Keywords: China, Guangzhou Technician College, higher apprentices, pilot

Introduction
The apprenticeship was in the past a common vocational pathway for technical workers in China. But since the 1990s the formal apprenticeship has gradually been replaced by vocational schools. Only informal apprenticeships are left. For example, some techniques are passed down from fathers to sons or from masters to apprentices. In recent years, China’s Ministry of Education has encouraged vocational schools to explore and practise the apprenticeship within China’s vocational qualifications framework. It was within this context that Guangzhou Technician College established a pilot project of higher apprentices transition from school to work in 2010.

Methods
The pilot project included research elements, made up of a study group and a practice group. The study group consisted of vocational education researchers, studying conditions and procedures of implementation. The practice group was composed of teachers and masters.

The pilot involved 14 young men, who had senior vocational qualifications. They

* China’s vocational qualifications are junior, intermediate, senior, technician and senior technician vocational qualification.
** Technician colleges, which are affiliated with the Ministry of Human Resources and Social Security, are important parts of full-time higher vocational education in China. They mainly educate technicians and senior technical workers. They enroll junior middle school graduates, high school graduates and other graduates. By the time the students graduate, they get graduation certificates from human resources and social security departments and vocational qualifications of senior technical workers, technicians or above.
*** The three classes of apprenticeship are apprenticeship (Level 2), advanced apprenticeship (Level 3) and higher apprenticeship (Level 4) in Britain. This study was about higher apprentices. They were graduates who had senior vocational qualifications from vocational schools.
were aged between 18 and 22, and were majoring in Numerical Control (NC) machine tool adjustment and maintenance. It lasted for three years and explored how technician colleges can help higher apprentices transit from school to work smoothly in China.

**Research design**

There were six aspects in the project.

1. **A company-college partnership**

   Guangzhou Technician College cooperated with Guangzhou Machine Tool Plant in the apprenticeship program. The cooperation agreement included the following aspects. First, the school and the company drafted the framework of the program together. Second, they jointly developed knowledge-based curriculum and competence-based curriculum. Teaching practice took place mainly in the workplace and the company did most of the teaching. Third, tutors were provided both by the school and the company. Fourth, the apprentices were assessed by the enterprise's high-skilled talents committee of assessment.

2. **Double identity: students and prospective employees.**

   The higher apprentices in the pilot project were students with senior vocational qualifications in Guangzhou Technician College, who volunteered to take part in the project. During their NC machine tool adjustment and maintenance apprenticeship, the higher apprentices were both prospective employees and students, paid by the enterprise.

3. **Integration of school-based and work-based curriculum**

   Professor Zhiqun Zhao (2003, 20-21) in Beijing Normal University divides comprehensive professional competency into methodological competency, professional competency and social competency. It was these three categories of curriculum that were adopted in the pilot.

   1. Methodological competency courses. After the expert worker workshop (EXWOWO), 12 professional tasks were identified: complex component machining, technology design, machine tool transformation, machine tool maintenance, technology innovation and project implementation, technology system installation and debugging, technical support of machining centres and acceptance check of machining centres. The technician college teachers incorporated these tasks into the methodological competency courses.

   2. Professional competency courses. The 14 apprentices were allocated work in different sections of the plant, such as the NC installation workshop, machining centre installation workshop, engineering branch, trial-production workshop, subassembly workshop, machining workshop, working in NC machining and programming, NC technology design, electrical equipment assembly, electrical equipment debugging, electrical equipment maintenance, machine tool assembly and machine tool maintenance.

   3. Social competency courses. These included production management, career planning, practical writing, professional English, with the emphasis being on cultivating the apprentices' transferable competencies.

   The college was in charge of methodological competency courses. These took up 0.5 day to 1.5 days in a week. Professional competency courses took the form of working in the workshops.

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* It is the largest NC machine tool manufacturer in the south of China.

** Guangzhou Machine Tool Plant applied to local vocational qualification administration for the assessment of enterprise high-skilled talents. After the authorization of the administration, the enterprise high-skilled talents committee of assessment was founded. It is consisted of leaders of the company, technical personnel, experts from the industry and experts from the administration. The committee was responsible for assessment criteria, organization and assessment. The apprentices who pass the assessment can get the vocational qualification from the local vocational qualification administration.
during the remaining 4.5 days. Social competency courses ran through the whole process.

4. **Team teaching**
The dual tutor team consisted of school and enterprise tutors. The school tutors were responsible for methodological competency courses, and regular teaching management. The enterprise tutors were technical experts or workshop leaders in the enterprise. They were in charge of the professional competency courses and daily guidance in the enterprise.

5. **Process management**
Process management was emphasised as part of the learning. The apprentices wrote work and study logs every day, where they recorded work procedures and the like. School tutors checked these logs. In addition, the apprentices made performance records about their production projects. After they finished every production project, enterprise tutors examined these performance records.

6. **Final assessment**
The enterprise’s high-skilled talents committee of assessment developed assessment criteria and carried out a four-part assessment of: basic quality, which focused on professional ethics; performance including competence, productivity and workload; skills such as machine tools assembly, electrical functions, installation for machine tools and performance report oral defence; theory, with exams that tested knowledge about machine tool structure and principle, NC system failure analysis and methods of NC programming.

After the assessment, six of the apprentices obtained technician vocational qualifications, a 42.9% pass rate. Another five apprentices worked in the enterprise as senior workers and waited for next assessment. During the process of apprenticeship, three apprentices withdrew from the project.

**Results**
These six apprentices are now employed by Guangzhou Machine Tool Plant. They have become technical backbones in NC machining and programming and in NC technology design in the company. On this basis, NC machining has adopted the model of higher apprenticeship piloted by Guangzhou Technician College.

More broadly, the project suggests that some reform is needed to spread the apprenticeship model in China.

1. **The apprenticeship and the formal education system should be integrated.**
In China, it is difficult to attract people to take up apprenticeships, because they are outside the formal education system. Therefore, the apprenticeship should be integrated into the formal education system by the Ministry of Education. This must be done on the premise that the apprentices enjoy the same social status, employment opportunities and payment as do graduates from formal schools.

2. **The rights and obligations of enterprises in apprenticeships should be defined.**
Enterprises are reluctant to take on apprentices in China, because they cannot get any tuition fee from administrations or social recognition. Some laws and regulations, which should be issued by the Ministry of Human Resources and Social Security, define that enterprises have...
social responsibilities in apprenticeships and can get some rights, such as tax reduction, tuition fee allowance, and social honour.

3. The education framework of the apprenticeship should be established.

At present, China’s vocational qualification system is fairly comprehensive, but the education framework of the apprenticeship is not shaped in any formal manner. The lack of apprentice education content and assessment criteria contributes to the low profession recognition. There is a role for sector associations in establishing the education framework of the apprenticeship, according to national vocational qualifications and to position requirements within enterprises. This role would need to be determined by local vocational qualification administrations.

4. The apprenticeship should be pitched at the higher level of vocational qualifications.

To overcome negative perceptions of the apprenticeship model, it is suggested that apprentice education aim at the higher qualification level. At this level, apprentices already have some senior vocational qualifications and can make a profitable contribution to the enterprises.

References

5.4. Working their way to school completion: School-based apprenticeships and traineeships for young Australians

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Centre for Vocational and Educational Policy, Melbourne Graduate School of Education, The University of Melbourne, Carlton, Victoria

Summary: This paper is part of a three-year longitudinal study of School-Based Apprenticeships and Traineeships (SBATs), which seeks to explore the nature and effectiveness of SBATs as a pathway from school to sustainable occupational employment. This paper discusses past and current policy trends and objectives represented by various Australian jurisdictions. It focuses on building a detailed illustration of the learner profile of SBATs and the type of occupations and qualifications being undertaken at school. This analysis was achieved through statistical analysis of two Combined Unit Record Files (CURFs) obtained from National Centre for Vocational Education Research (NCVER). This quantitative work builds the basis for future work future qualitative work exploring the motivations, expectations and experiences of SBAT learners.

Keywords: VETiS (VET in schools), SBAT (school-based apprenticeships and traineeships, employment-based pathways)

Introduction

Australia’s apprenticeship and traineeship framework is unique in the English–speaking world; only a handful of American states and Canadian provinces offer comparable systems, and there are no equivalent federal bodies and legislative arrangements for school-based models of employment-based training (EBT). The Australian apprenticeship system, predominantly modelled on the British system (Keating 1995), diverged from its historical form in the midst of growing youth unemployment during the 1990s. Looking to strengthen the EBT system, Australian governments proceeded with forming a unified entry-level training system that integrated State based apprenticeships with Commonwealth based traineeships (Keating 1995). School-based apprenticeships and traineeships (SBATs), first introduced in 1996 as an alternative to full-time apprenticeships, are among the more recent additions to the Australian EBT landscape, enabling mainly senior secondary students the opportunity to undertake a paid apprenticeship or traineeship part-time, while also completing a senior school certificate. The re-booting of SBATs under the New Apprenticeship framework in 1998, coincided with a Commonwealth push to widen access to VETIS (Knight 2012).

Internationally, standardised frameworks for delivering and assessing vocational competencies are few, and those that do exist are not delivered in mainstream schools. The capacity to undertake apprenticeships part–time is not common, and there are no VET in Schools (VETiS) equivalent frameworks. Barriers to effective uptake of EBT pathways include public perceptions about apprenticeship pathways and the politics of federation in Canada and the United States particularly.
While recent research has explored the role of Vocational Education and Training (VET) in Schools for young people (Clarke & Volkoff 2012; Clarke 2012; Polesel & Clarke 2012; Clarke & Polesel 2013; Clarke 2013), limited Australian-based empirical work has been completed examining the efficacy of EBT models for school-enrolled young people. A key challenge facing researchers of SBATs is the lack of an existing, clear governance and policy framework for understanding the objectives and role given to SBAT across States and Territories, including equity programs, financial incentives or mentoring structures. This paper, drawing on current research investigating the retention and attrition of apprentices and trainees within the school context, seeks to lay the foundations for longitudinal empirical work with cohorts of SBATs and other young apprentices and trainees.

Setting the scene
As SBATs have evolved they have represented both an uptake strategy by the Commonwealth Government for apprenticeships and traineeships in response to perceived industry need, and another move towards a user-choice model for the training of apprentices and trainees, established by the New Apprenticeships framework of 1998. This move has coincided with increased funding incentives for secondary schools to establish trade training centres, and a tax refund to apprentices and trainees of 50 per cent for all education and training related expenses (Karmel & Mlotkowski 2008).

SBATs have given young people the capacity to start a part-time apprenticeship or traineeship while still attending school; gaining their senior secondary certificate of education upon completion of Year 12, completing part of an apprenticeship or traineeship certificate and receiving a part-time salary. Uptake of SBATs was initially slow, but grew rapidly from 6,100 in 2002 to 20,700 in 2008, dropping slightly to 19,000 in 2010.

Australian-based studies of apprenticeship attrition have found that empirical findings and commentary on the efficacy of the SBAT model generally present a positive experience for schools, training organisations, apprentices, trainees and their employers (Smith & Wilson 2002; Helme et al. 2009). Research has indicated that participation in an SBAT can reduce the chance of attrition from a full-time apprenticeship (Dalley-Trim, Alloway & Waller 2008). Attrition from apprenticeships has been found to stem from a range of personal or background factors, training factors, employment/industry factors, and structural/system-based factors (Callan 2008; Volkoff & Jones 2007; Huntly Consulting 2008; Group Training Australia 2005; Harris et al. 2001).

Previous research highlights the layered and demanding nature of SBAT requirements, student readiness and commitment, and the organisational complications involved in partnering various educational and employment stakeholders as issues impacting take-up and requiring policy responses (Currie & McCollow 2002).

Methods and research design
The underlying research question for our analysis is ‘Who are the learners participating in SBATs and what qualifications are they undertaking?’ The research has focused on building a detailed illustration of the learner profile of SBATs and the type of occupations and qualifications being undertaken by young people completing an employment-based pathway to school completion. This work has been completed through interrogation (statistical analysis) of two Combined Unit Record Files (CURFs) obtained from NCVER. To provide a context for the Australian-wide analysis of these profiles it was important to analyse the policy-environment currently in place. For this reason, a comprehensive environmental scan of existing governance and policy frameworks for SBAT in Australia.
was conducted, which revealed a picture of a layered and complicated policy environment surrounding SBATs.

Findings and discussion

Policy Analysis
As is the case with many curriculum and provision issues associated with senior secondary education across Australia’s eight states and territories, there are a diverse range of frameworks within which young people can complete an SBAT. Following a comprehensive environmental scan of SBAT policy frameworks, a table was created to compare all Australian States and Territories including current policies in place, breath of the intake, contribution of SBATs to school completion certificates and entry to university, incentives, equity and mentoring provided. The key insights provided by this policy analysis were:

• SBATs are formally recognized within all Australian senior secondary certificates of education and in many cases can form the major component of a school completion pathway. There is particular flexibility within the school completion certificates of Queensland, South Australia and Victoria, for young people to use SBATs as the dominant activity through which they obtain credits towards their senior secondary certificate of education.

• The contribution of SBATs towards an ATAR (Australian Tertiary Admissions Rank) which is used to gain access to university, remains limited in most jurisdictions. In many cases an option for scored assessment, which may contribute to an ATAR calculation, is available for a limited number of fields or occupational areas.

• There is increasing incentivisation of the SBAT pathway, particularly for employers who in many jurisdictions have access to funds when taking on a young apprentice and again when apprentices successfully complete their four-year indenture.

• The dominant equity focus within SBAT provision is on Aboriginal and Torres Strait Islander (ATSI) young people. In most states and territories ATSI SBAT schemes offer mentoring for both learners and employers and cultural competence training for employers and trainers.

Quantitative analysis
To enable the quantitative mapping of the 2013 Australian SBAT cohort, two NCVER CURF files were obtained. These files provided detailed case level information for all 15 to 19 year olds engaged in VET, both those still enrolled at school and those who had completed Year 12 or left school early. The purpose of the analysis was to identify the demographic, locational, field of education and qualification characteristics of the SBAT cohort. This illustration is a pre-cursor to future qualitative analysis of the motivations, expectations and experiences of young people using the SBAT pathway to support school completion and to access post-school VET and post-school employment-based training.

The non-school apprenticeship/traineeship CURF was used to contextualise and compare the SBAT activity against employment-based training activity of young people more broadly.

Demographics of SBAT learners
In 2013, there were 21,676 SBAT learners, making up slightly less than one in ten (9%) of all school students undertaking a vocational program. There were almost equal numbers of boys and girls undertaking SBATs across Australia. However, this varied slightly by
socioeconomic quintile. Almost half (43%) of these young people using an SBAT to complete school were from the two lowest quintiles of the Socioeconomic Index for Areas (SEIFA). There were more young women than young men from the lowest quintile enrolled in SBATs, while in the higher SES quintiles young men outnumbered their female counterparts.

While there has been take-up of SBAT pathways across all three schooling sectors, the vast majority (78%) of SBAT learners are in the government sector, with a further 10 per cent in Catholic schools and 7 per cent in independent schools.

Location

In regional areas SBATs are sometimes used as a compromise for students who face transport and distance barriers to accessing full-time apprenticeships. Access to and take up of SBATs varies between urban and rural locations, with slightly more than half (56%) of SBAT students living outside metropolitan areas. New South Wales and Queensland have the highest proportion of their SBAT learners living outside metropolitan areas (67% and 61% respectively). The balance between metropolitan and rural participation in SBATs in more even in Victoria and South Australia. The balance between metropolitan and rural is skewed for Tasmania (72% rural) and the Australian Capital Territory (93% metropolitan), congruent with the geographic characteristics of those two jurisdictions. Western Australia, in contrast, has very little take-up of SBATs outside of Perth, with only 29 per cent of SBAT learners living in rural areas.

If we look at where SBATs are playing a significant role for young people (e.g. where enrolments are high), the list of local government areas reads as a list of Australia’s disadvantaged communities and also as those regions facing high youth unemployment: Tuggeranong in the ACT, Newcastle and Blacktown in NSW, Gold Coast West and Logan City in Qld, Northern Adelaide in SA, Melton-Wyndham and Frankston City on Victoria, and the South West and Northern metropolitan areas of Perth.

The initial statistical analysis has highlighted the socioeconomically disadvantage profile of SBAT learners. SBATs, serving the dual purpose of a pathway to school completion and a pathway to a skilled occupation, are most frequently being used in communities confronting the challenges of high youth unemployment.

Fields of education and qualification levels

Four fields of education (FoE) dominate SBAT participation, making up three-quarters (75%) of all SBAT enrolments: Management and commerce (26.5%), Food hospitality and personal services (20.2%), Society and culture (15.2%) and Engineering and related technologies (13.1%). The dominance of these four FoEs was fairly consistent across the different states and territories, with the exception of Victoria where the education field was more popular than engineering; Victorian SBATs in the education FoE made up 84 per cent of all education field SBATs nationally. The take-up of SBATs in the various FoEs vary by gender, with young men more likely to be doing an engineering SBAT and young women more likely to be undertaking a management and commerce or hospitality SBAT. There were also FoE differences between metropolitan and rural areas. SBATs in rural areas were more likely than their metropolitan peers to be enrolled in architecture, engineering and health related fields, while metropolitan SBATs were more likely than those in rural areas to enrolled in education and information technology fields.

The three dominant fields of education within SBAT enrolments raise some concerns about the efficacy of those fields in enabling transition to sustainable and secure post-school employment and employment-based training. Previous work (Clarke 2013) has highlighted
the tension for schools between providing access to vocational curriculum that is of relevance and interest to their students and promoting enrolment in vocational curriculum that has currency and value in the local labour market.

The vast majority (72%) of SBAT learners are enrolled at Certificate III level. A further one in four (24.2%) were enrolled in Certificate II level programs, which were more common in the architecture, and management and commerce fields.

**Future work**

The next stage of this study will involve qualitative interviews with SBAT learners. We are currently conducting interviews with SBAT students attending Catholic and public schools in NSW and Victoria. All students were undertaking an SBAT as part of their pathway to school completion. These interviews focus on motivations and expectations of SBAT learners.

A key challenge facing researchers of SBATs is the lack of an existing, validated conceptual framework for analysing the impact of an embedded employment-based model within a compulsory-age educational setting. Initial conceptual work by the researchers has drawn on the notions of employment and education logics. While this initial conceptual work by the researchers has enabled the identification of four key stages within the SBAT-Apprenticeship/Traineeship timeline (within 6 months of SBAT enrolment; at 12 months participation in SBAT; at school completion/school exit; and within 6 months of commencement of full-time Apprenticeship/Traineeship), there is limited empirical, Australian-based research that has examined the implications of the location of the employment-based training model (employment logic) within the Australian senior secondary landscape (education logic).

A second stage of this SBAT research will address the research question ‘*In what ways does the SBAT model enable educational and occupational development and progression?’* Drawing on the understanding of the learners from this first stage, this further study will involve the development of a new conceptual framework for understanding the employment-based training model within the school context. In stage two, school-based case studies will involve interviews with SBAT social partners (schools, employers, training organisations). This stage will also involve surveying young apprentices and trainees, employers and trainers about the effectiveness of the school-based model of employment-based training.

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Section 6

Status of Apprenticeship as a Career Path
6.1. Apprenticeships should work for women too: Supporting meaningful exploration of ‘non-traditional careers’ for young women

Linda Simon¹ and Kira Clarke²

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Summary: Women in Adult and Vocational Education (WAVE) undertook a study in 2014 to identify models of career exploration in Australian and international schools. The aim of the study was to find out what barriers young women were facing in undertaking careers involving STEM subjects and in entering the non-traditional trades, and consequently to identify successful models and strategies that could better meet their needs. The resulting recommendations in the report covered a range of models including changes to current government policies and funding, more extensive partnerships between schools and industries, support for a range of taster and career exploration activities commencing early in secondary schools, and models and mentoring to increase apprenticeship opportunities.

Keywords: Gender, career exploration, models, partnerships

Introduction

Current patterns of participation in Science, technology, engineering and mathematics (STEM) and trades based fields of education and training reinforce the highly gender segregated nature of the Australian labour force. Far fewer young women than young men are entering post school studies in these industry areas. Whilst women represent almost 46% of Australian employees (ABS 2014b), in the industries of construction, mining and utilities, women account for only around 12%, 15% and 23% of employees respectively. Negative experiences and/or perceptions of workplace cultures in some industries with low female participation, discourage young women’s engagement in associated study pathways. These anomalies indicate a need for a range of interventions including career exploration whilst at school. This paper draws on a recent study conducted by Women in Adult and Vocational Education (WAVE) for economic Security 4 Women (eS4W).

Methods and research design

This paper draws from a mixed method study. An electronic literature search and review of international and national sources formed the background to a national online survey of career exploration stakeholders. Key responses that detailed new and emerging models of career exploration for young women in STEM and non-traditional industry areas were followed up with semi-structured interviews.

The 217 respondents to the survey represented schools including career education and guidance practitioners, Government departments or authorities, non-profit organisations, VET institutions, academics and peak industry bodies. As well as critiquing current models
of career exploration and practices, both the survey and the literature suggested new models and strategies that could enhance the opportunities and aspirations of young women. This paper will focus on these.

Results

Despite a strong policy-focus on traditional trade VET and apprenticeships within current approaches to VET in Schools (Clarke 2013) and current government policy, participation data indicates that apprenticeship pathways continue to be relatively weak for young women (Rothman et al 2011). Female school leavers aged 15-19 are less likely to enrol in VET study fields. (see Figure 1 below), suggesting there is an on-going pattern of gendered educational participation that reinforces occupational outcomes, with women occupying many of the low-skilled and precarious jobs in a highly competitive job market (McMillan and Curtis 2008). Within this context, effective and coherent approaches to career exploration that support pathways to secure and skilled occupations for young women are important. This paper defines ‘career exploration’, as encompassing those strategies and approaches used to promote an active engagement with and exploration of career options from a young age.

Figure 1: Number of students 15 to 19 years of age, enrolled in Vocational Education and Training (VET) courses, by field of study and gender, 2013

Respondents to the national survey highlighted the absence of well-structured opportunities for young women to explore a wide range of occupations during their schooling, leading to relatively narrow educational choices and career options. NCVER data show that from 2009 to 2013, the proportion of women commencing a trade apprenticeship or traineeship has remained a steady 15%, compared to 84.9% of males in 2013 (NCVER 2014).
What strategies did our research show would be useful as elements in career exploration for young women?

• Highly visible female role models and mentors from STEM and non-traditional occupations are a crucial element to exposing young women to a broader range of career options.

• Young women need low stakes opportunities to ‘taste’ and experience non-traditional and STEM roles and occupations prior to and during their senior secondary years of schooling.

• Critical mass and support networks, whether workplace based or through networks of other women in STEM and ‘non-traditional’ careers are important for young women.

• Intermediary organizations, such as partnership brokers, can play an important role in supporting career exploration and can operate outside the marketised pressures that can negatively influence school career exploration approaches.

• Industry led strategies that actively invite and support both career exploration by young women and longer term female participation in STEM and ‘non-traditional’ industries, occupations and careers.

• National policy with explicit recommendations on the most effective approaches to career exploration, including mandating career exploration programs in secondary schools.

• Early and coherently staged career exploration opportunities that enable young women to reflect on their own skills and interests while exploring relevant options in a broad range of industries, occupations and workplaces, thus extending the range of informed choices available to them.

• A range of educational, industry and community partnerships with schools to enable access to non-traditional and STEM learning and work placement opportunities.

• Professionally qualified and resourced career guidance practitioners in schools, to facilitate career exploration opportunities including widening career choices for young women.

Policy development and reform is required in terms of:

• Coherent national leadership to support schools to effectively embed career exploration activities within their curriculum

• Partnerships between schools and industry in particular, including partnership broker programs

• Professionalisation of career guidance in schools

• Sustainable resourcing to allow the strategies outlined above to be implemented on an ongoing basis

Two further messages were strongly supported. By the time young women are making their subject selections for their senior secondary certificate or applying for tertiary places, it is too late to start career exploration as many of the foundations of career aspirations have already been laid. This includes gendered perceptions and stereotypes regarding ‘male’ jobs and ‘female’ jobs. Career exploration in secondary school should ideally start early (e.g. Year 7/8) and should continue in a coherently staged approach throughout the secondary school years.

Workplaces also need to change. Negative experiences of young women in part-time roles and work experience during high school and/or perceptions of workplace cultures in industries and occupations with low female participation can significantly discourage young women’s participation in the associated study pathways in both STEM and non-traditional
careers. Running parallel to changes in career exploration approaches in schools, there are implications for industry and employers to consider how their industries can address perceptions of negative workplace cultures and promote positive exploration opportunities for young women.

Our research did identify successful models of career exploration and partnerships that expanded career options for young women, but also recognised that these were often driven by passionate individuals or organisations. The challenge for policy makers is to provide the funding, knowledge and support so that such models can be adopted by all schools and adapted to suit local needs and contexts. Young women both deserve and need the opportunity to pursue a wider variety of career paths than is currently the case, and their participation in a wider range of jobs is necessary for Australia’s economic growth.

References
SECTION 7

APPRENTICESHIP'S CONTRIBUTION TO SOCIAL JUSTICE
7.1. The development of skills for sustainability for Australian apprentices and trainees during the UN decade of education and sustainable development 2005 – 2014

Mike Brown¹ and Fabian Sack²

¹LaTrobe University, Melbourne and ²Sustainably, Sydney, Australia

Summary: This paper provides a brief overview to the results of the suite of Gen Green bi-annual surveys that were conducted in 2008, 2010, 2012 and 2014. These surveys looked at the skill formation and utilisation of Australian apprentices and trainees with the period under study coinciding with the United Nations Decade of Education for Sustainable Development (DESD). The major strategy for developing Education for Sustainable Development in the Australian VET sector was the Green Skills Agreement that was implemented in 2010. Consequently the findings of these surveys stand as an evaluative indicator of the skill formation and utilisation of skills for sustainability during this period of intense federal, state and enterprise-based investment in skills for sustainability. These studies conclude that there has been and is high demand for skills for sustainability from apprentices and trainees and their workplaces and that most of this demand is being met.

Keywords: Apprenticeship, skills for sustainability, VET and DESD

Introduction

Research into skills for sustainability in Australia involves numerous examples of agenda setting and policy advocacy (DEH 2007; DET 2009; DEWHA 2009; Goldney et al. 2007; NQC 2009; NSC 2013), summaries (Thomas, Sandri & Hegarty 2010; Rafferty & Yu 2010), modelling and projections (Hatfield-Dodds et al. 2008) with fewer offering empirical and specific findings (DEEWR 2010). This paper reports empirical evidence drawn from a series of four bi-annual Gen Green surveys of Australian apprentices and trainees conducted over the period of the United Nations’ designated Decade of Education for Sustainable Development (DESD) (UNESCO 2005). The research questions guiding this study focused on identifying the demand and supply of skills for sustainability amongst Australian apprentices and trainees throughout and at the end of the UN DESD. Significantly the fourth survey in the series included a cohort of their teachers.

In 2008 the Dusseldorp Skills Forum (DSF) partnered with WorldSkills Australia (WSA) to initiate a program of surveys to capture young skilled Australian workers experience of skills and sustainability - the Gen Green Surveys. The first survey recruited apprentices and trainees from the 2006 and 2008 WSA competitors. There are a number of different models of sustainability (Brown 2014). In this first survey, sustainability was conceptualised as environmental sustainability. Thereafter in surveys of Gen Green 2 in 2011 (DSF 2011), Gen Green 3 in 2013 (Sack & Brown 2013) and Gen Green 4 in 2014, sustainability was conceived as the triple bottom line approach where each of economic, social and environmental sustainability was considered of equal importance. The Gen Green 3 survey
saw LaTrobe University replace the DSF and partner with the WSA as the main source of funding (Sack & Brown 2013). The Gen Green 4 survey was funded through the Skills for Carbon Challenge program by the Commonwealth Department of IIICSRTE (Sack, Brown, Rahimi & Turnbull 2014).

This paper reports on both the supply and demand for skills for sustainability in Australia that has emerged over this decade and stands alongside international attempts to map this progress (UNESCO 2014). The findings show that there is considerable demand for skills for sustainability amongst Australian apprentices and trainees and that supply is matching demand though some gaps have been identified. A further argument is presented around the social demand for skills for sustainability by Australian apprentices and trainees. Social demand is defined as the demand for these skills for sustainability by the primary stakeholders, the apprentices and trainees (Brown & Sack 2013; Brown, Sack & Rodd 2013).

**Methodology**

Large corporations are increasingly choosing to publicly report on their policies and practices relating to sustainability. Accordingly, the design of the survey instrument was based on the Global Reporting Initiative (GRI) framework (GRI 2013). Consequently sustainability is defined in terms of social, economic and environmental sustainability with social sustainability further sub-divided into the four sub-categories of labour practices and decent work, human rights, society and product responsibility. The reporting framework was used to extrapolate questions for the survey that would be appropriate for the work, training and lives of apprentices and trainees and their VET teachers. In particular it investigated the values, behaviours and learning or these cohorts.

As a cohort, apprentices and trainees have experience of both skill formation (the supply of skills) and skill utilisation in the workplace (skill demand). The cohort for the first three surveys was drawn from apprentices and trainees participating in the WorkSkills Australia competitions. Each of these three surveys elicited around 100 responses. The Gen Green 4 survey undertaken in 2014 had a significantly expanded cohort of apprentices and trainees from across seventeen TAFE Institutions across Australia (n=649). In addition to this expanded cohort, the teachers of apprentices and trainees in these institutions were also invited for the first time to participate in a related survey. This elicited some 419 responses. Participants were asked to provide responses to various statements on a five point Likert scale. Median points were worked out and are reported. In some instances opportunities were provided for participants to offer free text responses.

Apprentices and trainees are considered a unique cohort as they are learning and developing skills through participation in authentic workplace practice and within training programs. Clearly this cohort is already also coming to work and training with existing beliefs and values towards sustainability and importantly, apprentices and trainees are the skilled workforce of the future. The Gen Green surveys are a significant contributor to Australian studies to research apprentices and trainees and VET teachers with respect to skill formation and utilisation for sustainability.

**Results and discussion**

The four surveys in the Gen Green research program provide a unique insight into the effectiveness, motivations and challenges to the formation and utilization of skills for sustainability over the course of the United Nations’ Decade of Education for Sustainable Development (DESD) and therefore also the Australian Green Skills Agreement (COAG 2010; MTEE 2010; McDonald, Conlon & Riordan 2012).
Recent research with young people report environmental values and behaviours as decreasing in importance (Mission Australia 2013). The Gen Green surveys contradicted these findings as they indicate that apprentices and trainees continue to be committed to and value the environment. Respondents to the Gen Green surveys indicated that Training programs are increasing their efforts to address environmental sustainability issues though they acknowledge that there has been a decline in commitment to these practices in their workplaces in the period from 2010 to 2014. Gen Green surveys conferred findings from other research that aspects of social and economic sustainability were increasing. For example, gender equity was reported to be practiced more on-the-job rather than in classes, though in 2014 they reported being taught about ‘treating men and women equally’ slightly more in their training programs rather than through work.

All mean scores responses to all questions were on the positive side well above the median of 3 on a 5-point Likert scale. On a scale where 4 indicated agreement and 5 strong agreement, the apprentices in Gen Green 4 rated ‘working in a workplace that treats others fairly and treating others fairly the highest with a mean score of 4.7. Next in the ratings were ‘handing over a world in good shape for the next generation’. The 586 apprentices and trainee respondents to this section on values indicated that ‘Making enough money’, ‘protecting the environment’, ‘working in a workplace that contributes to handing over a world in good shape for the next generation’, ‘working in a workplace that makes enough money’ and ‘working in a workplace that protects the environment’, were all relatively important with these statements receiving a mean score above 4.

It has been estimated that around 20% of all apprenticeship training programs are non-trade specific general education for work. Some of the development of skills for sustainability falls into this category with much crossover into the Core Skills for Work (CSfW) framework. Teachers’ responses confirmed the development of these skills for sustainability with the difference in responses between apprentices and trainees and their teachers on matched questions being around 5%. Students provided a mean score of over 4 for having learnt their following skills for sustainability in their training programs: ‘How to apply safe work methods’ (4.4); Treating men and women equally; Procedures and instructions for the work I do; Respecting people from other cultures; What customers want; How to get better qualifications; How to bring new thinking into the workplace; and ‘what to do about bullying’.

Figure 1 over the page shows that there has been a substantial increase in apprentices and trainees practice of skills for environmental sustainability (the originally designated ‘green skills’) both through work and via training in 2008 and 2010. The practice of green skills increases further in training programs from 2010 – 2014 while reporting a decrease in their use at work. At the end of the DESD apprentices and trainees are practicing environmentally sustainable skills more in training than in their workplaces.

Students in Gen Green 4 indicated that they practiced all three forms of skills for sustainability. Of these they indicated that they performed socially sustainable behaviours the most with a mean score of 4.5 for when participating in training, to 4.4 when at home and 4.35 when at work. Economic sustainable behaviours were next with a range of between 4.3 and 4.2 for the three contexts. Environmental sustainable behaviours also had a mean score over 4.0 for all three contexts.

The preferred strategy for learning and developing skills for sustainability chosen by apprentices and trainees was through on-the-job training. The strategies of ‘getting training off suppliers’ and ‘covering them in their class as part of their qualifications’, also received mean scores over 4.0.
In Gen Green 4, female students self-reported more development of skills for sustainability than their male counterparts explaining that they were learning social skills mostly through work and then training, economic skills from training then through work and environmental skills almost equally from family and friends and through training followed to a slightly lesser extent at work. Male students reported learning skills for social sustainability at work and through training slightly more than economic skills through work and training and environmental skills to a lesser extent.

Conclusions
These studies conclude that there has been and is high demand for skills for sustainability from apprentices and trainees and their workplaces. The number of apprentices and trainees reporting that they are developing skills for sustainability through their training programs has increased over the DESD while developing these skills through work initially rose but has started to decline. There are some differences between the frequency and degree of developing these skills that is gender and age based.

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7.2. A quest for social justice: Exploring the possibility of expanding the South African apprenticeship system to provide access to informal apprentices

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Summary: In South Africa and other developing countries, the quest for social justice requires ongoing reflection on transformational intent and how it manifests in policies and practices. The relationship between people, policies and the labour market requires equilibrium to promote social justice and work-integrated learning opportunities, specifically for trade-related workers. Changes in the formal labour market spilled unemployed and jobless workers into the informal economy, which has been growing systematically, yet has not been recognised as an alternative for work-integrated learning. Insights from the conceptual framework of the study on trade workers in the informal economy are discussed. In conclusion, social justice imperatives are proposed towards a more nuanced approach to address social inclusion and sustainability.

Keywords: Policy perspectives, informal economy, alternative workplaces and informal economy trade workers

Introduction

The birth of South Africa’s democracy in 1994 was a world-recognised example of social justice, followed in 1996 by the adoption of the Constitution and the Bill of Rights, setting out the values and norms for transformation. However, 21 years into the democratic dispensation the country is confronted with violent class, race, gender and xenophobic issues, compounded by poverty, and a high unemployment rate. The formal economy is also struggling to create jobs and work-integrated learning opportunities, specifically for apprentices.

The 2015 political and socio-economic turmoil in the country prompted the current research, hence the title starting with: “A quest for social justice...” The word “quest” implies a journey to find something, hence the exploratory research journey to revisit the transformational intent of social justice and social inclusion as the primary conceptual tools of public policies in South Africa, subsequent to 1994.

The research has been conceptually framed to unpack two interrelated social justice concepts, namely the people-policy concept and secondly, labour market (economic) activities, inclusive of the informal economy. South African employment statistics by Blaauw (2011) reveal the following about the informal economy:

• It includes both self-employed and the employed and shows an annual growth of 8% between 1997 and 2003, and a possible higher growth subsequent to 2008;
• Occupations and economic sub-sectors mirror the formal sector to some degree;
• Although about 2.7% and 16.6% of informal workers respectively completed tertiary and
secondary schooling, an estimated 44.3% had not completed secondary schooling, with
the remainder ranging from illiterate to semi-schooled, and
• Approximately 16.2% of the occupations were craft and trade-related.

According to Blaauw (2011) the South African informal economy, by developing country
standards, still only absorbs a small percentage of the workforce. This implies that synergy
could be found in how to approach the informal economy by liaising with other developing
countries. South Africa’s membership of the BRICs association of developing countries
(consisting of Brazil, Russia, India, China), could be the platform to develop a synergised
approach, based on social justice as the key factor towards sustainability.

Research paradigm and methodological approach
The study builds on an investigation into the epistemological positions of communities of
practice constructing workplace and work-integrated learning (Liebenberg, 2010). The 2010
critical discourse analysis study revealed power and knowledge tensions, compounded by
competing education and training policy interpretations. The tensions and dichotomous
discourses overshadowed the transformational intent, which is under scrutiny in the current
study.

The research is located in the transformative paradigm, described by Creswell (2003,
p.17) as a paradigm that evolved when researchers felt that interpretivist and constructivist
approaches did not adequately address issues of social justice and marginalised people.
In the transformative paradigm the opportunity exists to use mixed method methodologies,
inclusive of contextual-historical descriptions, interpretations and case studies, complemented
by quantitative data and analysis tools.

The INAP research paper provides a select view into the conceptual framework
of the investigation, highlighting the multi-layered issues forming part of social justice
understandings specific to the apprenticeship system.

The multi-layered conceptual framework
Multi-layeredness describes the textured and interwoven situation that requires interrogation
to understand a social justice imperative, which is firstly a people-policy consideration and
secondly, an issue of the labour market and the economy deemed to create wealth and
well-being towards sustainability. Sustainable social justice also implies a third pillar, namely
the environmental, which will not be discussed in this paper. However, no economic activity,
whether formal or informal can operate without people, land and resources, hence the
position that equilibrium in the triple bottom line relationships between people and policy,
profits of all economic activity and the planet’s scarce resources should be the inter-related
driver.

The post-1994 policy context
In the early stages of South Africa’s democracy the initial emphasis was on reconstruction
and development. By 1999, the new education and training policies were already under
scrutiny and criticised for policy borrowing from developed countries with scant reference
to the diverse implementation contexts in South Africa (Jansen & Christie 1999; Kraak &
Young 2001). Although these sophisticated policies were transformative in intent, the notion
of social justice appeared to be symbolic rather than embraced and practiced.
Policy contestations also had a negative impact on the apprenticeship system, which is still plagued by qualification, curriculum and pedagogical tensions and different approaches on how best to qualify apprentices. One of the contestations is the emulation of artisanal continental traditions imposed on developing countries. Wedekind (2013) argues that comparatively the historical, institutional and employer differences between Germanic and Scandinavian societies and developing countries are significant, which make simplistic transfers problematic. Similar insights are expressed by Smith and Brennan Kemmis (2013) about diversity in cultural, socio-economic and political contexts, stating that “key features of countries’ systems can be identified and sensitively adapted, but systems cannot be transplanted”.

In South Africa a large percentage of the post-school population do not meet the entry requirements of the apprenticeship system. The purpose is not to recommend an artisanal systems change or to propose a parallel or “differently-badged system”, as termed by Smith and Brennan Kemmis (2013), but rather to create flexible access options into the apprenticeship system. This implies the recognition of workplaces in the informal economy for the purpose of work-integrated learning.

**Labour market considerations**

South African labour market policies and regulations have also been contested, specifically in view of the growing unemployment rate. South Africa’s labour policies are considered by many as rigid, despite the fact that redress may have been the intention. The perceived rigidity may have contributed to unemployment figures.

According to The Economist (April 2013), formal labour markets are going through a wave of unleashing new technologies to remain competitive in the global arena, forcing “disruptive innovation”, rethinking of operations and automating or outsourcing of routine work. Jobless growth therefore has become a feature of many formal businesses, also contributing to higher unemployment statistics and the growing pool of people seeking a livelihood in the informal economy where the lack of social protection of workers is an issue related to social justice.
Social justice options

In the conceptual overview the triple bottom line relationships have been broadly discussed. The growing informal economy, which appears to simulate the formal economy in some ways, has become an alternative labour market for self-employment and employment. In the shadow of the formal economy the informality of the second economy largely escapes the policy and legislative framework. In developing countries the issues are similar and could be addressed on an international policy platform, proposed as the BRICs association. In the quest for social justice, the following concepts could lead to a more nuanced approach to social inclusion and sustainability:

- Explore an informal economy policy approach, which allows for natural evolvement of informal businesses, yet includes minimum worker protection;
- Address access to work-integrated learning for informal economy workers through recognition of informal businesses as alternative workplaces, and
- Specifically focus on opportunities for craft and trade-related workers by bridging the workers into the apprenticeship system through access to recognition of prior learning processes, known in South Africa as Artisan RPL (ARPL).

References


PRESENTATIONS

(FULL PAPERS NOT SUBMITTED)
Preparing TVET graduates from small Pacific nations for international employment

Presentation by Antoine Barnaart

Principal, Kiribati Institute of Technology

Many small Pacific nations, such as the Republic of Kiribati, have high youth unemployment rates, matched with limited domestic and international employment opportunities. These nations now identify that demand driven, competency based, technical and vocational education and training (TVET), delivered to international standards, can slow the growth of unemployed youth bulges, within their populations, avoiding potential economic and political instability in the future.

Kiribati, with the assistance of countries such as Australia and New Zealand, has been developing innovative ways to ensure their TVET graduates are work ready, with the required technical and core employability skills to gain and retain jobs in highly competitive international labour markets.

This presentation will outline some of these innovations, including the strategic use of industry/institute training partnerships, business incubators, simulated businesses, internships and education pathways to higher level TVET courses in other countries, such as Fiji.

Antoine Barnaart has occupied the positons of the Principal of the Kiribati Institute of Technology and Team Leader of the TVET Sector Strengthening Program since 2011. He has been involved in technical, vocational and international education for over 35 years in vocational education and higher education settings. Antoine was Australian Team Leader for the AusAID funded Australia China (Chongqing) Vocational Education and Training Project, based in Chongqing, China’s largest municipality (32 million people). Antoine was also the Australian Project Manager for the Secondary Vocational Education Reform Project in Bahrain.
Apprenticeship in former Soviet Union countries: The role of employer organisations and intermediary bodies

Presentation by Didier Gelibert and Helmut Zelloth

European Training Foundation (ETF), Torino, Italy

The proposed paper relates to the conference topic 1 on Governance, including stakeholders’ roles and responsibilities. The paper is linked to a 3-years project (2015-2017) aiming to promote policy development and implementation for apprenticeship and work-based learning in selected countries of the former Soviet Union. It is based on the initial stage of research to be carried out between May and June 2015, covering 8 former Soviet Union countries: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Moldova, Ukraine and Russia. Preliminary research findings will be available by end June 2015 and inform the extended paper for the conference proceedings.

The overall research methodology of the 3-year project builds on the knowledge triangle of ‘researcher-practitioner-policy maker’ and aims to in-build commitment of various key actors in apprenticeship to research orientation and to related research findings from the outset. The methodology is action-oriented by going beyond the classical knowledge production and facilitation of knowledge transfer through encouraging the key stakeholders to take action towards apprenticeship development and implementation. The latter is thought to happen through connection of research (2015/16) to peer learning activities (2016), joint development of recommendations and planning of follow-up development and implementation activities (2017).

The initial stage of research, to which this paper refers, is mainly based on desk research by reviewing existing national and international documents relevant to apprenticeship – such as policy papers, VET and employment strategies, evaluation of national or donor projects. Desk research produced preliminary country reports mapping the supply of apprenticeship and work-based learning with emphasis on the role of employer organisations and intermediary bodies. This was complemented by the organisation of a regional workshop (23-25 June in Minsk/Belarus) in which three participants per country participated: one researcher, one policy maker and one practitioner (employer representative). The workshop will discuss the preliminary findings of desk research and in particular elaborate on the hypotheses on financial and non-financial incentives (see section 2). Key information and data will cover availability and level of direct subsidies to companies, tax reductions, social security contributions, measures to reduce administrative burden for companies and professional development of in-company trainers. In a second stage (July-September 2015), the methodology will involve a small sample of structured interviews with selected key stakeholders in apprenticeship in each of the eight countries (first findings will be presented), followed by country-specific Focus Groups planned between September and October 2015. The validated findings will serve as a basis for further research in 2016 on the feasibility of apprenticeship schemes in selected sectors/occupations and for peer learning and other capacity development activities. In each of the participating countries a ‘triangle’ of one selected national researcher on apprenticeship, one nominated representative from a major employer organisation and one representative from the Ministry in charge of apprenticeship, nominated by the Minister, will closely co-operate in the project and research. The authors of the paper will support this ‘knowledge triangle’ with international expertise and be in charge of the overall co-ordination of the project and research activities.
The methodology relies on the state-of-the-art concept of apprenticeship as proposed by the INAP International Memorandum on the Architecture and Governance of Innovative Apprenticeship (2011). It will explore also deviations from this concept due to historical legacies from the former Soviet Union and due to contextual specificities that emerged from the transition of these countries to market economies.

The paper will focus on the role of employer organisations and intermediary bodies in the governance of apprenticeship. More specifically, it will look at the impact that financial and non-financial incentives can play to motivate and commit employers to get involved in apprenticeship provision. A major hypothesis is that non-financial incentives as a policy measure may be more effective for countries that managed well the transition to social partnership and establishment of strong employer organisations since the collapse of the Soviet Union. Whereas financial incentives may play a more important function in countries with less developed employer organisations, absence of intermediary bodies and a weaker apprenticeship tradition.

The paper will also attempt to develop a typology of countries according to the level of employer engagement and prospect for apprenticeship implementation.
The automotive retail, service and repair sector of the automotive industry is critical to the
Australian economy. Currently, many of its traditional trades are identified on the National
Skills Needs List as experiencing a national skills shortage. These include automotive
electricians, diesel motor mechanics, motor mechanics, panel beaters, vehicle painters and
vehicle trimmers.

The study aims to take a multidimensional approach to examine issues affecting the
participation of females in the trade occupations in the automotive retail, service and repair
sector of the automotive industry. Several recent media reports highlighted an Institute of
Automotive Mechanical Engineers’ 2013 survey reporting on why employers would not
employ young women. The articles described employers as claiming the lack of separate
female toilets, ‘swearing by male staff’ and the risk that a ‘woman might quit if she got
married and had babies’ amongst reasons for not training female automotive apprentices.
More sensibly, the Institute’s CEO stated that the automotive industry needs to employ more
women amongst workshop staff ‘to fill a skills shortage, instead of hiring overseas staff on
457 visas’. These media stories provide an appropriate starting point for this research.

In addition, data indicate that only 4.5% of the automotive industry workforce is female,
and other evidence suggests that only 2% of its trades workforce are women. This research
seeks to identify the reasons for such low participation in the trades and to identify and
describe strategies that might make trade occupations in the industry more attractive to
women. A better understanding of strategies that support improved female engagement will
assist this industry to undertake actions to initiate and sustain change in gender participation.

The purpose of this research is to provide Automotive Skills Australia (the funding body
for this research) with a soundly researched evidence base upon which to formulate policies
and strategies which will facilitate improvements in the participation rate of females in the
automotive trades in Australia. Broadly, the research questions are as follows:

1. What are the enablers that facilitate effective participation of females in occupations
   such as the automotive trades?
2. What are seen to be the barriers to effective participation?
3. What strategies or approaches have been successful in attracting and retaining female
   participation in some trade occupations?
4. How might Auto Skills Australia (the funding body) facilitate or support improved
   participation by females in automotive trade occupations?

This qualitative study is presently a “work in progress” and is being conducted in two
phases:
• **Phase 1** seeks to elicit the perspectives of, and the expectations and experiences
  of, a sample of employers and automotive tradeswomen from across Australia.
  Information is being gathered through semi-structured interviews. Interviews are being
  undertaken with female automotive apprentices and trainees, principally in the states
of Victoria and New South Wales

- **Phase 2** seeks to gather views on female participation in the automotive trades from a sample of school students, teachers and careers advisors in secondary schools in Victoria and New South Wales. Information will be gathered through group interviews with students and semi-structured interviews with individual teachers and careers teachers/advisors.

The presentation concentrates on the Phase 1 research, and at by the time the paper is presented, more complete data from those interviews will be available.

A review of the literature and the research to date suggests that the low participation of women in traditionally male trades, including those in the automotive industry, is due to the interaction of a multidimensional set of personal, family, industry, community and societal circumstances. Therefore strategies to increase the participation of women in the automotive industry must be similarly multidimensional and complex. The presentation will report and reflect upon the various voices of the phase 1 research and attempt to identify enablers, barriers and ways forward for improving female participation in these traditionally male dominated trades.
The role of regional occupational standards and potential for apprenticeships in ASEAN countries

Presentation by Bob Paton

Chief Executive Officer, Manufacturing Skills Australia

Manufacturing Skills Australia (MSA) is participating in an Australian government-funded project involving skills benchmarking and capacity building in the Philippines and Vietnam with one goal of aligning vocational education and training programs with local/regional industry needs.

The presentation will illustrate the findings from this and previous work and expand on the potential for increasing apprenticeships in ASEAN countries, along with regional occupational standards.

Bob Paton is the CEO of Manufacturing Skills Australia (MSA). This is one Australia’s 12 national Industry Skills Councils, recognised and funded by the Australian Government. The organisation’s roles include the ongoing development and maintenance of national vocational qualifications and training products for the manufacturing industry, gathering and providing industry intelligence and assisting companies with their workforce skills needs.

MSA is pursuing the future success and sustainability of a vibrant, traditional and advanced manufacturing sector.

Bob was appointed at the end of 2004 after more than 8 years as National Executive Officer of the Manufacturing, Engineering and Related Services Industry Training Advisory Body.

Prior to that Bob spent 20 years working for TAFE NSW as a teacher and then in various administration roles associated with state-wide and national manufacturing and engineering curriculum development and implementation.

Bob originally served an apprenticeship as a motor mechanic.