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Assuring the Acquisition of Expertise
Apprenticeship in the Modern Economy

获得专家知识的保障：
现代经济条件下的学徒制
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INTRODUCTIONS
This conference, in Beijing on 26-27 May 2011, is the fourth international conference of the International Network on Innovative Apprenticeship (INAP). Previous INAP conferences have been in Bremen, Germany (2006), Vienna, Austria (2008) and Turin, Italy (2009). INAP has steadily grown to incorporate more researchers from non-European countries and the fact that our fourth conference is in Asia symbolises our global engagement on the topic of apprenticeship. Eighteen countries are represented among the 100+ participants at the conference, who are delivering 60 papers. The conference is hosted by Beijing Normal University and we are grateful for the contribution of Professor Zhao Zhiqun in leading the staging of the event. For many delegates, this conference will provide their first opportunity to visit and learn more about the exciting and rapidly developing country of China, and to learn more about the developing TVET systems in Asia. The conference’s location in China means that a substantial contingent of Asian researchers will be able to join with counterparts from other countries in discussing this important topic. A special session will be mounted by AASVET, the Asian Academic Society for Vocational Education and Training.

The success of attracting such a large number of delegates to a conference away from Europe indicates that apprenticeship is a model of work and training which has benefits for many different types of economies and societies. Within the general topic of apprenticeship, many areas of research interest present themselves, where researchers from different discipline backgrounds can make significant contributions. These areas of research interest are represented in Beijing by the four key topics:

- Developing curricula and qualification systems
- Learning and developing theories and models
- Multiple roles of universities, schools and their teaching and training staff
- Measuring competence development

The title of the conference ‘Assuring the Acquisition of Expertise: Apprenticeship in the Modern Economy’ indicates the need for apprenticeship to deliver on its promise of workplace skills and for it to develop and change as world economies develop.

INAP researchers have been much in demand at other international conferences in the period since the Turin conference. The publication of the book *Rediscovering Apprenticeship*, by Springer in 2010, based on INAP contributions, has had a major impact internationally. A feature of INAP has been the involvement not only of academic researchers but of senior practitioners and policy-makers in its conferences. We look forward to a similar engagement this year.

Besides the main organisations behind the conference – INAP and Beijing Normal University – we are also grateful to the conference co-organisers VETNET (the European Network in Vocational Education and Training), CSVTE (The Chinese Society of Vocational and Technical Education), AASVET (the Asian Academic Society for Vocational Education and Training) and I:BB, the TVET Research Group at the University of Bremen.
Since the turn of the century, rapid economic development has led to China's industrialization process entering a new stage. In enterprises, traditional simple operational tasks have been gradually replaced by flexible, integrated and solution-oriented "holistic tasks". This has set higher requirements for skilled workers and technicians both with regard to their comprehensive professional competence and their innovation. For instance, in addition to being able to make decisions, they also need to have the ability to analyze complicated systems. This means even more challenging expectations for vocational education. However, the school education system alone should not be relied on to fully provide students' development of the above-mentioned abilities. A duel system which combines both school education and corporate training is called for, whether it is integrated duality in the apprenticeship tradition or alternating duality where there is a period of school-based vocational education. The vocational education models that are meant to facilitate the combination of work and study are generally referred to as the "integrating working and learning" or the "school-enterprise cooperation" in China. They have become an important part of the reform and development of the vocational education system in China.

In China, school-enterprise cooperation generally refers to the cooperation between vocational colleges and the industries. By taking advantage of each other’s resources, the two parties cooperate in terms of school education, on the job training, teacher training, employment and technology transfer etc. and thus form a win-win situation. In recent years, vocational colleges have tried a variety of school-enterprise cooperation according to the local situation of economic and social development. However, owing to a lack of specific laws and regulations regarding this, school-enterprise cooperation is facing difficulties and problems. Some enterprises are not motivated to participate in the cooperation. Guidance and support from the government is not effectively guaranteed. The coordination and operation mechanism still needs improvement. There is a lack of clear specifications as to the rights and obligations of colleges and enterprises respectively. All these factors have greatly affected the healthy development of vocational education in China.

In 2010, the Chinese government issued The National Guideline for Middle- and Long-term Education Reform and Development (2010-2020), which not only signals the kick-off of the all-round education reform in China, but also sets the tone for education development in the next ten years. Accordingly, to establish a government-led, industry-guided, enterprise-participated educational system and improve it, to formulate laws and regulations that facilitate school-enterprise cooperation, and to help institutionalize the cooperation have become essential for development in the future.

Modern apprenticeship is a vocational education system of school-enterprise cooperation that incorporates the traditional apprenticeship into thoughts of modern school education. The research which INAP has conducted in this field in different countries has attracted our great interest. We are honored to host the 4th International Conference and welcome scholars from different countries to discuss
these issues, which are important for us all in terms of both research and educational practice.

This is the first time that Chinese vocational education research has focused on the establishment and development of modern apprenticeship. It will also offer new perspectives for our exploration of school-enterprise cooperation. The achievements and findings in this field from other countries in terms of theoretical models, practical experience and research methods will all be very valuable for us.

In 2006, the Chinese Ministry of Education launched the project of constructing national model vocational colleges, making school-enterprise cooperation the breakthrough point of reform in higher vocational education. The teachers have made great efforts to explore solutions to the problems in curricula and teaching-learning process. The core issues are to build a curricula system integrating working and learning, to develop related learning materials, and to establish a quality control and evaluation system. In addition, the Ministry of Human Resources and Social Security has also organized a number of research projects and pilot projects with the purpose of establishing highly-skilled personal training models according to the requirements of vocational development patterns.

The “Beijing Competence Development Project for Teachers in Beijing Vocational Institutions” (CDP) has been implemented since 2007. It aims at improving the overall quality of the teaching faculties in vocational colleges and schools. The CDP has been conducted jointly with the KOMET project with dozens of teachers being involved in it. Teachers are evaluated individually and participate in the follow-up research on diagnostic concept design. Participation in the project has not only facilitated the curriculum reform, but enhanced the teachers’ research and application ability. In 2010, the Ministry of Education conducted research on “the development and application of working and learning integrated curricula in vocational colleges”, hence began diagnostic studies on professional competence. The research has also expanded its scope of diagnostic to include more locations in Sichuan, Guangdong and other regions.

We hope that the 4th INAP Conference will attract more researchers and teachers of vocational education into the exploration of these issues, so as to provide more techniques to help build up school-enterprise cooperation systems, enhance the quality of vocational education, and eventually help more students to find their potential, build up their confidence, and enhance their professional competence and ethics so that they are better prepared for self-realization and serving the society.
Keynotes
The apprenticeship approach: A way to overcome demarcations between vocational and higher education

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Summary: Permeability and progression between vocational and higher education is a major topic for educational research and policy at national and international levels. But successful examples of continuous dual learning pathways are rare. This article suggests the implementation of a regulatory framework for the transition from vocational education to higher education and draws a distinction between different career tracks.

Keywords: TVET Architecture, permeability and progression, transitions

Introduction
The societal, political and economic interest in permeability between vocational and academic education is a result of

– the paradigm of equal opportunities: This concept refers to the claim of individuals to make use, irrespective of their social background and the income of their parents, of all opportunities for qualification offered in the education system as long as they fulfil the relevant entry requirements;

– the objective in education policy to make the opportunities for transition from school to work and from vocational to academic education easily accessible in order to stimulate lifelong learning and to promote the mobility of employees;

– the economic interest of enterprises and business associations to strengthen the dynamics between education and employment systems through a high flexibility of the education system and the mobility of the employees.

In education systems that are as highly diversified and stratified as the one in Germany the organisation of permeability between educational levels and school types and above all between vocational and higher education is particularly important. One reason is that the various interfaces that exist due to the complex architecture of the system almost inevitably lead to barriers and boundaries above all between vocational and higher (scientific) education. The cause is not so much a lack of relevant legal provisions but rather a deficit in terms of workability and pedagogical foundation of these regulations.

In Germany, for instance, the proportion of graduates from dual VET – not counting those who also have a regular university entrance qualification – who enter university education after their vocational training is only about 1%. Whether it is true that the federal system in Germany leads to the greatest amount of regulations concerning permeability and transition in comparison to the other OECD countries while at the same time there is less actual permeability in the German education system than anywhere else is a matter that cannot be discussed here. When we dismiss the German debate and practice regarding permeability in education and turn instead to the international trends concerning the shift ‘from the industrial society to the knowledge society’, the problem of permeability takes a different shape.
The ‘academic drift’ and the implications for the interrelation between education and the labour market

When one adopts the idea put forward by Daniel Bell in his 1975 study “The coming of post-industrial society” with regard to the relevance of scientific knowledge in the post-industrial society, the problem of permeability in education disappears. The idea is roughly as follows: The change of employment structure in the second half of the 20th century has taken place just the way it had been predicted by Fourastié in 1949. The tertiary sector – the service sector – would become the dominant part of the employment system. The production sector, which had been dominating until the middle of the 20th century, would largely lose its importance as the exploitation of technologically induced rationalisation potentials would lead to a dramatic decline of the number of jobs and the remainder of productive activities would be relocated to less developed countries. Moreover, the role of information in the work process would lead to an entirely new quality of work. The ‘knowledge worker’ was regarded as the new type of employee. Facing this scenario that was propagated by labour market research, Daniel Bell put forward the hypothesis that theoretical (scientific) knowledge would replace labour and capital as the leading development principles of industrialism. All spheres of society, especially economy, politics and the social structure, would be oriented towards the new axial principle of the post-industrial society, theoretical knowledge. This knowledge would be generated in research processes and transferred above all via higher education. According to Bell, it would be crucial to avoid the down-to-earth perspective of the qualification requirements of paid work, for these requirements were allegedly inconsistent with systematic knowledge based on the organisation of scientific disciplines. The question as to how the education system might be successfully disconnected from the employment system was left open by Daniel Bell.

In spite of a huge amount of contrary evidence from diverse research disciplines Bell’s ideas did not cease to be influential in political debates. Only a few years ago a publication on “The transformation of education” (Bildung im Umbruch) was published (Baethge, Solga, Wieck 2007), which repeats Bell’s central hypothesis with almost the same words: “The shift from the pre-industrial to the post-industrial employment society can be characterised – in terms of the types of knowledge concerned – as a change from experiential to systematic (theoretical) knowledge” (Baethge, Solga, Wieck 2007, p. 74 [translated from the German]). The central role of systematic (theoretical) scientific knowledge is emphasised as the fundamental characteristic of post-industrial societies. This leads to the following conclusion: “In a society that increasingly regards itself as a knowledge society the universities are the primary source of economically useful knowledge and highly qualified employees” (Mayer 2003, p.581; quoted in Baethge, Solga, Wieck 2007, p.75 [translated from the German]). When this thesis is accepted, the question of permeability between vocational and higher education becomes irrelevant. The educational concept of ‘college for all’ comes into the focus. At first sight it looks as if during the past two decades many OECD countries succeeded in designing education systems in Bell’s sense with up to 80% of young people having access to higher education.

The high university entry rates between 70 and over 80% in a number of OECD countries (OECD 2010) are a clear indicator of an education policy that aims to implement a system in which continuous learning pathways exist from elementary school to higher education. Regulations for transition are largely obsolete because it is up to the young people and their parents themselves to decide whether continue learning and to proceed to higher education after the end of compulsory schooling. Of course in such a system there are standards for university entry as well. However,
these are often defined by the universities. For instance, the top-ranking universities in the United States and in the UK have defined admission standards that allow them to select the best school leavers. The effects of a ‘college for all’ policy can be summarised.

(a) The growing gap between the education system and the employment system
The academic drift in education and the associated ‘college for all’ policy leads to a gap between the growing number of university graduates on the one hand and the number of highly qualified jobs (ISCO 1–3) on the other. This is true for an increasing number of countries not only in the OECD, but also among developing countries (OECD 2008)

![Figure 1: Population with tertiary education and occupations with high demands in OECD countries (OECD 2008)](image)

Approximately 20% of the employees in developed countries are classified as high-skilled. The proportion of university graduates who are employed as high-skilled workers is 69% on average in the OECD countries. In some OECD countries the share of those employed on their formal qualification level is considerably lower, e.g. in Denmark (61%), Canada (48%), Ireland (50%) and Spain with only 37%. In countries with an advanced dual VET system, on the other hand, this figure is much higher, e.g. in Germany (89%) and Switzerland (90%). This means that in these countries only 10 to 11% of university graduates are employed below their skill level or belong to the small group of unemployed graduates.

Whether and to what extent the proportion of high-skilled workers in the employment system will rise is under debate. The introduction of lean management structures and the associated relocation of competences and responsibilities into the productive work processes in the enterprises suggest that management levels will be reduced and the demand for managers will decline. This trend can be compensated by an increasing demand for research and development staff. It is a current research issue what the net outcome of these two opposite development trends will be. What seems to be certain is that the decrease of low-skilled jobs will accelerate until a level of about 10% of all positions is reached. On the whole this means that the proportion of employees in the medium-skilled sector (skilled workers, master craftsmen etc.) tends to be stable or might even increase slightly (cf. Müller 2009). This development supports the view that the intermediary or medium-skilled employment sector remains the backbone of economic development and competitiveness of national
economies. This is the reason for the crucial role of the professional qualification of skilled workers and of the comparative study of the performance of different VET systems. When the link between the education system and the employment system is neglected, as it is the case in countries with a 'college for all' policy and high university entry rates, the result is the emergence of formal and informal qualification structures in and after university studies. These qualification structures are oriented towards the employability of graduates.

(b) Vocationalism in higher education

In many countries with a 'college for all' policy there is a tendency to establish study programmes and courses below the level of the Bachelor degree. Besides two-year programmes so-called 'some college' certificate courses, which last only one or two semesters or even only a few weeks, are offered at American universities. The subjects covered by these courses already show that these are learning opportunities at the level of adult education that do not have the quality of professional training programmes. For instance, the University of Utah offers 'some college' courses in home & gardening, Apple training, marriage arrangement or, under the heading of natural science, a course in Colorado Excursion. Norton Grubb points out that the proportion of employees in the Subbaccalaureate Labor Market (SBLM) – that is, the proportion of those who have only a 'some college' qualification – has steadily increased from 13.1% in the beginning (1967) to 21% (1988) to 28.3% (1992). By now this figure can be estimated at approximately 40%. Norton Grubb draws the following conclusion from his analysis: “The SBLM in the United States proves to be a good example of a relatively free-market approach to the transition between schooling and work. As others have stressed in comparing Germany with Great Britain […] this transition can be governed by relatively institutional mechanisms, in which government regulation, strong unions and employer associations, a carefully established wage structure, and a culture rewarding vocational education combine to create a well-defined path from schooling into employment” (Grubb 1999, p. 174).

(c) The Australian example

Australia is an example of the few countries where there is a high enrolment rate in higher education rate and at the same time an advanced system of dual vocational education and training. This looks like a contradiction at first sight since school leavers usually opt either for higher education or for vocational training. Apparently this pattern does not apply to Australia as the enrolment rate in higher education is 82% (2009) while the participation rate in the Australian Apprentices programme is about 4.1%. This figure is the ratio of 420,000 trainees and 10.5 million employees. This rate is comparable to the situation in countries with advance dual training systems. This seeming contradiction can be explained by the fact that approximately two thirds of the trainees have a university degree or have entered vocational education and training after dropping out of higher education. Therefore the average age of trainees in Australia is considerably higher than in countries like Germany, Austria or Switzerland.

(d) The Chinese model: Higher vocational education

Education policy in China responds to the 'one-child families' strong desire to give their children the opportunity for higher education in the following way: Higher education institutions establish two- or three-year vocational programmes, and higher vocational education institutions are created, hoping that this way the stigmatisation of vocational education can be counteracted effectively. By organising vocational education as "higher" (academic) education, China managed to improve the social reputation of (higher) vocational education. However, this also intensifies the
academic drift in education and weakens the vocational programmes at the upper secondary level. It is far from clear whether Chinese education policy will be able to maintain the currently adopted method of controlling the student flow by means of rigid selection procedures on the basis of standardised tests. One reason why the culture of avoiding vocational training at the secondary level is so strong is the fact that the decision for vocational training at this level is irrevocable in character. Apart from few exceptions the route to higher education is closed once and for all.

**About the “nature” of higher and vocational education**

The definition of higher education as scientific (academic) education and vocational training as an inferior type of education is wrong and prevents the development of a modern architecture of education.

Professional knowledge is a prerequisite for understanding and mastering tasks in the world of work. In this context the paradigm of holistic (complete) problem solving applies. For instance, a heating specialist who plans and installs the heating equipment for a house has to observe the criteria of the complete solution of professional tasks. These are

1. **Clarity/presentation**: The results of professional tasks are anticipated in the process of planning and preparation, and they are documented and presented in such a way that principals (customers, work superiors) can understand and review the proposed solutions. Accordingly the explanation and presentation of a solution is an instance of professional learning and professional work. A core element of communication in the work context is the ability to express one’s thoughts in a clear and organised way by giving accounts, drawings and sketches. The adequacy of the presentation with regard to the facts is a sign of professionalism.

2. **Functionality**: The functionality of a proposed solution is an evaluation criterion that immediately presents itself. Functionality refers to the instrumental technical competence or the context-independent, subject-specific knowledge and skills. Evidence of the functionality of a solution is fundamental and determines all further requirements that are posed for the solution of work tasks.

3. **Sustainability/utility**: Professional activities, workflow, work processes and work assignments are ultimately oriented towards a customer, whose concern is the utility of the work result. In highly diversified production and service processes the aspect of utility often gets out of sight when subtasks are performed and vocational education is reduced to the aspect of action. The criterion of utility orientation therefore points at the utility of a solution in the entire context of work. A high utility of a solution depends not only on its immediate applicability for the customer, but also on the prevention of liability to failure and the consideration of aspects of easy maintenance and repair. Sustainability of application and the perspectives for enhancement must also be taken into account when the utility is assessed.

4. **Economy**: Professional work is in principle subject to the aspect of economy. The context-specific consideration of economic aspects in the solution of professional tasks is a characteristic of the competent activity of professionals. There is a constant necessity in professional work to evaluate how economically a task is carried out, and to consider quite diverse types of costs and influences. Costs that will be incurred in the long run (derivative costs)
need to be taken into account as well. Decisions are made on a summative assessment of the ratio of expenses and benefits. In addition, economic responsibility also includes an awareness of the societal aspects as not all strategies that make sense at the organisational level may also be acceptable for the national economy.

5. Business and work process orientation: This criterion refers to the preceding and the following operations in the organisational hierarchy (the hierarchical aspect of the business process) and in the process chain (the horizontal aspect). This aspect is particularly relevant in an environment characterised by programmed work systems in networks in and between companies. A business process oriented solution takes into account the linkages with the preceding and following processes and includes also the aspect of cooperation beyond the boundaries of one’s own professional work.

6. Social compatibility: This criterion refers above all to the aspect of a humane organisation of work, health protection as well as the social aspects of professional work that go beyond the work context (e.g. the often divergent interests of principals, customers and society). This includes aspects of work safety and prevention of accidents as well as the potential impact of a specific solution on the social environment.

7. Environmental compatibility: By now this criterion has become relevant for almost all work processes. What is at stake here is not the aspect of environmentalism in general, but the professional and technical requirements for professional work processes and their results that can be considered relevant for the criteria of environmental compatibility. It has to be taken into consideration whether environmentally friendly materials are used and whether an eco-friendly work organisation is followed in the solution of the work task. Other issues that need to be considered are energy saving strategies and aspects of recycling.

8. Creativity: The creativity of a solution is an indicator that plays an important part in professional problem solving. This is due to the fact that the room for manoeuvre for the solution of professional tasks varies strongly in the different work situations. The criterion of a ‘creative solution’ has to be interpreted and operationalised in an occupation-specific way. In the arts and crafts, creativity is a core aspect of professional competence. In other domains the aspect of ‘creative solution’ is a relatively independent concept of professional work and learning. The distinction of creativity in a specific solution also shows the sensitivity for the problems to be solved. Competent professionals are expected to find creative and unusual solutions which at the same time make a meaningful contribution to the attainment of the goal.

Whenever one of these criteria is neglected, the worker runs the risk that the solution he offers to the customer does not comply with legal and technical rules and may have flaws with regard to its economic operability and accordingly with regard to the utility of the device.

Under the conditions of the market, non-compliance with the criteria of holistic problem solving is associated with severe disadvantages. The objective and subjective requirements that characterise the solution of professional tasks and problems do not determine correct solutions like those in mathematical operations. Instead the point is to become aware of the situative conditions of professional tasks
and to consider all important requirements and circumstances that influence the solution of the problem.

Figure 2: The eight criteria of holistic problem solving in vocational tasks

What is crucial in this process is to reconcile contradictory specifications of the customer – “I would like a high level of functional quality, but at an affordable price” – applicable norms and the requirements that result from the company’s interest in a professional planning, fulfilment and quality management of orders. Moreover, professional activities are increasingly influenced explicitly and implicitly by the social demand to consider not only one’s own preferences, but also the aspect of environmental and social compatibility in the world of work and technology. Advising a customer who buys a car in choosing among an electrical, a hybrid or a diesel engine requires not only technical know-how, but also the ability to support the weighing of the relevant criteria in order to find a “smart” compromise. This example illustrates a fundamental principle of professional problem solving competence. Work process knowledge includes knowledge to guide action, knowledge to explain action and a third type of knowledge, which sustains the capacity of holistic problem solving: knowledge to reflect action (Figure 3).

Figure 3: Work process knowledge
The question of the genesis of a work situation, a product or a work and business process ("Why this way and not another?") is a stimulus for the understanding of the path dependency of a situation and the resulting tasks.

The question, "Can it be done another way?" follows next, and this is a motivation to test and exploit the room for manoeuvre. Due to the increase in productivity in the computer and technology based world of work the constitutive idea of holistic problem solving becomes more important. Incomplete solutions can lead to failures with dramatic consequences. This leads to the necessity to use vocational education for the development of complete (holistic) problem solving.

This type of competence is represented by the tradition of master craftspeople. A short glance at the professional learning pathway from apprenticeship to the awarding of the title of master craftsman after a final examination shows already how reflected work experience leads to a domain-specific, holistic problem solving competence. The legal requirement that the setting up of a business in a number of craft trades can take place only after a master craftsman's test is rooted in this fact.

Scientific knowledge is the antithesis to professional knowledge. Scientific knowledge emerges from the research processes of the academic system, which is characterised by a high division of labour. The capacity of the sciences to generate new knowledge in an increasingly diversified system of disciplines is the key to the knowledge explosion that took place in the past century and ever since the emergence of the modern university. Philosophy as a meta-discipline that is located somewhere above the sciences, the interpretation of sociology as the "science of reality" (Max Weber) and the attempt of pedagogy to focus on the entire personality of the learner: all of these are expressions of the intention to preserve a holistic understanding and practice in the academic system. But even these "subjects" were not and are not able to escape the constraints of disciplinary specialisation, except at the price of marginalisation. A typically broad introductory phase, in which the student is acquainted with the fundamental theories of a discipline, is followed by advanced studies that are characterised by increasing specialisation and the in-depth study of specific research problems according to the "state of the art". There is no alternative to this approach in the education of scientists since the objective of acquiring research-based knowledge necessarily requires specialisation. The theses that have to be submitted at the end of undergraduate, graduate or doctoral studies are regarded as part of the research process and as a proof of the ability to make a contribution – however humble – to the generation of new knowledge and the progress of the sciences.

Professional knowledge, which aims at holistic problem solving, and scientific knowledge, which is at the centre of academic professionalism, are standing in a dialectic relationship. The two types of knowledge are fundamentally different and at the same time constitutive of each other. Without the assimilation of scientific knowledge in the system of vocational education, professional knowledge would stagnate. It would lose its relevance for the capacity of holistic problem solving. On the other hand the scientific knowledge needs to be embedded in the practice of finding solutions to social problems. Scientific professionalism does not by itself lead to responsibility. Science considers itself to be non-instrumental. It is only the embedding of academic expertise into the dynamics of society, the social organisation of innovation that makes it possible to exploit the potentials of science.

This has consequences for the organisation of a modern education system.

In the development of international and national classification systems that describe the level of educational attainments or occupations, one-dimensional hierarchical approaches like the ISCO (International Standard Classification of
Occupation), the British system of National Vocational Qualifications (NVQ) or the European Qualifications Framework (EQF) are widely used. These systems generally ignore the dialectic relationship of academic and vocational qualification. The capacity of holistic problem solving is attributed to “lower” occupations while scientific knowledge and the corresponding qualifications are allocated to the higher levels of these classification systems. This is one of the roots of the academic drift in education and the corresponding trend towards vocationalism in higher education. In the context of American pragmatism instances of higher vocational education emerged relatively early. The move of vocational education to universities and the associated turn from the university as a place of science education is a response to the stigmatisation of vocational training as an inferior type of learning that is often reserved for marginalised groups.

The establishment of and adherence to one-dimensional hierarchical structures in the education system fail to acknowledge the importance of professional knowledge and weaken the deployment of academic and professional qualifications alike.

A remarkable revision of a one-dimensional hierarchical national qualifications framework took place in South Africa in 2004. The education system, which followed the model of the British NVQ system, had turned out to be conflictual and counter-productive for economic development. Since the revision was a first step towards a system of parallel educational tracks as outlined in this contribution, some characteristics of this systemic change shall be discussed in the following.

**The South African example: towards a dualism of educational tracks**

The national skilled development handbook 2010/2011 is a whole discussion about the question: why is the occupational learning system (OLS) necessary?

Some of the answers are characteristics for the international debate.

“There is a fundamental rift between the actual practitioners of discipline based learning (primarily in the Dept Education), and work based learning (primarily in the Dept Labour), and that in fact this kind of rift is visible all over the world in approaches to learning and knowledge.

It is in fact a feature of modern society that increasing levels of specialisation across all fields is resulting in a fragmentation of knowledge from the perspective of knowledge “consumers” […]. The need for integration and connections between these silos of specialised knowledge becomes very apparent when we try and apply knowledge to solve human problems” (pp. 236–237).

The analysis of the South African experts also leads to the distinction of scientific and professional knowledge as well as the necessity to implement the concept of holistic problem solving in the education system: “It is then that we realise that although we have reached an advanced level of specialisation in a particular field of knowledge, it is the ability to holistically combine and apply all the relevant fields of knowledge that really results in effective solutions” (p. 237). This leads to a fundamental criticism of the NQF, in which the qualification levels from 5 up to 10 were reserved for higher education. From 2004 onwards a structure of parallel and fully equivalent educational tracks – one for academic and one for vocational education – was developed (Organizing Framework for Occupations).

Both tracks include the possibility to attain the highest qualification level (level 10). The characteristic of the vocational track is the concept of holistic problem solving. South Africa thus has one of the most advanced education systems, even though the degree of vertical and horizontal differentiation between occupations can be only a first step from a modular qualification structure to a structure based on occupational profiles. The ISCO classification, which underpins the South African system, is not suitable for the establishment of modern comprehensive occupations since this
classification does not distinguish between job profiles or sets of work tasks on the one hand and modern training occupations on the other.

The Swiss example

Another approach to the development of a system of parallel tracks is taken by Switzerland with its concept of an integrated dual education and training system. Two features are the basis of an education system with a high level of mobility.

1. Dual vocational education and training in one of the approximately 250 comprehensive training programmes is perceived not only as an attractive learning opportunity, but also as an equivalent entry route to higher education. This is made possible by the institution of the *Berufsabitur*, a university entry qualification that can be attained already in the course of vocational education and training.

2. The universities of applied sciences in Switzerland are especially focusing on graduates of dual training programmes with *Berufsabitur* as their target group. Universities of applied sciences are thus part of the VET system. At the same time they are part of the higher education system, offering Bachelor’s degrees that give access to Master’s degree programmes.

Parallel learning pathways: a permeability structure for the area of vocational education and training

The alternative to the academic drift and the control of educational participation by rigid selection procedures is a systems architecture that allows for a parallelism of learning pathways. The pillars of this architecture are

- a science education that pays attention not to lower the admission requirements in terms of the capacity to study a scientific discipline;

- an integrated dual vocational education and training pathway from initial training to the level of skilled workers, subsequent dual CVET programmes (e.g. for master craftspeople) and dual higher education programmes that can be attended alongside the job.

The characteristics of the integrated dual track are:

- Each of the three qualification levels (skilled worker, master craftsman or equivalent, university degree) involves the attainment of professional aptitude. This criterion is distinctive of the dual track. The insight that each occupation needs to be learned in practice is embodied in the dual structure of vocational education and training programmes. Therefore school-based or university-based (pre)vocational education needs to be followed by a period of (more or less regulated) on-the-job training of several years.

- The second characteristic is the learning objective of acquiring the ability to solve professional tasks completely. This is expressed more precisely by the notion of holistic problem solving. This learning objective is derived from the objective conditions in the world of work: qualified workers always need to find a solution that is convincing in a concrete situation, and they need to take into account several criteria that compete with each other, e.g. high functionality at low costs.

The importance of scientific knowledge, on the other hand, is based on the principle of specialisation. For instance, it is crucial that a physicist who specialises in the aerodynamics of aircraft wings continues to generate new subject-specific knowledge that can spread into the practice of engineering. Thanks to research and teaching in an ever more specialised system of science there is an exponential growth in knowledge.
Between these two educational tracks – academic and vocational education – there is a multitude of learning opportunities that acknowledge both traditions of knowledge. This is true, for instance, of dual universities, vocationally oriented programmes at universities of applied sciences, and the efforts to strengthen interdisciplinary research and teaching at universities. The basis of interdisciplinarity, however, is discipline-specific knowledge.

The dilemma for education policy with regard to permeability and progression between vocational and higher education consists in the fact

- that the objective of putting into effect a higher level of permeability between vocational and higher education has been identified correctly since this is the only way to make the dynamic coordination of the education and employment systems a reality,

- but the international paradigms and classification systems that aim at a standardisation of degrees and qualification levels (like ISCED and the EQF) prevent permeability. All international scales of qualification levels and educational degrees are one-dimensional and define higher education as academic or scientific education while non-academic vocational education is confined to the lower levels. This is unjustified from a scientific point of view and highly problematic for education policy.

The consequences are:

- Recognition procedures (recognition of vocational qualifications for higher education programmes) where the criteria for recognition are derived, for good reasons, from the requirements of university programmes.

- Master craftsmen and technicians (as well as professionals with comparable qualifications) are systematically excluded from higher education. All attempts to solve this problem by means of accreditation procedures or by lowering the admission requirements for university studies must either fail or weaken both educational tracks alike: vocational as well as academic education.

The conclusion that easily presents itself is a structure of parallel educational pathways that takes into account the multiple competences of vocationally qualified learners and offers adequate learning opportunities up to the highest level of professional expertise.

A framework for transitions

No universal (cross-occupational) regulations

Given the objective to establish an integrated (dual) vocational track from initial training up to the level of postgraduate studies, it would be rational to regulate opportunities for permeability and progression in a way that takes the existing structure of occupations and higher education programmes into account.

The integrated dual vocational track

This professional career model makes sense for all occupations that have little or no affinity to academic professions. Here it would also be an advantage if contents that are relevant for advanced vocational qualifications like the Meister qualification were already offered as optional add-ons during the initial training programme. The characteristic of the master craftsman’s test is that the professional competence is assessed at the expert level. This is possible because the duality of vocational learning is preserved in the preparation for the master craftsman’s examination. Even
if the qualification of a *Meister* is attained in a dual university programme, the expert level of professional competence is achieved (Walter, Berwald 2008).

The next step in continuing vocational education and training are second-cycle university programmes for master craftsmen and skilled workers with equivalent qualifications. A realistic option would be vocationally oriented programmes that can be studied alongside the job. In order to increase the efficiency of these programmes the work experience should be used as a source of learning in dual Master’s degree programmes.

*Semi-academic professions*

In the semi-academic professions the route to higher education is open in a twofold way. The professional knowledge has a high affinity to the knowledge of corresponding academic disciplines. In the relationship of knowledge and skills it is the subject-specific knowledge that determines the skills. This leads to a methodological similarity to the academic style of learning and teaching.

For this professional group the transition from vocational to higher education is a matter of the accreditation of competences that were acquired in vocational learning processes. If, for instance, trainees in media design have a university entrance qualification, then their three-and-a-half-year training will most likely lead to a level of professional competence that is above rather than below the level of a corresponding Bachelor programme. In this case the establishment of an equivalence regulation would make sense, according to which the competence of a media designer including his professional aptitude is recognised as an admission requirement for the Bachelor examination. It must be observed that clauses like this can be successful only if they are limited to the formulation of objectives and leave the implementation to the higher education institutions themselves.

**Conclusion**

In the face of the demographic change an increase has to be expected in the demand for trainees in vocational education as well as students in higher education. Since a regulation of the learning trajectories by closing the entry routes to higher education is just as impossible as an early turn towards vocational education it is reasonable to call for a significant improvement of permeability in education and training. This applies especially the types of continuing education that follow vocational education as well as appropriate types of higher education (Fig. 4).

![Fig. 4: Integrated and continuous dual vocational track](image-url)
This requires:
- Graduates of dual vocational education and training who have a university entrance qualification should be admitted to the final examination for a corresponding Bachelor's degree.
- Establishment of a vocational university entrance qualification that can be obtained in the course of a dual vocational education and training programme. Following the example of Switzerland, this qualification should be recognised as an admission requirement for studies at universities of applied sciences.
- Establishment of dual degree programmes at technical colleges (e.g. master craftsman/technician).
- Establishment of genuine dual Bachelor programmes that allow for the attainment of the qualifications of master craftsman and graduate engineer at the same time.

The implementation of a modern systems architecture for education and training with an integrated dual vocational track will be all the more successful when European countries with advanced dual training systems coordinate their efforts and develop an interest to establish these principles in the European area of education and training and in the European labour market.

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Apprenticeship as a model for the international architecture of TVET

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Summary: This paper focuses on the nature and future of apprenticeships. It is important to have a clear notion about apprenticeship or rather of how the concept is used today. Apprenticeships are regarded as one promising way of a well organised TVET (Technical Vocational Education and Training). Generally, apprenticeships as a basic element of TVET should be well integrated into the education system. The topical move of reinventing apprenticeship in England, France and other countries around the world is part of a policy-driven agenda. In classical “dual-system” countries like Germany, Austria and Switzerland apprenticeships have to adapt to a new context as well. The future of apprenticeship will be a hybrid form of work-based practice and school-oriented learning.

Keywords: Apprenticeship, policy reform, learning

VET reforms

VET-Reforms are currently under way in nearly every European country. The main motivation for these reforms is found in the changing economic and societal principles. The knowledge-based society requires more skills in computer science, better language abilities, a greater orientation to entrepreneurship, and more general knowledge overall. Have traditional handicraft apprenticeships come to be jeopardised by these developments? Considering the international prominence of “work-based learning” or the concept of “situational learning”, as well as endeavours to strengthen or reintroduce apprenticeship models characterised by their proximity to the world of work and their practical relevance, it seems that there is a clash of two rather oppositional tendencies in the reform discussions.

The present contribution aims to provide a historical view of these opposing trends. Education, and in particular professional training, oscillates between immediate professional requirements and more abstract, long-term demands. This discussion is to be found in the theory of education as well as in the development of educational institutions.

Europe-wide, it seems likely that a mixture of curricular and institutional practices continues to prevail, thereby doing justice to the hybridity of the world of work and the youths’ different abilities.

Apprenticeship: concept and general perspective

Apprenticeship is a mode of learning, focusing on a specific learning site as well as a form of legitimate organisational setting in order to qualify and educate young adults for work and society. Enabling them to receive full membership in an occupationally determined small community, apprenticeship used to be an informal arrangement of teaching and learning historically. Today, apprenticeship is one (but by no means the only) type of TVET which suits the demands of trade and industry in a proper way.
The technological changes, however, will readjust the character of apprenticeships which have become more and more a basis for further education and training. Associations of trade and labour (the successors of guilds) define standards of teaching and learning that have to be adopted in vocational training and schools. Nowadays, it is the state (and not the guilds anymore) who supervises and governs TVET.

Apprenticeship is a common enterprise of state, associations or chambers, trades and educational stakeholders and one way to organise TVET which is itself ideally a part of an education system of a country.

A definition of apprenticeship is important insofar, as the term apprenticeship describes a formal kind of learning which always includes school attendance in countries with dual models.

Apprenticeship as a model of well organised TVET
What makes a vocational education and training system well-organized? A TVET system can be considered to be efficient and therefore well-organised when people accept this kind of qualification system as a career path for their own livelihood. Another advantage of an apprenticeship-based TVET system is the lower quota of unemployed youth. Apprenticeship-based TVET fulfils the demands of the labour market because the providers govern the number of learning places. In most countries where apprenticeships play an important role, firms are the gatekeepers for TVET. Furthermore, apprenticeships provide firms which have needs for certain qualifications with employees who exhibit these needed skills. However, for a long period of time, it was argued that the apprenticeship model was not innovative enough to adapt changes rapidly. As the generic skills offered by apprenticeships combined with specific and general knowledge allow youngsters to engage in lifelong learning, this view is outdated today.

The apprenticeship tradition: the example of Switzerland
In general, apprenticeship, i.e. the dual model in Switzerland as vocational education and training system has a very high reputation. VET graduates are considered to have a more practical approach than more schooled youngsters. Craft skills and pragmatic approaches are cited as advantages offered by employees who have completed vocational education and training. Against this background, it is quite interesting that dual models were not the result of a deliberate design of a great thinker or even a planning committee, but evolved or rather emerged out of several elements (see Gonon 2009).

Formalisation
In the 19th century, education and learning rose increasingly to become a public affair. The schooling of people grew to a task for nation-building. In this tradition the vocational schools and apprenticeships had to be included. A fundamental role played also the rise of an economic policy which furthered vocational schooling and regulations in order to become more competitive.

Amendments, legislation
The first legal acts and legislation with a wide-ranged impact happened in the dual system-countries between the period of 1880 until 1914. Before, there had been a lot of local, regional or branch-specific regulations. But in a comprehensive way this happened in the dawn of the First World War.
Contracts
The contracts between apprentices (or their parents) and the employer changed informal learning arrangements into a legally based defined program. In a defined period the employers and the apprentices had to fulfil their duties. The contracts for apprenticeship were guided and supervised by charitable and counselling associations.

Examinations
The final examination is the touchstone of the quality of apprenticeship. In former times, it was just a piece of work under the supervision of the master. The rise of modern apprenticeships (up from 1880s) included also school-examinations and the teachers and the public became a part of the awarding body as well.

Apprenticeship as a part of the educational space
Even in dual system-countries apprenticeships are not as unique. In Switzerland, the regional diversity is quite high, especially between German-speaking and French-speaking cantons where apprenticeships are differently spread. However, the apprenticeship model is dominant in TVET. In the last years, a strong integration of TVET in the so-called “educational space” took place. Formerly, separated tracks of academic education and vocational education and training were more interwined. This permeability has led to a stronger influence of meritocratic logic in all parts of the education system. School-based learning and achievement is important for the access to even TVET and enables young adults to continue in higher education (Gonon 2005).

The basis for a renewal of apprenticeships
In the 20th century, and especially after the Second World War, both reform movements – the establishment of a new educational system in close connection with the economy and the vocationally oriented methodological and curricular penetration of the existing educational system – led to a real kickoff: it is now common standard for adolescents up to adulthood to attend school and/or get vocational training. According to Grubb and Lazerson (2004), this comprehensive approach was only possible due to a vocational orientation of the educational system, or in other words, due to the establishment of “vocationalism” as the basic principle and justification of the educational system. Today, all these phenomena are captured under the notion of “vocationalism”, and some even refer to the aforementioned times as the “century of vocationalism” (Hayward 2004).

Work and education – two concepts in flux
These developments were further supported by an increasing need for technical and scientific knowledge in the world of work. As such, these changes added up to more complex production processes, and employees were required to be more flexible and prepared to acquire new knowledge. Today’s keywords in the discussion of these topics are “key competences” and “life-long learning”. As early as in the 1970s, Dieter Mertens claimed that the educational system should equip learners with the ability to acquire new knowledge and competences in a quick and flexible way, and he referred to this kind of ability as a “key competence”. The slogan of “life-long learning”, however, was created in the 1970s as a utopia of self-realisation beyond institutionalised education and has virtually become a categorical imperative for eloquent, computer skilled and entrepreneurial Europeans. The
1960s saw both the onset of the penetration of the world of work by information technology and a valorisation of in-house training and vocational training supported by the companies. In his 1962 article Education and Vocational Training, published in the “Berlin working papers for German adult education centres”, the vocational pedagogue Adolf Schwarzlose challenged the seemingly insurmountable contrast between the two notions in the title. He explained the predominant view of the two notions as antipodes with reference to their historical development in Germany. Like Wilhelm von Humboldt and the Neo-humanists before him, he demanded that instead of conforming to political, economic and mechanic demands, education was meant to impart intellectual traditions and cultural heritage. As a kind of leftover, vocational training had come to be related only to the world of work, and in this conceptualisation, workers had merely been regarded as some sort of functional elements. In contrast, the perfection of individuality by way of cultivating cultural heritage was reserved to education. The pedagogue Theodor Litt had been the first to acknowledge such educational possibilities for the world of work, and with this reorientation, the opposition between vocational training and education had been overcome, since intellectual growth was now possible even outside traditional forms of education. As such, those intellectuals who generally dispraised of the world of work had been deprived of their most common argument (Schwarzlose 1962: 13).

In the USA the gap between liberal education and education for work was not as deep. The management theorist Peter F. Drucker emphasised the practical usefulness of education. According to Schwarzlose, the American debate stressed the fact, that educated society as the basis of economic prosperity should strive to free education from its aura of non-productivity and luxury (ibid.: 15). In the beginning of the 1960s with reference to further reform plans he argued that it was therefore essential to integrate education and vocational training.

Weakening the contrast between education and vocational training

The above considerations are still topical in today’s reform debates on vocational training and education in Europe. In the English-speaking world, the “Vocational-Academic-Distinction” is no longer considered appropriate, too (Hager/Hyland 2003). It has become a widely accepted view to see vocational training as a form of education, and traditional forms of education at schools as economically advantageous.

The German pedagogue Adolf Schwarzlose was surely not the first to argue for the integration of education and vocational training. His contemporary Herwig Blankertz, holder of a chair of vocational pedagogy in the University of Munster, tried to present the contrast between neo-humanism and utilitarianism as fruitless and prone to be misunderstood (Blankertz 1985). In his view, the two philosophies are compatible in a reformed and vocationally oriented school. Looking further back in time, German reform pedagogy and especially American pragmatism are also cases in point. The education politician Georg Kerschensteiner from Munich and the educational philosopher Eduard Spranger reversed Humboldt’s formula, according to which general education necessarily preceded any vocationally oriented training and education. Instead, true education went beyond profession, and profession as vocation was seen as the gate to the true civilisation of man. In Paul Monroe’s 1913 encyclopaedia, which is oriented towards reform pedagogy, all forms of education are interpreted as vocational, and the prominent philosopher and pedagogue John Dewey criticised the traditional school curriculum on the grounds that it did not do justice to the cultivating character of modern industry. Thus, “vocationalism” does not
merely refer to institutional phenomena on the level of secondary school, but it is a
decisive concept for the perception of education as a whole.

By extending the notion of education and emphasising vocational skills it was
possible to provide easier access to education and to raise the population’s
educational level – to democratise education, as it were. However, the strong
emphasis on economic relevance and commitment that has come to permeate all
areas of education from kindergarten to university (Kliebard 1999) is sceptically seen
as a reductionist and one-sided understanding of education.

**Reinventing apprenticeship**

It is the modernisation perspective which enforced more sophisticated ways of
learning knowledge and skills for vocational purposes.

Apprenticeships are changing and become increasingly a part of the meritocratic
logic and thus basis for further or higher education. Occupational profiles loose their
profile orientation and make more general skills more important (Gonon et al. 2008).
Apprenticeships are a good way of initiating youngsters with the role of their work.

Agreeing with this concept, there were different modes of reaching this aim. The
first idea was to vocationalise schools.

It was the German pedagogue Kerschensteiner who propogeted in 1908 already
for young pupils “activity schools”. This meant schools which enabled pupils to
acquire an active role through learning by action and further more helped them to get
acquainted with technical skills and with a positive attitude towards work.

Georg Kerschensteiner and the German tradition stressed much the supplementary
character of schooling, which enforces and deepens the experience and the expert
knowledge of the workplace.

Also the American philosopher and pedagogue John Dewey propagated activity
schools. His concept was however more general, by adding vocational aims to the
public or general schools.

Today it seems to be quite clear that there is a pressure towards more schooling.
The knowledge economy that is oriented towards knowledge and science seems to
further even more school-educated people.

The second idea is to transform workplaces more towards schools.

This kind of development is the pedagogization of the workplace itself. A lot of
things really can only be learned by applying and by direct use. Computer skills are
quite obvious examples for that. The difference between learning and work gets
more and more blurred in the computing branches. Highly skilled workers and highly
motivated persons in enterprises need to have a learning culture surrounding. It
is the discovery of the workplace as a learning site, which helped to develop more
pedagogical impacts in enterprises.

The workplace has to get more pedagogical relevance. This was not only an idea
of pedagogues but also of economists. That is why it was said, that "pedagogical and
economic reason converge".

Workplace and schooling get closer and closer or the workplace itself requires
more and more "Bildung", best provided by enterprises themselves. This perspective
is held by the ones only as a normative idea. Companies should develop in
this direction, they should foster learning cultures. Others speak however of a
development which is quite functional and necessary.

This view is however not widely shared but there are some pedagogues who argue
that this is the way how pedagogy can play a role in this debate.

Another position is quite more critical related to this. The theory of differentiation
argues that the logic of enterprise is to earn money and be competitive meanwhile
the logic of learning and teaching is not compatible with such aims. That is why the enterprise discerns different spheres.

A third concept is the so called "Transformation Theory". It is said, that factories as schools are transforming themselves related to the requirements of the new economy and the globalization. Traditional ways of learning lose their importance, as well as traditional forms of in-company training will disappear.

It is clear out of these concepts that the idea of cooperation or collaborative work is the most appealing today. Every place of learning has its advantages. So the new perspective is asking for more precise arguments why this skill should be learned in this place and not in another.

Traditional learning in Vocational Education and Training (VET) was informal learning. Pupils or apprentices learned occasionally by doing, by trial and error and by observing and imitating the masters' know how and attitudes.

This is a different concept related to the traditional school concept, which you can characterise as a model of formal learning.

The most used concept in school is the model of instruction. Teacher teach clearly defined subjects and pupils have to learn it, mostly by reading. The knowledge is mediated by a competent person, i.e. the teacher.

It is an effective way of transmitting knowledge. I stress this fact, because in literature quite often there is heavily critique about this kind of teaching. However, it is the most applied method in school and despite its low prestige teachers perform most of their time like transmitters. There are a lot of variations of this instructional model and surely it is not just an opposition of active teachers and students as passive vessels. The place of such teaching and learning is the traditional school.

The second model is the apprenticeship. A master is performing and an apprentice is observing him and asks and imitates in order to learn all important skills and attitudes. This is for acquiring skills the most appealing model. This kind of teaching and learning is most applied in the workplace.

A third one is not so clearly located whether in schools or in enterprises. It is a loosely arrangement of learning. The teachers or organisers of learning possibilities is quite in the background and pupils or apprentices themselves “discover” worthwhile facts and skills related to problems. This kind of problem-solving is highly appreciated among pedagogues.

What is it that makes for the specificity of the dual system, often also spoken of abroad as the “apprenticeship system”? In the following I want to analyse not the “system” aspects as such, as this has been convincingly done by W. D. Greinert (1994), in his differentiation of the market from the state model, but rather to refer to specific forms of learning. So I will return to the duality of “trade” and “learning” raised by Heinrich Zschokke and more particularly to the specific mix of workplace-related learning and knowledge communicated in school, to look at the specificities of vocational education as provided by the apprenticeship system and its possibilities for the future.

As has been said, in the appropriately named “dual system” one has not only two places of learning but also two different learning cultures. Learning in a scholastic context is clearly differentiated from learning in the context of the workplace. In the following I will concentrate on the vocational learning in the workplace as the origin of vocational education.

Michael Coy and his fellow researchers used a mainly ethnological approach to conduct a world-wide analysis of learning-processes in skilled industrial and traditional craft occupations, where these are based on teaching-methods integrated in the work-process. They describe African artisans, Japanese potters and American
industrial workers, finally defining certain specific features of such learning based on
the “apprenticeship-model” in the following manner: “Apprenticeship is the means
of imparting specialised knowledge to a new generation of practitioners” (Coy

A specialised spectrum of knowledge and skills is in this way passed on to
a new generation, so that the “novices” over the years become “experts”. The
knowledge and skills here are not just “physical skills”, i.e. manual skills, but also
area-specific skills in the design of economic processes and the establishment of
social relationships. The characteristic in this process is the fact that such a spectrum
of knowledge and attitudes cannot easily be transmitted in the conventional manner:
“Apprenticeship is employed where there is implicit knowledge to be acquired through
long-term observation and experience” (op. Cit.).

According to these findings, then, the apprenticeship has its place where implicit
knowledge is required which cannot simply be communicated or written down.
Such a learning-process therefore involves the acquisition of special skills and
knowledge which cannot simply be looked up in the library, accessed through the
Internet or communicated in some other manner through the media. Such skills
and knowledge cannot be transmitted directly but require the active participation of
the learner. As in a family situation, such learning includes intensive participation in
social activity. Here, unlike in the classic teacher-pupil discourse, manual activity is
in the foreground, a situation treated as exemplary by many educational reformers,
from the activity – school – movement at the turn of the century to the advocates
of project teaching today. Learning is not based, at least not primarily, on verbal
communication, but transmitted through an object, in this case the product of work.
This product-orientation is central because it is in the product itself, amongst other
things, that success in learning becomes visible.

The learning relationship involves a transfer of “information” (in the broadest sense)
which has a particular social and material arrangement as its precondition. In this – as
a rule unlike at school – learning is not the primary aim, but often part of daily work.
It happens “in passing”. Here knowledge and skills arise from the immediate activity
and are often acquired by the novice through repetition. It is like learning to ride a
bicycle or how to tie one’s shoe-laces: understanding and comprehension are best
guaranteed through emulation and the actual performance of the task. The teacher
or instructor still has the job of facilitating such a process through the presentation of
the appropriate sequence of events, and if necessary giving reasons for exercises
and repetitions. The essential of the learning process is the availability to the learner
of sources of help which render emulation possible. That knowledge is “implicit” also
means that the whole context has to be experienced and absorbed. It seems then
that an important element is the “long-term observation” mentioned earlier. Progress
in learning presupposes observation over a certain period of time which finally ends
up in increasing skill which in turn can be gauged in the product of work.

This learning through activity was and remains characteristic of traditional craft
skills, but has also marked the industrial culture built upon them and is certainly not
confined to initial vocational training. Such implicit knowledge is not only difficult to
communicate, but also little accessible to the public. The guilds and the skilled trades
always took care to keep their specialised knowledge and their craft skills “secret”,
that is, available only to a select circle. This was the basis for the economic success
of their trade and also of many artisans’ pride in the fact that this spectrum of abilities
had as its precondition an experience gained through long years, which was not
available to just anyone. Closely connected to this principle of “imitatio” is another,
“vocatio”. Such knowledge and skills were passed on in the trade as corporate values
and were reserved for a selected group of people, who were, as the Latin has it, “called” to this. This principle of imitatio, strongly rooted in preindustrial society, was in a broader sense aimed at the good behaviour of the apprentice, such aims being later extended by Georg Kerschensteiner to include social and civic concerns.

Historically we can see a clear growth in technical innovation based on the principle of division of labour, often leading to changes in craft and industrial work. These innovations were often triggered by new inventions which in turn made use of scientific discoveries. Unlike craft skills and knowledge, which are strongly linked to experience, the penetration of technology based on science is subject to the logic of the given sciences themselves. The history of industrialisation and of industrial labour can be described as a continuing penetration of the world of labour by scientific knowledge.

Access to such general knowledge in turn requires a specific initiation. This is not a professional knowledge arrived at on the basis of professional activity and experience, but rather an applied knowledge transferred onto work which changes the existing basis of the process. The principle of its effectiveness lies in this manifold applicability that is its numerous possibilities of transfer to new situations, which also means a potential for innovation. On the basis of the rationalisation and formalisation of processes a product can with the appropriate changes or re-organisation be manufactured more easily and with less difficulty by fewer people. The relationship of previous periods, where technology followed from artisan practice, has been stood on its head by modern, i.e. science-based technology (Radkau 1989). This change also finds expression in a change in the material basis, from the age of wood in which artisan skill still meant “almost everything”, to the age of iron, which opened up new perspectives on the organisation of the production process.

As such knowledge is of benefit to the process of production but cannot simply be transmitted through it, further education in general and later on the vocational schools in particular took on an increasingly significant role. These developments encouraged a shift of vocational education into scholastic institutions, which also had to take on more and more “all-round” educational tasks. The history of vocational education can therefore also be described as the gradual disengagement of the qualification-process from the immediate labour process. This is the case particularly for scientific and technologically-based knowledge.

Methodology: Meta-analysis of research and documents
This paper is based on hermeneutics and critical thinking. The methodology relies on careful reading and reflecting gathered material by taking into account relevant publications to support an argument. Empirical evidence is crucial and derived in these considerations by other studies.

Results
The result can be summarised insofar as we can conclude that apprenticeship as a dominant mode of vocational education has lost some ground. Nevertheless, it will play an important role for TVET as a model in the future. In countries with no or lost tradition of apprenticeships, it will undergo a certain revival. Key elements are the willingness of employers and other important stakeholders to stick to this kind of learning and formalise such an educational regime.

It is obvious that a knowledge-based economy also requires new forms of learning. The knowledge-based society is not – as it seems to be – based upon scientific knowledge as an exclusive form. Knowledge management and the fact that in
enterprise learning often is very closely linked to work, and even sometimes the limits are blurred, shows us that competence and development of competence is quite an important thing today. Competence development is not so close to formal learning. It is not exclusively functional, but includes also biographical aspects and a long-term commitment.

Now with the so-called third technological revolution machine-work is networked and computerised, and one may observe a further substitution of manual skills by the machine, which gives the industrial labour of today a different character from 20 years ago. These developments should not however lead us to draw hasty conclusions about present needs in terms of qualification: manual skills and accumulated knowledge will not simply disappear. In order, for example, to be able to work with information technology in industrial production one still needs to hold on to mechanical knowledge and skills, so as to be able to understand what computerised information is based on and to intervene when disturbances occur. Nevertheless, new technology can no longer be acquired exclusively through learning by doing, i.e. a learning immanent in the work-process itself, and one is dependent on instruction at school and in the workshop. Experience-led activities are losing in significance in the concrete work-process. As background knowledge and skills, though, they still remain important assets of the skilled worker, which differentiate him from the academic technologist and the unqualified novice.

As well as the cultural and social changes which have promoted an increasing scholarisation of society since the 19th century, there have then also been developments on the business side giving increasing importance to school and to training away from the workplace. The increasing weight of academic components and of general education within vocational education has therefore been noticeable in the case of most occupations. The recent reforms in Switzerland too, like the introduction of the vocational baccalaureate and the revision of the general educational syllabus of the vocational schools reinforce the dominance of the learning culture already pre-eminent in the rest of the educational system.

Even today many activities are predominantly based on experience and implicit knowledge. Alongside this, in the course of industrialisation a science-based technology has gained acceptance that is putting traditional skills under pressure. Skilled industrial and craft work now starts from a patchwork of skill and knowledge elements. Looking to the future of the dual system, Wolfgang Lempert (1998) sees reform leading to greater focus on the “pedagogic core” of vocational education. For him the most important principle is that of “rotation”, continuing periodical change between systematic and situational learning, with the public-sector schools devoted to the first, and the enterprise being particularly suited to the second. Experience must combine with wisdom, which means, to return to Zschokke once again, that “trade” would do well to take a leaf from the book of “learning”. Those who wish to enhance the attractiveness of vocational education through an increase in school-based and all-round education, as is exemplified by the recent reforms, should, on the other hand, also be concerned to ensure that learning in the enterprise is also given enough attention. It is this balance between practical application and the provision of theoretical background that gives the apprenticeship-system its strength and viability for the future, despite all the prophecies of doom.

The Vocational quest today however is to find a balance or an adequate mixture of different modes of learning and combining the advantages of several learning sites.

References


School-enterprise cooperation in China’s vocational education and training

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Summary: This paper introduces situation and problems of school-enterprise cooperation in China’s vocational education and training (VET). To explore training models based on school-enterprise cooperation is now an important issue of the VET reform that aims at improving the VET quality. Although the government has adopted many policies, China has not established an operational system and long-term mechanism of school-enterprise cooperation. This is reflected in aspects as the following: 1) lack of institutional guaranty at both national and regional levels; 2) lack of coordination and administration mechanism; 3) the enterprises are not enthusiastic about school-enterprise cooperation. So far, governments and sector organizations can only use administrative measures or establish projects of the kind to create a necessary environment for school-enterprise cooperation.

Keywords: Vocational education and training system, China, school-enterprise cooperation

1. Introduction to school-enterprise cooperation in vocational education and training

To explore training models based on school-enterprise cooperation has now become an important issue of the vocational education and training (VET) reform that aims at improving the quality of education. In China, such terms as “school-enterprise cooperation” (xiao qi he zuo), “combination of industry and education” (chan jiao jie he), “integrating working with learning” (gong xue jie he) and “combination of production, learning and research” (chan xue yan jie he) are interrelated. Broadly speaking, they mean that by making use of varied education resources and business contexts of schools and enterprises, vocational schools/colleges and the industry cooperate in terms of teaching, technology development and transfer, on-the-job training, teacher training, graduate employment and the like for a win-win training model between schools and enterprises. To make it simple, this paper will use “school-enterprise cooperation” hereinafter, which refers to the cooperation between vocational schools and enterprises in its narrow sense and joint efforts made by educational institutions and the industry in areas such as workforce training, technology development and service.

The development of “school-enterprise cooperation” in China has gone through three major stages:

- The industrialisation in the latter half of the 19th century speeds up the development of vocational schools in China and witnesses the birth of the earliest school-enterprise cooperation mechanism. At that time, intern factories were set up to study the advanced technology from the West, and this practice was later developed into the early work-as-you-study model in a vocational education sense. The establishment of China Vocational Education...
Association (Zhong hua zhi jiao she) advocated and further promoted the idea of “Part work, Part Study” (ban gong ban du), integrating education with production. This in fact was primarily aimed for the purpose of enlightenment and promotion of literacy, focusing on work but also including study (Di, 2007).

- In the 1950s when the PR. China was just founded, the education system couldn’t meet the need of the economic and social development. On the one hand, graduates from secondary and primary schools lacked practical skills and thus couldn’t obtain what they wanted, work-wise and life-wise; on the other hand, children from poor families could hardly afford school education. In this context, the then President Liu Shaoqi started advocating and implementing “the Part-Work-Part-Study education alongside with the full-time in-school education”. This system would have worked well to suit China’s situation then, but it was destroyed as the “cultural revolution” swept China between 1966 and 1976 (Chen, 2004).

- Following the introduction of the “Open and Reform” policy in 1980s, the development of VET was back on track, and the “school-enterprise cooperation” idea received more and more attention. In 2005, the State Council of China states clearly in Decision of the State Council on Vigorously Developing the Vocational Education (guo fa [2005] No.35) that “the model of integrating working with learning as well as integrating schools with enterprises should be heavily promoted”. So far, “integrating working with learning” and “integrating schools with enterprises” have become the two of the top terms in the discussion of vocational education. In 2006, the Ministry of Education (MoE) published a paper entitled Views on Improving the Education and Teaching Quality of Higher Vocational Education (jiao gao [2006] No.16). The paper argues that work-integrated learning should be regarded as an entry point of the reform on training talents in the higher vocational education. In the same year, another document, Views on Pushing up Senior Skilled Worker Schools and Technician Institutes and Accelerating the Speed of Cultivating Highly-Skilled Personnel (zhong ban fa [2006] No. 15), was issued by the central committee of the Chinese Communist Party and the State Council, demanding the establishment of a new VET system to cultivate highly-skilled personnel through cooperation between schools and enterprises. This triggered a nation-wide interest in exploring how to train personnel through cooperation and work-integrated learning.

In 2010, the Chinese government issued The National Guideline for Mid- and Long-term Education Reform and Development, which not only signals the kick-off of the all-round education reform in China but sets tones for the education reform and development in the next ten years. It is determined to include “integrating working with learning” and “school-enterprise cooperation” in the list of the main reform trials within the national VET system.

2. School-enterprise cooperation – content and means

School-enterprise cooperation in China’s current VET system can be summarized in the following three aspects:

2.1 Administrative or stimulating measures implemented by governments or sector organizations at all levels

Although the central government has adopted many policies to support school-enterprise cooperation, these policies are still relatively vague in general. For
example, some provisions prescribe the enterprises’ obligation to participate in VET, but do not state clearly the corresponding rights and the legal consequences of violation. In addition, public policies have not provided sufficient protection to school-enterprise cooperation (Zhong, 2009). So far, no school-enterprise cooperation mechanism has been established at national level. Governments and sector organizations at all levels normally use administrative measures, or establish projects of the kind to create a necessary external environment for school-enterprise cooperation. For instance, in 2007, the city of Changzhou issued *Guidelines on Strengthening School-enterprise Cooperation in VET* which specified a number of related policies such as: 1) to establish Guidance Committee for School-enterprise Cooperation in VET by the Education Bureau, Labor and Social Security Bureau, Finance Bureau and other administrative offices to make plans and policies regarding the development of school-enterprise cooperation, coordinate between vocational schools and enterprises, and solve the problems that come up in the practice; 2) to support school-enterprise cooperation in terms of funding and tax incentives, e.g. setting up fund for VET development, cutting tax for enterprises which support VET, paying students for their internship etc. In 2008, the city of Ningbo issued *Regulations for Promoting School-enterprise Cooperation in Ningbo’s VET*, the first regional law to promote school-enterprise cooperation in China.

Most of China’s sector organizations were set up at the end of last century during the transformation from a planned economy to market economy by relevant line ministries through institutional reconstruction. They have played an important though limited part in VET thanks to a lack of legal functions and roles. For example, the major responsibilities of China Institute of Communication (http://cice.moc.gov.cn) include: to make plans for the VET development in communication sector, to organize training for VET teachers and administrative staff, to develop textbooks, to formulate qualification standards, etc. In recent couple of years, it organized automobile maintenance skills contest for students and teachers, and formed an employment coordination group for vocational school graduates. China Association of Hydraulic Engineering Education (http://www.cahee.org.cn) is also mainly responsible for participating in formulating views regarding VET development in the sector, promoting development of demonstration schools, and organizing skills competitions.

2.2 Cooperation between vocational schools and enterprises
School-enterprise cooperation mainly involves specific vocational schools and enterprises. Its current patterns can be summarized as the following according to varied combination of time, space and organizational factors.

1) Dividing school years (xue nian fen duan)
There are two patterns: “2 +1” model and the “remote places” (yi di fen duan) model. The “2 +1” model means that for a three-year vocational training programme, student spends the first two years in school and the third year in enterprise for internship (which is normally employment-related). This is the most common way of cooperation in China. The “remote places” model is meant to take advantage of the VET resources and the labour market of the cities and eastern China and implement the joint training in both east and west, urban and rural regions. For instance, students of such programs may spend their first year studying at a school in the rural regions, second year in a school in the city, and the third year for internship in an enterprise.

2) Half-work-half-study / work-study rotation (gong xue jiao ti)
In this pattern, schools and companies jointly develop training programs under
which the students rotate work in businesses and study in schools (for a certain period of time or in each semester). This model is helpful to facilitate combination between theoretic study and practice. It also helps students from poor family to complete their study successfully.

3) Flexible arrangement (tan xing an pai)
This means to flexibly arrange learning process according to the seasonal and periodical features (e.g. tourist season, exhibition period, and construction project) of the cooperative enterprises. This model is very helpful to the related businesses and is welcome.

4) “Training orders” (ding dan pei yang)
According to their own development needs, enterprises may book in advance a certain number of graduates of “certain specifications”, which is often accompanied by joint curriculum development, teaching and learning organization, and generally requires the businesses to pay for part of the training expenditure. Title class – for example “Haier class” is a common form of such model. The above three models are all likely to choose this way of training.

5) Work-study bases within the enterprises
Enterprises set up a separate training and practice workshop for students with multi-functions of teaching, training, practice, full-time management and instructors from the businesses. Such model is generally only found in some big enterprises that call for high-tech production, Digital China Group for example. The enterprises play a dominant role in such model.

6) Sector-led (hang ye zhu dao)
In a sector consists of mainly small and medium-sized businesses, an individual company may not have the conditions for cooperation with the school alone. Sector organizations take the lead to build the platform for school- enterprise cooperation, organize a number of enterprises to jointly provide internships and part-time teachers for the schools, and jointly make training orders. For example, the cooperation between over 1000 small and medium firms under Henan Supply and Marketing Cooperatives and five business schools right falls into this model (Department of Higher Education of MoE & Chinese Association of Higher Education, 2004; Yu, 2009)

7) Teaching factories (jiao xue gong chang)
Schools set up their own production or service enterprises, or the other way round, enterprises move their workshops into the schools. For instance, the school signed a contract with the enterprise by purchasing its teaching equipments. With the main body of the production still being the enterprise, the production site was transferred to the campus, and the production was embedded into the teaching and learning process. Students learned through an authentic work process, acquired competence and gained valuable experience within the school education system, and thus achieved the integration of production workshops and training workshops, teachers and masters, learning and production. This model is not only convenient for students, but also helpful for schools to have more control over the training process (Zhao et al. 2009).

8) Enterprises’ program replacement (ke cheng zhi huan)
Many vocational schools introduce programs directly from enterprises while the enterprises provide for them new curricula, equipments, personnel and even financial support. In doing this, the enterprises can not only help improve the
training quality, but also promote their own products and technologies. This model is very popular among many ICT businesses (e.g. Huawei, CISCO, etc.) and automotive manufacturers (e.g. GM, Toyota, etc.).

2.3 “Vocational education group”
From the early 1990s, there arose in China a new model of school-enterprise cooperation, i.e., the formation of so-called “vocational education group” (zhi jiao ji tuan) in the course of vocational schools redistribution and resource integration. Under the guidance of government and on the principle of voluntary participation, it is a VET organization that is led by elite schools, combining schools and enterprises of the same region or sector with shared resources, complementary strengths and common development. Its goal is to form a platform for multi-schools and multi-enterprises in terms of cooperative workforce training (Gao, 2010).

A common definition and understanding of vocational education group hasn’t been reached yet, although it was pointed out for example in the Views on the Promotion of Establishing Vocational Education Group in Shanghai that tied up by specialty with one or a few vocational schools at the core, and participated by relevant industry, enterprises and vocational schools, vocational education group is a non-independent corporate body formed on the principles of voluntary participation and mutual agreement for the purpose of sharing resources and school-enterprise cooperation. Its functions can be understood in the following three aspects:

- to integrate educational resources. Within the group, vocational schools of different levels can be better linked up in terms of offering specialties and programmes, and organizing teaching-learning process, etc., so as to facilitate the flow of teachers and hardware resources sharing within the group.

- to build a network between industry and academia. Companies within the group are united with the schools: the schools provide training conditions for the enterprises whereas the enterprises provide for the schools training bases and corporate trainers, and participate in curriculum and learning materials development.

- to promote employment and joint project development. In the group, companies offer internships and employment opportunities to students of the vocational schools while the schools join the enterprises in product development, and thus extend the group’s education and business functions (Guo, 2010).

3. The promotion of school-enterprise cooperation and the achievements
Currently, there are no comprehensive statistics on the scale of school-enterprise cooperation in VET except some sample data. According to the Research Report on the Current Situation of Reform in Secondary Vocational Education, those students who participate in “Training orders” and half-work-half-study account for one third of the total number of vocational school students in 2006. In 2007, a sample survey of 39,585 students that are to graduate in 2008 in Jiangsu Province showed that 90% of the students had participated in internships. In 2006, a sample survey conducted in a central China province of 56 secondary vocational schools indicated that there were 49 schools that organized internships and sent 28,600 interns to 43 companies, accounting for 80% of the total number of students. 23% of the internship positions perfectly fit in with the students’ specialty and 59% fit in generally. And assembly line
(low-skilled) job positions accounted for 57% (Wang, 2007). In addition, statistics also show that the first batch of 28 national demonstration vocational colleges have signed cooperation agreement with a total of 5,009 companies, establishing 5,334 off-campus practice bases, and employing 5,349 part-time teachers from enterprises (Coordination Committee for National Model Higher Vocational Colleges, 2007). Research shows that although companies are essential for school-enterprise cooperation, they are not active in this process. In practice, there exists commonly an “unrequited love” situation in which businesses are indifferent on one side while schools are eager on the other (Fan, 2010). To find out the reasons for businesses’ lack of enthusiasm, the Central Institute of Vocational and Technical Education (CIVTE) of the MoE conducted a survey to 139 enterprises. The results showed that these are the most important factors that affected their initiative in the cooperation: “lack of concrete measures to implement the policy”, “the challenge for the enterprises to undertake the security risks of the interns”, “the vocational school students not being able to meet the enterprises' requirements” and “lack of public recognition of the enterprises in the cooperation” (Wang, 2008).

The Institute of Vocational and Adult Educational Beijing (IVAE) and the University of Bremen in Germany have used ERC (Evaluation of Regional Cooperation) method to analyze a number of school-enterprise cooperation cases in Beijing. Figure 1 shows that the two parties vary significantly in the degree of acceptance of the cooperation, and on item “cooperation planning” in particular, where there is a difference of nearly 6 points (out of 10). The evaluation of cooperation inputs (target 6.67, implementation 6.63) is significantly higher than the evaluation of outputs (result 6.03, radiation 5.71).

Figure 1: ERC bar chart of school-enterprise cooperation of a Beijing vocational college

It is shown in the spider diagram that the five first level items are relatively flat, indicating that they are at a stage of reflection. For instance, it is considered that the target of cooperation is comparatively clear, yet it is quite controversial in the “radiation” and “achievements obtained” of the cooperation (Institute of Vocational and Adult Education Beijing, 2008).

Researches on the learning results of internships demonstrate that what the students do in this period plays an important role in their competence development.
Some students were assigned to work on the assembly line for simple work and what they got from it was at best “enhanced discipline and endurance”. They failed to learn enough knowledge and skills for the future, but become cheap labors instead. However, if the students are able to do some professionally demanding work, their gains will be enormous.

Figure 2: ERC spider diagram of school-enterprise cooperation of a Beijing vocational college

As is shown in Figure 3, results of the research project competence diagnostic (KOMET) show that if a secondary vocational school (Skilled Worker School) is able to frequently participate in the important work of the workshop in internship, student’s competence can even surpass that of a vocational college student (FG IBB Bremen, 2009).

4. Problems and discussion
Despite some achievements, China has not established an operational system and long-term mechanism of school-enterprise cooperation. This is reflected in the following aspects:
4.1 Lack of institutional guaranty at both national and regional levels
The institutional construction on school-enterprise cooperation has not yet been put on the legislative agenda, although the state government attaches great importance to school-enterprise cooperation, realizing that “governments at all levels must play a leading role in promoting the combination of industry and education, and the practice of school-enterprise cooperation” (Lu, 2010), and pushing forward the development of cooperation by carrying out large-scale trial projects. Official documents are not legally binding enough for either schools or businesses. The government does not have a promotion mechanism for the enterprises and adequate protection for the interests of the businesses in cooperation in particular. Therefore, many cooperation projects failed to obtain support from the corporate decision-making bodies or the administrative authorities. In addition, in the implementation of national policies, the local authorities did not formulate workable administrative measures accordingly. As a result, there aren’t standard documents for schools or businesses when they sign agreements of cooperation. Nor is there any corresponding service of the approval and supervision of the agreements. And lastly, some current administrative mechanisms the schools have also restricted the further development of school-enterprise cooperation.

4.2 Lack of coordination and administration mechanisms for school-enterprise cooperation
School-enterprise cooperation involves businesses, schools, sector organizations and governmental departments. The administration of school-enterprise cooperation is not only the function of education department; it also involves departments of economy, labor, finance, taxation and so on, calling for special policy guidance, special organizations for coordination and services, special funds and even support from the public. However, at present, except for the efforts of the education sector, there aren’t any special institutions and mechanisms responsible for the shaping, supervision, assessment and implementation of school-enterprise cooperation, and thus make it very hard for the schools and businesses to carry out their cooperation practice. Research shows that even in some provinces/regions with good development in VET like Jiangsu and Qingdao, businesses and schools’ satisfaction level of the policy environment and the public services for school-enterprise cooperation is very low (Yu, 2009).

4.3 The enterprises are not enthusiastic about school-enterprise cooperation
School-enterprise cooperation has not yet institutionalized or standardized. The majority of enterprises get involved in VET only at a superficial level by means of hiring graduates from the schools or donating funds to the schools, and hardly take part in the teaching process and administration. Some enterprises even take school-enterprise cooperation as a solution to meet their urgent needs for hands. Sometimes personal factors (e.g. business leaders have a good relationship with the school) played an important role and corporate personnel changes and operating conditions, etc. are all likely to affect the sustainable development of the cooperation. Apart from that, the following factors have also reduced the enterprises’ desire to cooperate: the policies that encourage cooperation tend to have problems in implementation; the participating enterprises cannot get compensation for their cost or benefits to raise their reputation; there is an obvious difference between the reality and the enterprises’ comparatively high expectation of the schools’ quality of education and third party coordination service. For some small or medium sized
businesses, cooperation is even more difficult as they have small demand for human resources and can provide even less opportunities of internship and so on.

4.4 Schools’ own ability to cooperate
Although the majority of vocational schools are aware of the important value of school-enterprise cooperation, they lack experience in this aspect as they are used to the closed-door model of running a school. Rather than considering school-enterprise cooperation as a breakthrough point for deepening the reform and improving the quality of personnel training, some vocational schools and colleges just use it as a solution to the shortage of educational resources and insufficiency of employment channels resulted from increased enrollment. Such facts as the teaching staff are generally lacking in high competence to offer services to businesses, and the graduates have insufficient skills and capacities have affected the attractiveness of vocational schools to enterprises (Hou, 2010).

References


CHAPTER I

DEVELOPING CURRICULA AND
QUALIFICATION SYSTEMS
Apprenticeship growth and quality in England

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Summary: A short analysis of recent developments in Apprenticeships in England in light of the recent growth in the apprenticeship programme size. Assessing whether the introduction of the new Specification for Apprenticeship Standards for England (SASE) has addressed long standing concerns about the breadth and rigour of apprenticeships in England, as identified when making comparisons to continental European models. The paper finds that the dramatic growth in apprenticeships in England has not been to the noticeable detriment of quality. Equally that even post SASE the English apprenticeship will not equate to those in Germany, for example, and nor does it try to. Instead, like our economy it operates in the middle ground; between the prescriptive, heavily regulated and highly valued central EU work-based learning models and the low regulation economic ideals and practises of America and the new economies.

Keywords: Apprenticeships, standards, England, quality

Apprenticeships in England

Apprenticeships have a long tradition in England, dating back to around the 12th century and were flourishing by the 14th century (Aldrich/Richard 2005). The concept of apprenticeship is well engrained into the psyche of the public and they are generally held in a relatively high, if old fashioned, regard as a concept.

By the 1990’s however apprenticeship volumes in England had fallen to a post war low and their perception and quality were in decline leading to a major revision of the programme into Modern Apprenticeships in 1994, which halted their decline.

Since 2000 and in particular since Gordon Brown became prime minister in 2007 there has been a renewed focus on growing apprenticeships in England (and the rest of the UK). This focus has been sharpened still by the 2010 Conservative-Liberal governing coalition who has made apprenticeship growth the centre of their skills policy (BIS 2010). The amount of government money invested annually in Apprenticeships in England has risen from circa £700m PA in 2007 to £1,300m in 2010 (BIS 2010). Correspondingly the number of apprentices has also grown dramatically (see table 1).

It is also worth noting that during this period of expansion completion rates have also improved, with average success rates rising from approximately 30% in 2001/2 to over 70% in 2009/10. This improvement in quality has helped facilitate the increase in apprenticeship respect and demand.

Introducing a new standard

In order to solidify gains made in apprenticeships quality and to address concerns about the variable academic content of apprenticeship programmes the 2010 English legislation the ‘Apprenticeships, Skills, Children and Learning (ASCL) Act’ introduced the Specification of Apprenticeship Standards for England (SASE). The SASE sets out the minimum requirements to be included in a recognised English Apprenticeship framework. Only those Apprenticeship frameworks which comply with the SASE will
be recognised and funded as official English Apprenticeship frameworks from April 2011.

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Table 1: Apprenticeship starts per academic year in England x 1,000 (Data from BIS 2010: *Skills for growth*).

In addition SASE brings in the requirement for all apprentices to be employed and this along with the new apprentice minimum wage assures both apprentices legal footing as employees and increases employer ownership of the programme.

**Design, contents and purpose of the SASE**

The fundamental purpose of SASE is to codify what an Apprenticeship framework must contain and the qualification or qualifications which an apprentice must obtain. SASE sets out how apprenticeship qualifications must provide the evidence that the individual apprentice has achieved two fundamentals:

- the competencies required for performance of the particular occupation or job role;
- the technical skills and knowledge/understanding of the theoretical concepts specifically relating to the occupation or job role, together with knowledge and as well as these core competence and theoretical elements SASE also introduces four elements that address long standing criticisms of the English Apprenticeship system including those identified by Steedman 2001, and again by Brockmann, M., L. Clarke, and C. Winch. 2010 by making the apprentices think about and analyse both their role in the organisation and the organisation’s role in society a particularly important element for young apprentices in their first place of employment. These four elements are:
  
  i) Key and Functional Skills (numeracy, literacy, ICT). SASE addresses the need for all apprentices to prove intermediate or advanced levels of English and Mathematics, and often ICT (the requirement for ICT is covered on an apprenticeship basis based on need) via the assessment of ‘Key’ or ‘Functional’ skills. Although this seemingly self evident requirement is not without challenge from stakeholders (see later section on consultation results).
  
  ii) Employee rights and responsibilities (ERR). The contents of this section covers legislative aspects as well as social elements such as ‘knowing the types of representative bodies (e.g. Unions) and understands their relevance to their industry and organisation, and ‘can form a view on issues of public concern that affect their organisation and industry’. 
iii) Personal learning and thinking skills. Achievement of the PLTS element must be based on evidence that is subject to quality assurance. The six PLTS and their outcomes include:
   - Independent enquiry and decision making
   - Creative thinking individual and collective problem solving
   - Reflective learning monitoring and managing their own performance and progress
   - Team working apprentices work confidently with others, adapting to different contexts
   - Self management apprentices organise themselves, showing personal responsibility, initiative, creativity and enterprise
   - Effective participation apprentices actively engage with issues that affect them and those around them.

iv) Guided Learning Hours (course duration). This sets out the minimum hours off and on the job learning required, even for experienced and older apprentices, meaning all apprentices must undertake a substantial amount of dedicated, away from the workplace theoretical study.

It must be noted that for apprentices, their employers and educators this is a minimum set of criteria and should be added to as required. Evidence from our assessment of good apprenticeship schemes such as the ‘MGTS engineering apprenticeship’ for example is that the requirements of SASE make up only 50% of the contents of a well rounded and bespoke apprenticeship programme.

Research methodology: A public consultation
In 2009 the Department for Business Innovation and Skills (DBIS) launched a public consultation on the contents of SASE. A total of 357 responses were received from a wide range of sources including FE colleges, universities, training providers, employers, Sector Skills Councils, unions and learners.

Balancing vested interests
Looking at the results of the consultation it is clear that the views of what might be termed social partners and interested parties are divergent. However they are predominately against the expansion of the core academic content of apprenticeships; for example only 30% of respondents agreed that Functional Skills in English and Maths at Level 2 (school leaver / GCSE level) should be required for all Apprenticeship frameworks, (many more wanted a lower level to be acceptable), and only 51% of respondents agreed that Personal Learning and Thinking Skills (PLTS) are necessary in all apprenticeships.

What we discover by assessing the responses to the consultation on SASE is that there appears to be no wide scale demand for a more in depth and or broad based apprenticeship system in England.

Conclusion: looking for a third way
Apprenticeships in England are used for workers of all ages, abilities and experiences and are primarily used as a way to qualify within a job role. They fulfil the role of a gateway to work as well as on the job training for experienced workers.

England and with some small differences the rest of the UK, has developed an apprenticeship model which is neither as academically broad based, nor prescriptive as some central European models but is instead reflective of the more flexible, low regulatory nature of the English economy. According to the World Bank, 2010 the
UK is the easiest place in Europe to do business and the fourth easiest in the world. Recent governments have been keen to retain this flexibility for employers and are reluctant to introduce the taxes, levies and compulsions associated with central European apprenticeship systems. This has led, in equal parts to apprenticeships in England being somewhat shallower and narrower than some central European models but at the same time being both more flexible and task focused than these programmes. This does not mean that they are without value however and recent analysis from Sheffield (2007) the Warwick (2008) and the LSC (2009) found that apprenticeships in England do provide strong economic returns for both individuals and employers. They are also considerably more challenging and regulated than the prelevent formal and informal work-based learning routes in operation in Britain and as the OECD noted in 2009 the English Apprenticeship system “is flexible and allows for tailor-made training solutions for employers” and this remains its inherent strength.

It remains to be seen whether this typically British approach will lead to the continued growth and success of our Apprenticeship revival but the indications in early 2011 are positive.

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Curriculum reforms in VET in Europe – a comparative view on France and Germany

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Summary: This paper compares curriculum reforms of the past thirty years concerning the apprenticeship systems in France and Germany. The comparative analysis of the curriculum development process and the structure and content of VET curricula in both countries reveals a common shift to learning outcomes and a trend to more flexibility. This shift is examined and interpreted in relation with major challenges confronting most European countries, for instance the establishment of a better link between VET provision and the labour market on the one hand, and the increase of lifelong learning through better permeability within the education system and at its margins on the other hand.

Keywords: Curriculum, learning outcomes, France, Germany

Introduction

VET systems in Europe have been subject to profound reforms and increasing attention from the part of policy-makers at national and European level during the last decades, reflecting the awareness of their crucial role in meeting such challenges as ageing societies, skills gaps, global competition and social exclusion. What is the role of the curriculum in this context? How have curriculum reforms been used to address these challenges and modernise VET systems? What are the similarities and the differences across Europe, and what lessons could be learnt from their experience by other countries?

These questions shall be answered through a comparison of the German and the French case, with a focus on apprenticeship within the initial VET system. The underlying assumption is that curriculum analysis reveals important features and implications of developments in VET systems.

Methodology

Definition of “curriculum”

International comparisons of curricula can address several dimensions of the curriculum: its ideological dimension, unveiling the goals and assumptions underpinning it; the planning dimension, focusing on the normative character of the curriculum; the enacted dimension, manifested in classroom interaction; and the experienced dimension, revealed by changes in students’ attitudes and competences (Adamson/Morris 2007). This paper sets the focus on the planning dimension of the curriculum, which is the most directly accessible to policy making. The curriculum is therefore understood as a “normative document (or a collection of documents) setting the framework for planning learning experiences” (Cedefop, 2010a, p.25). In the case of the French apprenticeship system, the curriculum is composed of the référentiels (standards) and learning programmes published by the Ministry of Education, as well as the circulaires (circulars) of the Ministry of Education and
guidelines issued by the education administration at regional level. In Germany, the curriculum is mainly composed of the *Ausbildungsvorschrift* (training regulation) with the *Ausbildungsrahmenplan* (curriculum framework) for training and learning in the company and of the *Rahmenlehrplan* (curriculum framework) issued by the Länder (federal states) for the school-based part of the apprenticeship.

**Research questions and research design**

The comparison builds on a document analysis conducted following an analytical framework addressing following issues: How are curricula structured (i.e., forms of modularization)? What are the aspects of training and learning regulated through the curriculum (e.g., contents, duration, teaching methods...)? What is the understanding of competence underpinning the curriculum? How is the curriculum development process organized and who is involved? The comparison is based on VET curricula in the occupational field of Logistics (*Kaufmann für Speditions- und Logistikdienstleistungen* in Germany and *Baccalauréat professionnel logistique* in France). In both countries, the design of curricula is highly standardized, so that these two examples can be considered to be largely representative of current practices in VET.

**Results**

Several comparative studies of reforms in European VET systems have identified a “shift to learning outcomes” affecting qualification systems and curricula in almost all countries in Europe (Cedefop 2010b). The comparative analysis of VET curricula confirms this in the case of France and Germany as well. However, it also reveals how the introduction of outcome-oriented curriculum approaches is rooted in the national contexts, fulfilling similar functions but taking different forms.

**The German and the French VET curriculum**

The major reforms of the French VET curriculum since the middle of the 1980s have consisted in the generalisation of competence-based qualification standards, the strengthening of work-based learning in apprenticeship schemes as well as in school-based VET, the validation of non-formal and informal learning and the attempt to grant more autonomy to local and regional actors in curriculum development.

Qualification standards (*référentiels*) in VET are developed under the responsibility of the ministry in charge by working groups including teachers, ministry officials, professionals and researchers. Social partners have a consultative role. The learning programs for apprenticeship schemes, which define the content to be taught at school and the training tasks to be performed on the work-place, are developed at regional level by working groups including teachers and professionals.

Qualification standards provide the basis for assessment for all training pathways and for the validation of informal and non-formal learning. They mainly consist of occupational standards (functions, tasks and activities) and certification standards (professional skills and associated knowledge). Timetables (defining also the amount of school-based and work-based learning) and regulations concerning assessment methods are also included. Certification standards are organized in units, which can be certified separately in case of validation of informal and non-formal learning. A proper qualification is only awarded when all units have been validated.

There is no explicit and agreed understanding of competence in the educational system. The term learning outcome is rarely used and the concepts of competence and learning objective are not always clearly distinguished in curricula. In VET curricula, competences are usually expressed in terms of know-how (the basis for assessment) and associated knowledge (content specifications for teaching).
Most authors agree however that following principles underpin a competence-based approach (*approche par les compétences*): transversality, contextualisation, complexity, integration (Houchot/Robine 2007).

In Germany, curricula have undergone two major reforms since the end of the 1980s. The work-based part of the curriculum is now focused on “*berufliche Handlungsfähigkeit*” (occupational proficiency), a holistic concept integrating occupational skills and knowledge. The second reform, implemented progressively from the end of the 1990s on, reorganized the school-based curriculum in learning fields corresponding to working areas instead of academic subjects, and defined “*berufliche Handlungskompetenz*” (occupational competence) as the overarching goal of learning.

Curricula for the work-based part as well as for the school-based part are developed on the basis of agreements by the social partners, and representatives of the federal state and of the Länder (including teachers). According to the consensus principle, all parties have to agree upon the training and learning regulations for them to be adopted. The curriculum for the school-based part of learning may be adapted by the Länder to regional specificities.

Curricula in the dual system are organised following a clear regulation of learning duration and place, defining the knowledge and skills to be attained through workplace learning and the learning objectives of school-based learning. Recently, a series of pilot projects have started to increase the flexibility of the system by creating opportunities for the recognition of prior learning. In order to improve the transition from school-based VET to the dual system, new curricula have been developed with outcome-based assessment standards which integrate the knowledge and skills of the training regulation and the learning objectives of the framework curriculum. These learning outcomes are organised in modules validated separately. These new approaches, which are still in a testing stage, are the object of controversial debates about flexibility modes in VET. In parallel, several other approaches to differentiate the curriculum on the basis of the traditional concept of minimal standards are being tested.

Beyond all their differences, Germany and France have experienced a similar trend towards outcome-orientation and increased flexibility in their VET curricula.

**Outcome-oriented curriculum approaches for enhancing the link between VET and the labour market**

A motivation common to both countries for reforming their curriculum has been the need to strengthen the link between VET delivery and labour market requirements. In this context, the use of learning outcomes appears to offer several benefits. First, it facilitates communication between companies involved in training, and vocational schools. In Germany, the learning fields in school-based curricula reflect working areas and thus contribute to a better match between theoretical and practical learning. In France, occupational standards included in the curriculum help teachers, companies and students to “make sense” of the curriculum and to better coordinate school-based and work-based training. Second, the holistic concept of competence (*berufliche Handlungskompetenz/Handlungsfähigkeit* and *approche par compétence*), which helps to integrate knowledge and skills in complex situations, provides the basis for a new pedagogy directed towards occupational competence. This is especially seen by policy-makers in France, who often blame the “academisation” of VET as a source of high youth unemployment.

**Learning outcomes as a means for increasing flexibility and lifelong learning**

A second motivation for the adoption of outcome-oriented curricula is, in both
countries, to increase the flexibility and inclusiveness of the VET system. In the case of France, the adoption of outcome-based qualification standards has provided the basis for the validation of informal and non-formal learning and for the opening up of new pathways to qualifications. In Germany, where qualifications are still strongly related to the completion of training in the dual system, initiatives to increase the permeability of the VET system go hand in hand with a reformulation of curricula based on learning outcomes (for instance in the pilot project DECVET or Ausbildungsbau steine).

Conclusion and further research needs
The comparison of French and German VET curricula highlights the common trends in reforms, which target similar problems. However, the different performances of the two VET systems in terms of youth unemployment and lifelong learning for instance (e.g. access to tertiary education and participation in continuing education and training) raise the question of the role of other factors on the development of VET. Beyond the written curriculum, which fulfils a planning function, it could be interesting to compare the enacted and the experienced curriculum. How are curriculum reforms implemented? How do the outcome-oriented approach relate to other components of the VET system, such as teacher and trainer training? What should this mean in terms of policy-making?

References
Study on the implementation of the learning field curriculum in Germany

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Summary: This paper reports a study on the effects of implementation of learning field curriculum in Germany by using the eight competence criteria for the measurement of students' vocational competence. The eight criteria were developed by Professor F. Rauner, a famous scholar of German vocational education, and his team. The results show that the curriculum's objective to enhance the students' comprehensive vocational competence has only been partially realized. This is due to a lack of feasible standards of teaching design in the implementation of learning field curriculum.

Keywords: Learning field curriculum, Germany, effects of implementation

Research background
It has been seven or eight years since learning field curriculum program was fully implemented in Germany in 2003. After years of practice, what is the effects of implementation of learning field curriculum? Has the curriculum program achieved the objective to foster students' comprehensive occupational competence? The author conducted a study on this issue while in Germany as a visiting scholar.

Research method
To study this issue, the author used a questionnaire survey in some vocational schools in the state of Bremen, Lower Saxony and North Rhine-Westphalia of Germany. The survey adopted eight competence criteria (Functionality, Comprehension and Clarity/Presentation, Utility Value, Cost-Effectiveness/Efficiency, Business and Process Orientation, Social Acceptability, Environmental Compatibility and Creativity), which were developed by Professor Felix Rauner and his team to measure students' vocational competence level. The eight criteria fully reflect the technical personnel's competence required to fulfil occupational tasks. Whether or not these competences have been effectively developed in vocational schools is mainly determined by how adequately teachers are acquainted with and understand the eight criteria and how sufficiently teachers implement them in teaching process. The questionnaire studies the teachers' and students' opinion on the eight competence criteria by asking two questions: one question is for teachers, "What role have the eight criteria played when you evaluate students' project?"; the other question is for students, "What role have the eight criteria played when you fulfil a task or carry out a project?" From this questionnaire, we can see whether or not the teachers have designed and organized teaching in accordance with the eight criteria and whether the students have considered the eight criteria while fulfilling occupational tasks. 290 questionnaires were used to survey students and 285 were returned, of which 282 were valid. Namely, the effective rate was 97.2%. Meanwhile, 40 questionnaires were used to survey teachers and 36 were returned, of which 34 were valid, with an effective rate of 85%.
Findings
According to the questionnaire survey conducted among teachers and students, the following conclusions can be reached:

a: Students generally give high ratings to the significance of the eight competence criteria. According to the survey data, the mean value\(^1\) of students’ evaluation for the eight criteria is between 3.23 and 4.00 when they are fulfilling tasks. Students generally feel that the eight criteria have played an important role in fulfilling occupational tasks. This indicates that after more than ten years of reform, German teachers basically agree with the objective of learning field curriculum program and have implemented them in teaching to a certain degree.

<table>
<thead>
<tr>
<th></th>
<th>Functional-ity</th>
<th>Comprehension and Clarity/Presentation</th>
<th>Utility Value</th>
<th>Cost-Effectiveness/Efficiency</th>
<th>Business and Process Orientation</th>
<th>Social Acceptability</th>
<th>Environmental Compatibility</th>
<th>Creativity</th>
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</thead>
</table>

Table 1: Students’ overall evaluation of the importance of the eight competence criteria

b: During the whole period of study, students’ evaluation of the roles of the eight criteria in completing tasks shows the following characteristics: the first-year to the third-year students report a gradual decline in their evaluation of the eight criteria, while the fourth-year students increase their ratings to varying degrees.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Functional-ity</th>
<th>Comprehension and Clarity/Presentation</th>
<th>Utility Value</th>
<th>Cost-Effectiveness/Efficiency</th>
<th>Business and Process Orientation</th>
<th>Social Acceptability</th>
<th>Environmental Compatibility</th>
<th>Creativity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 1</td>
<td>4.170</td>
<td>4.007</td>
<td>4.082</td>
<td>3.857</td>
<td>3.520</td>
<td>4.051</td>
<td>3.388</td>
<td>3.959</td>
</tr>
<tr>
<td>Grade 3</td>
<td>3.907</td>
<td>3.542</td>
<td>3.639</td>
<td>3.201</td>
<td>3.229</td>
<td>3.542</td>
<td>3.146</td>
<td>3.639</td>
</tr>
</tbody>
</table>

Table 2: Evaluation of the eight criteria from students in different grades

This variation trend indicates that students have a high expectation of the dual-system vocational education at the beginning of vocational study. As the study is unfolded gradually, there appears a gap between what students have expected and the actual learning, which makes students’ evaluation of the eight criteria decline gradually. Yet by the fourth school year, students’ evaluation begin to increase to varying degrees. This is because in the fourth school year students have to take a skilled worker examination held by the guild. The practical part of the examination usually requires students to complete an occupational task in accordance with the relevant requirements, and students will be graded according to the eight criteria mentioned above. Accordingly, during this period the teachers lay more emphasis on the eight criteria than ever before and also implement the criteria to their teaching. This naturally improves students’ evaluation of the eight criteria to varying degrees.

c: Of the eight criteria, the beginners (first-year students) of vocational schools give the lowest ratings to two criteria, “Business and Process Orientation” and “Environmental Compatibility” (see Table 2).

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\(^1\) The number represents the degree of significance of the eight criteria: “1” means “not significant”; “2” means “not too significant”; “3” means “neither significant nor insignificant”; “4” means “significant” and “5” means “rather significant”.

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The reason why the first-year students give a low score to “Business and Process Orientation” criterion is that it is difficult for them to draw a relatively complete picture of future career and thus they can hardly understand the essence of “Business and Process Orientation” criterion. The reason for a low score in “Environmental Compatibility” is that the first-year students’ environmental awareness is virtually quite general, which is only gained through public discussions and they have not associated specific pro-environmental behaviors with their future occupations.

d: The survey result is not consistent with the conclusion of competence test items. Such inconsistence indicates students’ competence acquired in training does not reach the level expected. Meanwhile, according to students’ evaluation and actual developmental level of vocational competence, students show strength in “Functionality”. By contrast, students show a great weakness in “Process and Creativity”. This indicates a lack of effective teaching design and plan that could improve such competence. The objective of learning field curriculum has only been partially realized.

e. Teachers evaluate the importance of most competence criteria (with an exception of “Utility Value” and “Cost Effectiveness”) much more highly than students. Teachers give a much higher rating particularly to three criteria, i.e., “Business and Process Orientation”, “Environmental Compatibility” and “Comprehension and Clarity/Presentation”. Teachers score the three criteria 0.4-0.6 points higher than students do. The reason why teachers evaluate the “Business and Process Orientation” criterion more highly than students is that it is the main feature of the learning field curriculum program. Although people in Germany hold different views on learning field curriculum program, yet they all agree that “Business and Process Orientation” is the major feature of the program. After more than ten years of implementation, teachers have partly understood and grasped the essence of “Business and Process Orientation” criterion. Teachers give a higher rating to “Environmental Compatibility” criterion, because they have a good understanding of the profession and are familiar with career practice, which makes them better understand the essence of “Environmental Compatibility” criterion and so they have the competence to link environmental requirement with specific occupations. “Comprehension and Clarity/Presentation” is a criterion which has always been given importance in teaching. Teachers have always seen this criterion as a standard to examine whether students have mastered what they have learnt.

<table>
<thead>
<tr>
<th></th>
<th>Functionality</th>
<th>Comprehension and Clarity/Presentation</th>
<th>Utility Value</th>
<th>Cost-Effectiveness/Efficiency</th>
<th>Business/Process Orientation</th>
<th>Social Acceptability</th>
<th>Environmental Compatibility</th>
<th>Creativity</th>
</tr>
</thead>
</table>

Table 3: Average evaluation by teachers and students on the importance of the eight criteria

Compared with students, teachers give a much higher rating to the above three criteria. However, they agree with students on the value of “Utility Value” and “Cost-Effectiveness/Efficiency”, which are given a rather low ratings. This suggests that the “Utility Value” and “Cost-Effectiveness/Efficiency” haven’t been given adequate importance in teaching.
f. Teachers share a common view on the value of “Functionality” criterion, but their evaluation of the other seven criteria vary considerably.

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Average Evaluation</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functionality</td>
<td>4.1414</td>
<td>.43325</td>
</tr>
<tr>
<td>Comprehension and Clarity/Presentation</td>
<td>4.1009</td>
<td>.62625</td>
</tr>
<tr>
<td>Utility Value</td>
<td>3.7197</td>
<td>.71468</td>
</tr>
<tr>
<td>Cost-Effectiveness/Efficiency</td>
<td>3.4242</td>
<td>.98521</td>
</tr>
<tr>
<td>Business and Process Orientation</td>
<td>3.9697</td>
<td>.51447</td>
</tr>
<tr>
<td>Social Acceptability</td>
<td>3.9091</td>
<td>.80482</td>
</tr>
<tr>
<td>Environmental Compatibility</td>
<td>3.9091</td>
<td>.89506</td>
</tr>
<tr>
<td>Creativity</td>
<td>3.9697</td>
<td>.84723</td>
</tr>
</tbody>
</table>

Table 4: The average evaluation and standard deviation by teachers on the importance of the eight criteria

According to the results, teachers give the highest score to “Functionality” criterion. Also, the standard deviation of “Functionality” is the lowest, which indicates a minimum difference in their views upon this criterion. That is to say, teachers give a high and uniform recognition to the importance of “Functionality”. This is because “Functionality” is the most fundamental and most important criterion in all occupational areas. It also indicates that the vocational teaching has always attached great importance to this criterion and teaching has been designed and carried out in accordance with this criterion. Teachers’ evaluation of other criteria vary considerably. The difference is particularly obvious in the evaluation of “Cost-Effectiveness/Efficiency”, “Environmental Compatibility” and “Creativity”. The standard deviations of these three criteria are respectively 0.98521, 0.89506 and 0.84723. This means that great differences exist between individual teachers in the recognition of the importance of these criteria, and such differences will be reflected in teaching design and teaching practice.

Conclusion

After more than ten years of reform and practice, teachers in Germany basically agree with the Learning Field Curriculum’s objective to foster students’ vocational competence and the objective has been reflected in teaching to a certain degree. However, although the eight criteria were highly evaluated by teachers and students, yet students’ actual ability acquired did not reach the level expected. This indicates a lack of effective teaching design and plan in Learning Field Curriculum. The objective advocated by the Learning Field Curriculum program has only been achieved in a limited way. The key to enhance the effects of implementation of the learning field curriculum is through improving the teachers’ teaching design and implementation capacity and by integrating the concept advocated by the learning field curriculum with the teaching design. The eight criteria for measuring students’ occupational competence developed by Felix Rauner and his team can be utilized as reference standards by teachers in teaching and task design.

References


Are we ready for the new round of TVET development based on China’s National Plan for Medium and Long-term Education Reform and Development (2010-2020)

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Summary: China’s National Plan for Medium and Long-term Education Reform and Development (2010-2020) (abbreviated as “Plan” in the following expressions) was published on July 8th, 2010. The Plan is the first key document in the 21st century which advances that China attains in the main her education modernization by the year of 2020. This is an inevitable demand of China’s socio-economic development, the promotion of the international status, and the solution to the problems arising in education progress. In the Plan, there are more emphasis and requirements on TVET development. In the paper, we comment on the plan and express our worries about whether we are ready for these changes and challenges.

Keywords: TVET, China’s National Plan

Introduction

Background of the plan
The world today is undergoing great development, profound changes and major adjustments. Both world multi-polarization and economic globalization are witnessing in-depth development. Science and technology are making rapid strides, and competition for talents or professionals is intensifying with each passing day.

China is currently at a key stage for reform and development, as all-round progress is being made in economic, political, cultural and social development as well as in promoting ecological civilization.

International situations and education development
We are experiencing a new era which is characterized by 3 features:

- Knowledge-based economy which has been a dominant economy in the world should be supported by millions of knowledgeable workers;
- Internationalization which leads more cooperation and communication in all kinds of fields including education;
- Informationization and network popularity has changed thoroughly in civil living style and social operation system.

The quality of human resources is reflected as a more and more important factor by the 3 features of our world. Human resources especially creative talents are inevitably becoming the priority of international competency. Therefore, whether a country’s education can produce these human resources will determine the future of the country’s development.
Domestic situations and education development

1. Demand of completing a lifelong education system and building a learning society
In China, we are in the progress of building a learning society. Learning needs to be organized on a different set of principles requiring a new learning system. People not only learn during their student’s time but learn through their lives as well. It is necessary and urgent to completing a lifelong education system to provide all sorts of education service for all kinds of people with different ages, different situations and to meet different needs. At that time, everyone will enter the learning system at anytime with any identification and get the appropriate education.

2. Demand of sustainable economic growth
Since the reform and opening to the outside world, the economic growth in China has been increased rapidly. GDP in China has increased from 300 billion in 1980 to over 34,000 billion in 2009. The increase rate of GDP has been over 8% for nearly 30 years and it will last for a period if there is no great accident.

However, the economic growth in China costs a lot including resources consumption, environment damage, and cheap labor force. These cannot support a sustainable economic growth in the future year, so we have to change our way of economic development from relying on cheap labor force to skilled and qualified labor force, from relying on high consumption of resources to high-tech advances, from relying on investment and export to improving management. All those changes should be supported by improving the quality of human resources which is based on qualified education.

3. Demand of turning China into a country rich in human resources
In accordance with the strategic arrangement of the 17th Communist Party of China National Congress to “give priority to education and turn China into a country rich in human resources”, we have to enhance citizens’ overall quality, boost educational development in a scientific way, and speed up socialist modernization.

China is seeing increasing pressure from its vast population, limited natural resources, the environment, and its transformation of economic growth pattern. All those have highlighted the pressing need to enhance citizens’ quality and cultivate innovative personnel. The future development and great rejuvenation of the Chinese nation is predicated on talents or professionals, and on education.

4. Meeting the needs of people’s desire for education
After 30 years’ rapid development, China has popularized its compulsory education; the enrollment rate of senior secondary education has reached 80%; the enrollment rate of higher education increased from 7% in 1995 to 24.2% in 2009; the average educating time has increased from 5.3 years to 9.5 years. However, it is not enough.

Chinese people have more requirements for education including getting more opportunities to enjoy higher and more qualified education, richer and higher qualified education provision.

Brief introduction of the Plan

Procedure of establishing the Plan
The establishment of the Plan was first discussed during 2007-2008. In March 2008, Prime Minister Wen Jiabao said that the Plan should be based on a deep and
comprehensive survey. On Aug. 29th 2008, Wen Jiabao hosted the first conference of national education leading groups. During the conference, the work program of the Plan was made. The whole procedure of establishing the Plan can be divided into 4 stages.

(1) Workload of establishing work
The establishment of the Plan is a huge project. We can see it from a set of numbers.

(2) Framework of the plan
The Plan is composed of 4 sections, 22 chapters, 70 terms and 27,000 words.

(3) Strategic goals
The strategic goals to be attained by the year 2020 are to basically modernize education, bring a learning society into shape, and turn China into a country rich in human resources.

- Further Popularizing education.
- Delivering equal education to everyone.
- Offering qualified education in various ways.
- Building a consummate framework for lifelong education.
- Establishing a full-fledged, vibrant education system.

Contents of TVET in the Plan

*TVET terms*
Chapter 6: Vocational Education

No. 14: Intensifying efforts in developing vocational education.
No. 15: Mobilizing the enthusiasm of industries and enterprises in vocational education.
No. 16: Speeding up vocational education development to meet the needs of rural areas.
No. 17: Making vocational education more appealing.

*TVET related terms*
No. 11: Accelerating popularization of senior middle school education.
No. 13: Promoting diversification of senior middle schools.
No. 53: Raising teachers’ professional efficiency.
No. 57: Improving distribution mechanism
No. 66: Major projects to be organized and undertaken
No. 67: Pilot reform to be undertaken.

*Main development tasks and requirements*
- Greatly develop vocational education
- Promote the development of diversified upper secondary education
- Speed up the universalizing of upper secondary education
Comments and discussion

Comments:
1. The Plan puts forward more requirements for government and VET schools/colleges.
   - Requirement for vocational schools/colleges
   - Requirement for the government
2. The Plan gives more emphasis on school and business partnership.
3. The Plan facilitates developing VET in rural areas.
4. The Plan tries to make TVET more attractive.
5. The Plan improves the quality for vocational teaching forces.
6. The Plan innovates the investment mechanism.
7. TVET in the Plan is mainly based on the needs of market instead of based on the development of students.
8. The Plan focuses more on vocational education, but less on technical education.

Discussion:
The duration of the Plan is 10 years. In the Plan, we are ready to conduct a series of projects and issues about TVET in China. It is really a huge blueprint which will benefit a large amount to China’s TVET, but we still bear some worries about the difficulties among the 10-year time period.
1. Are we ready for school-industry cooperation?
2. Are we ready for connecting TVET with salary series? Change the status of TVET thoroughly?
3. Are we ready for reforming TVET as a system?
4. Are we ready for achieving the goals within 10 years?

References
The link between the didactic approach of the vocational training system and the curriculum development approach

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Summary: Many different models and macro systems of vocational education and training (VET) are around the world. An international view shows that training places or combinations of training places are one of the important didactic factors of those models. Another factor is the didactic approach of the VET curriculum. And because the quality of curricula determines mainly the qualification results, the curriculum development approach is also a very important factor for the quality of the different VET models. Hence investigation results particularly in Germany and China show that normally there is a close link between the VET system and the quality and approach of the curriculum development.

Keywords: Curriculum approach, VET didactic, subject- or scientific-oriented curriculum and training, work-oriented curriculum and training

Introduction
In Germany, the essential VET model used is called a “Dual System” with training taken place in companies and vocational schools. Since this training happens in two training places, the corresponding model “needs” normally two different but synchronized curricula which can be called Training Regulation and School Curriculum. The VET research shows that the modification of the both curricula during the last years can be clearly described as a more work or business and work process orientation. The training profiles with the VET aims and qualifications therefore based more than in the past on real occupational profiles and activity fields. This work process orientation of the training profiles and known as “Lernfeld” curriculum become within the VET discussions more and more a pattern status and in the mean time, e.g. in China there’re several transfer projects to use the new curriculum approach within the Chinese VET system.¹

In China however, the predominant model of vocational education and training is school vocational training. So here is only one curriculum for the vocational schools. Despite the fact that in China three different kinds of schools offering VET, the school practice shows all in all that the didactic approach of these curricula is widely subject or technology and catalogue oriented. The competencies are often only taught with a focus on technical knowledge. Except a bit the so called skilled worker schools (ji gong xue xiao) where the curricula are based more on the work practice. But during the last years there is also for all vocational schools a nationwide intensification of a Chinese VET curriculum reform with more work process orientation or practice integration which will bring in general more “work-based learning in the Chinese

¹ See the GTZ Program: The Sino-German program “Vocational Education and Promotion of Employment in Jiangxi” with the objectives among others: “… the work team members of the 6 partner schools are able to update curricula in a systematic way according to ‘Lernfelder’” (GTZ 2008).
VET system” (cp. Xu 2009). Current research results show that these curricula adjustments are difficult because they influence at the same time the Chinese VET model and system and they also require among others in addition to the companies for practice learning and especially new teacher qualifications with improved vocational competences.

Methodology
The curriculum evaluation based on the one hand on analyses of documents of the German Training Regulations and frame curriculum for example the training profiles for electricians or electronics technicians. In China the occupational standards for electricians are also used to evaluate the curricula. On the other hand the evaluation used in references a sample of occupational case studies in companies. The concept and methodology of these case studies is called the “GAHPA-GAHFA” approach (cp. Petersen 2005 or Petersen et al. in: http://www.euquasit.net 2011), which is very helpful to investigate in big or small companies in a systematic way business and work processes, the phases of activity and the work tasks of the staff with different professions and qualifications.

The evaluation and investigation therefore used both analytical methods for the documents and empirical methods for the company and work practice.

Results
The analyses result of the German Training Regulations for the “Elektroniker für Automatisierungstechnik” shows a clear business and work process orientation. And the structure and contents of the “Lernfelder” show the same didactic within the frame curriculum for the schools. The curriculum “picture” of the training profile includes therefore all qualifications which are needed in the different work and activity fields in the range of a whole business process (see Figure 1).

Figure 1: Example of business and work process oriented curricula for electronics technician
In reference to the “GAHPA-GAHFA” approach and based on a sample of case studies in companies the first occupational work field contains according to the training regulations service qualifications to consult customers; the second work field contains analyses, design, outline and solutions qualifications etc. and over the different work and activity fields with installation, assembly, configuration or inspect and assess qualifications; the last work field comprises about automation systems maintaining and optimising qualifications. And the according school curriculum contains more or less in the same structure within the “Lernfelder” all these business and work process oriented qualifications. The learning field eleven for example includes for automation systems the same maintaining and optimising qualifications like the training regulations.

The evaluation result for Germany in summary shows that the gap between the skills needs of the labour market and the qualifications of the VET in the “Dual System” is much less. In other words the combination and the link between the work-oriented curriculum, training and the “Dual VET System” lead to a high quality work or job opportunity of the graduates.

Partly in opposite the curricula for the vocational schools in China there are in general more subject-oriented according to a subject catalogue (zhong deng zhi ye xue xiao zhuan ye mu lu) with actual 19 categories, 321 subjects (zhuan ye) and 927 subject specialities since the amendment 2010 (cp. MoE 2010). And because these subjects and subject specialities are within the curricula and the didactic not direct linked with professions or occupational profiles and standards, the vocational schools training leads often not to a high quality work of the graduates. These show the two-certificate system (liang zhong zheng shu zhi du) too whereas it is more easy to achieve the vocational school certificate (xue li) in comparison to obtain in the same time a high national vocational qualification certificate (zhi ye zi ge zheng shu) in regard to China occupational standard. As for example the subject curriculum and training in “Electric and control technology” should very likely leads to vocational qualifications in regard to four occupational profiles “Fitter for electrical systems” (dian qi she bei an zhuang gong).

In addition to this example the concrete investigation and curriculum analyses results to the according subject “leading teaching plan” show the following content areas or themes: “Basics of electric”, “Electric and electronic experiments”, “Electric measuring devices”, “Electric machines”, “Control engineering”, “Microprocessors”, “Applied electric” etc. The evaluation of this curriculum must now on the one hand consider what the expected vocational qualifications of the trainees are. On the other hand we must know what the skill or qualification needs in the four occupational profiles are or concrete for “Fitters for electrical systems” in practice. For this reason and the necessary empirical studies a sample of occupational case studies in China companies are used to investigate with the methodology of the “GAHPA-GAHFA” approach within the business and work processes the phases of activity and the work tasks and therefore the qualification needs of the “Fitters for electrical systems” (cp. Xie 2011).

The results of the investigation show, like the case study example to the business and work processes “Installation of light systems” in a Chinese company (see figure 2), that the work processes, phases of activity and the work tasks in China require different qualifications of the “Fitters for electrical systems”. These qualifications are necessary in the range of a whole business process in regard to work in teams, to analyse drawings and plans, to plan the work, to provide and supply materials and equipments, to prepare electrical systems and control technologies, to install and assemble conductions, wiring harnesses, cables and different electrical components, panels and systems. But the qualifications are also necessary in regard to the work
tasks like test and check of different electrical systems or also to the work tasks work, safety and quality control and especially to the wide range of maintenance, repairs, support and services (cp. Xie 2011).

Figure 2: Case and work study example of “Fitter for electrical systems” in a Chinese company

With these work and work process qualifications needed in companies in mind it is directly reasonable and clear that in comparison with the expected vocational qualifications based on the above subject curriculum and training in “Electric and control technology” there is a big gap. The curriculum reform process for VET schools in China should therefore go on and like the new curricula for skilled worker schools show the work oriented curricula are on a good way (cp. MoHRSS 2009).

Conclusion

The presented results of VET research in Germany and China show only basics of the link between the didactic approach of the VET system and the curriculum development approach. But the discovery and findings are very clear that the change of the curriculum approach changes the didactic approach of the VET system too.

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Implementation of work process based curriculum in technician institutes

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Summary: China’s rapid economic development triggered a strong demand for highly skilled personnel. In recent years, the MoHRSS has organized a number of research projects to explore the model to training highly skilled personnel which is not only consistent with China’s reality but also meets the requirements of occupational development. This paper documents one of the key projects, research on technician training model and curriculum development. The research includes: i) the occupational characteristics and developmental laws of technicians; ii) designing of work process based curriculum and shaping of teaching-learning process in technician training; iii) development of learning resources; iv) implementation of school-enterprise cooperation; v) policy recommendation to technician training.

Keywords: Technician Institute, professional task, learning field, work process based curriculum

Introduction

Triggered by the rapid economic development and industrial restructuring, there is a strong demand for highly skilled personnel in China. By the end of 2009, the number of “highly skilled personnel” (gao ji neng ren cai)\(^1\) had reached 11.725 million, including 2.807 million technicians and 0.982 million senior technicians (National Bureau of Statistics 2009). However, the supply of highly skilled personnel still could not meet the needs of economic development in terms of either quality or quantity. After entering the new century, the Chinese government has begun to take the building of highly skilled personnel as its most crucial strategy of national development. In recent years, the Ministry of Human Resources and Social Security (MoHRSS) has organized a number of research and pilot projects so as to establish a highly skilled personnel training system that is not only in accordance with China’s reality but also consistent with the principles of professional development. As part of these research programs, this paper focuses on Technician Institute’s (ji shi xue yuan) work process based curriculum development as well as the pilot projects designed for this purpose.

Genesis of technicians in China

Technicians are an important part of highly skilled personnel who have been playing a significant role in enterprises’ production and business process. The establishment and development of the professional group “technician” in China has historically gone through four stages.

- Granted by the government,
- Assessed within sector administrations and appointed by companies,

\(^1\) According to the MoHRSS’s definition, highly skilled personnel consist of higher-level skilled workers, technicians and senior technicians.
Public assessment,
Trained by expanding vocational schools.

In the above phases, technicians’ qualifications, means of obtaining the title/certificate as well as ways of technician training tend to be different in specific stages and people’s perception of “technician” has also been changing accordingly. With the development of technology and re-construction of work organization, technicians are no longer traditional craftsmen, instead, they have gradually been required to fulfill tasks that are more comprehensive and that involve work organization, hence the new terms “new technician”, “modern technician” and so on. The access to the title of technician has shifted from enterprise appointment, which was quota-bounded to public authorized assessment, which is quota-free. This has not only broadened the growth path of skilled workers and motivated young workers to further improve their competence, but also resulted in a rapid quantitative expansion of technicians.

Apart from offering a new possibility for the training of highly skilled personnel, the new training pattern of technicians in school-form has posed a challenge to vocational education. How to train high quality technicians that meet the needs of industries through a school-based training system? That is a major research topic of this study.

The actual situation of technician training

Currently in China, training of highly skilled personnel is mainly provided by vocational schools/colleges, training centers and enterprises. Targeting different groups, they provide either systematic school education, or pre- and/or in-service training. Among them, vocational schools have become the main force of systematic training of large numbers of highly skilled personnel thanks to their advantages in number, geographic extension and didactical concepts.

However, due to the lack of real work practice, both the occupational community and the educational circle took a sceptical position as to whether the vocational schools would be able to train qualified technicians. The MoHRSS issued Views on Issues Concerning Encouraging Technician Institutes to Speed Up Highly Skilled Personnel Training (lao she bu fa [2006] No. 31), putting forward a proposal to train “pre-technicians”. Since 2006, technician institutes have started to enrol students for technician training programs and generally set the aim of training “pre-technicians”; however, there wasn’t a mutual understanding as to what constituted a pre-technician.

Methodology

This paper attempts to analyze a technician’s occupational features and growth patterns. It takes for example six specialties like CNC-technology to discuss the training models on the basis of current vocational education system, policies in technician institutes and the curriculum design using work process based approach. The main research methods adopted are as follows:

a) Comprehensive work analysis

In consideration of the unpredictable and innovative nature of a technician’s work, we did not choose the popular DACUM approach for job analysis. We used Expert Worker Workshop (EX WOWO) to find out the “developmental tasks” (Havighurst, 1948), and further describe them (Kleiner et al 2002; Reinhold et al 2003; Zhao 2009).

b) Sector study and enterprise surveys

The legwork of occupation analysis in the project is sector study and enterprise surveys through interviews and on-site observation. The objectives are:

- to better understand the needs of enterprises, so as to determine the specialty focus and training objectives (Spoettl 2008);
- to select expert workers for the EXWOWO.

In order for an effective quality control over the investigations, a set of instrumental forms are designed, e.g. Occupational Development Stages and Key Incidents, etc.

**Results**

*Occupational features and growth patterns of technicians*

Although the status of technicians has been officially established for many years, there is no clear definition of technicians’ occupational profiles (MoLSS, 2001). To ensure a sustainable development of technician training, it is necessary to analyse technicians’ occupational features with special focus on those who are working under the condition of modern industry.

i) Occupational profile and role of modern technicians

The project conducted research in several relatively developed regions like Shanghai and Guangdong on the technicians’ occupational features. The results show that technicians are specialists who are engaged in the production and business process. They are experienced and highly skilled, not only work independently, but also have to communicate with other teams or departments responsible for design, maintenance, etc. in the work. They are the core force for the production and usually play a leading role in a complex work process.

The survey showed that some technicians also do production organization, train and guide lower-level workers, and thus work as the backbone of their enterprise in maintaining normal production and business process, improving production efficiency and realizing technology transfer.

In modern industry, technicians’ role displays a trend of diversification and there have been a variety of types such as the so-called “operational”, “technology-based”, “versatile”, “knowledge-based” technician (He/Song 2006). Compared with traditional technicians, “modern technicians” demonstrate their value in “professional thinking” and “complicated communication”. Their work involves both “difficult production – innovation – passing-on” and “on-site management – technology guidance – maintenance – training” (Chen 2008).

ii) Technicians' characteristics

The study finds out that in modern manufacturing, technicians demonstrate four common characteristics: continuous process of practice, strong competence to adapt, spirit of innovation, good occupational identity and reflection competence. The study shows that technicians must have a higher comprehensive professional competence, including not only functional competence for their post, but also processual competence and shaping competence for complex tasks (Rauner et al, 2009). Therefore, technician training programs should embrace the following:

- comprehensive competence development as learning objective;
- combination of professional competences with professional identity;
- integrative learning of theory and practice, which facilitates students’ overall perception and reflection of tasks, process and context in the world of work;
- task-oriented learning situation, in which students work through the complete work process.

*A summary of the achievements in curriculum development*

According to the idea of work process based curriculum, with reference to the existing national qualification standards, curriculum frameworks of six specialties have been developed, including curriculum standard, assignments and Leit-text. The project has conducted relevant trial teaching. With a grasp of the direction of the curriculum
reform, the project has following innovative features.

- New curriculum in form of “learning field” is in line with technicians’ growth patterns and reflects their occupational features. It has set a reference curriculum model for technician training.
- New teaching materials are different from the traditional textbooks in function and form. They provide samples for learning resources development.
- Trial training has implemented new learning arrangement and provided experience for vocational training reform.
- The project provides systematic methods for work process based curriculum development and inspiration for the establishment of technician training model. However, some problems still need to be further explored in the future.
- It has not been widely recognized in the economic circle as to whether vocational institutes can successfully train technicians in school-form.
- The new curriculum is demanding in teachers’ competence and experience and tends to go beyond their current level. The insufficiency of teachers’ competence has greatly hindered curriculum implementation.
- The majority of the institutes still lack a stable and effective school-enterprise cooperation mechanism.
- The new curriculum calls for changes in the traditional teaching arrangement and training administration (e.g. separation of theoretic teaching administration from practical teaching administration, etc.), and will result in changes in training evaluation and teachers’ performance assessment.

These have posed a great challenge to the current vocational education and training administration system.

References


From “Deep Blue” to “Deep Green”: Case study on the project of TVET for SD in China

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Summary: TVET for SD is an urgent issue in China. Under the support of UNEVOC, collaborated with Griffith University in Australia and 11 institutes in China, an action research on the curriculum reform of TVET for SD had been carried out. By the change of contents and methods, they incorporated SD into their courses concretely. The reform in course pedagogy was also implemented. It is a basic platform for the further research in the curriculum and expansion to the other institutes and curriculum in China.

Keywords: Curriculum reform, sustainable development

Introduction
Sustainable Development (SD) is a crucial and hot issue for human beings in the 21st century. In China, sustainable development is a very important part of our national development strategy – scientific concept of development which is becoming a consensus to cope with the serious challenges in environment, economy, society and culture in the new era. Technical and Vocational Education and Training (TVET) is believed as a “master key” to solve such problems as Peace Building, Poverty Reduction and Sustainable Development in the world today. TVET for SD is a very important part of ESD in the world. However, TVET for SD is still a new topic and rarely mentioned in China. The real action research is elusive. TVET in China has been working as a tool of employment with the deep blue characters in its instruction. In July, 2008, UNESCO-UNEVOC and ZJTIE signed a contract of joint-research on TVET for SD in China, to support a curriculum reform on TVET for SD co-chaired by Dr. Pavlova and Prof. Huang. From July 2008 to December 2009, more than 80 teachers and 5000 students in 45 courses within more than 30 majors from 11 TVET institutions were involved in the project. UNESCO-UNEVOC sent an evaluation group to check the termination of the project in December 2009. The major outcome of the final report had been published on UNEVOC bulletin.

Purpose and design of the project
This innovative project uses a number of ways of conceptualizing the relationship between the level of social and economic development and the teachers’ views presented through education. One of the main benefits of the project for the TVET sector is in identification of sustainability concepts and activities across a number of TVET industries. These would be used within the sector to develop learners’ capacity to understand socially and environmentally significant issues for improving the quality of life and to apply concepts of sustainable development. The benefits thus, are in the identification of learning contents and approaches that TVET could provide to increase students’ awareness of sustainable development. Another important benefit is related to the conceptualization of students’ attitudes towards SD in the context of their current studies and future employment, and the identification of the main pedagogical issues within this teaching.
The surveys to the research

The design of the surveys

The surveys among teachers and students are in the form of a questionnaire. The structure of two surveys between teachers and students are almost the same except a slight change in some items. The questionnaire consists of six parts. First, is basic information of the answerers including gender, age, occupation and province, etc. Part A is the basic awareness to SD. Part B focuses on the analysis in the context of SD. Part C consists of 18 items about education for SD. Part D is also asking you to mark your opinion on NEP. The last item is a subjective question asking you to express your idea on what training you would need to increase your understanding of SD and education for SD.

The surveys among industries are in the form of interviews. Eleven questions were raised. The structure of an interview outline is designed as 4 parts. First, the basic information provided the interviewee’s occupation. Second, questions related to the regulation on SD. Two questions on the TVET graduates toward the SD regulations. Six questions on the understanding of SD in the industry. We provided some instructions to the interviewers for the better understanding of the industry in particular.

A concept map was used for the survey of community. They include concepts, usually enclosed in circles, and relationships between concepts, indicated by a connecting line linking two or more concepts. Words on the line (linking words or linking phrases) specify the relationship between the two concepts. We provided 18 concepts to ask them to draw a map that shows the relationships between the issues. The concepts include climate change, rural development, wasteful consumption, etc. They are also asked to use one color to indicate significant links and another color to indicate less significant links.

The findings of the surveys

Eleven institutes sent 6930 questionnaires to their students. There were 6542 students who responded, for a 94.4% response rate. Eleven institutes sent 678 questionnaires to their teachers. There were 638 teacher who responded, for a 94.1% response rate. Large amount of data and responses have been gained. Basically, we can summarize them in four points.

- Teachers and students share some similar understandings toward some issues while disagreed on some others.
- Teachers tend to approach problems based on rational analysis while students are more sentimental on some issues.
- Teachers surveyed demonstrated substantial interests towards TVET for SD; some teachers claimed that they are making some attempts and exploration in their specialized teaching process or even in their research field.
- There is broad consensus among teachers and students on the 15 issues in need to be addressed. They all agreed on the significance or the relative significance of those issues.

As per the design of the survey, industry interviews have been conducted by a research network. 36 people from 11 industries were interviewed. The industry includes mechanism, petro-chemistry, light-industry, transportation, chemistry, agriculture, sanitation, environment protection, international business, commerce food industry.

Through careful data analysis on the information obtained from those industry personnel interviewed, a series of valuable industry-related viewpoints were clarified,
which laid a solid foundation for further curriculum reform. We can summarize four points as the findings:

− The basic regulations are already there; however, further enforcement of the system requires industry-imbedded consciousness.
− A sound day-to-day monitoring and evaluation system needs to be established.
− A thorough understanding towards higher vocational education is still needed.
− It is essential that curriculum reforms be carried out with regard to Higher Education for Sustainable Development.

In light of the design of the survey, 3300 concept maps have been sent, 2486 responded. Most of the drawers are TVET students' parents, relatives, and friends. Results from the drawings:

− For key concepts, most of the responses are nature issues. Quality of life, economic development, clean water, and sanitation are also found.
− For general concepts, most responses are climate change, then economic development and sustainable use of natural resources.
− The next level is quality of life, then population growth and infectious diseases.
− We can see that gender inequality and violation of human rights are not hot issues in their responses.
− The link between nature and climate change are often seen. Then the link between nature and sustainable use of natural resources, climate change and biodiversity loss, population growth, and quality of life.
− The linking words between the concepts are often seen as restrict, influence, and block.

It is obvious that the surveys have become the basic understanding of current situations on TVET for SD in China and the indicators toward the curriculum reform of TVET for SD in China.

The action research in teaching and learning
The relevant teachers reviewed their reform actions and completed them during the summer vacation from August 2009 to the beginning of September 2009. From their reformed syllabuses and logbooks, we can find many valuable outcomes and experiences. From their summaries, some very impressive common parts are:

− Incorporate SD into the teaching and learning by changing the contents and teaching methods.
− Integrate the hot issues of SD in China to their course reform.
− Students' changes in values and skills toward SD are emphasized.
− Enlighten the teachers to rethink the TVET in a new point of view.

The reform in course pedagogy is also implemented. It aimed the improvement of the students' learning characteristics and sustainable learning for career development. Since many courses used some of the approaches interdependently, so we will not point out the independent examples. We can summarize them below:
Aiming | Pedagogies | Brief comments
---|---|---
1. improving the employability | ○ Case-study approach  ○ situation-centered approach  ○ role-play approach  ○ comprehensive operating approach  ○ site-visit approach  ○ work-project based teaching | Matching the work requirement by the effective approaches to improve the employability.
2. improving the critical thinking | ○ Exploratory learning  ○ Material-searching approach  ○ Q & A's  ○ Brain storming  ○ Stimulating learning | Encourage students to think in holistic and different ways.
3. improving the collaborating | ○ Group discussion  ○ Team assignment  ○ Collaborative activities | To improve the team works. This is very important to those who live in a one-child family in China.
4. improving the problem-solving | ○ Learning by doing  ○ Problem-solving  ○ topic-presentation | The training of real doing and innovation will fulfill the long-term needs of students' development.
5. improving the sustainable learning | ○ Problem-seeking  ○ Information sorting  ○ Self learning  ○ Self evaluation | Learning to learn

Table 1: pedagogical reform on TVET for SD

During their class reforms, logbooks for teachers and students have been used to keep as the proof data to follow-up the trials. Some of the requests have been asked to the logbook keeping.

Conclusion

TVET for SD in China is a necessary issue in terms of curriculum reform. It needs a contents infusion from four aspects of environment, economy, society and culture. It also needs a pedagogy innovation from the traditional notion to the SD oriented. The common platform is meaningful for sharing, but the diversity to different courses, different curricula is also precious.

References


Globalization and apprenticeships: Does apprenticeship survive in transnational companies?

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Summary: The following paper is focused on recruiting policies of transnational companies (TNCs) and the required competencies, asking if youngsters with an apprenticeship background are seen as being still able to fulfill tasks in a knowledge-based economy. The TNCs rely more and more on academic knowledge for work, sometimes formerly done by skilled workers. Most of our interviewed recruiters of 18 TNCs, based in Germany, England and Switzerland know the advantages of apprenticeships, especially if they have a tradition in dual model countries like Germany and Switzerland. We argue that a modernized apprenticeship which takes academic knowledge more into account, languages (especially English), entrepreneurship and “soft skills”, which is permeable to other learning opportunities as a basis for further education has a good prospect in the near future.

Keywords: Apprenticeship, recruitment, transnational companies

Apprenticeships and bachelor degrees

A definition of apprenticeship is important insofar, as the term apprenticeship means a formal kind of learning which includes in countries with dual models always school attendance as well. Therefore, vocational education is described as being dual: likewise the traditional vocational education in times of guilds, the modern dual vocational training also involves a high proportion of working/operational presence and practical experience. This is organised in courses, too, and the wide range of opportunities of learning in the workplace plays an important role respectively. In general, dual vocational educations are characterized by a high percentage of practical experience which results from the participation of the operational-practical/applied production. Academic education is hereby originally seen as an addition of the operational work.

In the course of years, the operational experience has become more and more pedagogical as advisors or rather trainers of the trainees were increasingly obliged to acquire pedagogical skills. The academic part in turn has on the one hand more aligned towards the academic curriculum and on the other hand stands out due to its strong vocational orientation in professional and theoretical respect. Additionally, at the beginning of the twentieth century in the course of the integration of lower social classes or the working population, a civic education was integrated into the curriculum. Nowadays, in the light of the development towards a society that is based on the provision of services and knowledge, the academic part of vocational education plays incrementally an important role. The vocational education has incorporated itself more and more into the system of education at large; the permeability to the higher system of education becomes hereby more important.

Our analysis focuses on the knowledge and skills that were acquired in the apprenticeship system because they allow companies with increased requirements a
high applicability in practice. This characterizes such trainees compared to those that were educated on the academic level only. The creation of bachelors at universities which focus on the working world and practice is insofar not really an alternative on the way of vocational education, particularly because many persons from continuative vocational education and alumni of universities of applied science – as in Switzerland – have originally completed an apprenticeship.

This tradition of vocational education should be reported in the following using the example of Switzerland and, subsequently, the practice of large concerns (TNCs) and their perceptions of apprenticeships should be explained further. The question is whether global developments will lead to a loss of importance of vocational education or rather whether vocational education will fade out into TNCs.

The apprenticeship tradition: The example of Switzerland

In general, companies in Switzerland give vocational education and training very positive marks. VET graduates are considered to have a more practical approach than academically trained persons and scientific research does not seem to be that important. Craft skills and pragmatic approaches are cited as advantages offered by employees who have completed vocational education and training (c.f. Gonon et al. 2010).

The employability of apprentices in Switzerland is good, as long as the transition from the apprenticeship to the professional activity entails few risks when it is possible to integrate apprentices directly in the workplace and youth unemployment is low. By international comparison, youth unemployment is relatively low in Switzerland. Dual or three-track vocational education systems with corporate courses as in Switzerland seem to have a positive impact on employability, because unemployment is low and the apprentices’ mobility is high.

These two aspects can be traced back to widely standardised apprenticeships and basic vocational education and training that corresponds to the needs of many companies and is sufficiently flexible to allow graduates to change their employer or occupation (Dubs, 2006, p. 90 f.). The trademark and strength of VET programmes in Switzerland is their direct correlation with the labour markets’ needs. This is reflected in various training arrangements like in-company training, in-school education and industry courses.

The view of apprenticeships in TNCs operating in England, Germany and Switzerland

The survey of persons in charge of recruitment reveals a homogeneous picture which is independent of the county and the large concerns. Specifically in technical companies, the traditional apprenticeships still play a fundamental role.

In a Swedish-Swiss concern situated in England two categories of trainees are compared: the bachelor graduates and the apprentices or former trainees that work as technicians. Both have the opportunity to continue their personal development in the company by visiting an Open University or through gaining working experience.

The same company in Germany still thinks that vocational apprenticeships are important although the proportion of university graduates has increased due to technical courses. The company does not believe that there is any competition between bachelors and apprentices as both groups receive different scope of duties and operational areas at the beginning of their working career. In the face of a skills shortage no rigorous entrance restrictions are being made and internal further education is still significant. An important role is assigned to universities of cooperative education which grant the dual education on the tertiary level by this in Baden-Württemberg, Germany, located company. Also at the Swiss headquarters apprenticeships are being considered to be very meaningful. Here, the opinion is
held that is rather less important what the educational background of someone is, but what someone accomplishes and how motivated the person is. In Switzerland almost all employees with a bachelor have completed an apprenticeship before, which is why they are greatly demanded throughout the company. As a matter of course for specific operations more academics on the managerial level are existent than in some technical dominated areas.

A huge German concern which operates in three different countries in the technical and electronic area as well shares the above explained view: the actual differences are seen between the Swiss apprentices and university alumni and not between apprentices and bachelors due to the occupational career that most bachelors preferentially had. The longer a career in the company takes, the less relevant does the previous education (vocational education in form of apprenticeships or university degree) become. The person in charge of recruitment at the German headquarters agrees with this theory.

Even in England, after a clear decline of the apprentices since the 1970s, a training centre which trains apprentices was established in this company. All these branches highlight that beside all the advantages of vocational education, the former apprentices have to distinguish themselves through more willingness to acquire new skills, more flexibility and even more social competence or so-called soft skills than it was necessary in former times.

These last statements can be found in a similar way in the banking sector as well. At the Swiss headquarters of an international operating major bank, the difference between university and other bachelors is seen in the practical experience which university bachelors do not have and other bachelors can exhibit. This leads to different operational areas as also the representative in Germany concludes. Additionally, the English branch employs more and more persons with an academic or MBA, too, whereby the vocational education seems to be limited to certain areas in the banking sector.

Methodology: Qualitative data analysis

The above mentioned results of a survey are part of a qualitative field manual supported approach in which persons in charge of recruitment of 18 TNCs out of 3 different countries were interviewed.

The recruitment strategies and behaviours of companies are changing, and in future some companies perhaps have greater faith in graduates than holders of VET qualifications. The project takes an international comparison of the recruitment behaviour of companies as a vehicle for focusing on the interface between the educational and employment systems. Individual qualitative case studies form the basis for the international, cross-occupational and cross-sectoral reconstruction of company recruitment strategies and decisions in the context of changing VET pathways of Germany, England and Switzerland (see Hippach-Schneider & Weigel 2010, p. 1).

The project comprises two parts. The first maps the key features of the national labour market, employment, educational (including VET) and qualifications systems, while the second focuses on case studies of company intermediate level recruitment strategies. Two rounds of semi-structured guided in-company interviews were scheduled. The first phase (November 2008 – July 2009) involved questioning company heads of human resources responsible for recruitment decisions in a semi-structured relatively open way, which represented an explorative search for meaning. During the second phase (September 2009 – April 2010), managers from the relevant operational divisions of the same companies were interviewed. The HRD managers
confirmed that operational managers play a major role in recruitment decisions, so the perspectives of both parties are needed in order to gain a holistic picture of recruitment motives (ebd., p. 3 f.).

The analysis of the upraised data was carried out by a codification (MaxQdA) and analysis, which is very common in social science. In a second step, operative employed persons were interviewed again in order to assess the achievement potential, autonomy, customer focus, entrepreneurship and flexibility as well as intercultural, social, and professional competencies of bachelors and people, who have graduated an apprenticeship, working in the technical and commercial areas of their company on a four-level-stage scale. The scale compasses operations that could be carried out easily just as operations that were unpredictable.

Results
Our results can be summarized insofar as we can conclude that vocational education itself still plays a fundamental role for the operational recruitment and as a basis for further education. It is shown in particular that vocational education has to open up to new requirements and challenges in order to keep its important position. In Switzerland e.g. the higher vocational education, both on a more academic and a more practical oriented way has to be recognized as a valuable pathway for a highly skilled workforce. In order to be prepared for a global economy, foreign languages, intercultural competences and entrepreneurship get also for the vocational pathway more important. On the other hand also the traditional higher education will be more focused on employability. TNCs are not opposed deprecatory towards vocational education but they rely increasingly on academic recruitment. Against this background, it is of eminent importance that young adults who have passed an apprenticeship successfully signal their willingness for further education within and outside of the company.

References
A qualitative research of curriculum development in China’s further vocational education: The staff’s perception

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Summary: Further vocational education is a crucial part in China higher education. The majority learner is adult with employment. Their learning needs and objective are totally different from youth. This paper mainly focuses on degree-level curriculum development in further vocational education. Qualitative method is used to collect data and analysis staff perception on curriculum development. After data coding and discourse analysis to the interview contents, researcher finds out the further vocational curriculum objective, curriculum content and curriculum assessment which suit adult learners.

Keywords: Further vocational education, vocational curriculum development, China vocational education

Introduction
Degree-level higher education system in China includes regular universities sub-system and adult higher education sub-system. According to the 2010 education statistic report published by the Ministry of Education, by 2010, there were 33.7 million students at higher education institutions and the gross enrolment rate was more than 24%. Among those students, there are 23,856,345 students (70.69%) who study at regular universities system and 9,891,831 students (29.31%) who study at adult higher education system.

Almost all students who study at adult higher education institutions are adults with employment. Their learning objective is totally different from youth who study at regular universities. Most of them intend to get a degree then promote professional and career development. It is a kind of degree-level further vocational education.

Methodology
Qualitative research paradigm and interview research methodology are applied in the research. Researcher mainly focuses on the question: “Whether further vocational education should hold the same curriculum standards with regular higher education?” Researcher designs an interview guideline, all the interviewees are asked a series of questions around “How would you compare the course development in further vocational education and regular university?”

The research initially applies semi-structured and in-depth interviews method. 29 staff with different role in nine adult higher institutes were interviewed by the researcher. The interviewees are from Open University of China, Distance Education College of East China Normal University, Beijing Open University, School of Distance Learning for Medical Education of Peking University, School of Distance Education of University of International Business and Economics, School of Continuing Education.

1 2010 higher education student population statistic,http://www.stats.edu.cn/tjzx/2010%E5%9C%A8%E6%A0%A1%E5%AD%A6%E7%94%9F%E6%9D%A5%E6%BA%90%E6%83%85%E5%86%B5%EF%BC%88%E6%80%BB%E8%AE%A1%EF%BC%89.htm. 2011-2-10.
of Beijing Language and Culture University, Online College of Beijing University of Posts and Telecommunications, Online College of China Agricultural University, Hunan Radio & TV University and Chaoyang Community College. The participants are all staff who engage in further vocational education. Their roles are central academic staff, academic related support staff, staff tutors, associate lecturers and tutor counselor. Most of them are all have abounded work experience.

Among the 29 interviews, only one was telephone interview; others were all face to face interviews. An audio recorder was used for all interviews. The interviews were scheduled to last for about 60 minutes (which they all did with a few minutes variation) and the shortest was 49 minutes, and the longest was 118 minutes. All events were audio-recorded. All participants were explained about the general purpose of the research. If the candidates accepted the interview, researcher would discuss with them about the interview time and place. This was followed by the researcher sending the interview guidelines to them. Giving importance to the quality of recording, most interviews are arranged in a quiet meeting room. The recording equipment was placed overtly, but not intrusively, near the interviewees. All interviewees were asked for their permission to record the interviews and were assured that any responses they made would be kept anonymous.

The whole transcription includes 415,823 words in total, and the interview time is totally 29 hours 20 minutes. Each interview was examined separately and the transcript was analyzed using Nvivo 8.0. The notes in Nvivo were made according to particular issues of potential interest to us and the relevance of the content of curriculum development. After the data were exhausted and no more notes arose from it, the transcript was analyzed again and then the original notes were expanded into a narrative revealing the interviewees’ perception of curriculum development.

Results

Curriculum objective in further vocational education

When interviewees were asked “whether further vocational education should hold the same curriculum standards with regular higher education?”, 18 people answered it and 94.4% of them considered further vocational education has different values orientation comparing with regular universities. The curriculum objective should focus on application-oriented talents. Adult learners need rather too much theoretical knowledge than practical knowledge and professional skill. It is a wrong way to simply compare the degree that are granted from further vocational institutes and that from regular universities.

“In my opinion, there are great differences between regular higher education and further vocational education. We can not say this is good and that is bad, because they serve different people. They have different values orientation. In general, regular universities mainly focus on elite education, their students are highly selective. But the China Open University opens to any people. Some of them are from minority ethnic group, and poor academic background. Our university mainly serves minority region, rural and undeveloped area, serves local economic development. Educational objectives are totally different. Further vocational education is a kind of massive education. In the curriculum development, we should fit the needs of adult learners and help them to improve their professional capability and career development. ”

“Further vocational education should focus on application-oriented talents and continuing education. Most of the learners are adults with employment. They are keen to learn what teachers teach today can be used in work tomorrow. At this situation, the curriculum objective should have close relationship with learners’ work. They don’t need too much
theoretical knowledge. They welcome practical knowledge and professional skill. The world needs the people who can fly the airplane, but also needs the people who can fix the toilet. Most distance learners are ordinary people. If they can improve themselves, change their life, get better job through online distance learning, I think that is the quality of online distance learning.”

Curriculum content design in further vocational education
When Interviewees were asked “How to develop curriculum to fit the needs of application-oriented talents?”, six people gave answers form their work experience. Three of them are staff tutors, two of them are tutors and one is course manager. They all have engaged curriculum development in further vocational education for more than six years. Different from regular universities, curriculum content in further education should integrate suggestions from academic institute, enterprise and professional organization, further vocational education. The curriculum content on campus should have close relationship with learners’ real work and promote learners’ career development. It should involve certain theoretical knowledge but can’t indulge in theory. The final objective is learners’ professional development.

“In the curriculum content design, our institute involves more professional content in the credit course. We have a course named “Regional Development in Rural Area”, and learners are all cadres of the countryside. Their main work is the management of rural areas issues. Our curriculum reform has been underpinned for few years. We cut off part of higher mathematics course in the programme. The vegetable cultivation courses are also not the core course. After surveying learners’ needs, we found socio-political and law knowledge, communication skill and official document writing are fundamental to them. For their career development, some practical courses such as ‘Contract Law’ and ‘Civil Mediation’ are introduced to the learners. Now these courses are very popular and learners told us what they learn today can be used in their tomorrow’s work.”

“When we design the curricula, 30% curriculum content is foundation knowledge, 40% is professional skill and 30% is practical operation. The course structure is a bit like an olive. Foundation knowledge is subject orientation, it prepares for students’ further academic development, such as for master or doctor degree. Professional skill has close relationship with their job and practical operation that push students to use what they learn in their daily work. Case study is used in our university. Our case bank is open to students, they can find out cases which suit themselves. When we set up a new programme, experts from universities, professional organizations and companies were invited to discuss how to design the curriculum content to fit the needs of society. But we must be very carful about another issue. That is, we are working for a further vocational institute not for a training centre, and we grant degree to students. So we can’t only offer students professional training, we should integrate necessary theoretical knowledge to the curriculum content which can promote students’ further development.”

Curriculum assessment in further vocational education
When Interviewees were asked “How to develop curriculum to fit the needs of application-oriented talents?”, three people gave their answers from curriculum assessment aspects. Two of them are staff tutors and one is academic staff. Interviewees thought assessment method in further vocational education should be different from regular university. Almost all learners are adults with employment. They have rich working experience and good comprehension ability, but poor memory. Capability test should be used in the curriculum assessment. The main objective
is testing competence of knowledge application and operating ability. Assessment should have close relationship with learners’ job.

"Rote learning and mechanical memorizing have been criticized for a long time. Few years ago, we changed evaluation mode. I can give you an example, in some courses, if students are asked to write a short paper or a small project, the topic must have close relationship with their work. One student designs a financial computer programme for their company and another student writes a marketing sales proposal for his boss. Their assignments were used in company’s real activities which enhanced their confidence and were approved by their colleagues."

"In further vocational education, practice session is arranged before students graduate. This is a very important part to assure teaching quality. In regular universities, students usually just do some desk research and attend the oral defence. But we require student to do survey in their job field. If student is a teacher, he is required to do an action research in his school and then attend the oral defence. And students who study market major need to finish a business proposal report in term of his company’s situation. All data are real including market analysis, swot analysis related with his work. We don’t think this session is easier than graduate thesis of regular universities, on contrary, it is more difficult than the desk work."

**Conclusion**

Learner is always the central of education. In degree-level higher education, people always intend to compare vocational education and regular universities. This research shows curriculum development in further vocational education is different from that in regular universities. The vocational curriculum objective, curriculum content and curriculum assessment focus more on application-oriented talents. It is a dangerous way to copy curriculum from regular universities without considering adult learners’ needs.

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Entrepreneurship through apprenticeships: The need, practice and interim evaluation. Case Finland

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Summary: Qualification in entrepreneurship through apprenticeship was introduced in Finland in 2000. During the first decade the number of students increased from 450 to 5400. This study includes two surveys and three “minicases” evaluating the impact of this new entrepreneurship training approach. The results reveal that this qualification is typically a second degree for the adult students and its benefits are contextual learning opportunities occurring daily out necessity in business life. The role of informal and incidental learning in this context is also discussed.

Keywords: Entrepreneurship, apprenticeship training, informal and incidental learning

Introduction
Entrepreneurship, as a field of business, seeks to understand how opportunities to create new products and services arise and are discovered or created by specific individuals, who use various means to exploit or develop them, thus producing a wide range of effects. In recent years, the allure of entrepreneurship has increased in most countries, with the result that more people than ever are choosing or planning to choose this activity as a career. Entrepreneurship, as a branch of business, has important roots not only in economics but in behavioural sciences and sociology as well (Baron & Shane, 2008). The field of entrepreneurship recognises that both the micro perspective (focusing on the behaviour and thoughts of individuals) and the macro perspective (focusing primarily on environmental factors) are important for obtaining a full understanding of the entrepreneurial process. This process unfolds over time and moves through distinct but closely interrelated phases. Societal factors influence all the phases of this process.

Entrepreneurship is also a training and educational issue. Having been partly underestimated if not neglected for many years at various levels of educational systems, it has recently been a target for new initiatives and programmes. In the case of Finland, there is an estimate that in a few years 40,000 – 60,000 entrepreneurs who have not yet solved their successor question are going to retire. Thus, a new entrepreneurial generation is badly needed.

Qualification in entrepreneurship through apprenticeships was introduced in Finland in 2000. The number of participants in this training increased steadily from 468 in 2000 to 5,356 in 2009.

Methods and research design
Theoretical framework of the paper is twofold. Firstly, the process perspective of entrepreneurship is presented as a dominating current approach to entrepreneurship. Secondly, a typology of learning depending on action orientation and reflection presented by Watkins and Marsick (1992) is employed. This typology allows
occasional learning and reflection in addition to the prevailing idea of rigorous knowledge based on technical rationality. Traditional school-based learning is important, but occasional learning and reflection help to apply concepts into practice and are also needed to discover hidden norms, values and assumptions guiding behaviour (Gerber et al., 1995). These play an important role in entrepreneurship, when situations deviating from ordinary routines occur. This study is also an evaluation study about the impact, advantages and challenges of apprenticeship-based entrepreneurship training in Finland in 2000-2009.

Statistical data indicate that the number of participants in apprenticeship-based entrepreneurship training was more than ten times higher in 2009 compared to 2000, when this opportunity was introduced in Finland. Further, these data show some interesting issues about different structural characteristics compared to the existing entrepreneurial society. The reasons to attend this training were studied in an evaluation study and a factor analysis was administrated to reveal the motivations and attitudes of the participants. Furthermore, three interview-based case studies are presented here to demonstrate the various types of exploitation of training for such purposes as a generation change and a career change from an employee to an entrepreneur. These data are qualitative and enrich the quantitative data provided by the surveys.

Results
Two surveys were conducted. In an internet-based survey (October-November 2008) the target group was a sample (N = 495) of persons who had achieved further or specialist qualification in entrepreneurship. 56 per cent of the respondents were female and 44 per cent male. The average age was 43 years and about a third had achieved a degree in higher education (20 per cent from a polytechnic and 13 per cent from a university) before starting the qualification studies in entrepreneurship. After the qualification studies in entrepreneurship, 63 per cent of the respondents worked as entrepreneurs and 37 per cent in other types of jobs (mostly as employees). Out of those who started (or continued) an entrepreneurial career, 39 per cent worked as solo-entrepreneurs, 46 per cent in micro firms (employing 2-9 people) and 15 per cent in small enterprises (employing 10-49 people). There were only a few persons in the sample working for companies employing more than 50 people.

In another questionnaire-based survey the initial experiences of people attending qualification studies in entrepreneurship were explored (N = 108). This survey focused on how the apprentices chose this training, their motivations, the scheduling and content of the training and their experiences about mentoring provided during their studies. The demographic characteristics were very similar to the previous study indicating that for a great majority the training for qualification in entrepreneurship represented a second degree after their basic education in another area.

The most important reason for attending the training was a willingness to develop one’s professional competence (63%) followed by reasonable costs of apprenticeship training compared to other alternatives available (44%) and changes in the enterprise calling for updating of know-how and skills (33%). For further analysis, a factor analysis was conducted. A four-factor solution revealed the following:

- Factor 1: Impacts of training
- Factor 2: Progress of studies
- Factor 3: Content of studies
- Factor 4: Instruction arrangements and learning motivation

An interesting detail (based on Chi-Square testing) showed that the female students found the quality of content more important than their male counterparts,
who considered formal competence through training more important than the females. In addition to the surveys described above, three case studies were administrated. They represent various applications of entrepreneurship training through apprenticeship. The first one describes a generation change in a brickwork business, the second one how a candidate from outside the family was selected to continue the business, and the third case a young man in his thirties, who after a BBA degree from a polytechnic found an entrepreneurial career attractive and apprenticeship-based qualification to fit his further plans perfectly.

Case study 1: Generation change in a brickwork business – one of the daughters takes over.
The aging master mason planned to retire in the near future. He had three daughters. Having been already in the business for more than 37 years, he had trained five youngsters to become bricklayers. He very much wanted to have a successor from his family. One of the daughters was married to a bricklayer (trained by her father through apprenticeship) and she was preparing to take the business over. This daughter had a BBA degree from the commercial college and she now obtained further qualification in entrepreneurship through apprenticeship training to run the family business successfully.

Case study 2: Running a locking venture.
The second case is a locking business where the entrepreneur moved to another position within the same industry sector. A person from outside the family was selected to continue the business. She had worked earlier for this firm in sales, but needed additional training in management and in running an entrepreneurial business. Qualification in entrepreneurship was a natural solution, because this firm had exploited apprenticeship training earlier to train locking experts. This enterprise was founded in 1994 and there had been four apprenticeship trainees before the female successor who has run the business with good results since taking the office after her qualification degree in entrepreneurship.

Case study 3: From a polytechnic degree to a special qualification in entrepreneurship.
A young male adult in his mid 20s had graduated from a polytechnic and got an idea to become an entrepreneur. However, he was not satisfied with his earlier education which concentrated on “learning for storage”, but wanted to acquire practical skills for his future entrepreneurial career. Special qualification in entrepreneurship in 2006-2009 appeared to be just the answer to him: “learning from others and facing daily solutions calling for immediate decisions and action – strongly outperforming my previous studies with the opportunities for self-reflection.” The practical experience came from working in a small entrepreneurial venture publishing customer news. He has now (2011) started up a photographer’s studio of his own and is training for this particular field through a new apprenticeship training.

Discussion and conclusions
The study revealed a number of advantages of on-the-job learning compared to more traditional training methods in entrepreneurship training. Individual oriented performances in contrast to the more socially shared accomplishments that often characterise the non-school setting were found very beneficial and rewarding. Instead of clearly defined problems with “one best solution” real life settings with ill-defined opportunities and problems, which one could be tackled by multiple solutions were
appeared to be an attractive alternative and were appreciated by the participants (Beach, 1999; Collin, 2007). The students emphasised that learning in the firms was contextual and occurred daily out of necessity. For adult students, this allowed also critical reflectivity (Ellström, 1996). Hoover et al. (2010) state that this type of an experimental learning model is based on “the concept of whole person learning”. Informal and incidental learning often take place under non-routine conditions (Cross, 2007; Marsick & Watkins, 2001; Watkins & Marsick, 1992). Informal and incidental learning is at the heart of adult education, because of its learner-centered focus and the lessons that can be learned from life experience unlike formal learning that is typically institutionally sponsored, classroom-based and highly structured (Cross 2007; Cseh et al., 1999; Gerber et al., 1995). This difference was clearly pointed out in the interviews of the participants.

There are still a number of points in the efforts to develop the curriculum of the qualifications in entrepreneurship. We should understand better the tacit processes by individuals and learning at individual, team and organisational level as the way how people create meaning and acquire knowledge and skill. Technology is changing rapidly and has an impact on the nature of learning. Given the current distributed nature of technology-driven interaction more can be learned informally outside a curriculum. Thus, more studies exploring how people really learn in these settings are needed.

References
Considerations of curriculum integration of general education and nursing technology profession

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Summary: General education used to be neglected in technology education, but technology education should emphasize not only specialized curriculum but also synthetic general curriculum. This study applied qualitative method to explore one of junior college nursing department which implemented curriculum integration project in 2009 in Taiwan. Apply content analysis and results found that general curriculum infused nursing context into their courses, increased importance of some part of units, and developed free participated integrated curriculum. Different teacher concern degrees included that teacher coordinated in existed contents, created new units with self ability, explored contents’ knowledge and learned to teach automatically. Moreover, the study analyzed teachers’ beliefs, reasons of less resistance and opportunities of starting dialogued within this school. Finally, pointed out that core competence of nursing can be achieved more easily from crossing borders by integrating general and professional curriculum.

Keywords: Curriculum integration, nursing profession, technology education, general education

Introduction
Taiwan Nursing Accreditation Council (TNAC) was built in 1996 aimed at increasing nursing education quality in Taiwan. The organization suggested eight core competences that including basic biomedical science, general clinical nursing skills, critical thinking and reasoning, ethics, accountability, life-long learning, caring, communication and team work capability (Chao, 2004). Nursing core competences must be achieved by general curriculum, professional curriculum and selective curriculum in junior college. However, students and teachers in technological and vocational school are used to more emphasizing professional curriculum than general curriculum. People argued that the characteristics of emphasizing professional curriculum and ignoring general curriculum in technological and vocational education are lead to the lack of humanity for the professional people (Wu, 1999; Jiang, 1998).

The author has taken responsibility of curriculum plan in nursing department. In 2008, the author had interviewed some of administrator of clinical nursing. The administrators suggested that professional competences have to be adopted earlier in general curriculum to 10th or 11th grade. General curriculum such as English, Mathematics and Informational courses have to be considered as required competences of nursing profession. However, both general and specialized teachings are long-standingly separated. There are some researches talking about the importance of curriculum integration (Wu, 1999; Lee & Wang, 2009; Su, 2003), but seldom researches showed how to do the curriculum integration in college school.
Curriculum integration is a kind of methods of curriculum design that emphasized on cross-curricular connection (Beane, 1997; Fogarty, 1991). Tasi (2000) pointed out curriculum integration is to put two or more events, phenomena, thoughts or learning experiences together, to organize them become a meaningful learning context or experience. It seems to be helpful for students to do the integrated learning. However, the information from grade 1-9 curriculum experiences remind that it would be fail when the policy is implemented too roughly or teachers don’t understand the spirits of curriculum integration (Ouy, 2010). Also, teachers would develop resistance during curriculum reform process (Chou, 2004; Ouy, 2004). In other words, the implementation of curriculum integration would fail if teachers are lack of enough communication or do not reach a mutual agreement.

In order to help nursing department prepare nursing education accreditation, the author proposed curriculum integration project that invited general teachers and specialized teachers to come to the forums and negotiate how to do the curriculum integration. This paper aimed at inquiring two questions. One is “What condition did the nursing profession implement general and specialized curriculum integration?”. The other one is “How about teachers’ attitudes and beliefs during participation in curriculum integration?”.

Methodology
To apply qualitative method, 20 teachers who teach general curriculum and specialized curriculum were invited to the forums. The author asked agreement, took record in the forums and wrote down transcripts afterwards. Data collection consisted of integrated curriculum table, dialogued transcripts in forum, non-formal interviewing records and observing records. Applied content analysis and raised themes are important issues of this paper.

Before writing the research paper, the author showed data which would be presented in paper to the participated teachers and confirmed their consent.

Results
Almost all teachers acted in close coordination. They showed less resistance and participated to discussion faithfully. The results include two dimensions:

*Development of specialized-based integrated curriculum*
Data analysis showed three characteristics of curriculum innovation as follow:
1. General curriculum added nursing context into their curriculum content.
2. General curriculum increased importance of some part of units. Teachers are willing to increase time to help nursing students to master specific units.
3. General curriculum developed additional, free participated integrated curriculum.

*Different teacher concern degrees at implementation of curriculum integration*
Teachers showed three different concern degrees in participation in the curriculum integration project. Their attitudes as follow:
1. Teachers agreed the importance of integrated curriculum for nursing students and are willing to coordinate in existed contents.
2. General teachers created new units with self ability.
3. General teachers explored contents’ knowledge and learning to teach automatically.

The author analyzed teachers’ beliefs from three characteristics of curriculum integration and three different concern degrees of teachers as Table 1.
<table>
<thead>
<tr>
<th>three characteristics of curriculum integration and different teacher concern degrees</th>
<th>teacher beliefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>added nursing context into general curriculum</td>
<td>Expand practicability of general knowledge</td>
</tr>
<tr>
<td>increased importance of some part of units, increased learning time</td>
<td>General knowledge can not be substituted, but increase learning time to enhance the synthetic nursing knowledge</td>
</tr>
<tr>
<td>developed additional, free participated integrated curriculum coordination in existed contents</td>
<td>General knowledge can not be divided up, adopting additional integrated model</td>
</tr>
<tr>
<td>created new units with self ability</td>
<td>Agree some units that are important to nursing students, willing to coordinate learning contents</td>
</tr>
<tr>
<td>explored contents’ knowledge and learning to teach automatically</td>
<td>Emphasize learners’ needs, integrated curriculum has to consider life field</td>
</tr>
</tbody>
</table>

Table1: Teachers’ beliefs from three characteristics of curriculum integration and from different teacher concern degrees

Dunscombe and Armour (2004) pointed out the potential of knowledge construction will be enlarged if participators engage in dialogue and inquiry corporately. New opinion produced or rich creativity will be stirred up through sharing opinion or response to others (Well, 2000). Schwab (1973) proposed that teaching materials, learners’ prior knowledge, society, and teacher’s knowledge and curriculum design could be the guideline of the curriculum revision. Hsu (2006) pointed out the curriculum’s importance, learners’ needs and interests, materials adequacy, implementation time, and public recognition of this curriculum would be the concerned factors in innovative curriculum. Different from the fail of 1-9 curriculum reform, nursing department concerned departmentalism may lead to fail of curriculum integration. Professional dialogue among teachers leads to motivate teachers’ learning and growth during the project implementation in nursing department. Therefore, it would be necessary to help teachers understand the spirits of curriculum integration and provide opportunities to dialogue what curriculum design has to concern.

Moreover, the results found that teachers’ participation in curriculum integration of nursing department showed less resistance.

There are three possible reasons such as:

1. The principal plays an important role in breaking out long-standing separate between general and specialized curriculum. The principal as a curriculum leadership whose statement tells all of teachers what kind of knowledge worth best in the school.
2. The school pays high attention to nursing education accreditation. Teacher showed high degree of coordination could be getting the pressure from bureaucracy.
3. Fewer babies and surplus of teachers became the pressure of the school teachers. Teachers were apt to coordinate the project that could be struggle for school recognition.

School faces to nursing education accreditation pressure, the principal as a curriculum leadership, and surplus of teachers are the factors that could impact teachers’ attitudes and beliefs of implementation of curriculum integration. Therefore, nursing education accreditation, curriculum leadership and teachers expected recognition are strengths that lead to positive result of curriculum innovation.

In addition, it is very important to pay attention to what contents was eliminated when teachers reorganized the curriculum. When general teachers consider what
topic or content might hold the curriculum together, they have to confront the question of whether to draw nursing students from widely concerns of liberal art education, focus on specialized profession, or inquire in-between with both two.

Also, nursing teachers have to emphasize not only general education infuse core competencies of nursing profession but also consider how they could design their specialized curriculum that infuse general competencies such as accountability, life-long learning, communication and team work capability et al. In other words, general and specialized teachers have to cross borders to infuse specific contents that will help nursing students reach the nursing core competences and to become a professional nurse.

References
Pre-apprentice programs and their impact on apprenticeship completion

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Summary: Pre-apprenticeship programs have generated interest recently from government, employers and other stakeholders in the training system as one means of improving apprenticeship completion rates. This report uses data from the 2010 NCVER Apprentice and Trainee Destination Survey and finds that there is no universal benefit attached to undertaking a pre-apprenticeship. Instead, the impact of pre-apprenticeships varies with occupation and prior education level. Pre-apprenticeships increase the likelihood of completion for apprentices in the construction, food and electro-technology trades and those with a Year 10 or Year 12 level of education. Pre-apprenticeships reduce the likelihood of completing an apprenticeship for hairdressers and apprentices in the automotive and engineering trades and for those people who already have a Certificate III or higher qualification.

Keywords: Apprenticeships, pre-apprenticeships, completion rates

Introduction

Pre-apprenticeship programs have generated interest recently from government, employers and other stakeholders in the training system as one means of improving apprenticeship completion rates and meeting skill shortages. The programs are institution-based and aim to develop subject-specific and work-process knowledge without involving a formal employment relationship. Dumbrell and Smith (2007) found strong support among employers and prospective apprentices. Employers they spoke to saw them as an effective and efficient screening device. Dumbrell and Smith also found that those who undertake pre-apprenticeship programs are more engaged with the occupation. However, there has not yet been any Australian research which establishes that pre-apprenticeship programs actually increase apprentice satisfaction and completion rates.

A pre-apprenticeship program is a training pathway that prepares an individual for entry into an Australian apprenticeship. It consists of off-the-job training with a Registered Training Organisation and may contain an element of work experience with an employer (Australian Government 2009).

In practice, there is no formal definition that distinguishes a pre-apprenticeship program from other training activity in the VET system. The apprentice and trainee data collection has little information on prior education and training, and therefore it is not possible to link pre-apprenticeships to success in apprenticeships and traineeships. Consequently, it has been difficult to measure the extent of pre-apprenticeship programs and their effectiveness at improving apprenticeship completion rates and satisfaction with training.

In this paper, we concentrate on apprentices in trade occupations, where pre-apprenticeship programs are most prevalent. Approximately 28 per cent of apprentices and trainees in the trade occupations reported that they had completed a pre-apprenticeship program (NCVER 2010). This allows us to examine a number of
questions regarding the impact of pre-apprenticeship training on the apprenticeship experience. First we conduct a logistic regression analysis to analyse whether those who undertook a pre-apprenticeship are more likely to complete their training. Second we use ordinary least squares regression to look at whether those who undertook pre-apprenticeship training were more satisfied with their apprenticeship than their peers who had not. Third we examine whether those who undertook a pre-apprenticeship but who did not complete their apprenticeship are less likely to give work- or training based factors as the main reason for not completing their training. Our motivation is to understand whether the pre-apprenticeship training gives potential apprentices a more realistic idea of what an apprenticeship really involves.

In answering these questions we try to tease out a number of relationships to assist in understanding the potential role of pre-apprenticeship training:

- The interaction of pre-apprenticeship training and prior education. In particular, we are interested in whether pre-apprenticeship training is a complement to prior education or whether it is remediating low levels of prior education.
- If pre-apprenticeship training provides apprentices with a better appreciation of what the trade is about, whether this has an impact on completion rates.

Methodology

We use data from NCVER’s 2010 Apprenticeship and Traineeship Destination Survey (NCVER 2010), which included questions on pre-apprenticeship programs. The survey also collected information about the destinations of apprentices and trainees approximately nine months after leaving their training. Information was collected on employment outcomes, reasons for non-completion, satisfaction with the apprenticeship or traineeship, and further study destinations.

We test the impact of pre-apprenticeships in a binary logistic regression model. Our dependent variable is the completion status of the apprentice (completed training or did not complete training) and our independent variable is whether the apprentice undertook a pre-apprenticeship program.

As controls we add age, sex, highest level of education, occupation of apprenticeship, part-time status and existing worker status. We also include the interaction of highest level of education and occupation. It has already been shown that the incidence of pre-apprenticeships vary by occupation and highest level of education and we want to be sure that we do not attribute any effect to pre-apprenticeships that is actually the result of underlying relationships between these two variables. Finally we include interactions of whether the apprentice had undertaken a pre-apprenticeship with (1) highest level of education and (2) occupation. This enables us to test whether pre-apprenticeships improve completion rates in some circumstances but not in others.

To test the second research question, we run two OLS regression models, with two factor scores (satisfaction with work-related aspects of apprenticeship and satisfaction with training-related aspects of apprenticeship) as the dependent variables. Whether the apprentice completed a pre-apprenticeship was included with the same interactions as the completion model and the same control variables were added. To test whether pre-apprenticeships had any impact on the reasons for non-completion, we ran a binary logistic model. To create the dependent variable, we scored all those reasons for not completing training that related to not liking the type of work or training as “1” and all other reasons (including redundancy) as “0”. 
Results
We started our analysis of the likelihood of completion with the full model. We found that all interaction terms were significant and they were retained in the model. So that the results are easier to interpret, we take the coefficients to calculate the change in likelihood of completion associated with completing a pre-apprenticeship. These are shown in Table 1. Pre-apprenticeships appear to be working well in the construction trades, where a pre-apprenticeship is associated with a 3.8% point increase and the likelihood of completion, and in the food trades, where the associated increase is 3.2% points. There is evidence to suggest that they are having a perverse impact in hairdressing (a reduction in the likelihood of completion of 5.2% points) and to a lesser extent in the automotive and engineering trades (1.5% point reduction).

Clearly, undertaking a pre-apprenticeship is of no benefit for people who already hold a Certificate III or higher qualification and indeed reduces the likelihood of completing an apprenticeship by 3.4% points. Beyond that, any clear effect for level of education is hard to discern. We would expect that pre-apprenticeships would be of most benefit to those with lower levels of education. This is not what the results indicate. Instead, a pre-apprenticeship increases the likelihood of completing an apprenticeship for those with Year 10 by 3.5% points and those with Year 12 by 3.7% points, but not those with Year 11, for whom a pre-apprenticeship is associated with a 1.3% reduced likelihood of completion.

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Pre-apprenticeship</th>
<th>No Pre-Apprenticeship</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automotive &amp; Engineering</td>
<td>71.9%</td>
<td>73.4%</td>
<td>-1.5%</td>
</tr>
<tr>
<td>Construction</td>
<td>84.5%</td>
<td>80.7%</td>
<td>3.8%</td>
</tr>
<tr>
<td>Electro-technology</td>
<td>78.8%</td>
<td>78.0%</td>
<td>0.7%</td>
</tr>
<tr>
<td>Food</td>
<td>57.4%</td>
<td>54.2%</td>
<td>3.2%</td>
</tr>
<tr>
<td>Hairdressing</td>
<td>65.4%</td>
<td>70.6%</td>
<td>-5.2%</td>
</tr>
<tr>
<td>All other trades &amp; technical occupations</td>
<td>76.0%</td>
<td>73.8%</td>
<td>2.2%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Highest level of education</th>
<th>Pre-apprenticeship</th>
<th>No Pre-Apprenticeship</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cert III</td>
<td>71.5%</td>
<td>74.9%</td>
<td>-3.4%</td>
</tr>
<tr>
<td>Year 12</td>
<td>81.4%</td>
<td>77.7%</td>
<td>3.7%</td>
</tr>
<tr>
<td>Year 11</td>
<td>65.7%</td>
<td>67.0%</td>
<td>-1.3%</td>
</tr>
<tr>
<td>Year 10</td>
<td>72.7%</td>
<td>69.2%</td>
<td>3.5%</td>
</tr>
</tbody>
</table>

Notes: Assumes apprentice is full-time, not an existing worker and commences at age 19.

Table 1: Probability of completing an apprenticeship by occupation and whether undertaken a pre-apprenticeship

In contrast to the clear findings in relation to the likelihood of completion, there is a much weaker relationship between pre-apprenticeships and satisfaction with the job-related and training-related aspects of an apprenticeship. In the satisfaction models tested, there were no significant interaction effects. There was a small, positive non-significant effect of pre-apprenticeship programs on satisfaction with job-related aspects of the apprenticeship. The factor scores are standardised, meaning that the average score is zero and around 95% of all responses are between -2 and 2.
Completing pre-apprenticeship increases the satisfaction score by less than 1/25th of one standard deviation. To compare, the effect of undertaking the apprenticeship part-time was to increase the satisfaction by more than 1/5th of one standard deviation. In contrast, if there is any effect of a pre-apprenticeship program on satisfaction with off-the-job training, it is negative. The effect though is of no consequence. All other things being equal, undertaking a pre-apprenticeship reduces satisfaction with off-the-job training by less than 1/70th of one standard deviation.

We found that pre-apprenticeships do have an effect on reasons for not completing. However, as with the effect on completion the effect is not uniform. Apprentices in the engineering and automotive trades, the food trades and hairdressing are less likely to cancel their apprenticeship because they didn’t like the type of work or training if they have undertaken a pre-apprenticeship. The same is true for apprentices who have completed a Certificate III, Year 12 or Year 10. But the relationship is the opposite for those with Year 11 and for the remaining occupations.

So our tentative conclusion is that pre-apprenticeships do provide a better understanding of what work and training apprentices can expect in undertaking an apprenticeship. However, when we compare these effects with the earlier results relating to the probability of completion, we find little evidence that this better understanding translates into higher completion rates. Instead we see no consistent pattern at all: The occupations and levels of education where pre-apprenticeships increase the likelihood of completion are not the same as the occupations and levels of education where pre-apprenticeships reduce the likelihood of not completing because the apprentice did not like the type of work or training. This suggests obtaining a better understanding of what the work does not contribute in any systematic way to improving completion rates.

The results present some challenges for current policy settings in Australia. If we take these results at face value, they point to the potential of pre-apprenticeships to act as a positive filter by providing prior knowledge and relevant experience, but suggest that they have no meaningful impact on satisfaction. They also have the potential for negative effects. In some occupations, most particularly the construction trades, pre-apprenticeships appear to be working well. For some other occupations, completing a pre-apprenticeship appears to reduce the likelihood of completing an apprenticeship. It seems that the design of effective pre-apprenticeships – and matching to the right candidate – is a challenge.

References
A model for redesigning levels and types of national technical qualifications based on national competency standards in South Korea

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Summary: The major advanced countries have developed the national competency standards to interrelate the work/industry, education & trainings, and qualifications. In South Korea, National Competency Standards (NCS) have been developed since 2002. However, it is relatively poor to use NCS for qualifications. In this context, the study has developed a model which redesigns the levels and types of National Technical Qualification (NTQs) by using the NCS. Based on this model, it is possible to redesign the levels and types of NTQs by the categories of the NCS. It is expected to improve the field suitability of the qualifications.

Keywords: Qualifications, competency standards, South Korea

Introduction

The National Technical Qualification System of South Korea was established by the enactment and proclamation of the National Technical Qualifications Act in 1973. Currently, the total number of types of the National Technical Qualifications (NTQs) is 512 with 26 categories. It is established under five-level system of Craftsman, Industrial Engineer, Engineer, Master Craftsman, and Professional Engineer. These NTQs have continuously been reorganized including revisions of the related laws for nine times in total. However, there is still criticism that NTQs lack common use and the field suitability (Kim et al., 2008; Na et al., 2009; Cho, 2009).

As a tool to interrelate the Work/Industry, education & trainings, and qualifications, the major advanced countries like U.K., Australia, and France have developed the national competency standards and operated qualification framework based on them. The national competency standards refer to standardize the competencies required to do jobs successfully in one’s occupation in the national level. Although, South Korea has developed the National Competency Standards (NCS) since 2002 and tried to improve its application, unlike the advanced countries, it is actually not using the NCS in the redesigning of the qualifications such as establishment of new qualification types (Human Resources Development Service of Korea, 2010; Na et al, 2009). Consequently, this study has aimed to develop a model for redesigning levels and types of NTQs based on NCS.

Methods

The main contents of this study include the development of draft and validation of a model for redesigning levels and types of NTQs based on NCS. The major methods of this study were literature review, content analysis, interview, and professional committee. The methods according to the main contents are as below.

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1 This work was funded by the Ministry of Employment and Labor in 2010.
To develop the draft of the model for redesigning levels and types of NTQs based on NCS, literature review and interview were conducted. For the literature review, the domestic and international research reports, books, and seminar data related to the NTQs and NCS were studied. The interviews were conducted on the experts related to the qualifications working in BIBB in Germany, Cereq in France, and ETF in EU. The main points of the interviews included the ways and process to interrelate the qualification framework and competency standards.

To examine the validity and usefulness of the developed draft of the model, a professional committee and application were conducted. The professional committee were held four times and included experts in qualifications, competency standards, education & training, and industrial settings from the Ministry of Employment and Labor, Human Resources Development Service of Korea, Korea Research Institute for Vocational Education, Korea Labor Institute, and others. The major discussion points were examining the model draft’s appropriateness, validity, and applicability as well as drawing items for revision, and improvement.

The application was conducted on the molding and casting field. The selection of the field focused on the area in which a standard is developed among the six basic industries of South Korea. According to the developed draft of the model for redesigning levels and types of NTQs, the application was conducted through content analysis, professional committee, and interview. The content analysis was conducted by using the NCS of two categories as well as assessment criteria of 8 molding qualification types and five casting qualification types. The major details of the analysis were matching the testing contents presented in the assessment criteria of each qualification type with the competency units indicated in the NCS, and comparing the testing contents among the qualifications based on the matching results. The professional committees were held four times based on the experts of qualification, education & training, and industrial setting of two fields. They were held twice per field. The major discussion point was the validity of the comparison between the test contents per qualification type and competency units of NCS, and the validity of draft for redesigning types of NTQs of each category. Finally, the interviews were conducted on the workers with qualifications in two fields. The main contents of the interviews were whether or not the issues drawn by analysis of qualification’s testing contents actually exist, and opinions on redesigning the qualifications of the relevant fields.

Results

A model for redesigning levels and types of NTQs based on NCS

A model for redesigning levels and types of NTQs based on NCS consists of eight steps based on the previous studies related to revising qualifications using the competency standards such as Na et al. (2009), Jo et al. (2009), Kim & Park(2005), and Kim et al. (2008) (Refer to the Figure 1 for details). (2) Acquiring of Related Data is a step of collecting the assessment criteria and NCS. The assessment criteria refer to the scope and level of knowledge required to receive each types of NTQs testing of South Korea. Also, The South Korea’s NCS consists of competency unit, competency unit type, competency map, competency unit element, performance criteria, knowledge, skill, attitude, working context, and guide of assessment. Among them, the competency map is the diagramming of competency unit according to the types and levels of the competency units. It is fundamentally used in the analysis of verification contents based on the qualifications redesigning model in the future. (3) Content analysis of target types of NTQs refers to the work of marking the
competency units to be tested by each qualification type on the competency map. (4) Comparing the competency units among types of NTQs means conducting a comparative analysis among results of content analysis of target types of NTQs. (5) Investigating field suitability means confirming whether or not the issues drawn by the results of comparing the competency units among types of NTQs actually occur in the industrial settings, and collecting opinions on the improvement on the levels and types of relevant qualification areas via interviewing site workers.

Figure 1: A model for redesigning levels and types of NTQs based on NCS

Application of model to the molding and casting fields
Through the application to the molding and casting field, it has been indicated that the model for redesigning levels and types of NTQs based on NCS is mostly valid. A part of concrete application guideline in the model was improved.

The current types of NTQs for the molding field are operated by eight qualification types in five levels of Craftsman, Industrial Engineer, Engineer, Master Craftsman, and Professional Engineer. The range of testing content of the Industrial Engineer is similar to that of Craftsman by 85% in the molding field. Also, the field suitability issue of Industrial Engineer qualification was the most apparent with ambiguous roles of persons who had received Industrial Engineer qualification in the industrial settings. In order to resolve that problem, combining the Industrial Engineer and Craftsman or readjusting the verification area of the Industrial Engineer were needed. Meanwhile, the current casting field types of NTQs are operated with five qualification types of four levels such as Craftsman, Industrial Engineer, Master Craftsman, and Professional Engineer. The casting field qualifications indicated the fact that only the Craftsman Pattern Making exists as a qualification related to pattern making despite the distinguishing between the casting field and pattern making field in the industrial settings as the main problem. To resolve this problem, it is needed to include newly established qualifications tentatively named Industrial Engineer Pattern Making or Master Craftsman Pattern Making.
Conclusions
In this study, a model for redesigning levels and types of NTQs based on NCS was developed. By using this model, it would be effective unifying the work/industry-education & training-qualification and acquiring the field suitability of the qualifications. It signifies that the NCS is useful in acquiring the field suitability of the qualifications. Considering this fact, like the examples of advanced countries, it would be appropriate and advantageous to develop and operate a qualification framework based on the NCS in the long-range perspectives.

Implications
A qualification can contribute to the growth of national economy by saving the time and cost of job-seekers and recruiters through acting as a sign of acknowledgement of competencies and allowing the effective human resources development and management possible. In this regard, discussions on establishment of the qualification framework or methods to study on qualification are being held internationally. This study used the competency standards as the methodology for reviewing and redesigning the current qualifications and confirmed its potential as well as effectiveness. Considering it, the method of using the competency standards can be considered in the process of reorganizing or establishing the framework of the domestic and overseas qualifications.

References


National context of apprenticeship training in South Africa: Possibilities and challenges in a new structural order

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Summary: This paper explores the contextual determinants of apprenticeship development leading to artisan development in South Africa. The new structural positioning of skills development provisioning has considerable possibilities for an expanded system. There is, however, an ever present danger of the dominance of a supply-side bias, which might undermine its longer term impacts. The need for an enabling environment to secure continued development is called for.

Keywords: Skills development, South African education and training, artisan development

Introduction

A review of the education and training system since the election of 2009 under President Zuma has created expectation of considerable optimism for a more effective post school system that would lead to a more efficient skills development era. In this regard the move of the skills development portfolio to the newly created Department of Higher Education and Training (DHET), together with the establishment of Quality Council for Trades and Occupations (QCTO), and a National Artisan Moderating Body (NAMB) has provided the context for optimism. By means of this, there is promise of a new impetus to establish synergy between education and training directed to the production of a skilled workforce for an ‘inclusive growth path’ necessary to respond to key national development challenge of unemployment, inequality, education deficits and skills shortages. The need for balancing growth with equity still looms large in the national context.

The nature of the apprenticeship system is intrinsically linked to the socio-economic and political context of its development. As a means by which to train and prepare artisan\(^1\) for trades, the system is designed towards targeting 50 000 new artisan over the next 5 years. It is argued that while, ‘targeting’ might well deliver in the short to medium term, it does leave the enabling conditions for its continued development intact, precluding possibilities for the development of an enabling climate for its development.

This short paper will begin by exploring some international lessons on the key determinants for expanding the national apprenticeship system leading to artisan status. The South African national artisan development context is then illustrated, with some considerations for expanding the purview of current the target(-ing) strategy to establish the basis for a more sustained artisan development pipeline.

\(^1\) Artisan in terms of the latest Skills Development Act (RSA 2008) is considered a person that has been certified as competent to perform listed trade in accordance with this Act (the later is still to be specified).
Literature overview

It has been shown that the decline and/or absence of a vibrant apprenticeship system results not only in poor use of national human resources, but is a key indicator of the rollout of the economic growth trajectory. Toner (2005) points to the existence of a “virtuous circle between apprenticeship systems, product markets and industrial structure.” (p.3). Citing the “circular and cumulative relation between the supply of and demand for higher intermediate skills”, a vibrant apprenticeship system has been shown to promote the development of industries that intensively use these skills – thus the notion of ‘high skill equilibrium’ (e.g. Finegold and Soskice 1988, Wagner 1991). While the need for establishing a demand driven system is important, it has been shown that the decline in a national apprenticeship supply results in difficulties for productivity, quality and capacity for innovation (Anderton & Schultz 1999).

The need for expanding apprenticeship training has, however, been attempted in several countries including the U.S., the U.K., France, and Norway, with varying success (see Bowers, Sonnet and Bardone, 1999). It has been argued that in order for an apprenticeship system to survive – or be revived – significant institutional and government support in the form of incentives or compulsions for employers is necessary (Gospel, 1994). However, Acemoglu & Pischke (1999) warn that in a perfectly competitive labour market, the training market would break down completely if contractual considerations prevented firms from committing to training provision. The success of the German system is, nevertheless, the result of a regulatory environment and legislative context that specifies the legal rights and responsibilities of the apprentices and their employees. It is associated with “large-scale firm-based apprenticeship schemes that combine firm-provided on-the-job training with state-provided school-based education...”(Dustman and Schomberg 2008, 1). The policy recommendations flowing from this include the following:

- The ‘enforceability’ of apprenticeship contracts, stricter regulation (Ireland and Germany)
- External inspection of training forms
- Setting nationwide standards and external testing of apprenticeships

(∗ibid, 31-33)

In general, therefore, evidence suggests the importance of a range of mechanisms that enable development of the apprenticeship system. The recognition of the role of supporting institutions, such as multi-employer co-ordination of industrial relations and training that ensures training content and delivery by industry standards and the importance of a vibrant union structure that balances the firm-specific training bias that is likely to result from this. The need for statutory regulations governing the contract of employment and training of apprentices and the regulation of the labour market which encourages training and development by providing incentives for workers investing their time in an apprenticeship has also been emphasised. The importance of state financial support for training infrastructure and overall supervision of the system is also considered crucial to its development (Toner 2005).

2 In the UK, for instance the decline in apprenticeship has resulted in target-setting to offset shortages and respond to the youth unemployment crisis (see for instance Ryan, Gospel & Lewis 2007; DIUS 2008).
The national apprenticeship context

The need for expanding the apprenticeship system leading to artisan status has been recognised in the national development discourse. The high-level government Joint Initiative on Priority Skills Acquisition (JIPSA) in March 2006, committed to train 50 000 artisans per year from 2007-2010,\(^3\) with varying success. This has since recently been replaced by the National Growth Plan (NGP), developed by the Department of Economic Development (DED 2010), designed to provide an overall context for job creation and growth. It is envisaged that the country needs to train at least 30 000 engineers and 50 000 additional artisans by 2015\(^4\). In keeping with this goal, the latest National Skills Development Strategy (NSDS III) has identified the central role of Sector Education and Training Authorities (SETAs), funded by mandatory skills development levies, to achieve the target of 10 000 per annum (DHET 2011, 11). This accords with the Ministerial Performance agreement, which in addition, has committed to increase the trade test pass rate from 46% (in 2009) to 60% (by 2014). Table 1 shows recent trends and scenario for achievement of these targets.

<table>
<thead>
<tr>
<th>NGP Education and Skills Development Requirements</th>
<th>Relevant PME Outcome 5: Outputs, Measures and Targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artisans: 50 000 additional by 2015</td>
<td>10 000 artisans annually by 2014</td>
</tr>
<tr>
<td></td>
<td>Pass Rate from 46% to 60% by 2014</td>
</tr>
<tr>
<td>Registered</td>
<td>8,957</td>
</tr>
<tr>
<td>Competent (Certificated)</td>
<td>3,896</td>
</tr>
<tr>
<td>Pass Rate ***</td>
<td>N/A</td>
</tr>
<tr>
<td>Cumulative numbers from 1st April 2010 onwards to meet NGP Target</td>
<td>6,887</td>
</tr>
</tbody>
</table>

Source: NAMB*As identified by the Ministry (DHET) according to a Mail and Guardian press report 11.03.2011.

Table 1: Artisan production: Achieved and Proposed (2007-2016)

The initial challenge of the achievement of the almost 11 500 in April this year is considerable as is the accomplishment of the Growth Path targets in the forthcoming period. The fact that the targets are expected to be reached by increasing trade test pass rates (to 60%), without identification of necessary means to achieve these, will still need to be identified. Clearly, while the use of targeting is a necessary means for achievement of specified objectives, it is not a sufficient condition for its success. Establishing a sustained means by which to ensure a dedicated artisan pipeline including a regulatory environment for its achievement will provide the necessary context for its broad achievement. Thus, while the new Ministry (DHET) has clearly defined plan and has engaged substantial effort with supply-side entities to ensure achievement of these targets, the real engagement with demand-side entities, industry and business, the real players in the artisan development game, are engaged only indirectly. Thus the target-driven strategy, while useful to respond

\(^3\) 16 priority trades were identified including automotive electricians, boilermakers, carpenters and joiners, diesel mechanics, earth-moving equipment mechanics, light and heavy electricians, fitters, fitters and turners, instrument mechanics, millwrights, motor mechanics, sheet metal trades workers, shutter hands and steel fixers, toolmakers and patternmakers, and welders.

\(^4\) These numbers exclude, as a matter of course, the latest statement by the Minister of Public Enterprises about the need for 24 000 artisans for the expansion of the energy sector by 2014.
to immediate political imperatives, is unlikely to have longer-term impacts, unless specifically identified as such.

Conclusion
The new era of skills development as a result of the transfer of the competence to a new Ministry (DHET) has created confidence for much greater synergy in achieving identified objectives. In particular, there is a deliberate attempt to respond to the disarticulation between the public vocational college system and industry by using Sector Education and Training Authorities (SETAs) as the intermediary. There is, however, a clear and ever present danger of considering artisan development in supply terms. The development of expertise in this sector requires active engagement of workplaces and their engagement as an intrinsic component of an enabling systemic environment that will provide the basis for success. The overly bureaucratic and managerialist perspective of ‘artisan targeting’ is not likely to provide a sufficient means by which to respond to the need for a sustained and lasting effective solution to expanding the pipeline of artisans. It is argued that understanding more clearly what makes national apprenticeship systems work will provide the basis for a more effective artisan development pipeline that will create the conditions for increased uptake of apprentices on a sustained basis.

References
“Working-learning integrated”
curriculum development practice and reflection –
taking vehicle maintenance specialty as an example

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Summary: In 2006, the Ministry of Education (MOE) started the project of constructing national model higher vocational colleges in which one important task is to develop “working-learning integrated” curricula. This paper documents the research for this purpose: the process and results, with a focus on the curriculum reform and “excellent course” development in automobile service. The research content includes: i) deciding on the specialized curriculum system (learning field); ii) development of specific (learning field) subject curriculum, including learning tasks, design of learning organization, development of teaching materials and teaching process; iii) innovative points and difficulties.

Keywords: “Working-learning integrated” curriculum, learning field, work process based curriculum, curriculum development

Introduction
In the recent ten years, the higher vocational education in China has expanded rapidly in size; however, the education quality has not significantly improved. One important reason for this problem is that the courses cannot meet the goals in higher vocational education. In 2006, the Ministry of Education (MOE) and Ministry of Finance jointly started the project of “constructing national model higher vocational colleges.” The project aims to develop a large number of excellent core courses that reflect workplace skills requirements as well as facilitate the training of students’ practical work skills according to the actual needs of highly skilled talents. As a college of the national model higher vocational college construction program, Sichuan Jiaotong Vocational Technology College (hereinafter referred to as SJVTC) has rebuilt ten of its specialties (SJVTC, 2010a). The present research takes vehicle maintenance specialty as an example to discuss the work process based curriculum development, implementation and the problems in higher vocational colleges.

Prior to the curriculum reform, the College had three major types of courses for each specialty, i.e. general basic courses, specialized basic courses and specialized courses. Specialized courses generally adopted the model of discipline based curriculum complemented by appropriate practical teaching. In this model, theoretical teaching and practical teaching were comparatively independent in terms of content and time, in other words, they both had their own independent system and did not pursue or it was hard to achieve coordination in terms of content and time arrangement. Such is the so-called “parallel curriculum of theory and practice” (Zhao et al, 2005). In practice, this curriculum has run into the following problems which cannot be solved so far.

- The contents of theory teaching tend to be the didactic reduction of the discipline knowledge, namely they are “hard tacks” of theory which bear no direct relationship to specific work;
Practical teaching puts emphasis on training of work skills and techniques. However, due to a lack of action oriented integrative learning in work, this way of teaching fails to help students to build high-level vocational competence.

Without treating “work” as a whole, it is difficult to form an overall understanding of work and therefore impossible to establish a direct link between study and work practice.

Over the past decade, SJVTC has attempted to address the issue through the introduction of foreign advanced courses in order “to skip over the barrier of separation of theory from practice and improve the overall quality of vocational education” (Jiang, 2003). As for vehicle maintenance specialty, the major approach is to introduce job training programs from big international enterprises, e.g. Toyota’s SAEP and TEAM21, BMW’s IBT, General Motor’s ASEP, Citroen’s maintenance training course, etc. The introduction of these courses has achieved good results in the “order-based training” classes of the enterprises mentioned above and the graduates are welcomed by the enterprises. However, the positioning of these programs is to meet specific job requirements of specific businesses (e.g. Toyota) rather than emphasize the overall perception of the occupation of a “maintenance worker”. Besides, the programs do not pay sufficient attention to “educational goals” such as the students’ career and competence development. They are not efficient in helping students form comprehensive professional competence to solve complex problems in their work. Therefore, these programs cannot meet the needs of specialty construction throughout SJVTC.

In order to fundamentally solve the problem, SJVTC has set its objectives of curriculum reform in the model construction program: to rebuild the curriculum system in accordance with the work process based “working-learning integrated” curriculum ideas and methods, to form a set of specialized core curriculum standards which have reference effects, to build curriculum resource with learning materials as the major content, to implement the new curricula with the process of “trial teaching – evaluation – improvement – promotion”, and eventually to realize the overall improvement of education and teaching quality through model curriculum development and implementation (Zhao 2009; SJVTC 2010b; Jiang, Wu 2008). This paper takes vehicle maintenance specialty as an example to discuss the development, implementation of work process based curriculum and the related questions in higher vocational colleges.

Methodology
This research attempts to develop and found new curriculum system by using work process based approach in vehicle maintenance specialty. The main research methods adopted are as follows:

Sector study and enterprise surveys
The legwork of occupation analysis in the project is sector study and enterprise surveys through interviews, on-site observation, return visits to graduates, searching on recruitment website, etc. The objectives are:

- to better understand the needs of enterprises, so as to determine specialty focus and training objectives (Spoettl 2008);
- to select expert workers for Expert Worker Workshop (EXWOWO);
- to get a detailed description of the professional tasks.
Comprehensive work analysis
A comprehensive work analysis method of EXWOWO was used to determine professional tasks (Kleiner et al 2002; Reinhold et al 2003; Asia-Link Project DCCD 2007). Practice experts of team leaders, technical heads and service managers from 4S stores and comprehensive maintenance businesses will analyze, under the auspices of the specialized host, the occupation’s professional tasks according to specific procedures, and then decide on a certain number of professional tasks to determine and describe an occupation (Zhao 2009).

Results
The specialized curriculum system (learning field)
At the EXWOWO, findings showed that graduates of vehicle maintenance specialty will experience five stages of career development and finish 14 professional tasks from an “apprentice” who has just started his/her job to “integrated sector management personnel”. In most cases, a professional task will be named the same with a learning field, so as to stress the correspondence between learning content and working area. In order to facilitate teaching, SJVTC has also merged a few minor and closely related tasks or those which are difficult to accomplish in the college into one learning field and likewise, divided a few major ones into several learning fields. Hence there are 12 learning fields in total (please refer to Table 1).

<table>
<thead>
<tr>
<th>Professional tasks</th>
<th>(Learning field) Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of trades and businesses</td>
<td>Knowledge of trades and businesses</td>
</tr>
<tr>
<td>Auto assembly replacement</td>
<td>Auto electromechanical basics</td>
</tr>
<tr>
<td>Car disassembly</td>
<td></td>
</tr>
<tr>
<td>Vehicle maintenance</td>
<td>Auto maintenance</td>
</tr>
<tr>
<td>Auto minor trouble diagnosis and repair</td>
<td>Auto minor trouble diagnosis and fixing</td>
</tr>
<tr>
<td>Vehicle maintenance reception</td>
<td>Vehicle maintenance reception</td>
</tr>
<tr>
<td>Auto assembly overhaul</td>
<td>Auto engine overhaul</td>
</tr>
<tr>
<td>Automatic transmission trouble diagnosis and fixing</td>
<td></td>
</tr>
<tr>
<td>Auto major trouble diagnosis and fixing</td>
<td>Auto major trouble diagnosis and fixing</td>
</tr>
<tr>
<td>Team maintenance inspection</td>
<td></td>
</tr>
<tr>
<td>Vehicle maintenance inspection and testing</td>
<td>Vehicle maintenance quality inspection</td>
</tr>
<tr>
<td>Customer relationship establishment and maintenance</td>
<td>Customer relationship establishment and maintenance</td>
</tr>
<tr>
<td>Coordination between teams and workshops</td>
<td></td>
</tr>
<tr>
<td>Workshop scheduling</td>
<td></td>
</tr>
<tr>
<td>Technical guidance</td>
<td>Vehicle maintenance enterprise operation management</td>
</tr>
<tr>
<td>Vehicle maintenance enterprise operation management</td>
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</tbody>
</table>

Table 1: Professional tasks and learning field for vehicle maintenance specialty

Specific (learning field) subject curriculum
What follows is the curriculum design for the learning field of “auto minor trouble diagnosis and fixing”.

i) Comprehensive work analysis
The curriculum designs 15 comprehensive learning tasks such as “auto shock
absorber failure diagnosis and fixing.

ii) Learning organization
The whole process of learning takes place in four “work-learning stations”.
– 1: in the ICT room, virtual training through simulation teaching software;
– 2: in the learning-training area, simulated training on the fault diagnosis bench;
– 3: in the Top 5 brand training centers, training on real cars;
– 4: off-campus training base, training by the way of summer practice and internships before graduation.

iii) Teaching materials
Teaching materials include featured learning materials, teaching courseware, teaching cases, teaching exercises, tests, online course resources and teaching resources bank.

iv) Teaching process
Teachers engaged in teaching this course have more than one principle, and they need to follow these basic principles:
– Putting emphasis on the selection of learning materials and attaching less importance on textbooks;
– Adopting an approach of “holistic action”;
– Student-centered learning;
– Summary and reflection.

The curriculum demonstrates the following characteristics and innovative points:
– Integrated occupation analysis;
– Adherence to the logical principles of career development;
– Realization of “incorporation of famous brands, mergence of college and business, and communication with the industry;
– Innovative ideas in learning materials’ content organization and layout.

Despite many merits, the new curriculum has come across some difficulties and problems as listed below.
– The teacher’s competence;
– Higher demand for teaching environment;
– Corresponding management system;
– Some curriculum reform is only at the beginning stage.

References
Apprenticeships and community colleges in the United States: Complements or substitutes?

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Summary: President Barack Obama is calling for expanded funding for community college programs, usually two year programs leading to Associates degrees in an academic field or a vocational field. Yet, the vast majority of community college students leave without a diploma or any valued certification. Has the emphasis on college-for-all in the U.S. diverted attention from other approaches to skill development? This paper examines the potential for increasing valued and marketable skills in the U.S. by scaling up apprenticeship programs in combination with community college and other postsecondary education programs. It considers the extent to which community colleges and apprenticeship programs currently collaborate and/or compete in skill development. It looks at barriers to collaboration and considers areas where linkages between the two systems can be most valuable.

Keywords: Apprenticeship, skills, community college, credentials

Introduction
The weak capabilities of the U.S. education and training system have been a major source of concern for the last several decades. Today, commentators, researchers, and policymakers continue to decry the state of American education and its negative implications for the state of American workers. The apparently poor performance of American students on international tests is one piece of evidence showing the shortcomings of U.S. students and thus future workers. Another indicator often highlighted is the college graduation rate. While about 40 percent of 25-34 years-old held an Associates’ or BA degree in the U.S., this rate is well below the 56 percent levels in Canada, South Korea, and Russia. A key element in President Obama’s education agenda is to raise the U.S. college graduation rate to 60 percent in 10 years.

In pursuit of this goal, Mr. Obama has proposed spending billions of additional dollars on America’s community colleges. These community colleges are 2 year programs leading to Associates degrees, usually in an academic field or a vocational field. The colleges are funded primarily through state and local governments and are available at very low tuition levels to any high school graduate and even to many who did not complete secondary school. Unfortunately, the vast majority of community college students leave without a diploma or any valued certification. One critical concern is whether the emphasis on college-for-all in the U.S. has diverted attention from other approaches to skill development and to ignoring the importance of occupational and non-academic skills necessary for productive careers. This paper examines an alternative approach to increasing valued and marketable skills in the U.S.—scaling up apprenticeship programs in combination with community college and other postsecondary education programs.

The U.S. already has an apprenticeship program involving well over 400,000 individuals, but the scale of the program is small relative to other postsecondary
programs that provide qualifying training. For example, as of Fall 2008, enrollment in two-year colleges reached about 7 million students. At least half of these students are in occupational-based programs.

Until recently, apprenticeship has been a substitute for community college or other advanced training. This paper looks at the potential for apprenticeship and community colleges to complement each other. The underlying objective is not only to understand these relationships but also to determine how best to use the portfolio of training approaches to improve career preparation in the future. To examine these issues, we draw on the Survey of Sponsors of Registered Apprenticeship (Lerman, Eyster, and Chambers 2009), which provides nationally representative data on the characteristics and attitudes of registered apprenticeship sponsors. In addition, we use telephone interviews of more than 20 officials at community colleges, state offices, and apprenticeship programs.

Advantages of apprenticeship programs
Apprenticeship programs offer an array of advantages over pure postsecondary education programs (Halpern 2007; Lerman, Eyster, and Chambers 2009). Since apprenticeship openings depend on employer demand, mismatches between skills taught and supplied and skills demanded in the workplace are unusual. Apprenticeship provides workers with a full salary so that participants can earn while they acquire valued skills. Apprentices learn in the context of real work settings and attain not only occupational skills but other work-related skills, including communication, problem-solving, allocating resources, and dealing with supervisors and a diverse set of co-workers.

Apprenticeship is particularly appealing as a way of integrating minorities, especially minority young men, into rewarding careers. Having learning take place mostly on the job, making the tasks and classroom work highly relevant to their careers, and providing participants wages while they learn can give minorities increased confidence that their personal efforts and investment in skill development will pay. In addition, mastering a skill by completing an apprenticeship gives graduates a genuine sense of occupational identity and occupational pride. Apprenticeship offers a respected, portable certification. These advantages help explain why many countries have been working to expand their programs significantly.

At the same time, community colleges are quite uneven. Although these colleges serve many useful purposes, the majority of students entering community colleges fail to complete their programs—many get discouraged after taking only remedial courses. Moreover, community colleges lack the resources for effective counseling of students on an individual basis (Rosenbaum, Deil-Amen and Ann Person 2006).

Combining apprenticeship programs and community colleges
Can the benefits of apprenticeship training be incorporated into community college and other postsecondary settings? Collaboration between community colleges and apprenticeship programs makes sense for several reasons. Worker success in occupations requires that they gain not only content knowledge about their field but also other skills (including problem-solving) used in the context of the occupation as well as on other jobs. For many occupations, community colleges are well-positioned to provide the academic-based instruction but cannot deliver the necessary non-academic skills and occupational expertise. These require learning in the context of productive work and real operations, the type of learning that comes with apprenticeship training.
For community colleges, apprenticeships assure relevance for their students and allow students to document their abilities to perform in the workplace. In addition, they allow overcrowded and strained community colleges to offload some of their education and training to effective work-based learning under skilled supervisors. For apprenticeships, community colleges provide college credit and a college framework.

What barriers limit the interactions between apprenticeship programs and community colleges? Sponsors of apprenticeship—usually employers but often union-employer programs—often find that community colleges do not offer courses that are well-tailored to the needs of the apprentice. In addition, the content of the college courses is not always sufficiently specific, the equipment at the college is sometimes dated, and the courses and semester starting points are often not flexible and well-timed enough to meet employer needs. It may take too long for community colleges to develop new courses that are required as new programs or new technologies in existing programs arise.

However, there are many examples of collaboration. About one-third of all apprentices obtain their academic instruction from community or technical colleges. Some apprenticeship programs—for example, several sponsored by the Utility Workers of America—require apprentices to complete an AA degree along with their apprenticeship training. Some states, including Florida and Washington, provide tuition subsidies to community colleges for those in apprenticeship training. Community colleges often grant college credit for courses apprentices take as part of their related instruction. Many programs use community college instructors for courses held outside the school.

South Carolina offers a distinctive form of collaboration. Using a special grant from the legislature, the technical college system in South Carolina hosts the Apprenticeship Carolina initiative. Staff housed at the college system actively market apprenticeship and encourage employers to use community college and other resources for related courses. Other potential areas of collaboration are infrequent, including the granting of college credit for skills developed in apprenticeship programs and the use of community colleges as a base for recruiting potential apprenticeship sponsors.

In the five states contacted for this study, most community colleges have linkages to at least one apprenticeship program. Some states provide tuition waivers or subsidies for sponsors to use community colleges. In Washington, which has an extensive and mature apprenticeship system, the majority of sponsors use 20 of the state’s 36 community colleges for related instruction. One possible reason for the extensive use of community colleges is Washington’s incentive to sponsors that discounts tuition costs to apprentices by 50 percent. Most of the courses in Washington community colleges are in the construction trades, but others include subjects for child care and education, firefighting, utility, and even optician occupations.

Interviews with apprenticeship sponsors indicated varied attitudes about collaboration. One view is that, since apprenticeships already provide a sufficiently respected certification, apprentices have little interest in remaining in school long enough to complete an associate’s degree. On the other hand, some apprenticeship programs are successfully collaborating to insure that apprentices complete associate’s degrees. Industries as diverse as auto repair, maritime, and fire-fighting fields have developed curriculum and other standards relevant to link employer apprenticeship programs and community colleges (Cantor 1993).

What is the scope for expansion? The main obstacle is the relatively small number of apprenticeships. Although occupational certification and licensing is common in the
U.S., most achieve these certifications outside the apprenticeship system (Kleiner and Krueger 2009). More apprenticeships will lead to more collaboration as community colleges see opportunities for closer links with employers and jobs. Despite concerns about the decline of middle skill jobs in the U.S. (Holzer and Lerman 2009), estimates developed in the paper show that occupations that can effectively use apprenticeship training are expected to generate nearly 8 million job openings over the next decade. If the country used apprenticeship to produce about 780,000 fully skilled workers in these occupations per year and assuming an apprenticeship program runs for an average of 3.5 years, the stock of apprentices would reach about 2.7 million or almost 6 times the current level of registered apprenticeships.

One way to expand apprenticeships is to extend the same federal and state resources per student on behalf of apprentices. The federal government should be expanding budgets for marketing apprenticeship, providing an incremental subsidy to employers expanding their programs, and subsidizing portions of the tuition of apprentices taking community college courses. Another potentially fruitful approach is to develop standards to award college credit for expertise gained and mastered on the job. Some schools already offer such credits but the practice is spotty. The knowledge and capabilities apprentices attain are often of a highly advanced character and certainly deserving of college credit. Already, four-year colleges and universities offer credit to students for internships that involve far less documented expertise than apprenticeship. Were the practice of awarding systematized and widely practiced, more apprentices would be encouraged to complete degree programs, at least at the Associate’s level.

Expanding apprenticeship training through collaborations with community colleges will diversify the nation’s portfolio of training strategies and incorporate a wider variety of strategies that succeed in raising skills and earnings.

References


Apprentice work process knowledge enhancement in post-recession Ontario

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Summary: This paper discusses an approach to the expeditious restructuring of the work process knowledge elements of apprenticeship in the automotive manufacturing sector in the Canadian Province of Ontario. It reviews a potential strategy to be undertaken by the Council for Automotive Human Resources (CAHR) and Georgian College of Applied Arts and Technology to pilot the process. CAHR has recommended an approach, largely based on key elements of the United Kingdom’s apprentice program, as the appropriate model to emulate. Georgian College has developed a pilot approach to implementation based on an automotive seating product supply chain model.

Keywords: Automotive sector, comparative analysis, Canada

Introduction

The recession of the latter part of the current decade has had a highly negative impact on North America’s manufacturing sectors, particularly in the Province of Ontario, Canada. Ontario’s automotive-related manufacturing employment declined from a level of over 160,000 jobs in the first quarter of 2007 to slightly less than 80,000 jobs in the first quarter of 2010 according to the Ontario Manufacturing Council. Since then, the industry has recovered about half of those lost jobs, mostly within assembly plants.

The Council for Automotive Human Resources (CAHR), a Canadian, industry driven sector council devoted to workforce and skill development in the automotive manufacturing industry, undertook a study in 2010 to detail an alternative, parallel scheme for training technical apprentices in the mechanical, electrical and machining/tool & die trades that would address concerns raised by small and mid-sized manufacturing operations (less than 250 employees). A key condition for any proposed model was that it must fit within the current regulatory framework for recognized apprenticeships in Ontario.

Georgian College of Applied Arts and Technology, one of 24 in the Province of Ontario, undertook a comparative analysis to determine the appropriate apprenticeship delivery approach by which to pilot the CAHR model within the Ontario automotive manufacturing sector. This included intra-company, geographically, or supply chain based.

Overview of Industrial-based Apprenticeships in Ontario

Apprenticeships in Ontario are centrally administered by the Provincial Government’s Ministry of Training Colleges and Universities (MTCU). MTCU sets standards as to on-the-job (OTJ) work requirements and performance standards. MTCU establishes

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2 In 2012, MTCU will hand off the regulatory oversight of apprenticeship to a newly established College of Trades. This governing body will establish procedures and processes among all trades in Ontario, as to the attainment of provincially mandated standards.
the specific learning outcomes and curricula direction that are to be delivered by the province's recognized training delivery agents. Colleges are contracted by MTCU to provide the in-school portion of apprenticeship training. In-school completion is assessed through a series of examinations culminating in a final exam at the end of apprenticeship period leading to a “Certificate of Qualification”, in effect, the journeyperson’s license. While undertaking their OTJ training, apprentices function under the direction of a journeyperson licensed in the particular trade. It is this individual journeyperson who subjectively determines the attainment of the Provincially prescribed OTJ training standards through subjective observation. A logical enhancement of apprenticeship delivery would address the issue of improved OTJ assessment.

Small and mid-sized employers (SME), in the automotive sector employ proportionally fewer apprentices than larger (OEM, Tier 1) companies. They indicate a number of reasons including:

- cost (perceived and actual);
- complexity of training apprentices;
- complexity of the paperwork and administration;
- loss of productivity during in-school block release periods; and
- inflexibility in scheduling the in-school portion of the apprenticeship.

The CAHR research project was developed to address these issues and provide an alternative, and potentially more effective methodology to allow greater SME participation in apprenticeship training.

**Methodology**

The CAHR projects methodology included:

- broad secondary research activity covering apprenticeship practices in a number of jurisdictions, including Canada, the United States, the United Kingdom, Germany, France, Austria, New Zealand and Australia;
- primary research conducted in the United States, the United Kingdom and New Zealand;
- study tour and analysis of automotive and aerospace manufacturing operations and training facilities in the Northwest of England and North Wales;
- study and analysis of delivery model applications.

**Results**

A number of innovative practices are described in the study and would be integrated into the pilot. They include:

- adding flexibility to the in-school portion of apprenticeship, augmenting the existing OTJ portion of apprenticeship;
- introducing mentor training for journeypersons, conducting regular skills assessment for apprentices;
- transferring administration of apprentices to an external coordinating agency, and
- remaining compatible with the existing rules and regulations for apprenticeship in Ontario.

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Adding flexibility to the in-school portions of apprenticeship:

The norm for in-school training is block release, whereby apprentices from all employers attend college classes for a continuous period of eight weeks. Often, this system does not offer SMEs sufficient flexibility, since block release periods may be established without regard to the production environments of the employers. The proposed model advocates a flexible approach offering a number of different in-school delivery options, to be arranged and delivered by recognized training delivery agents.

Augmenting the existing OTJ training standards with additional structure and performance criteria for skills and sub-skills:

The proposed model embraces the current regulatory framework for apprenticeship delivery, but adds the element of demonstrated competency assessment, using standardized assessment tests in the workplace. The proposed model retains the final exam certification, and adds regular/quarterly independent OTJ skills testing throughout the apprenticeship.

Introducing mentor training for journeypersons:

Often, a journeyperson is asked to take on the training of an apprentice without the knowledge of how to most effectively develop skills in another person. The proposed model includes mandatory mentor training for journeypersons to ensure a consistent and proven approach to skills transfer.

Transferring a portion of the administrative burden:

Under the current system, individual employers and/or the apprentices are responsible for a large portion of the administrative requirements of apprenticeship. The proposed model would remove a large portion of the administration from employers by the establishment of an external coordinating agency. For the pilot project, it is proposed that this role be assumed by CAHR.

A rotational system of apprenticeship through an appropriate group of employers:

Small employers might not participate in apprenticeship delivery because their operations do not encompass the breadth of tasks necessary for an apprentice to learn the full scope of their trade. The proposed model provides for rotation among a group of participating employers, each offering part of the entire scope of necessary experience.

A model for a pilot project in Ontario

CAHR will provide the administrative support to the project. Additionally, the Apprenticeship Committee of CAHR's Board of Directors would provide oversight of the initiative. Georgian will provide the vocational in-school training. The model will use a rotational format of workplace knowledge acquisition among five employers within an automotive seating product supply chain. Eighteen industrial electrician apprentices, will be selected from the employers in the chain from OEM through tier 3 employers. Selection of the participants and their undertaking of the project in general would conform to provisions of collective agreements in place in unionized plants. The supply chain model has several advantages:

- The automotive seating product represents a typical “system-level” automotive product whereby the final seat-complete product is the culmination of a continuous flow of material, through a variety of processes and plants, normally delivered to the automobile assembly on a sequenced, just-in-time basis.
- Employers gain the advantage of collaborative troubleshooting expertise along the chain if process issues arise.
Employers within a homogeneous chain tend not to recruit employees within their chain, thus providing stability within the trade workforce.

Employers along the chain have many common objectives contingent of the expertise of their skilled trades employers, such as continuous quality improvement, cost efficiency and dependence on supplier expertise for product and process development; therefore the likelihood is high and they will participate in the pilot project.

A panel of technical advisors will be assembled consisting of members from each of the five employers who will develop specific competency-based assessments criteria relevant to OTJ training. Assessments will be undertaken by appropriate third party assessors much in the same way ISO-related quality systems are currently assessed within the chain.

In-school training will be more flexible with classes being offered on a basis agreed to by the employers, including either day release (1 day/week), semi-block (3 days/week) or full block (5 days/week).

The supply chain model accomplishes the initial objectives of CAHR’s research. It can be undertaken completely within the regulatory framework currently in place within the province and therefore can be done expeditiously. It does not disrupt the current employer/apprentice relationship in place within the Ontario automotive manufacturing environment. It addresses the lack of consistency in OTJ training among apprentices. It strengthens the viability of an entire product supply chain in terms of product quality, cost and acquired expertise. It decreases the administrative burden and work-place related issues associated with apprenticeship delivery among SME suppliers.

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CHAPTER II

LEARNING AND DEVELOPMENT
THEORIES AND MODELS
Learning at the workplace: Optimal learning environments

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Summary: Becoming an expert employee depends on the development of domain specific vocational competences. Knowledge, skills and attitudes are all necessary elements of the development of vocational competences. The development of these competences depends on individual, task and team related factors, the trainer as well as on the curriculum. The workplace has the potential to be a perfect learning environment and gets more attention in many western countries in the recent. But, working and the continuous execution of specific tasks is not guarantee for learning and the development of competences or that a novice becomes an expert. This paper makes a contribution to a better understanding of workplace learning and training, especially in initial vocational education and training.

Keywords: Workplace learning, initial vocational education and training, job design, trainer

Introduction

The workplace as a site for learning gets more attention in many western countries in the recent years. Workplace learning is an important factor to enable and sustain innovative processes in organizations. In an apprenticeship system, learning at the workplace is an important factor to train and educate young people and to give them a good start in their vocational career, but its potential is often not utilized (Maurer, Rauner, & Piening, 2009).

Vocational education and training on upper secondary level in Switzerland

In Switzerland most young people attend the upper secondary level educational setting that relies heavily on company-based workplace learning, also for occupations with high academic demands (Stalder & Nägele, 2011). Vocational schools support this process as they impart the theoretical and more academic elements of the vocation. Cross-company courses offer as a third learning place the opportunity to educate and train apprentices without any restraints coming from the needs of production or the order situation of a company (Wettstein & Gonon, 2009).

Characteristics of workplace learning

Apprenticeship is training on-the-job and highly context-dependent (Evans & Fuller, 2006), as it is learning in a real setting, doing real work. In initial vocational education and training in Switzerland the context-dependence is mediated through a curriculum that is jointly developed for all three learning places (BBT, 2007).

The training in the company has to establish the transfer from theory to practice. But, this cannot be achieved by simply participating in work related activities. Jobs and tasks need to be designed so that learning can emerge.
Determinants of favorable workplace learning

We will discuss five aspects: the individual, job design, the role of the trainer, the team and the curriculum. Cognitive processes regulate and control the execution of any task in a work context and learning is an active and constructive process (Steiner, 2007; Hacker, 2005, 2003). The workplace is only an optimal learning place if individual and shared cognitive representations and mental models are developed with effects on the action regulation.

In our study, we looked at specific individual characteristics and personality variables with an impact on learning processes (Gustavsson, 2007; Bergmann, 2000). We included self-efficacy as a predictor of interests, motivation and goals and performance, self-esteem as correlates of academic achievement, persistence (Stalder, Meyer & Hupka-Brunner, 2011), or cognitive flexibility, for example.

Task characteristics were assessed through: task variability, autonomy, task identity, challenging work and feedback (Hackman & Oldham, 1975), with a special focus on the possibility to work on complete tasks, including preparatory, executive and evaluative components. These factors are related to the development of competences (Dehnbostel et al., 2007; Lantz & Brav, 2007; Hacker, 2005; Bergmann, 2000).

The role of the trainer is manifold: he is an instructor, coach, guide, mentor, confidant and boss. He has the socially and pedagogically responsible. He has to introduce the apprentice into the workplace, he has to steer the learning process and assign task to the apprentice, induce reflection, and positively handle errors. But the trainer is also a co-worker and an expert in his occupation. It is also important that the trainer has high task related demands. The trainer becomes an important reference person and trust is an essential element of relationship between the trainer and the apprentice. Trust is an important element of any mentoring relationship (Rhodes et al., 2005).

The team and colleagues at work are a system of reference to evaluate the own skills and attitudes (Coetzer, 2007).

The curriculum assigns specific educational and training tasks to the three learning places (company, school, cross-company courses). The learning objectives specified in the curriculum are binding for the company.

Methods and research design

In cooperation with the professional organization Viscom (www.viscom.ch) all apprentices from the 2nd and 3rd year and their trainers in Polygrafie in the German part of Switzerland were asked to fill in an online questionnaire during a cross-company course or at the vocational school. It is almost a complete sample of all apprentices in the 2nd and 3rd year of their training (N = 414, full sample approx. 462).

The learning and training conditions were assessed through individual characteristics of the learner, task characteristics, trainer competences and characteristics of the team. We relied on (partly adapted) measures developed and used in other studies. For example TREE the longitudinal study on post-compulsory educational and labor market pathways (Stalder et al., 2011), a study on job design and its influence on learning processes (Scharnhorst, Petrini, Schmied & Hug, 2007), or learning cultures (Friebe, 2005). We assessed the competences of the apprentices based on the learning contents of the curriculum.
Results

Apprentices in Polygrafie start their apprenticeship on upper secondary level at the age of 17 to 18 years, one or two years after the end of their compulsory schooling. Many of these apprentices left school with good to very good marks. This would allow them to enter the academic track on upper secondary, leading to the academic mature. We find that almost 40% of these apprentices attend the professional mature, either during or directly after the apprenticeship in order to gain university access.

Although many of these adolescents could go into general education (academic baccalaureate) they prefer to continue their training and education in an apprenticeship. They want to become independent from the parents; they want to be involved in the real adult world; they are fed up with a school type that primarily relies on academic contents and learning by heart without an immediate impact, for example.

Overall, we found high correlations of persistence and cognitive flexibility as individual factors, task variability, pedagogical competences of the trainer and good colleagues with the apprentices’ satisfaction with their workplace and their competences.

Training conditions vary largely among the companies. Some apprentices reported to be underemployed. We see that overall high satisfaction with the training is highly correlated with the satisfaction with the trainer. The role of the trainer is manifold: he is an instructor, coach, guide, mentor, confidant and boss. It is not only his teaching and didactics that is important. It is also his good relationship with the apprentice and trust. Trust is correlated with the pedagogical competences of the trainer, his high job and task related expectations and his positive error handling. For an apprentice, trust is a secure base for his exploration of the working world.

The transfer of knowledge and skills between the learning places (school, company) is far from being optimal. In general the trainers rate the transfers between the learning places higher than the apprentices.

We see the important role of the trainer. And we see a potential to further train the trainer for a better workplace training and education of the apprentices. Trust is important. But trust seems to root in good work related instructional practices of the trainer. It starts with the work allocation, including adequate instructional techniques, a honest and direct feedback as well as a positive handling of errors.

References


Enhancing situated learning: Apprenticeship in learning departments

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Summary: In the Netherlands, as in many other countries, workplace learning has been a characteristic of courses in secondary vocational education. There are two main issues in dispute: the quality of workplace learning (content, guidance, assessment) and the quality of the connection between workplace and school-based learning, despite attempts to make VET more practice oriented and to improve connections between school and work. In the paper new theoretical approaches on workplace learning throw some light on developments in Dutch apprenticeships and vice versa, by analysing the example of the learning department.

Keywords: Learning departments, cooperative learning

Introduction

Situated workplace learning occurs mainly through processes of participation in communities of practice. But there are no ‘automatic’ learning processes. Actual learning depends of conditions of the workplace, both with regard to work content, workplace culture as well as guidance by colleagues, managers or trainers. It is often not highly conscious, but haphazard and influenced by chance. Often, it is not guided by learning objectives, but by (developmental) work objectives. Learning takes place during performing activities and participating in practice. So, learning possibilities depend largely on the structures, norms, values and practices within workplaces. But individual agency always shapes what constitutes, through workplace ‘affordance’, an invitation to participate in learning.

This is even true in organised workplace learning in apprenticeships. Research shows that many practice coaches are unaware of content and subjects taught at school. Or things taught at school are experienced as irrelevant for solving occupational problems. Deep learning by apprentices is difficult to realise. Many school teachers do not know enough about vocational practice to help understand the links. There is often little preparation for or effective use of workplace learning experiences in school settings. Many ‘natural’ workplaces show a lack of learning opportunities and guidance. That is why, recently, several new apprenticeship models have been added to the traditional model, combining school and workplace learning. These experiments are aiming for quality improvement and connectivity of work-based learning by establishing quality criteria for work based learning places, by enriching workplace learning and by designing curricula which integrate learning places as well as learning experiences.

The paper elaborates one interesting example: the learning department. The learning department is a form of work placement involving a group of 6-8 apprentices within a single department of an organization. Apprentices run the department. They engage in collaborative learning, involving all aspects (both subject knowledge and work process knowledge) of the tasks in the department. The regional vocational college and the labour organisation are together responsible for quality, content and
guidance of workplace learning. On the learning department students are coached by a teacher from school, by a workplace coach and by each other (often students come from several levels and from higher education). Part of the theory lessons are given by teachers of the regional college in the company. As teachers and coaches work together there can – at least in principle – be more alignment in designing developmental tasks than in a regular apprenticeship.

Learning departments are a new development in the Netherlands, contrary to i.e. Germany, where there is a longer tradition. In recent years learning departments have been developed in hospitals, care organisations and shops. Some 150 healthcare institutions have arranged such a learning department, in cooperation with the regional colleges.

Methodology
The paper is reporting earlier evaluation research and case studies, involving data from teachers, school, company and students. Case studies are carried out in two regional VET colleges and a number of health care institutions. The case studies are carried out in the context of a larger research project on effective ways of organising workplace learning, in which schools for VET and HPE (higher professional education) together with academic researchers investigate the impact of different work place learning schemes.

The case studies are examples of action research. Apart from interviews with all stakeholders involved, there has been established a community of learning, in which key actors from the school, the institution as well as a researcher was participating. The proceedings of this meetings as well as documents and evaluative interviews were analysed, using a specifically designed analytical scheme, consisting of three main parts: characteristics of the learning site; analysis of the organisation and occurrence of learning processes in the apprenticeship (content assignments; workplace culture; guidance) as well as organisational aspects of this school-company collaboration (co-makership).

Results
In a learning department school and workplace work together to create high quality learning places as well as more close connections between theory and workplace learning. The main reason for schools and businesses for such cooperation is the shortage of good quality apprenticeship places. There are too few places available, both from the perspective of the growing demand in prevocational, vocational and professional education, but also from the perspective of future needs of companies. And many places lack quality. So a second important objective for schools and businesses is to increase the quality of training by better connecting theory and practice.

Results show the learning department is a promising form of organizing and strengthening situated learning. The experiences with learning departments show that the professionals at the workplace become more closely involved in training. They can deal more efficiently with their own guidance capacity. Because more ‘hands’ are present, they can do more for the clients. In the learning department care institutions and school work closer together, and there cooperation improves. A structural, long-term cooperation between school and institution is established. Collaborative learning in real professional practice gets more space and constitutes one of the key points for a learning department. The connection and coherence between theory and practice is encouraged. Both teachers and workplace coaches are more satisfied about
connecting theory and practice in learning departments than in standard individual internships. A part theoretical schooling is in the learning department itself. School teachers visit apprentices in the workplace and support, upon request, the workplace coaches.

But this is not accomplished easily or without setbacks. In the learning department close cooperation between school and workplace was realized, but there were differences with regard to objectives. The care institution wants good students who can take responsibility as a team to run a ward where they have to take care of group of elderly people. So it would like students, motivated for the activities they’re going to do. They were expected to have basic knowledge of the target group. They must be socioemotionally strong and mature enough to do the job. The school initially saw the learning department as a protected learning environment, because of the more intensive guidance offered by school and the workplace. So there were complaints about the students selected for the learning department.

Teachers at school recruited and prepared the students. There were some bottlenecks here, because some teachers had doubts about the demands made by the care institution. The work goes on 24/7. Although because of their age students were not expected to work at night, they were expected to work in the weekends and (short) holidays. Some students were not willing to do this and were backed up by some teachers. This diminished the number of students wanting to work in the learning department, so sometimes it was not possible to ‘fill’ a whole team.

The school guides students in the learning section more intensive than in a regular internship. Theory lessons by teachers of the regional college are provided in the company. Teachers are supposed to regularly visit the workplace. Although both the institution and the school (including the teachers involved) were enthusiastic about this arrangement, it turned out to be difficult for schools to have teachers present at the workplace. Lesson schedules were sometimes too inflexible to adapt to workplace needs. Because the institution also delivered extra guidance on the job, compared to regular apprenticeships, sometimes teachers were unclear about their role in the workplace. Also, communication between apprentices and other teachers at the regional vocational college remains a problem.

Nevertheless, the learning department is seen by apprentices, teachers and workplace coaches as a valuable, ‘expansive’ way of organising and strengthening workplace learning. The students who choose to work and learn in the learning department evaluate it mostly very positively. Apprentices run a whole ward, under supervision of a trained nurse as workplace coach (‘with the hands on her back’, something she had to learn). The well-being of patients required empathy and learning to cope with the specific needs of the target group of patients. There are many opportunities for cooperation between students of different levels, i.e. in work meetings and work transfer to the next shift. The students must themselves organize cooperation and division of labour to do the team job.

Research shows that through the collaborative skills-based learning in a powerful learning climate apprentices show better learning outcomes than apprentices in a regular apprenticeships. Learning departments are based on the idea that apprentices learn more if they can learn autonomously and independently, can ‘own’ their learning. Many apprentices in regular settings indicate a passive attitude to training, even if they like to learn the job in practice. They do not think very much about what they learn or about what they want to achieve in the future. Apprentices who have been in a learning department are more motivated for what they learn and have more plans for the future. Their role in the team is seen as ‘real’ and contributes to social skills as well as a stronger sense of self control. Also these students feel
more responsible, as they feel themselves taken seriously by both their student and professional colleagues as well as the institution (and the clients!).

Evaluation of learning outcomes shows that apprentices do develop work process knowledge: they get a higher degree of self-direction and autonomy. For the participants learning departments have a clear added value because they fit in with the staff and they feel more responsible. They use the opportunity to create learning plans and organize them. The apprentices benefit from the realistic working conditions of the learning department. They show high learning efficiency, theory and practice are well integrated. The motivation of the student is magnified by the intensive guidance and by enhancing responsibility and collegiality. The work itself is enhancing motivation because they experience competence: they can do the job. They learn to organise something and to take initiative. Apprentices develop collaborative skills. The intensive support in a learning department also affects motivation of the apprentices. Both attributes of a learning department (collegiality, guidance) ensure that the motivation to learn expands and that apprentices start thinking more about what their future career wishes and opportunities, sometimes resulting in a decision to go on studying for a higher level qualification. Also, there is a clear growth in learning abilities of apprentices. Apprentices learn better how to plan, how to cooperate and they develop a larger problem solving ability.

Learning outcomes with regard to domain knowledge seem more ambiguous. One main reason for this seems to be a lack of appropriate didactics aiming for competency-based and integrative acquisition of knowledge.

References
How to convert individual skill operator to integrated task solver: 

Teaching research on action-oriented learning for secondary vocational school students studying Basics of Computer Application

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Summary: Vocational education aims at developing students' comprehensive vocational competence in situated learning by developmental tasks reflecting the work process systematization. This paper confirms action-oriented teaching model based on studying the gap between teaching goals of Basics of Computer Application in secondary vocational schools and the status quo. The following teaching case is from students majoring in computer learning “Application of PowerPoint”. Based on major features, a developmental task which aims at promoting students' comprehensive vocational competence is designed; relative learning situation is created according to real work situation; teaching contents are supplemented and learning resources such as studying pages are prepared. Students can experience complete work process by six learning stages of “Informing, Planning, Deciding, Realizing, Controlling, and Evaluating” in order that they can be converted from individual skill operators to integrated task solvers.

Keywords: Action-oriented teaching, comprehensive vocational competence, developmental tasks, situated learning

The background of the project

Vocational education should be employment-oriented and competence-based. To develop students' comprehensive vocational competence is an essential goal of vocational education. Nowadays, Basics of Computer Application is a basic course for secondary vocational school students. The goal of the course is to develop students' comprehensive vocational competence including professional competence, methodological competence and social competence.

There are two steps in the current widespread used teaching model in this course. First, teachers design the simple task according to section order. Then teachers demonstrate how to fix it and ask students to copy it. This model aims at the single operation skill, which emphasizes students' hands rather than their brains, and neglects the competence such as solving the complex problem, obtaining the information, drawing up a plan, making a decision, controlling the quality and evaluating. Action-oriented teaching model aims at cultivating students' comprehensive vocational competence, so it should be applied in Basics of Computer Application course.

Presentation of the project

The following is taking “Application of PowerPoint” as an example to illustrate how to use the action-oriented teaching model in the course.

Set the teaching objective according to the requirements of comprehensive vocational competence
“Application of PowerPoint” is the last unit of Basics of Computer Application. According to the course goal, the objective of the unit is set to be that students can make a product introduction by PPT, which means converting students from individual PPT operators to integrated task solvers. The objective of the unit can be expressed specifically as following: After completing the learning task of the unit, students should be able to (1) read task book independently; understand the task requirements and obtain relative information;(2)make an overall plan and design the PPT independently or cooperatively;(3) work together to modify and improve everyone’s design scheme;(4) make the PPT independently or cooperatively according to the design scheme;(5) rehearse the speeches cooperatively according to task requirements and evaluation standards; correct problem and refine commentary;(6) introduce the products by PPT in public with cooperation; conduct self-evaluation and mutual evaluation justly.

The teaching design of the unit reflects the action-oriented teaching idea in many ways according to its objective. Its characteristic is learning by doing.

Create the learning situation according to the characteristics of comprehensive vocational activities
Based on the principle of “the content of learning is to work and realize learning by working” (Zhiqun Zhao 2009), combining with the characteristics of computer application course, the learning situation is designed as making computer products introduction by PPT. Developmental task is described as following:

The Educational Equipment Center opens tender for purchasing computers. You are the sales-staff of a brand computer agency company. You take on the task of making a PPT and introducing your products to clients with the purpose of winning the bidding.

Arrange the teaching content according to the requirements of teaching objective
Combined with the PPT practical application in real work, the unit converts only learning computer knowledge and skills into cultivating students’ comprehensive vocational competence. Accordingly, teacher supplements teaching contents such as PPT categories, PPT basic structure, colours matching skills and presentation skills.

Prepare the learning resources according to learner-centered characteristics
Based on the learner-centered idea, teacher prepares the teaching resources such as studying pages, PPT examples, websites, BLOG, teaching courseware, etc.

Design the teaching process according to the integrity of action process
In this unit, students will learn how to work and experience the complete action process of “Informing, Planning, Deciding, Realizing, Controlling and Evaluating”. This unit relies mainly on the students’ learning in teamwork and individual work with teacher’s assistance and action-oriented learning model throughout the whole teaching process. The teaching process includes six stages as following:

- Informing: Teacher creates relative learning situation to present learning task, and instructs students how to obtain the information related to the task. Students understand the requirements of the task. Under the direction of the guiding text, students look up the necessary information such as PPT categories, PPT basic structure, designing principles of PPT, the artistic layout, common features of excellent work, how to introduce the product, evaluation standards of a product presentation. Guiding texts and brainstorming are mainly used at this stage.

- Planning: The team leader organizes team-discussion to determine the speech subject, namely, the brand of computer. They make team-work plan and task allocation together. The members design PPT independently according to the
division of work: draw the mind map and determine the PPT content; convert the mind map into the frame map; make an overall plan and design PPT script; write the commentary. Group discussion, mind map and guiding text method are mainly used at this stage.

Deciding: Students discuss modification of design plan in teamwork and forge consensus with the teacher’s suggestion. Group discussion is mainly used at this stage.

Realizing: Students carry out the task. They make PPT according to the approved design plan, which is called learning by doing. Guiding text method, the “Task Driven” teaching method and instructing are mainly used at this stage.

Controlling: The team leader organizes team members to practice speech with the PPT presentation and correct problems according to task requirements as well as evaluation standards. Then they integrate every member’s PPT into the complete introduction of the brand computer. Group discussion is mainly used at this stage.

Evaluating: Students demonstrate the computer products by PPT in class to participate in the bid in team. They also evaluate their work by themselves and mutually. Then teacher evaluates the work of the individual and the team, directing students to learn from each other in order to improve their comprehensive competence. Group discussion is mainly used again at this stage.

Results

This unit provides students with a learning opportunity to experience a complete work process. Therefore,

The students’ learning interest has increased

We did a survey of students about “Are you interested in PPT learning?” respectively before and after learning “Application of PPT”. The survey results show that the number of the students who are very interested has increased by 37.7%. Those who are generally interested has decreased by 33.3%, and who are not interested has decreased to 0 (see Figure 1). In a word, the students’ learning interest has increased obviously due to the action-oriented teaching.

<table>
<thead>
<tr>
<th></th>
<th>Very interested</th>
<th>Generally interested</th>
<th>Not interested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before learning</td>
<td>55.6%</td>
<td>40.0%</td>
<td>4.4%</td>
</tr>
<tr>
<td>After learning</td>
<td>93.3%</td>
<td>6.7%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

Figure 1: Survey results

The students’ comprehensive vocational competence has been improved

Students can choose the subject of learning task, make plan, design and put it into practice on their own, which improves students’ creativity and autonomy. Students have improved learning competence by collecting information, learned the working methods by making a plan, promoted the computer professional competence and learned the learning methods by implementing the plan. They also have learned how to listen, communicate, cooperate with each other, self-assess and peer-assess by designing PPT and practicing the speech. In a word, students have improved their comprehensive vocational competence through completing the integrated task by brains and hands. After this unit, the survey about “learning gains of the unit of
Application PPT” shows that 95.5% students have gained a lot, only 4.5% students have gained a little, and 0% students have gained nothing.

**Tentative conclusion**
Teacher should improve the teaching ability, and establish the action-oriented teaching idea based on cultivating students’ comprehensive vocational competence.

*Teach “course” and not teach “textbook”*
Teaching should be based on the course goals, not the textbook. Teachers had better adjust the teaching content according to the need of the task instead of insisting on the systematization of teaching contents. In addition, teachers need to supplement the teaching contents based on the course goals.

*Design the developmental tasks meticulously*
Design the learning task from easy to difficult gradually: With the learning process of the course, according to the cognitive law of students, teachers had better design the learning tasks step by step, which is from the “closed task” to “open task”, then to the “design-oriented task”. With teachers’ gradual “let go”, students’ ability to complete the task will be gradually strengthened, and their comprehensive vocational competence will be gradually improved.

Design the integrated task based on students’ majors: Teachers should design integrated task which has practical application value based on students’ majors. Taking the Flowers major as an example, “Application of PPT” unit can be designed as making flower arrangement products introduction by PPT. As a result, students not only love their own majors, but also improve the comprehensive application competence of computer in their professional field.

*Select the appropriate teaching methods*
Action-oriented teaching does not completely exclude the traditional teaching methods (Zhiqun Zhao 2009). Teaching needs teaching methods, but the methods are not fixed. A teaching method is called a good method as long as it is good for improving students’ comprehensive vocational competence. Teachers should select the appropriate teaching method according to different factors such as students’ situation, teaching objectives and teaching contents to optimize their own teaching. In short, our goal is to cultivate students’ comprehensive vocational competence.

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Learning practical workplace-based judgment through using cognitive apprenticeship and occupational identity formation models

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Summary: This paper provides examples from applied research studies of apprentices learning baking and welding towards utilising connections between conceptualisations of vocational identity formation and appropriate methods of feedback supported by the cognitive apprenticeship model. Learning to become trade workers, requires consolidation and application of ‘judgement’. Aspects of learning judgement may be enhanced by receiving and acting on appropriate feedback.

Keywords: Cognitive apprenticeship, feedback, workplace-based learning, occupational identity formation

Introduction

Through a longitudinal case study conducted with 13 apprentice bakers, occupational identity formation is explained using the metaphors of ‘belonging to a workplace’, ‘becoming a baker’ and ‘being a baker’ (Chan, 2008). In attaining bakers’ identity, skill and knowledge attainment accompanied by dispositional transformations may comprise aspects of ‘learning as becoming’ (Hodkinson, Biesta & James, 2008). Commencing initial work as an apprentice entails aspects of ‘belonging to a workplace’ by which identity transformation is supported by the building of workplace-based relationships and the learning of new craft skills and language (Chan, 2009). In becoming a baker, adoption of the identity of a baker, assists not only with the acquisition of tacit skills and knowledge (Gamble, 2001; Sennett, 2008); but also workplace inter-subjective understanding (Hutchins & Klausen, 1998) which characterises distinct or specialised workplace practice-based communities (Gherardi, 2010).

Concepts of occupational identity formation, learning as becoming and learning practical judgement

One of the important aspects of becoming a trade worker is the application of ‘know-how’ or tacit knowledge, to make practical workplace-based judgements (Hager, 1999). Consequently, learning practical judgement is encompassed in the term ‘learning as becoming’ (Hodkinson et al., 2008). There are various models of workplace learning based on Vygotsky-inspired socio-cultural theories of learning (Penuel & Wertsch, 1995). Vygotsky proposes learning to require human interaction, with feedback between teacher and learner as important contributors to the learning process. However, students and especially novice learners, are often not able to access teacher feedback to improve learning as they do not possess critical background knowledge or are unfamiliar with the language of feedback (Sadler, 2009). Yet, feedback is one of the most important contributors to student learning (Hattie, 2009).
Using cognitive apprenticeship model to improve feedback and learning of practical judgement

One approach to assist novices with attaining skills and knowledge, including aspects of tacit knowledge, is suggested by the cognitive apprenticeship model (Collins, Brown & Newman, 1989). Each cognitive apprenticeship model stage/step, when supported by good teaching and provision of relevant feedback (Hattie & Timperley, 2007), leads to learning being scaffolded through coaching and modelling towards eventual ability to articulate, reflect, explore and extend skills and concepts. Combining precepts of cognitive apprentices with recommendations on using appropriate feedback in the form of feed up, feedback and feed forward processes (Hattie & Timperley, 2007) enhances learning opportunities for learning trade based skills. Specifically, bringing together the stages of cognitive apprenticeship as a form of 'making thinking visible' and guidelines for effective feedback provides for the contents of feedback to be made more accessible to novice learners.

Findings from teaching and learning welding

As an example, the findings from a multimodal study of welding students are used to illustrate how cognitive apprenticeship model stages / steps may be enhanced by providing students, tutorials on effective feedback techniques, before peer-learning based workshop activities were undertaken. In Table 1, two students, Bill and Steve, discuss the dip transfer process. Bill is welding and Steve is watching and commenting. The conversation was collected six weeks into an 18 week full-time introductory welding course to prepare students for entry level employment within the engineering trades.

<table>
<thead>
<tr>
<th>Conversation</th>
<th>Feedback</th>
<th>Cognitive apprenticeship steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bill - That’s a decent amount of spattering then, hey.</td>
<td>Feed up</td>
<td>Here, Bill is articulating the welding action.</td>
</tr>
<tr>
<td>Steve- Yeah. That’s it.</td>
<td>Feed up</td>
<td>Both Bill and Steve are checking on whether the criteria for conducting a good weld are met. Bill models good welding.</td>
</tr>
<tr>
<td>Bill- I am watching, I am watching the um, the weld pool burn in, as I am tidying it along and I am going quite slow.</td>
<td>Feed up</td>
<td>Steve now coaches by helping Bill to check on his travel angle.</td>
</tr>
<tr>
<td>Steve- Do you get much of an angle on that, the travel angle?</td>
<td>Feedback</td>
<td></td>
</tr>
<tr>
<td>Bill - It’s going like that.</td>
<td>Feed up</td>
<td>Bill acknowledges the coaching effort.</td>
</tr>
<tr>
<td>Steve - Oh yeah.</td>
<td>Feedback</td>
<td></td>
</tr>
<tr>
<td>Bill - I am putting it to the side a bit but also I am getting my torch a lot closer than you.</td>
<td>Feedback</td>
<td>Here, Bill attempts to help scaffold Steve towards improving his own practice</td>
</tr>
<tr>
<td>Steve - Yeah.</td>
<td>Feedback</td>
<td></td>
</tr>
<tr>
<td>Bill- So I think, with the dip transfer, that’s the key, it’s getting the torch a lot closer.</td>
<td>Feed forward</td>
<td>Bill reflects on his practice and offers an explanation of how dip transfer is different. Bill offers feed forward on how to improve practice.</td>
</tr>
<tr>
<td>Steve - You can see it as well, hey, like this.</td>
<td>Feed up</td>
<td></td>
</tr>
<tr>
<td>Bill- Yeah it’s got a different sound to it too.</td>
<td>Feed forward</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Analysis of feedback
Discussion
The example provided in the table above, is from a project to improve the learning outcomes for novice welders. Peer learning was introduced as an intervention that could obviate the independent nature of learning welding within individual welding booths. As novices, students' ‘belonging to a workplace’ phase was compromised by their initial inexperience and lack of background knowledge of welding practice. The opportunity for pairs of students to work together on welding exercises provided opportunities for novices to learn a range of approaches to welding and to assimilate a broader spectrum of the nuances exhibited during welding practice.

Students were encouraged to provide feed up (is the task or process undertaken meeting the learning outcome); feedback (how is the task or process going?) and feed forward (what can be done to improve the task or process?). As detailed in Table 1, stages or steps in the cognitive apprenticeship model were also evidenced. The feedback cycle, encouraged the student to firstly reflect on whether the process was undertaken correctly through feed up.

A modelling/coaching process then followed as the students articulated the process, assisted by feedback loops. Then the need to undertake feed forward, encouraged the students to reflect on and explain the process, leading to improved practice at the next iteration of the task.

Another important aspect from the above excerpt in Table 1 is the ease with which Bill and Steve used welding terms (i.e., dip transfer, weld pool, burn in, travel angle). Over the first month of the course, students have learnt how to use these terms in the appropriate context through repeated use of these terms by the tutor and then students. The excerpt above provides good examples of aspects of situated learning (de Saint-Georges & Filliettaz, 2008), the ‘belonging to a workplace’ stage of becoming a trades worker (Chan, 2009) and the adoption of specific inter-subjective understanding (Hutchins & Klausen, 1998).

In particular, both students have begun to form shared understandings of welding tasks. Through forming inter-subjective understanding or a shared vocabulary and perspective learnt through engagement with welding practice, both Bill and Steve are beginning to learn the social norms and cultural practices (Gherardi, 2010) of welding and becoming welders (Hodkinson, Biesta & James, 2008).

Conclusion
A method of enhancing student learning through the introduction of effective peer feedback techniques was studied. Analysis of peer group conversations over the course of a full-time welding course indicates peer groups to be using effective peer feedback strategies.

In turn, welding skill acquisition was accelerated. Further investigation is planned to explore the actual effectiveness of peer learning in vocational learning settings. In particular, to find out what actual aspects enhance peer learning and under what conditions peer learning may be most effective.

References


The importance of the psychological contract for effective learning in apprenticeships

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Summary: This paper looks at apprenticeship learning and training from a new standpoint – the psychological contract. The notion of the psychological contract is commonly used in the human resource management field to understand the nature of employment relationships. It has not previously been applied to apprenticeships in any systematic manner. This paper reports on a research project that applied a pre-existing instrument to apprentices and employers and also included qualitative case studies in nine companies.

Keywords: Apprenticeships, learning, obligations, employers

Introduction

The psychological contract consists of the perceived mutual obligations between employees and employers (Rousseau, 1990). Employees and employers alike form expectations about the employment relationship that lead them to believe that certain actions will be reciprocated. When an employee perceives a discrepancy between what he or she believes was promised by the organisation and what has in fact been received, the employee views this as the organisation’s failure to meet the terms of the psychological contract and a contract ‘breach’ occurs (Turnley & Feldman, 1999). The existence of a breach loosens the employee’s ties to the organisation and can lead to the employee leaving, or at least to withdrawal of goodwill. Similarly if an employee does not ‘deliver’ what the employer expects, particular actions follow.

In apprenticeships, the psychological contract involves not only the apprentice and employer but also a third party – the training provider. In Australia, there is sometimes a fourth party – the Group Training Organisation (GTO), which for many apprentices acts as their formal employer while ‘leasing’ them to ‘host employers’; in addition, Australian Apprenticeship Centres, which broker contracts between employer and apprentice, have an influence (Smith, 2010). In Australia the apprenticeship system also includes ‘traineeships’. These are apprentice-like arrangements usually in ‘newer’ or service industries, and are much shorter than apprenticeships, which are generally confined to craft and manufacturing occupations and take 3-4 years to complete. Traineeships are less likely than apprenticeships to involve off-the-job training at a training provider, but in all cases, a training provider must oversee the training and award the associated qualification.

While Symons & Simons (2000), for example, suggest that clearer expectations – on both sides – of what is expected in an apprenticeship would help to increase satisfaction and reduce attrition, expectations have not previously been researched in a systematic manner. The psychological contract enables such an examination to take place. In apprenticeships the expectations about learning and training in the employment relationship might be expected to be greater than in ‘normal’ employment. For effective learning to take place in apprenticeships, all parties need to be committed to the development of the apprentice; but equally all parties need to share similar expectations about what training and learning is to be expected.
Research method
A random sample of employers and apprentices/trainees in two States, taken from State Training Authority databases, were surveyed to examine their views about the obligations of the other party in apprenticeships and whether those obligations had been met. We adapted an Australian measure developed by Hutton & Cummins (1997). Respondents (employers and apprentices/trainees alike) were asked about the importance of 12 items about employer obligations and 16 about employee obligations, and the extent to which each was met. A training obligations measure, with 11 items, was developed especially for this project (although the employer obligations measure included one generic item about training).

In addition, nine company case studies were undertaken. We sought to interview in each case at least two senior managers, a supervisor, and at least two apprentices and/or trainees. In total interviews were carried out with 67 participants across the nine case study sites; 31 were with apprentices/trainees. These case studies covered a range of industries and included two Group Training Organisations (GTOs); the latter case studies each included visits to two host employers as well as the GTOs themselves. The case studies examined the views of the stakeholders about other parties’ expectations and provided the chance to examine the reasons for expectations in different contexts. This paper focuses primarily on the findings of the research about the apprentices’ training and learning and how learning was affected by the fulfillment or breach of the psychological contract.

Main findings from the survey and the case studies

Surveys:
Survey findings indicated that employers and apprentices/trainees held similar perceptions about the psychological contract in relation to training and learning. Both parties agreed that training (‘provide adequate training for the job’) was the most important employment obligation that employers should fulfil. Within the specific training obligations measure, there was also general agreement across groups about the obligations considered most or least important and about the extent to which the obligations were met. Group differences in ratings were calculated using the independent samples t-test statistic, with an alpha level set at .05. Similarly, opportunities for learning and opportunities to apply what is learnt were consistently rated as two of the most important training obligations. Training obligations regarding assessment, such as assessment not too hard/easy were generally not considered to be important by the various parties.

When we look at the extent to which obligations were perceived to have been met, we find that there was a significant difference between employers and apprentices/trainees in their perceptions of how far the employment obligation ‘provide adequate training for the job’ was met. It then becomes important to look at the questions specifically about training. The most significant differences between employers and apprentices/trainees in their perceptions of how well the obligations had been met (in descending order of significance) were as follows:
- Specific time for training
- Opportunity to apply what is learned
- Exposure to difference processes/experiences
- Range of training methods
- Opportunity to keep learning

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It needs to be noted that in these questions we did not specify who was responsible for each item. So any deficiencies identified could be the ‘fault’ of the employer, the training provider, another party or a combination of more than one party. Overall, though, it should be said that apprentices/trainees perceived that employers met training obligations well, with mean ratings on an 11-point scale being in excess of 7.5. Trainees were generally less satisfied than apprentices; the most satisfied trainees were those employed by GTOs. By industry, retail and hospitality apprentices/trainees were the most satisfied with their training; this industry group also had the highest expectations, so these results were not the consequence of low expectations being met. By age, those 25 plus were less satisfied than the younger age group with the extent to which their training and employment expectations had been met; to some extent this may be explained by the fact that those above 45 in particular had the highest expectations.

Case studies:

The case study data indicated that training and learning were significant features of the psychological contract and that the concept of ‘learning’ within the framework of the fulfilment or breach of the psychological contract was multifaceted. The apprentices and trainees engaged in a range of different learning. They learnt socially about the dynamics, culture and ethos of the workplace and the explicit and implicit expectations of their employers, co-workers and other parties to the psychological contract as shown in the diagram above. Cognitively they learnt the skills and competencies of their particular trade or industry. Emotionally they learnt to cope with new relationships, with new patterns of living and with the disciplines imposed by the role of novice and learner in a workplace. These different forms of learning were all enacted in their attitudes, feelings and actions during the period of their apprenticeship or traineeship. This learning both strongly affected, and was affected by, the fulfilment or breach of the psychological contract.

In all cases there were a number of core promises that remained consistent across apprenticeships and traineeships and across all parties to the psychological contract. These core promises were also consistent across industry areas. Participants explicitly discussed a number of these core promises. In all cases the provision of appropriate, relevant and good quality training formed a large part of the psychological contract, and was regarded as central to its effective operation. This was the case in both on the job and off the job contexts. It was important that the training provided by the workplace was supervised, well planned and monitored by the workplace supervisor or, in the case of the GTOs, by the Training Manager and the Field Officers and assessors. Both the apprentices and the trainees needed to have a variety of experiences and be exposed to a range of work opportunities.

While the survey had not included items related to the apprentice/trainee obligations with regard to training and learning, through the case studies we found that the obligations agreed on by the parties were (in order of importance): ‘take training seriously and complete assigned work in a timely way’, ‘demonstrate a willingness to learn’ and ‘apply learning in the workplace’.

There were thus a number of reciprocal ‘promises’ between the managers of the businesses in the case studies, and the apprentices and trainees. The provision of the appropriate, relevant and good quality training was the responsibility of the employer, Registered Training Organisation, and/or Group Training Organisation. The trainee or apprentice had a reciprocal obligation to engage with this training. Any compromise of this reciprocity could lead to low levels of learning and a consequent breach of the psychological contract.
Conclusions
Many ‘outside’ factors affect apprenticeship and traineeships. The quality of the qualification, economic constraints, the availability of government funding and the quality of local training providers affect the extent to which employers can oversee the provision of good training and the perceptions of apprentices/trainees and their willingness to accept less than perfect situations; such factors have previously been described (Smith, Comyn, Brennan Kemmis & Smith, 2009) as ‘quality resilience factors’. Thus companies’ ability to provide good training may be compromised; satiation levels on both sides are also influenced by the quality of applicants.

Examination of the results from the survey items about training, reinforced by the case studies, shows that the obligations least met, from the employee point of view, were ‘specific time for training’ and ‘a range of training methods’; trainees in particular thought these had been met to a relatively low extent. Employers did not rate these items as highly in terms of importance as apprentices/trainees did, suggesting that perhaps they knew they would not be able to meet them. In items on which there was agreement on importance, the ‘opportunity to apply what was learned’ and ‘exposure to different processes and experiences’ were also considered by apprentices and trainees not to have been very well met. Meeting these obligations relies on organising work to enable learning, and could be regarded as more difficult for employers than arranging a specific time for training and a range of training methods, particularly for smaller companies who might not be able to offer as wide a range of job tasks and contexts as large companies.

While acknowledging the production pressures incumbent upon businesses, and the special needs of remote employers, attention to the perceived deficient areas of ‘specific time for training’ and ‘a range of training methods’ are items that in fact could be reasonably easily addressed by procedural means. They are clearly more of an issue in on-the-job apprenticeships and traineeships than those which involve training at a training provider, suggesting that a major policy need is the encouragement of off-the-job training, because it very obviously provides specific time for training, and also ensures at least some variety in training methods.

References


The collective nature of guidance in workplace learning:
Evidence from the Swiss VET system

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Summary: This paper focuses on pedagogical aspects of initial vocational training in the context of the Swiss VET system. It examines how first-year apprentices are guided and supported by experienced workers in the workplace, and how the guidance and support is distributed collectively in work teams. Drawing on an ethnographic and discursive methodology borrowing concepts and tools from applied linguistics, the paper concludes that particular attention should be given to the pedagogical quality of guidance in the workplace to improve the global efficiency of the dual apprenticeship system and to foster smooth and consistent transitions into work experiences for apprentices.

Keywords: Apprenticeship, guidance, verbal interaction, workplace learning, participation.

Introduction
Social theories of learning have recurrently underlined the collective and distributed nature of learning processes and the configuring role of “the others” in the ways individuals access and interiorize knowledge and develop skills. The Vygotskian concept of the zone of proximal development defined as “the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more able peers” (Vygotsky, 1978, p.85) is often regarded as a central reference point for approaches that see learning processes as involving a plurality of agents. From such a Vygotskian perspective, it is assumed that psychological development does not consist of a process of biological maturation but involves close interactions with the cultural environment and with more experienced individuals.

By transposing the concepts of guidance and the ZPD beyond the limits of the classroom, contemporary approaches to vocational learning have promoted new ways for understanding the relations between work and learning. In the field of research devoted to workplace learning, it has been recurrently argued that direct and indirect forms of guidance provided by experienced workers constitute important conditions for learning (Lave & Wenger, 1991). Workers do not learn on their own and just by completing activities and tasks. They can do so only when specific resources are being afforded to them. As Billett (2001) puts it, “the quality of direct interaction accessible in a workplace is a key determinant in the quality of learning outcomes. This extends to the availability of this guidance, the willingness of individuals to assist others and the skills experienced co-workers have in sharing this knowledge.” (p. 35)

Considering that apprentices often interact with a plurality of colleagues, experts, supervisors, peers, etc. when they engage in productive tasks in the workplace, this paper addresses the following questions: What kinds of guidance do apprentices receive from the various categories of workers they interact with? How do they manage the contradictions that might arise from this distributed nature of guidance at
work? In what ways do these distributed forms of guidance constitute opportunities or obstacles for their learning and professional socialisation?

Methodology

In a recently initiated research program conducted at the University of Geneva (Filliettaz, 2010), these various issues have been addressed by developing and promoting innovative methodologies borrowed from various trends in applied linguistics. Analysing discourse and verbal interaction among apprentices, trainers and workers, it is proposed, can contribute to a better understanding of the complex learning processes associated with transitions from school to work and illuminate the multiple challenges faced by apprentices at the beginning of their training programs.

The methodology selected for this research program draws upon concepts and analytic categories originating from various fields of linguistics, such as conversation analysis (Schegloff, 2007), interactional sociolinguistics (Gumperz, 1982) and multimodal discourse analysis (Kress et al., 2001). These fields have explored multiple avenues of linguistics and are often seen as offering competing or contradictory approaches for analysing discourse and interaction. Nevertheless, these frameworks also share common assumptions about language and social life. In particular, they view language not only as a way of transferring information from speakers to recipients, but as a historical and culturally shaped medium through which individuals take actions, achieve cooperation, align identities, and participate in social events.

Consistent with this broad discursive and interactional perspective, specific kinds of data were collected for this research program. Data collection was conducted in the form of ethnographic observations of a cohort of approximately 40 apprentices engaged in three different technical trades: i) car mechanics, ii) automation and iii) electric assembly. Observations took place in naturally occurring training conditions in the Geneva area.

With the consent of participants, observations were video recorded by the researchers. The complete data set comprises 150 hours of audio-video recordings collected in one vocational school, two training centres and seven different workplaces. These recordings document sequences of everyday training and work activities in which apprentices interact with a variety of experts, ranging from vocational teachers, dedicated trainers or experienced co-workers.

For the purpose of this investigation on collective guidance, two contrasted case studies have been conducted. Both situations were observed in workplaces where apprentices encountered real production conditions. Although belonging to different industries (car mechanics vs. automation) and presenting distinct organisational properties (a public utility vs. a private small sized business), both observed companies were related to technical occupations and hired apprentices attending a dual apprenticeship program in technical trades. Moreover, both apprentices were observed during the first two months of their practical training in the workplace. Finally, the two cases analysed involved a form of collaborative distribution of guidance and illustrate the wide range or interlocutors with whom apprentices may interact at work.

The data analysis, conducted in a fine-grained linguistic perspective, aimed at describing the specific interactional dynamics illustrative of these situated work practices and reflecting on the potentialities and limitations associated with these collective forms of guidance at work.
Results

The data analysis, which cannot be reported in details here due to space limitations (see Filliettaz, forthcoming), showed that despite general contextual similarities, the two cases considered illustrate rather contrasting forms of learning experiences at work. The ways apprentices were expected to participate in work-related tasks as well as the pedagogical qualities of the guidance they got from trainers or other experienced workers differed quite substantially.

The first case was observed in a car mechanics workshop and involved a first-year apprentice working together with an experienced mechanic to fix a problem with the chassis of a car. The work environment illustrated in the first case appeared to afford close and rich forms of guidance to the apprentice. This guidance was collectively distributed amongst a plurality of experienced workers, and related to different and complementary dimensions of work practices. The experienced mechanic the apprentice was working together with shaped local opportunities for the apprentice to participate in the repair process and provided detailed instructions regarding a procedure to follow. The chief mechanic of the workshop exerted a global supervision, ratified the apprentice’s work plan and drew his attention to security issues. Such a collective form of guidance had important implications in terms of participation and membership for the apprentice. It placed the apprentice in an active role, in which he was progressively given increasing responsibility and was seen as a legitimate partner of a work team. In other terms, the way information and decisions were shared amongst experts and mediated through the apprentice afforded local opportunities for increased participation in the local community of practice.

The second case was observed in a small business producing electric material for the building industry and involved a first-year apprentice who was expected to take full responsibility of entire production tasks very quickly. Although collectively distributed across various experienced workers, the forms of guidance provided in this context appeared as misaligned and competitive rather than collaborative and oriented towards learning purposes. Explanations provided by workmates contradicted instructions initially given by the official supervisor. The interactional dynamics specific to this second case placed the apprentice in a very uncomfortable position in terms of participation and membership. Not only was the apprentice placed in a position of observing a controversy between his colleagues, but this controversy also generated a conflict of loyalty. By electing to follow instructions from workmates, the apprentice encountered tensions with his own supervisor, which affected their interpersonal relations in the future.

Significance and practical implications

The two case studies briefly reported in this paper illustrate the configuring role of guidance for apprenticeship learning. They stress the collective and distributed nature of this guidance and the role of experienced workers in assisting apprentices in problem-solving tasks. This range of “guidance providers” goes far beyond official trainers and supervisors. It comprises a wide scope of workmates who may share their work environment with apprentices on a regular basis or on an occasional one. As also illustrated by the empirical analysis, the pedagogical qualities of these distributed forms of guidance may vary quite substantially. In some cases, they take the form of complementarities and continuities across evolving steps of work tasks. In other circumstances, they consist of misalignments or controversies between competing workers. Such a collective distribution of guidance may afford rich opportunities for learning. As seen in the data, it may bring to the awareness of
apprentices a wider range of conceptual, procedural and dispositional knowledge related to the tasks at hand. But conversely, it may also lead to confusion when discrepancies emerge between experts or when important dimensions of the tasks remain implicit.

From there, it appears that it is not so much the distributed nature of guidance itself that should be seen as a resource or a limit for participation in apprenticeship training. Rather, it is the conditions in which these distributions are enacted in specific contexts that shape the potentialities or limitations associated with collective guidance. Interactional approaches to workplace learning provide adequate methodological tools for understanding the fine-grained contextual arrangements that shape workplace environments. These approaches reveal the sequential and semiotic mechanisms by which trainers or experienced workers are “doing guidance” and afford opportunities for participation, knowledge acquisition and identity construction. They also show how apprentices elect to engage with the resources afforded to them and the reciprocal nature of these social and personal dimensions of workplace learning (Billett, 2001). Hence, applying a discursive and interactional lens on vocational learning may help us to understand not only why but most importantly how workplaces can become expansive or restrictive learning environments for apprentices.

This empirical and methodological approach has important practical implications for reflecting on the effectiveness and efficiency of the dual apprenticeship system as it is implemented in Switzerland. It illustrates how workplaces provide potentially rich learning environments for apprentices, but how these potentialities may be enacted differently depending on the awareness and skills experienced workers have for sharing their knowledge and shaping opportunities for apprentices to participate adequately in productive tasks. In consonance with previous studies devoted to workplace learning and the pedagogy for practice, research results presented here show an urgent need to increase the level of pedagogical qualification and awareness of trainers in the workplace to enhance the overall quality of the guidance provided in companies.

References


The role of deliberate practice in Chinese vocational teaching

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Summary: Deliberate practice theory was proposed by Ericsson et al. (1993) to explain the acquisition of high-level expert performance. This paper reviews the studies on the role of deliberate practice in teacher expertise development. The authors proposed some possible deliberate practice activities for vocational school teachers, and developed some research ideas to improve research in this area. We should identify deliberate practice activities of Chinese vocational school teachers and compare them with those of teachers in other context. Furthermore, we need to investigate the microstructure of teachers’ deliberate practice and the factors that influence teachers’ engagement in deliberate practice.

Keywords: Deliberate practice, vocational teachers, expertise development

Introduction
The development of expertise has become a compelling topic in teacher education during the last decades. Many studies have been conducted to explore the characteristics of expert teachers or what constitutes teacher expertise (e.g., Berliner, 2004; Clermont, et al., 1994; Grossman, et al., 1989; Shulman, 2000). However, little is known about how expert teachers have acquired their expertise. Researchers are more and more interested in finding ways to improve teacher’s expertise development. Research has shown that many factors can play role in expertise development, but only some activities, which are chosen with the goal of improving a particular skill, can optimize performance. These activities are called deliberate practice by Ericsson and colleagues (Ericsson, et al., 1993).

Deliberate practice
Ericsson and colleagues (1993) argued that expert performance is the result of a decade or more of maximal efforts to improve performance in a domain through deliberate practice. They proposed that practice and experience is necessary but not enough for attaining superior expert performance. Only deliberate practice can lead to the acquisition of expert performance (Ericsson, 2006).

In order to characterize deliberate practice, Ericsson (1998) distinguished deliberate practice activities from work and play. He argued that work and play cannot optimize performance. Work is directly motivated by external rewards, where task demands and goals may vary greatly in difficulty and fall beyond one’s control. While play is inherently enjoyable, where the task is relatively easy and is performed with minimal regard for accuracy or the improvement of one’s ability. Only deliberate practice is specially designed to improve the current level of performance, which is most relevant to improvement of performance.

Researchers have demonstrated the importance of deliberate practice in a lot of domains (Ericsson, 2004; Moulaert et al., 2004; Sonnentag & Kleine, 2000). For
instance, in the research of insurance agents, Sonnentag and Kleine (2000) found that mental simulation (e.g., simulating the possible difficult situation and the ways to deal with it in mind before meeting the insurance customers) and asking for feedback (from colleagues or experts) are two major deliberate practice activities for insurance agents. Research on medical expertise showed that the acquisition of superior performance in medicine is closely related to engagement in practice with feedback during medical training (Ericsson, 2004).

**Deliberate practice in teaching**

Dunn and Shriner (1999) investigated 136 teachers with a questionnaire and concluded that frequent and mindful engagement in evaluating and planning activities can improve teacher expertise development, that is, deliberate practice activities in teaching are evaluating students’ performance and planning for teaching. They further argued that these activities are routine activities that are conducted by all teachers, but “Learning from these activities is possible but not automatic” (p. 644).

Due to the difference of cultural and educational system between Western and Asian countries, the deliberate practice in teaching in western context is not always suitable to Chinese context. Chinese researchers (Shi, Hao, Liang, & Li, 2009) investigated senior high school mathematics teachers based on the framework of Ericsson’s deliberate practice theory. In this study, the researchers found some deliberate practice activities that Chinese teachers engage in, which are similar to those of Western teachers (e.g., preparing the lesson is similar to planning their teaching). However, there is also some unique activity for Chinese teachers, such as teachers majoring in mathematics accumulating math exercise items. Besides, evaluating students’ written work and test is not regarded highly relevant by Chinese teachers. Discussing with colleagues is regarded highly relevant but low in effort by Western teachers, while Chinese teachers see it as high both in relevance and effort.

**Deliberate practice research in Chinese vocational teaching**

Teaching in Chinese vocational schools can be considered as very challenging because of the background of these students. Since most of the low-achieving students have low motivation in learning, teachers have to spend a lot of time on classroom management because students always chat and do irrelevant things in the class instead of listening carefully (Li & Xu, 2009).

Moreover, Chinese vocational school teachers have different backgrounds, partly come from universities, and partly from enterprises (Zhao, 2002). Since vocational education aims at cultivating skilled and technical workers in some professions, vocational school teachers must know about the requirements of modern industry and business, master and hence update their knowledge and techniques continuously. Furthermore, vocational school teachers need pedagogical knowledge, professional skills or techniques and pedagogical-technique knowledge, which is a counterpart of pedagogical-content knowledge in general education. It means knowledge about how to teach certain kind of technique. Most importantly, they should have some practical experience in enterprises so that their teaching will combine theory with practice (Zhao, 2002).

In future studies, we should be concerned about the role of deliberate practice in vocational school teachers’ expertise development in Chinese cultural context. Ultimately, the following questions deserve further research.

First, what is Chinese vocational school teachers’ deliberate practice? Is deliberate practice in teaching context dependent? That is, will deliberate practice in teaching
differ in different cultures, subjects and educational types (vocational school and high school, secondary education and higher education)?

Second, what is the microstructure of vocational school teachers’ deliberate practice? What are characteristics of vocational teachers' deliberate practice?

Third, does the deliberate practice in teaching vary in different developmental stages?

And last, which factors (including internal and external) will influence teachers to engage in deliberate practice activities? If we can find these factors, the suggestions that we give to improve teacher development will be more realistic.

References


CHAPTER III

MULTIPLE ROLES OF UNIVERSITIES, SCHOOLS AND THEIR TEACHING AND TRAINING STAFF
Eight characteristics of good “Automotive Teachers”: 
Consequences for the TT-TVET

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Summary: This paper reports the design of a special TT-TVET-Curriculum for teachers in the sector of “Automotive Service”. Eight characteristics of a professional teacher’s work were deduced on the basis of vocational scientific analysis of best-practice-examples. To educate these characteristics, every module of the curriculum expects from the prospective teachers the planning, realization and reflection of full teaching-units. Thereby, the curriculum is characterized by simultaneous development of discipline-oriented scientific, didactical and pedagogical competences and the growing complexity with every module.

Keywords: Automotive service, vocational education, teacher-training

Introduction
The above average growth in the Chinese automotive market affects above all the segment of upscale middle class and luxury vehicles. Justifiably, the customer expects not only contemporary technology, but also as an outstanding aggregate supply a corresponding product support. Service and repair of these vehicles require a comprehensive training, since such a vehicle is to be seen as an interconnected system which is to be diagnosed and repaired as a whole (Spöttl 2005, 75). Therefore, it is important that the training of the service staff is not limited to particular assembly-groups or work-processes on the vehicle. Particular structures of vocational education are questioned as consequence (Spöttl 2005, 76). Moreover, based on so far established results within the vocational sector they have to be rejected as not being purposeful.

To be questioned now is what this means for the education of TVET, particularly in the sector “Automotive Service” which, to this day, has not focused sustainably on this matter (Dreher 2005).

Methodology
In order to find answers for the development of a TT-TVET-Curriculum which fits into the vocational sector and, thereby, to concretize actions which are to be taken for the TVET-education, findings from vocational scientific analyses in the “Automotive Service” sector (Step 1a) have been received in a first step just as elaborated assumptions for an ideal concept of vocational lectures (Step 1b).

In a second step (Step 2), actual teaching-units which (just about) matched this ideal have been examined in a vocational scientific manner. The aim was to determine how these lectures were planned, realized and reflected by the teachers and what characterized the work of these teachers.

Step 1a: Characteristics of sector-specific work in “Automotive Service”
Via vocational-scientific research results in the field of “Automotive Service”, which are available since the end of the 1990s, it could be proved that work in the field of vehicle service and repair is increasingly characterized by “diagnostic work” (Enning 1997, Dreher 2009).
Most notably meant by “diagnostic work” is the determination of the causes of malfunctions of the vehicle – based on both, malfunctions (described by the customer) and error log which can be created and accessed by the vehicle system itself. The diagnostic tools used for this purpose are to be understood as expert systems whose system boundaries can always be found where the failure’s consequence and cause are still clearly detectable and describable (in the sense of still being metrologically identifiable). However, the other failures, the nebulous ones, which cannot be described through linear fault trees, augment inevitably with an increasing level of linking within the vehicle – while at the same time the possibility of an automatic diagnosis decreases (Becker 2003).

Despite the everlasting process of completion of diagnostic tests, qualified workmanship is still a non-tutorial-supported diagnostic. Thus, service staff has to improve and adapt its expert knowledge continuously by work-process oriented learning. The ability to learn in such a way has to be understood as requirement for a successful diagnosis which, in turn, composes the core of the vocation. The ability to think abstracting and holistic, the working on and in interconnected technical as well as social structures, the allowing for and utilizing of intuition and creativity have to come across as crucial elements of what has to shape the training in the automotive service sector as “developing diagnostic competence”.

Step 1b: Criteria of vocational training

Regardless of the trend forcing national structures of curricula (e.g. the German concept of “Lernfeld”), nowadays, the dominating characteristic of vocational training is its concentration on the complete vocational activity (planning, doing, controlling, ideally complemented by informing and reflecting) (Pampus 1987). The topic of lectures is, therefore, a working task which characterizes the vocation and is preferably to be solved independently. During the process of finding a solution, a work-oriented learning supported by TVET takes place. This is either based upon an assimilative or an accommodative motivated direct regulation of one’s actions or a reflection with the purpose of improving one’s own doing.

Hence, such a lecture does not highlight the providing of knowledge itself, but an approach of learning through decision making (Adolph 2001) and for the purpose of designing one’s own work with its determining technique (Rauner 2001).

Step 2: Best-Practice-Lessons: Common requirements and characteristics

A summarizing view of 36 chosen best-practice-examples of teaching-units in the automotive training in the North German area in combination with interviews of the teachers during which they were asked about their factors of success has led to the following results:

- To develop the diagnostic competence, the core of each teaching-unit is a failure based task (simulated customer’s order with fault simulation on the vehicle);
- every task allows for an internal differentiation; the students work in accordance with their level of development in small groups;
- the choice of failures is taken in accordance with the principle of relevancy to practice and in close coordination with the reality in a garage as well as the effectiveness of the diagnostic testers;
- there is a positive failure culture (school as shelter for “crooked grown failure analysis trees” as results of planning and doing);
- the teacher sees him-/herself as coach in the case of thinking barriers, lack of apprehension of text or illustration and problems with handling tools;
the teacher deliberately initiates phases of reflection for self-awareness and conservation of good strategies for problem solving.

Consequence: Eight characteristics of good “Automotive Teachers”

The generally applicable goals of each teacher training (lecturing, educating, assessing, advising and innovating) are also applicable to the “automotive teacher”. However, they are too imprecise to develop a TT-TVET which meets the requirements of the key points of good teaching mentioned in the previous paragraph.

Therefore, in order to reach a precision, the whole working process of teachers has been reflected vocational-scientifically in the context of the surveyed lectures. Thus, on the basis of this analysis the following eight characteristics of good teaching especially for the “Automotive Service” (Table 1) have been identified:

<table>
<thead>
<tr>
<th>“Automotive Sector”</th>
<th>Teacher training</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Practice- and work-oriented without organizational blindness/myopia</td>
<td>Definition of tasks: Find realistic working tasks</td>
</tr>
<tr>
<td>2. Organize (vocationally scientific-oriented) analyses of work-processes</td>
<td>Development of tasks: Define workable and internally differentiated working tasks</td>
</tr>
<tr>
<td>3. Working didactically synthesizing (instead of reducing)</td>
<td></td>
</tr>
<tr>
<td>4. Designing of failure-based tasks in keeping with the learner</td>
<td></td>
</tr>
<tr>
<td>5. Preparation of teaching-units down to the last detail</td>
<td></td>
</tr>
<tr>
<td>6. Comparative reflection of work-planning and its degree of implementation</td>
<td></td>
</tr>
<tr>
<td>7. Acceptance of the role of a coach who works emphatically and encourages the gaining of knowledge</td>
<td></td>
</tr>
<tr>
<td>8. Being open towards the constant further development of one’s own classes</td>
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</tbody>
</table>

Table 1: Eight characteristics of good “Automotive Teachers” and their effects

Now, the question to be asked is how these characteristics can be advanced in the course of TT-TVET. Looking to the empirical studies of May 2006 as well as Neuweg’s proposed fundamentals for the aimed development of the implied knowledge (Neuweg 2002) it is made clear, that the teacher training has its focus on the generation of experiences through doing (the action of the TVET), which can then be reflected.

This shows that teacher training, too, has to orient itself to the principle of action-orientation with the ultimate goal of a self-responsible competence (of class). This can be achieved by focusing on the planning, implementation and reflection of teaching-units tailored to exemplary working tasks (Dreher/Kath 2004). Therein integrated will be the subject-didactic and pedagogic discussion of issues as well as the giving of a feedback about the TVET’s behaviour. Based on this paradigm a consecutive modular system of development tasks (Havinghurst 1972) has been defined specifically for the “Automotive Service” sector. The result will be a spiral curricular course of TT-TVET-studies.
<table>
<thead>
<tr>
<th>Module</th>
<th>Planning lectures for one of following work-tasks:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automotive Service</td>
<td>Inspection, exhaust-gas test, control of brake-system and steering-system, change of fluids</td>
</tr>
<tr>
<td>Abrasion Repairs</td>
<td>Repair of brake and clutch, renew axle mounting and steering knuckle, renew exhaust pipe</td>
</tr>
<tr>
<td>Repair of Engine Mechanic</td>
<td>Failure diagnostic and based on it a valve seat overhaul, renewal of main and connecting rod small end bearing, cylinder measurement and insertion of oversized piston</td>
</tr>
<tr>
<td>Repair of Gear Box</td>
<td>Renewal of synchromesh mechanisms; renewal of brake band, multi-plate clutches and free-wheel feature, checking of control valve for module/control pressure, overhaul of power lock differential</td>
</tr>
<tr>
<td>Repair of electrical circuits</td>
<td>Fix defects in the lightning set or power supply (generator/alternator battery)</td>
</tr>
<tr>
<td>Repair of Control Technology</td>
<td>Failure diagnostic and removal at the engine management, the driving dynamics control and the comfort functions</td>
</tr>
</tbody>
</table>

Table 2: Modules of TT-TVET for the vocational sector “automotive service”

For each of these modules adequate failures shall be chosen within the frame of TT-TVET which are both realistic and internally differentiated. These failures shall be embedded into the vehicles and the according diagnostic testers shall be prepared. Afterwards, these lectures are to be implemented and reflected, whereby the eight characteristics adapted from Table 1 will be used as equal criteria for the level of performance of the TVET.

References
New approach for teacher training in Austria
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Summary: Based on a decision of the Austrian Government the responsible Ministries, the Federal Austrian Ministry for Education, Arts and Culture, and the Austrian Federal Ministry for Science and research started an initiative in the year 2009 for a new concept for education and training for all pedagogical professions in Austria. The government established an expert group with the order, to develop a concept for an education and training structure in Austria for all pedagogical professions. The expert group was composed of experts from the areas of university, pedagogical colleges, early childhood education, general and VET education, including experts from Germany and Switzerland, chaired by Dr. Peter Härtel. Based on the concept worked out by this group, additional comments and communication with stakeholders a preparation group plans in detail the next steps for political and legislative process in order of the government and the concerned ministries.

Keywords: Teacher training, VET, general and vocational education, cluster concept

Introduction: Special position of VET education
Due to the aspect, that about 80 percent in upper secondary education in Austria choose a vocational education pathway, one of the highest rates in the OECD and the European Union, half of them in apprenticeship education, half of them in VET fulltime schools, the education of teachers and trainers in this area is a priority topic in the concept (cf. Table 1).

In Austrian VET education system a high percentage of the teachers and trainers in the VET education schools – esp. in the apprentice part-time school system have a professional background from other initial VET education than teacher training, many of them come from the apprentice education, professional experience, VET further training, some with experience of self employed. Additional pedagogic and didactic education qualifies these persons for teaching and training in apprenticeship-VET-schools and VET-fulltime-schools (OECD 2010).

<table>
<thead>
<tr>
<th>Type of school</th>
<th>Academic secondary schools</th>
<th>Part-time VET schools</th>
<th>Full-time VET schools</th>
<th>Full-time VET colleges</th>
<th>Higher colleges for teacher training</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>grade 10</td>
<td>22.448</td>
<td>44.716</td>
<td>13.065</td>
<td>26.125</td>
<td>1.679</td>
<td>108.033</td>
</tr>
<tr>
<td>in%</td>
<td>20.8%</td>
<td>41.4%</td>
<td>12.1%</td>
<td>24.2%</td>
<td>1.6%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Source: Statistik Austria

Table 1: Enrolment rates by school type
This must be seen as strength of the Austrian education system. Strengths should be improved and transferred to other sectors of the teachers and trainers education, this is a principle of the new concept, which was delivered by the expert group to the Ministries in March 2010.
So this approach is the first case in Austria that elements of the VET system – esp. from the apprentice education – could be an impact for other, also general education areas (ExpertInnengruppe “LehrerInnenbildung NEU” 2010).

**Methodology: New “cluster” concept for co-operation between universities, colleges and others**

This include a new organizational framework of co-operation between Universities, Pedagogical colleges and other institutions in the way of “clustered processes”, which are developed under a strong national governance, using the competences and strengths of providers at regional level in a co-operative way. One of the central aims is to establish a kind of a “Professional Master” for teachers and trainers in VET education in the way of “joint studies”, which considers the personal learning attitudes and experiences of professional practitioners in the VET system and guarantees a equivalent of degree at the same level like academic university degrees.

**Integrated approach of educational pathways**

In combination with the incentive of “Lehre mit Matura” – apprenticeship including access to university – and the upcoming National Qualification Framework as the base for accreditation and validation of qualifications this new concept could be a complete new approach for teacher and trainer education in VET as a part of the education system as a whole and for a high quality positioning of VET teacher training within a comprehensive model, which is specified to the different needs and demands of the education sectors as well as to the companies and enterprises.

In this model the strengths and values of the Austrian VET system should be integrated, improved and innovative adapted, concerning to the different principles and approaches in VET full-time concepts and within the apprenticeship model.

The integrated co-operation and co-ordination with the business sector is an essential part of the concept. The involvements of all relevant stakeholders ensure the consideration of all relevant aspects (Härtel P., Marterer M. 2010).

**Results**

The new teacher training concept has some key features, like

- A common setting of competencies which are relevant for all pedagogical professions, like communication, learning and teaching processes, individualization, quality development...
- Specialization regarding the needs and demands of the teaching and training area, esp. in VET system;
- Accreditation and validation of competences and qualifications for teachers and trainers, independent of the way, how they are gained;
- Permeability and flexibility of pathways for teachers and trainers, within the VET and general education system, as well as between the education system and other professional areas;
- Innovative concepts for common developments and co-operations between school and the world of work, in a view of lifelong learning process, beginning in an early stage of education process, and continuing after completing initial VET education (ExpertInnengruppe “LehrerInnenbildung NEU” 2010).
Starting points for a new concept of teacher training in Austria

Being aware of the importance of the VET sector within the Austrian education system, esp. at the level of upper secondary, the aim and objective of a new teacher training concept is to improve the quality in all areas by using experiences in general and vocational education areas. A main aim is to bring vocational and professional experiences outside of school into the pedagogical process – this is a brand mark of the VET system in Austria, both in fulltime school and enterprise based apprentice model (Hopmann S.T, 2008).

Comprehensive and specified aspects of a new national concept

The Austrian education system – also regarding teacher training – has a very segmented approach. A prior objective of the new teacher training concept is to bring together the strengths of University, Pedagogical colleges and practical professional potentials in an integrated way, this is the philosophy behind the innovative “Cluster Concept” (see table 1), with a strong approach of governance, responsible provided by a “Council for Development of Teacher Training”, by order of the National government.

Special aspects for VET and apprenticeship

The main quality aspect of VET in Austria is, that most of the vocational teachers have a background of another profession as pedagogic, with professional education in the field of vocation for teaching, practical experience and expertise, and additional pedagogical education targeted to the relevant educational and school profile.

The concepts actually differ between fulltime school VET and professional schools for apprentices. One of the most important aims of the new teachers training concept is to use all relevant experiences in a comprehensive way for all sectors of pedagogical professions. Details will be defined and implemented by the running work within the preparation group “Pedagogical Professions NEW”.

Connections between VET and general education in a Lifelong learning perspective

This is both, a special quality and a challenge. A special quality concerning authentic, real work life, reality didactic approaches, and it is a challenge regarding pedagogical, didactic, learning attitudes and behaviours. This is a “dual dual mission”: to motivate and to qualify persons with other professional background to work as a teacher and trainer in VET, and to bring a real worklife perspective also into general education processes. This “dual dual” aspect is essential in a Lifelong Learning perspective: To connect learning concepts and contents with real life and world of work is a quality element of pedagogic – and a base for continuous ambition to recognize own potentials and talents, to find interests, to improve skills and qualifications and to find opportunities to apply in job and private life.

Competences for VET teachers and conclusions for initial and further education

In Austrian education system there are several types of VET teachers and qualification profiles, e.g.

- for upper secondary technical fulltime school: Professional engineers at tertiary level, with years of professional experience, often international, and a beside the job education for the teachers profession.
- for upper secondary commercial fulltime school: for this teaching profession exists a special study course: “Business education”, that qualifies for both teaching in upper secondary commercial schools (practical work experience needed) and for professional work in commercial area.
for so called “Berufschulen” – part time schools in apprenticeship education – all teachers have a qualification background in the relevant professional area, work experience, further training, a kind of “professional master” (not comparable with a tertiary “master”, but with high competence level), and often with experience as self-employed and entrepreneur, including training or apprentices. These and other types of qualifications have their specific aspects of quality and value.

The concept “Teachers Training NEW” tries to combine all the positive aspects in different areas with the aim and approach, to save all qualities, but to take benefit from all potentials of synergies, co-operation and co-ordination opportunities in an innovative way, combining institutional, regional, research and policy frameworks.

References
Networks as agents of innovation: Networking patterns of VET & higher professional education teachers
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Summary: This paper concentrates on the networking processes in the context of educational changes, focusing on Estonian VET reforms during the last decade. We follow the concept of social innovation (SI) to explain the educational changes/implementation process, emphasizing on networking as a facilitating/mediating mechanism in the educational change process. Based on the results of the quantitative survey different types of innovation networks will be identified. Secondly, the relationship between networking and educational innovations will be analysed.

Keywords: Teacher networks, educational change, social innovation, Estonian survey

Introduction
The VET systems and particularly teachers are continuingly challenged by more or less permanent changes. The educational changes are often characterized as ‘top-down innovations’ (Hofman/Dijkstra 2010) and overwhelming attention is placed on teachers’ ability and motivation to adopt and implement the changes (Struyven/De Meyst 2010; Fullan 2001). Networking is considered to be one of the mechanisms which could facilitate the process of adoption and implementation of innovations, but the knowledge and empirical evidence regarding the functioning and patterns of teachers’ networking and their capability to support educational changes is rather vague (de Lima 2010; Hofman/Dijkstra 2010; Coburn/Lin Russel 2008). This paper aims at identifying and describing the teachers’ networking patterns, and explaining the relationship between the networks and educational innovations. We will concentrate on the networking processes in the context of Estonian VET reforms, following the change of the concept of VET from “Soviet dual” system into the school-based system in the context of radical socioeconomic and political changes.

Theoretical framework: Networking in (educational) change process
In approaching the mechanisms which could facilitate and mediate the process of adoption and implementation of educational changes/reform, we follow the concept of social innovation (SI). This explains the change processes from two perspectives. One approach originates from sociological theories and explains SI as distinct kind of innovation which has specific social goals and which develops from the grassroots level initiatives (Moulaert et al. 2005; Mulgan 2006). The other approach proceeding from economic and organisational theories sees SI as co-developmental or accompanying process induced by technological-economical, business or organizational changes (Pol/Ville 2009). As VET reform can be considered as top-down innovations we follow the second approach to SI. The innovation, to be actually implemented - adopted and accepted by actors, should be accompanied by changes in meanings, everyday practices and social structures (Tuomi 2007), that is, changes should occur not only in regulative, but also in normative and cultural-cognitive levels of social institutions (Scott 2001).
The theorists of SI emphasize the social mechanisms which have to accompany the innovations in order to mediate and facilitate the process of adoption and implementation of innovation. Accordingly, SI considers interaction processes – networking, collective learning, etc. – to be fundamental in the innovation process (Marcey/Mumford 2007; Heiskala/Hämäläinen 2007a). In order to analyse the networking processes we follow the network perspective (e.g. Wasserman/Faust, 1995; Scott, 2000) which provides a framework for studying the structure and patterning of relationships (Jones et al. 2001). In this paper the special focus is made on exploring the relationship between the characteristics of network and its relations to reform-guided innovations. To characterise a network, the following features are important: (a) type of actors in the network; (b) characteristics determining the nature of the relationship (incl. centralization, density, strength of ties, connectedness, size of the network, etc.); (c) genesis of the network; and (d) the network substance (what the interaction is about) (Scott 2000; Hatala 2006; de Lima 2010).

(Historical) background and VET reforms after transition period
The Soviet VET system in Estonia, an extremely centralized and related to the planned economy, was completely interrupted in the process of the transition to market economy. The previous system of practical training was completely destroyed because of privatisation and extensive restructuring of enterprises. At the beginning of 1990s until 1996/1997 almost single determining factor of changes was liberal adjustment of VET schools to dramatically changed environment. In this period, the state intervention was minimal and social partners (employers, unions) were too weak to initiate and support reforms in VET. Since 1997 the period of extensive reform of VET began. The most important steps of reform included: restructuring of the VET schools’ network; development and implementation of national qualification system and creation and establishment of national curricula in VET in the partnership with schools, teachers employers and sector organisations. The reforms have been accompanied by extensive investments into the content and infrastructure of VET schools and teachers’ development, supported by EU Programmes. The processes of change in VET have led to ever stronger regulation and standardisation of the system and actors’ behaviour.

Methodology
In this paper the results of quantitative survey carried out among the teachers in VET and higher professional educational schools in 2010 are presented. The survey was internet-based. The sample consisted of teachers from 41 schools teaching in the three fields: creative industries, services and technology. The return rate was 45%. The questionnaire consisted of 30 questions divided into 4 parts: (1) general information about the teacher; (2) educational changes in the school; (3) partners and co-operation; (4) networks related to educational changes. In data-analysis, at first general statistics were calculated followed by the factor and cluster analysis using SPSS Statistics.

Results
Altogether, 5 type of VET teachers’ networks related to educational changes can be identified: (1) intra-school network (networking within the school – schoolboard, management, different departments); (2) sector network – encompassing the field-specific networks with professional associations, enterprises and their unions, educational and teacher organizations; (3) reform-related networks – comprising of networks, established and developed in the frame of state-initiated reform, including working groups of social partners in development of vocational standards,
curricula etc. (4) inter-sectoral network – including different kind of co-operations with universities, R&D institutions, public sector etc. (5) international networks – encompassing international educational or teaching associations and networks of international projects and programmes.

Teachers’ participation in the 5 networks becomes divided as follows (see Fig. 1).

Figure 1: Teachers’ participation in different innovation related networks: the general division and by three sectors (%)

The typology of networks enables to claim that teachers’ networking pattern is rather diverse – teachers are involved in different kind of networks and networking takes place on many different levels, including international. Figure 1 shows that almost half (48.6%) of respondent teachers attach importance to sector-based networks which indicates that the sector has the strongest influence in the process of educational changes. Still, it is important to highlight that relevant differences lie between the 3 fields: teachers in the field of services participate mostly in reform-related networks and in sector networks; teachers in the field of technology brought out mostly inter-sectoral networks and also sector and international networks; and the teachers in the field of creative industries are primarily involved in inter-sectoral networks, but also in intra-school and international networks.

When analysing the 5 types of networks based on the characteristics of networks the study results reveal that several characteristics inherent to innovation networks in other fields apply also to the education innovations. Specifically speaking, all 5 types of networks bring together different parties, whereby the importance of universities and R&D institutions in the networks is relatively modest. All these 5 type of networks base on shared values and understandings and strong ties exist between the partners in the network. This refers to close interaction, supporting transfer of complex and tacit knowledge. Although these networks provide socio-emotional support to the participants, strong ties between network parties refer also to certain kind of closeness of the networks. Predominance of strong ties do not always provide new, ‘beyond boundaries’ information (Ryymin et al. 2008) which is critical for innovation.

The sector-centered networking of teachers can illuminate this suggestion. To analyse the relationship between reform-related innovations and the 5 types of networks we first explored which innovations taken place in schools were considered most important. The factor analyses brought out seven groups of changes which were then compared with 5 types of networks (Fig. 2). These results enable to argue that from one side, the networks differentiate the multiple reform-related innovations; from other side, co-evolvement of various networks, teachers are involved in, supports the interaction and mutual learning and therefore the processes of social change, which in turn can make the “real” changes more probable. Some networks have particularly related to changes in teaching methods and restructuring of schools organisations and in partnership. As intra-school network are related to the changes in involvement and development of teachers, we can assume, that networking has increased the school democracy.
In the teachers’ networking pattern, the specific, reform-related network has emerged. This indicates that the networks, generated as part of reform strategy, have become the part of teachers’ networking pattern, facilitating interaction and bringing about new type of network structure, which doesn’t follow the traditional regulation levels and involves diverse set of actors from educational institutions, public and business sector, professional associations, etc.

References


Towards a new kind of VET teachers’ professional competence structure

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Summary: This paper suggests a new kind of VET teachers’ professional competence structure mainly with a set of study methods, including literature research, psychological research and comparative educational research. Macroscopically, the professional competence structure comprises five dimensions, such as cognitive competence, functional competence, social competence, transferable competence and meta-competence. Furthermore, all these competence can be divided into various sub-competence. According to this study, transferable competence is the absolutely vital one in VET teachers’ professional competence structure, which affects VET teachers’ professional development and VET learners’ studying quality as well.

Keywords: VET teachers’ professional competence structure, functional competence, transferable competence, meta-competence

Introduction
At present, many developed countries and some member states of the EU have successively suggested some successful approaches to developing VET teachers’ professional competence based on teachers’ qualification system. However, judging from their practical experiences, the existing VET teachers’ professional competence structures are reasonably beyond the increasing restriction of the teachers’ professional competence development from thought to practice. Thus it is necessary to reconstruct a new one in order to improve the developmental approaches to VET teachers’ professional competence.

Methodology
This paper mainly employs literature research methodology, some psychological research methods and international comparative educational research methods.

Competence and competence structure
Competence is the state or quality of being adequate or well qualified to do something, while competence structure is a kind of specific format as a whole for the permutation and combination of various competences in the individual competence set.

The connotation of VET teachers’ professional competence structure
Professional competence structure refers to the competence structure in relation to the individuals’ employment in a specific occupational organization. Individuals in the specific occupational organization have to encounter three essential factors in connection with the employment task, such as persons, occupational tasks, and other things. Therefore, there are at least three dimensions of competence that are respectively exploited to operate the three essential factors, with the relations...
independent and interrelated somehow. Furthermore, the interrelations of all these competence are relied on transferable competence and meta-competence.

Thus it is evident that the VET teachers’ professional competence structure should also consist of five dimensions of competence relevant to VET, namely cognitive competence, functional competence, social competence, transferable competence and meta-competence, as shown in Figure 1.

![Figure 1: The holistic structure of VET teachers’ professional competence](image)

Hereinto, cognitive competence refers to any kind of competence with the mental operations of things concerned within VET teaching and learning process (hereafter as VET context). “Things” here means anybody, any task and anything involved in VET professional tasks. Functional competence refers to any kind of competence with the operations of professional task within VET context, surely in which the relevant persons and things will be involved. Social competence refers to any kind of competence with the operations of persons, especially the interpersonal relationships within VET context, the correlative things and professional tasks, such as teaching and learning tasks, etc., will be involved in as well. Transferable competence is a type of competence which undertakes the interconversion of all the above-mentioned competence under some certain conditions. This type of interconversion may occur not only inside of an individual VET teacher, but also among multiple VET teachers, and may take place in the same context or in different contexts. Meta-competence is a special one that takes charge of acquiring, actuating, controlling, managing, assigning, ensuring and evaluating all the others. These five macroscopic competence can be further divided into sub-competence at the microscopic level.

VET, as a specific organization, its required professional competence structure, i.e. the organizational competence in Figure 1, probably is only a set of some competence represented by a non-regular tetrahedron with the split of the plane P. In the VET organization the practical professional structure of a VET teacher individual, i.e. the actual competence in Figure 1, is only a subset of the organizational competence. The different split position of the plane P represents the required professional competence structure of different organizations, and the slope coefficient of the plane P means that the specific organization has tendency to some special competence requirements. The different location of actual competence in the tetrahedron implies the diversity of professional competence structure amongst different VET teachers.
In a word, VET teacher’s professional competence structure is a specialized and professionalized structure in VET domain, which at least consists of those five dimensions of independent and interrelated competence mentioned above. 

*The function of VET teachers’ professional competence structure*

In a certain sense, VET teachers’ professional competence structure plays a nonlinear decisive role in formatting and developing VET learners’ professional competence, since VET teachers are the maternal intelligence resources who undertake the task of producing and reproducing the occupational talents.

Hence, in VET teachers’ professional competence structure, transferable competence is the foremost one that not only affects the degree of VET teachers’ professional development, but also the quality of VET learners’ achievement. With the full participation of meta-competence, VET teachers’ professional competence structure affects the VET teachers’ instructing and the VET learners’ study in three main instructing or/and learning stages. Its mechanism is shown in Figure 2.

![Figure 2: The mechanism of VET teachers’ transferable competence](image)

Circumstantially speaking, in the first stage, transferable competence is responsible for abstracting and assimilating the knowledge, skills, norms, standards, and even feelings implicated in social occupational fields, and then transforming them into cognitive competence and implicit knowledge internalized in VET teachers themselves. In the second stage, transferable competence further converts the cognitive competence and implicit knowledge into VET teachers’ functional competence, so as to format the instructing language and explicit knowledge which can be understood by VET learners. After that, through the intercommunication and interaction of social competence between VET teachers and VET learners, it promotes learners to attain cognitive competence and implicit knowledge internalized in VET learners themselves. In the third stage, transferable competence, with the participation of VET teacher(s), furthermore promotes VET learners to attain functional competence and explicit knowledge in their action field, and finally drives them to be effectively employed and exert their comprehensive professional competence in social occupational fields.

In these three stages, social competence is responsible for acquiring, sharing and spreading the other competence and knowledge between VET teachers and VET learners, while meta-competence takes charge of appropriately managing, assigning, controlling, evaluating and promoting the other competence and knowledge of themselves.

Thereupon, in the holistic process of the competence transference between them, the professional competence of both VET teachers and learners are substantially enhanced through multiple practices of competence transference in VET instruction.
Conclusion
The new kind of VET teachers’ professional competence structure can solve the current issues in the development of VET teachers’ professional competence in two main aspects. Firstly, it reveals the interconverting mechanism of professional competence between teachers and learners in VET, and this is the key secret to improve the quality of VET teachers’ professional development and VET learners’ achievement. Secondly, it suggests a common sequence of and an important approach to the development of VET teachers’ professional competence. Therefore, the development of VET teachers’ professional competence should primarily focus on three main aspects in future, that is, transferable competence, meta-competence and functional competence. However, this competence structure also needs some further researches into the classification and hierarchy of VET teachers’ professional competence, so as to set up a more elaborate VET teachers’ professional competence structure in days to come.

Acknowledgements
This paper has been substantially amended in the light of comments from participants in these events, as well as from all references’ authors listed or not. Limitations of space necessitated reduces the references; a more comprehensive bibliography will be provided in other ways later if you need.

References
The “PIL” project: Improving employability through the integration of education, training and work

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Summary: In this paper, the PIL Project (“Percorsi di Inserimento Lavorativo”, Paths of Work Insertion) of the University of Ferrara (Italy) is described. The PIL project, started in 2001, is a work and education integrated pathway that the University of Ferrara developed in partnership with research centre CDS (Centro Documentazione e Studi) and education consortium CPF (Consorzio Provinciale Formazione). The project pursues a variety of goals: increasing graduated students’ employability, improving learners’ education, facilitating technology transfer to enterprises, enabling enterprises’ internal mobility. The qualitative and quantitative outcomes of this 10 years’ long experience prove the effectiveness of the general logic and the specific mechanisms implemented in the PIL project.

Keywords: Education, integration, work, employability

Introduction: An overview of the PIL project

The acronym PIL stands for “Percorsi di Inserimento Lavorativo”, that is, “Pathways of Work Insertion”. PIL is a project coordinated by the University of Ferrara which started ten years ago at the Faculty of Economics, and in time it was extended to all the Faculties of the University. While initiated in 2001 as an “experimental” project, the number of students, companies and institutions involved increased rapidly over the years, as well as the interest that the project captured from other Italian and European universities (for example, University of Ferrara and CDS engaged in 2009 and 2010 in a European research project, called “Meet Us!”, in which PIL was compared to the best European practices of education / work transition and integration). In 10 years, PIL involved over 1000 students, about 500 of them were allocated in over 200 companies through 12 months work contracts. The logic and mechanisms of PIL have been also implemented, in the last few years, in several master courses at the University of Ferrara through apprenticeship contracts for the master students. Other Universities, thanks to the experience accumulated by the PIL project of Ferrara, already started similar projects (in the Veneto, Molise and Emilia Romagna regions).

The PIL Project pursues the following goals and outcomes:

– to improve and accelerate the learning process of the students thanks to an actual work experience in the last phases of their educational pathway;
– to enable companies in implementing an internal mobility processes in order to develop new, high added-value activities, and to improve the technology transfer process between universities and companies;
– to increase students’ employability in the labour market thanks to a first, significant work experience, integrated in their education process;
– to offer institutions operating in the labour market (public institutions, trade unions, associations, etc.) grounded verification for government policies for
labour flexibility, especially for the insertion of young people into the labour market;
− to help universities and Higher Education institutions to rethink and redesign
their educational offer thanks to an improved awareness of what are the
demands of the labour market to the graduated students.

Methodology: How the PIL project works
The typical, traditional approach to the education / work transition can be described
as a sequence of well separated phases: first “education” (up to the university degree
level), then “training” (either through some post-graduate degree, stages or other
training programs) and finally the “work” phase. The problem with this approach is the
separation of the three phases. The process is neither designed (by all the institutions
and the actors involved) nor experienced (by the students) as a “whole” process,
but as a sequence of steps in which every passage is full of uncertainties and where
inconsistencies between steps abound.

The PIL model tries to effectively integrate the three phases, by overlapping them
through a number of specific mechanisms and activities. As graphically represented
in Figure 1, this model creates a tighter, more interconnected and consistent pathway
from education to training and work. Thus, instead of a “transition” approach, the PIL
model proposes an “alternation” approach, where the advantages and the added
value (for all key stakeholder: students, enterprises and universities) is generated
thanks to the coordinated effort and the overlapped (alternated) activities.

Figure 1: The traditional transition approach and the PIL alternation model

In practical terms, the PIL model works in the following manners:
1. A process of students recruitment is carried out by the University and its
   partners. The ideal-typical candidate is a student in the final phase of his
   University career with still a few exams to pass and the final thesis to prepare.
2. An external partner (CDS) looks for enterprises that are willing to participate
to the PIL project. Participating companies must offer one or more “job
   profiles”, that is, a job position where the student will be engaged in a 3
   months stage plus a 12 months full time job, with a regular contract. The
   search usually lasts several months in order to ensure a good match
   between students and job opportunities.
3. A certain number of classes and seminars are offered to students (usually
   120 hours). During these classes, specific subjects are covered in order to
   prepare students in the best possible way to the workplace and the labour
   market. General subjects are covered, like management and organization,
   quality and safety at work, law and others, but also practical subjects, like:
   how to write a resumé, how to give an interview, how to read and understand
work contracts, how to improve communication skills, how to self-evaluate competencies, etc.

4. A crucial role is played by the enterprises' seminars (these are included in the 120 hours of classes). Each participating enterprise holds a specific seminar (about 1.5 hours each) in which it introduces itself to the students and explains what the proposed job profile is about. An actual dialogue is created between enterprises and students, so that students can better understand what to expect in the workplace.

5. The first selection and matching process takes place, called “Mercatino 1” (Little Market 1). In this process, each student freely expresses his / her preference for one or more (usually several) job profiles. Thus, a list of several “candidates” is created for each job profile, ranked according to several criteria related to their academic career.

6. Enterprises perform face-to-face interviews for all the candidates for each job profile (up to a predefined limit). The company has the right to score the candidates, so that the final ranking of students, for each job position, results from both the academic criteria and the scores.

7. The second (and final) selection and matching process takes place, called “Mercatino 2” (Little Market 2). In this phase, each student chooses, according to the rankings generated in the previous steps, his / her own job profile. It is worth noting that while the rankings depend on the academic performance of the students and on the enterprises' assessments, the final choice is given to the students. The order by which students choose their job profile depends on those rankings. For example, the highest ranked student will be the first one to choose.

8. All students begin a “stage” phase, that is, 3 months of on-the-job training within the company, according to the job profile that they chose during “Mercatino 2”.

9. After the stage, a 12 months work contract is signed, and the actual work experience begins. During the whole process, the student will be able to finalize his educational pathway by giving exams or working on his thesis. The integration between work and education is monitored by the university during the whole process. For example, students are encouraged to choose subjects for their thesis that are as much as possible related to their work experience.

Results: Benefits and outcomes of the PIL model
The main outcome of the PIL project is the increase in students’ employability. It is worthwhile emphasizing that the goal of the PIL logic is not the “placement” of learners into the labour market. The PIL project is a didactic pathway. As such, the expected outcome is not to provide employment to students, but to increase their ability to be employed, that is, their attractiveness in the labour market. That is what we called “employability”. One year after the end of the PIL project, about 75% of PIL students have a job, and about 49% have a stabilized work position. After three years, about 96% of PIL students have a job, and 92% have stabilized work position.

There are two elements worth noticing that are crucial for the effectiveness of the model. The first one is the ability to leverage on the educational value of work. The workplace can be of enormous educational value for students and learners. However, the work experience has to be long enough (12 months) and “serious” enough (regularly paid by the company) so that both parties, students and companies, find a real interest in the relationship. The second crucial element is the idea of integration
and alternation. It is through alternation that students can better realize not only how to capitalize on the workplace the concepts and ideas that they learn in classes, but also how to benefit from the work experience in order to better understand the theories and the concepts that the university provides.

Enterprises can also greatly benefit from the PIL project. There are a variety of possible advantages. One is the possibility of being exposed to the fresh ideas and to the different points of view that students can bring to the workplace. Another advantage is the increased effectiveness of the selection process. A third one is the opportunity of internal mobility that the PIL project provides. A significant number of enterprises participate to the PIL project for several years in a row.

Universities could also find significant benefits. The most important one is the ability to establish a closer, steady relationship with the labour market and enterprises. This could bring significant advantages, for example in terms of ideas for the redesign of their education programs in order to make them more relevant for the society and the economy.

Finally, the PIL model seems to be particularly well suited for the apprenticeship contract. In fact, in Ferrara, 3 University Master Courses have implemented in the last few years precisely the same PIL model as described in this paper while utilizing the apprenticeship contract for the work period of their master students, with very satisfactory results. It is worth noting that while in Ferrara we use the apprenticeship as a specific form of work contract, according to our experience companies greatly appreciate an integrated, monitored process of work-study alternation. In fact, Italy there isn’t a tradition of apprenticeship for high level students, but the success of the PIL practice is inducing institutions at the various levels of governance (both National, Regional and local) to consider the development of similar practices. In 2011, for example, the Emilia-Romagna Region will introduce in every sub-areas (n.11) a new high school – level pathway of 2 years (for technicians) designed according to the PIL "model".

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1 The actual publications are in Italian. Here the titles have been translated to English.
Teachers’ skills development model in the evaluation of competency-based student learning outcomes in vocational schools in Indonesia

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Summary: Vocational schools in Indonesia are aimed to prepare the learners for having some competences needed in the world of work. This study was conducted to identify the teachers’ needs to the material of evaluation and the teachers’ skills in evaluating. This study also tried to find out the problems of the teachers in evaluating and also the role of schools in the implementation of evaluation. This study used nine regions in Indonesia as samples. The results of this study showed the high level of needs from the teachers to the material of competency-based evaluation activities. This study also showed that the teachers’ level of understanding about these aspects is still low. Thus, the large gap between these two dimensions showed the teachers problem in conducting the evaluation and the lacking of the schools role in improving teachers’ skills in evaluation.

Keywords: Development of teachers’ skills, Evaluation of students learning outcome in CBT, Vocational School, Indonesia

Introduction
Vocational schools in Indonesia emphasized the students for having some competences needed in the world of work. This aim is reflected in the plan, process, and evaluation. The teachers’ skills in plan, process, and evaluation are needed. The teachers should improve the quality of study continously in order to achieve goal of study. The success of teachers in teaching and improving the quality of study can be seen through assesment. The result of assesment can be used as description for the teachers about the success of study. So that the teachers can develop or continue the teaching strategy that can motivate the students in learning. Teachers’ skills play important role to measure students’ competences. Thus, the school especially the teacher should prepare the lesson strategy for conducting the teaching and improving the quality of study and also developing good assesment in order to get the best description about the succes of study.

Methodology
This research was planned in two phases, namely the first phase focused on identifying the need assesment of teachers in implementing evaluation activities. So that, description about the teachers’ needs and comprehension in evaluating the students learning outcome can be achieved. The result of this phase can be used as references for the second phase research in arranging teachers development model in evaluating student learning outcomes in CBT (competency-based teaching) in vocational schools in Indonesia.

This first phase research was descriptive research. It conducted in two ways; Literature study and survey. Literature study conducted in order to get data and
information which is relevant with the research. Meanwhile survey conducted to collect data using questionnaire and interview to the Head Master/Vice Head Master, Chairman of the department/program, and vocational school teachers.

**Research scheme**

The samples of research were teachers of Vocational School (SMKN) located in 9 regions of Bandung, Cianjur, Sukabumi, Purwakarta, Subang, Cirebon, Kuningan, Tasikmalaya, and Ciamis in Indonesia.

Data analysis used in order to identify the needs of teachers, the skills of teachers, the problem of teachers, and the schools efforts in evaluating. Later on descriptive statistic used also to see the trend level of teachers’ needs and level of ability of teachers. Then, further analysis conducted to obtain the level of the gaps occurred.

The result of this research will be used as reference in arranging the teachers development model in evaluating student learning outcomes in CBT (competency-based teaching) in vocational schools in Indonesia.
Results
The results showed the high level of needs from the teachers to the material / content of competency-based evaluation activities, while teachers’ level of understanding about these aspects in the planning and conduct of the evaluation is still low. The result can be seen in the tables below.

<table>
<thead>
<tr>
<th>AVG</th>
<th>SMKN Bandung</th>
<th>SMKN Cianjur</th>
<th>SMKN Sukabumi</th>
<th>SMKN Purwakarta</th>
<th>SMKN Subang</th>
<th>SMKN Cirebon</th>
<th>SMKN Kuningan</th>
<th>SMKN Tasikmalaya</th>
<th>SMKN Ciamis</th>
</tr>
</thead>
<tbody>
<tr>
<td>LN</td>
<td>4.44</td>
<td>4.58</td>
<td>4.46</td>
<td>4.38</td>
<td>4.26</td>
<td>3.18</td>
<td>4.43</td>
<td>4.52</td>
<td>4.26</td>
</tr>
<tr>
<td>LC</td>
<td>0.42</td>
<td>0.63</td>
<td>0.39</td>
<td>0.28</td>
<td>0.37</td>
<td>0.36</td>
<td>0.38</td>
<td>0.42</td>
<td>0.36</td>
</tr>
</tbody>
</table>

LN: Level of need, LC: Level of comprehension

Table 1: Level of need versus level of comprehension
This is indicated the large gap between these two dimensions. The size of gaps for each vocational school showed no significant difference, i.e. to the level of needs from the teachers in evaluating is high, whereas the level of teacher ability is quite low. The chart below is provided:

Figure 1: The level of teacher needs versus the level of teacher ability
The large gap between these two dimensions showed the teachers problem in conducting the evaluation. The high level of needs from the teachers to the material / content of competency-based evaluation activities reflected the lackness of training and guidance from the school and also education department in city or province. It demands the education department in city or province to introduce more about basic scheme of evaluation system as references for the teachers.

The sosialization of the evaluation system also can be conducted by the schools for their teachers. Some material needed are:
1. The basic principles of Evaluation based on competences
2. The implementation of evaluation
3. The application of quality guarantee in conducting evaluation
4. The evaluation reports
5. Monitoring the implementation of evaluation based on competences
6. The preparation of evaluation administration
7. The analysis of evaluation result
8. The report of evaluation result

The education department in city or province and schools shouldn’t consider that the improvement of teachers’ skills in evaluating is only the teachers’ responsibility. However, it needs the involvement of all stakeholders in order to conduct good quality of education.

The result of this study can be used as main references in arranging Teachers’ skills Development Model in The Evaluation of Competency Based Student Learning Outcomes in Vocational Schools in Indonesia.

The large gap can be minimized by arranging teacher’s skill development model in the evaluation of student learning outcomes in CBT. The competency indicators in evaluation should be relevant with the world of work. In measuring those competencies, Teacher skills in in evaluating is very important.

References
Building pre-service teachers’ capability through cognitive apprenticeship

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Abstract: As the economic society developing quickly, our education system is getting on its high-speed road. Teachers play an important role in the education system. And the quality of teachers is a key element in the education innovation. As the reserves of teachers, pre-service teachers should be fostered in a delicate situation. We find that cognitive apprenticeship is a right one. Cognitive apprenticeship is based on the situated cognition theory. As its process well matched the pre-service teachers’ grow process, we’re trying to establish an education model which can build up the pre-service teachers’ capability according to the cognitive apprenticeship.

Keywords: Cognitive apprenticeship; pre-service teacher; education model

Rationale for cognitive apprenticeship

The intension of cognitive apprenticeship
Cognitive apprenticeship is viewed as an “instructional tool” (LeGrand,Farmer & Buckmaster,1993) that is aimed at acquiring thinking skills such as cognitive skills and meta-cognitive skills resulting in sustained participation within a community (Brown et al.,1989; Collins,Brown & Newman,1989) and applicable to solving future problems (Le Grand, et al.,1993).

Collins et al. (1989) pointed out that in cognitive apprenticeship, learners can observe how experts deal with problems in an authentic context, and they can learn to solve the same or similar problems by “learning-through-guided-experience” in authentic activities.

The basic steps of cognitive apprenticeship
The breach between learning and use, which is captured by the folk categories “know what” and “know how”, may be a product of the structure and practices of our education system( John Seelybrown, Allan Collins,Pau Duguid,1989).Some cognitive apprenticeship models have been constructed to enhance learning and instruction (For example: LeGrand et al., 1993; Collins et al.,1989; Farmer et al.,1992). The model that Collins et al.(1989) proposed is divided into six major steps:

a) Modelling: the experts demonstrate and explain their way of thinking for students to observe and understand.

b) Coaching: the learners practice the methods, while the experts advise and correct.

c) Scaffolding: through increasing the complexity of problems and decreasing the level of assistance according to the learners’ progress, the experts progressively help the learners successively approximate the objective – accomplishing a task independently.
d) Articulation: the learners are given opportunities to articulate and clarify their way of thinking.

e) Reflection: the learners compare their own thoughts with those of experts and peers.

f) Exploration: the learners manipulate and explore the learned skills or knowledge to promote their true understanding.

Theoretical foundations of cognitive apprenticeship
The cognitive apprenticeship model is a model of learning with its roots in the situated cognition theory, which has two fundamental tenets about learning. Firstly, the theory suggests learning as a process which is naturally linked to authentic activity, context and culture (Brown et al., 1989a, 1989b; Palincsar, 1989; Lave, 1988, 1993). Secondly, the situated cognition theory assumes that learning and skills are also to be acquired through social interactions, communications and collaboration with peers and experts about authentic contexts (Collins et al., 1991; Collins et al., 1990). When multiple viewpoints, perspectives and opinions are shared within a group, individuals can comprehensively process concepts and information by seeing their relevance and value within a specific context (DeFillippi and Ornstein, 2003).

The process of build pre-service teachers’ capability through cognitive apprenticeship
As pre-service teachers, their final aim is to be a teacher. No matter how much knowledge they have mastered, their responsibility is to let the students know how to learn. So the teaching academic content is a key element which decides their future teaching capability. Cognitive apprenticeship sets up a right way to build their teaching capability. In the teaching process of education major in normal universities, much better teaching results will be achieved by applying cognitive apprenticeship. We have proposed an instructional model of cognitive apprenticeship which can be employed to improve pre-service teachers’ capability.

Modelling
A cognitive modelling strategy, with teachers and competent students serving as cognitive role models, is a key characteristic of cognitive apprenticeships. The models should put their thoughts and reasons into words while explaining and demonstrating certain actions, because students cannot otherwise monitor the thinking process (Meichenbaum, 1977; Shunk, 2000). These think-alouds allow students to build a conceptual model and acquire an integrated set of cognitive and meta-cognitive skills through processes of observation (Collins, Brown, & Newman, 1989; Collins, 1991).

In cognitive apprenticeship practices, students work with teachers and experts who use higher-level thinking processes; they are exposed to these processes through cognitive modelling (Hogan & Tudge, 1999). Teachers or experts give modelling classes aiming at making the experts’ teaching process explicit to pre-service teachers. It can be done both in pre-service teachers’ own learning classes and in other classes that the pre-service teachers take the place of their teacher’s assistants. Cognitive apprenticeship may encourage greater levels of retention and transfer. Learning within the cognitive apprenticeship framework is situated in a context similar to that in which experts actually practice (Resnick, 1989).

Coaching and scaffolding
Cognitive apprenticeship encourages authentic activity and assessment. The most important emphases of the learning environment in cognitive apprenticeship are
situated learning and the culture of expert practice (Collins, Brown & Newman, 1989). These elements are addressed together because they share many characteristics. Although coaching does not enjoy the familiarity of its cousin scaffolding in the research literature, some researchers call it “the thread running through the entire apprenticeship experience” (Collins, Brown & Holum, 1991).

Cognitive apprenticeship provides students with authentic tasks; it encourages them to think like and to be treated as experts (Collins, 1991). In this step, pre-service teachers can be given opportunities to have a class in which he or she acts as a teacher. In these classes, pre-service teachers should practice their skills which were learned in the former step. Collins et al. (1989) pointed out that approaches such as cognitive apprenticeship (Collins, Brown & Newman, in press) that embed learning in activity and make deliberate use of the social and physical context more in line with the understanding of learning and cognition that is emerging from research.

Articulation and reflection
Articulation and reflection are two more hallmarks of cognitive apprenticeship practices. These components are discussed together as they often go hand-in-hand in practice. Articulation is defined as “the act of giving utterance or expression” (Merriam Webster’s, 2001). Merriam Webster (2001) defines reflection as “consideration of some subject matter, idea, or purpose.” Reflection has been identified as one of the most important, yet neglected, aspects of learning and instruction.

In this step, students should articulate their thinking and logic process which exist in their practicing teaching classes. Students should also make a reflection on their teaching practice. At least they should find out their strong points and weak points during the process so as to improve their capability.

Exploration
Exploration in cognitive apprenticeship is pushing students to try out their hypotheses, methods, and strategies that are similar to those the experts use to solve problems with (Collins, 1991). The responsibilities of the teacher to foster students’ explorations include gradually reducing support, encouraging students’ autonomy, and transferring responsibility to students (Rogoff, 1990). The goal of the students is to actually use their mental models of experts’ cognitive processes on their own or as a group to find and solve problems, to set achievable goals, to test hypotheses, and to make their own discoveries (Collins, 1991).

Concluding thoughts
Applying cognitive apprenticeship approach in Normal School has its challenges. Some pitfalls in employing the cognitive apprenticeship model include:

Advanced facilitative teaching skills are required in cognitive apprenticeship.
The cognitive apprenticeship model is base on the environment learning; during this progress there is more responsibility shouldered by teachers. Teachers not only have to be familiar with academic knowledge, also have to take their learning or teaching progress into a pellucid way and build the learning environment. So in the cognitive apprenticeship model, teachers need advanced facilitative teaching skills. It means higher require for the teachers.

We may in a dilemma when arrange the teaching environment.
In Normal Universities, classes are always proceed in the traditional classes. But cognitive apprenticeship emphasizes on environmental learning. If cognitive apprenticeship still goes on in the traditional class, will the effect be weakened? If cognitive apprenticeship is proceed in a new environment, how should we deal
with the capability of a class? As we know, it is the “cognitive” apprenticeship. Apprenticeship itself always requires for a small class. But the reality is that we have lots of students to be educated. It is not clear that how large a class should be. If the number of the students and teachers is invariable, whether we should divide them into small class or not? In this way, measuring the quantity and quality is a matter that we have to deal with.

*Students’ creative ability should be paid attention to.*

In cognitive apprenticeship, students have models to imitate. Teachers and competent students provide a complete teaching form. The pre-service teachers only have to imitate their manner and experience. It has good effects on keeping the excellent teaching strategy and knowledge, but it may hinder the students to develop their own creative ability.

**References**


From quality management towards school development:  
The establishment of a new quality development concept – conclusions from a Chinese & German teacher training pilot project cooperation

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Summary: This short paper is about a Chinese-German paper on quality development on VET schools in Beijing. Tools and theories of German and Swiss pedagogical quality management were introduced, reflected and adapted in this project. These tools were referred to the classical fields of school development: improvement of teaching, organizational development, human resource development and development of cooperation. The most important issue in our project was the improvement of school-company-cooperation. This paper introduces our basic QM-concept and two evaluation tools: HOLAQ and the ERC tool. In the conclusions we reflect our conclusions from the project in respect to school development and intercultural learning.

Keyword: Pedagogical quality management, vocational education, school-company-cooperation, self-evaluation

Introduction
To improve the vocational education system in China has become a political priority. Especially the qualification of vocational teachers is regarded as a key issue. The Competence Development Program (CDP) for Beijing TVET teachers is a local government project, which aims to improve TVET teachers’ teaching in pedagogical and practical aspects. Beijing Municipal Education Commission (BMEC) and Beijing Finance Bureau jointly launched the project in the year 2007. CDP includes nine strands of quality improvement of the local VET systems, such as the provision of teacher training to improve the in-service training at the VET school premises and the cooperation with enterprises, the building of teacher teams, the support during teacher recruitment etc. CDP covers all TVET schools in Beijing to enhance the overall quality and development of vocational education and training.

This article is about a Chinese-German teacher training cooperation, which was one part of CDP. In this training, German approaches of pedagogical quality management were introduced and adapted by Chinese VET schools. The Bremen Institute of Technology and Education (ITB) and the Beijing Institute for Vocational and Adult Education (IVAE) accompanied the process. The idea of school development with quality management tools encompassed all levels of schools: development of teaching, organizational development, human resources development, and development of cooperation. We found that especially the topic of cooperation between schools and companies was an important topic for the Chinese VET schools.

Outline of quality development (QD) project
The goal of QD project was to support a participative school development process in
Beijing with pedagogical quality management systems developed in Germany and Swiss: Q2E (quality by evaluation and development, Steiner & Landwehr (2003)) and PQM – (pedagogical quality management, Kempfert & Rolff (2005)). Such pedagogical quality management encompasses five aspects: self-evaluation, external evaluation, individual feedback, development statement and steering. School’s self-evaluation refers to the idea that schools can develop their quality by evaluating their own performance and drawing conclusions out of these inquiries. Those conclusions should be realized with measures, which essentially change problematic aspects. Some time after those measures were implemented, an evaluation should be done to assure that changes occurred and which (side-)effects they had. External school evaluation in the German context means to gather information about the school especially for accountability purpose. In the Chinese context, it was interpreted as evaluation of the school by people who are not working or studying within the school, like parents and companies. Individual feedback refers also to a process of data collection and improvement, but it refers to the individual level. Single teachers, leaders or administration staff can ask for feedback to get to know where their strengths and weaknesses are. The school’s development statement shows up, which concrete development goals the schools has, so it is possible to evaluate after some time if the promised development took place or not. Quality development is most effective when the school members take responsibility for quality, and this happens rather probably when criteria for quality and quality assessment were defined in a participative way. Management and steering of the QM process is necessary to make sure that regulations concerning feedback and evaluation were made, that evaluation and feedback are conducted, that goals are clear to all school members and transparency is assured, and that measures resulting from evaluations were realized.

Tools, theories and philosophies connected with pedagogical quality management in the Swiss and German discussion were introduced in seminars in Beijing to managers and teachers of VET schools. It was the school’s task to adapt these tools and procedures to their own use.

**Evaluation instruments to support quality development process**

Especially evaluation was an important topic for the VET schools in Beijing. Besides questionnaires, two dialogue-oriented tools were used in the project: HOLAQ and the ERC Tool.

HOLAQ (holistic assessment of quality improvement) is a tool for self-evaluation. It is an open method to find out what strengths and problems an organization has and what can be done to improve its quality. This is done by making interviews with different school members – leaders, teachers, managers and students – in small groups. The interview results were visualised in schedules and maps and discussed with the organizations’ decision makers. It can be used as an evaluation to initialize improvement processes on a school, and should not be repeated very often, because the results are rich in content and should be rather discussed and realized than reproduced.

In the QD project, HOLAQ analysis was done for three VET schools in Beijing. Leaders, students, teachers, and administrative staff were interviewed by members of the Institute for Vocational and Adult Education (IVAE). It was found that the most appreciated five aspects in the interviews were: the schools itself, the teachers, teaching facilities, leadership and communication within the school together with students’ behavior. It was stated that the schools develop well and that they have clear and common goals. Especially teachers and students emphasize that the
schools wear social responsibility. The interviewed persons said that they work in a
good school culture, which is motivating and cares for a good learning atmosphere.
They appreciate that the schools are achievement-oriented, young, ambitious,
harmonic and fair; that they have rules, and encourage teamwork, but also that
they organizes interesting events. The teachers were admired because they are
hardworking and assiduous, but also nice, fair and democratical, motivating and
motivated, faithful and helpful. It is seen that they teach not only school knowledge,
but also how to behave in everyday’s situations. Teachers exchange their knowledge,
do further education, know and teach a lot, have many talents, are well prepared and
learn by side jobs. Teaching facilities were regarded as professional and practice
oriented, especially the quality of the books was recognized, and many found that
the campus of their school is nice. The interviewed persons appreciate their school
leadership because it is rational, direct and efficient; fair, democratical, but also stern.
Communication and information in school is regarded as good, when it is open and
transparent. Students’ behavior is valued when it is obedient and motivated. The
aspects regarded as most negative were lack of practice for students and teachers,
students’ attitudes, the educational reform, teachers’ further education and the
overburdening of teachers.

Since the school-company-cooperation is of great importance for the VET
schools in China, the QD workshop participants appreciate the ERC tool. In China,
cooperation between VET schools and enterprises is rather weak. VET schools
want to change this in order to learn more about occupational requirements and
because they want to support their students in getting a job after finishing school.
In some cases enterprises support schools by providing extra resources for the
learning equipment. Therefore there is a need to find out how this partnership can be
improved. For this purpose, the ERC tool was introduced in the QD project. The tool
grew from experiences while undertaking assessments in regional and national R&D
programmes (Manske et. al. 2002). The most important design element of the EE Tool
is a criteria-based questionnaire. The criteria were selected on the basis of innovation
theory research literature (Deitmer & Heinemann 2009). ERC is a method which
supports the network partners to self-evaluate and exchange their perceptions about
the common goals of the partnership, the partnership structure, the communication
and learning processes and the network results. It was intended that this type of
discursive and participative evaluation should help the actors to gradually develop a
clearer strategy to set up the right objectives and action plans for the partnerships.

Results from QD project: Recommendations and perspectives

In this project, German researchers had the opportunity to learn more about Chinese
culture and ideas of school development. One great difference from their point of view
is the hierarchical thinking in schools: while in Germany teachers were regarded as
motor for school development and school leaders are only “primus inter pares”, the
Beijing school leaders and managers define quality and measures to its improvement
without teachers’ or students’ participation. This project introduced evaluation tools
which involve teachers and students to gain information. Such tools were accepted
by the schools, but the decision making remained in the hands of the leaders. In
some evaluation seminars (BITC 2009) the users of the tools reflected on this aspect.
As one participant said, “By using ERC methodologies we as teachers moved from
an object of evaluation to a subject of evaluation.”

It was interesting to see that there were also similarities between Beijing and
Bremen (besides the people’s love to bicycles). The HOLAQ analysis pointed
to three central aspects in schools life: overburdened teachers, unmotivated
students and political reforms causing irritation. In Germany as in China, there is a need to improve the dialogue between schools and industry. In China, curricular arrangements between learning in school and in practice, learning frameworks, and practical learning task still have to be defined individually between VET schools and companies, which makes the external evaluation tools very useful.

Our experiences especially with the ERC tool show that the dialogue triggered by the different sets of criteria enabled the company and school partners to recall the history of the partnership, pointing out the effects of the partners’ activities, at once quantified (with the help of the quantitative elements of the evaluation method) and textual (the arguments and explanations on the scoring and weighting figures by the participants in the evaluation session). Furthermore, in the reflection about the evaluation sessions in all cases it became clear that a major contribution of the evaluation was not just the identification of strengths, weaknesses and threats but also to allow more visibility of the state of the art of the co-operation practices. The members received a deeper understanding of their own activities in relation to other activities. For the future of the cooperation there is a need to continue dialogue between schools and industry. To improve vocational education in China requires the development of learning frameworks, transparent curricula and adequate learning tasks.

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Australian vocational education teachers’ qualification and standards: Experience and borrowing from TAA training packages

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Summary: Australian TAA (Teaching and Assessment) training package, which defines the competencies of teaching and assessment for vocational teachers, is composed of eight competency modules: Learning Environment, Learning Design, Delivery and Facilitation, Assessment, Training Advisory Services, Coordination, Management and Quality of Training and/or Assessment Services, Language Literacy and Numeracy Practice, and Imported Units. The eight modules cover the requirement of both Certificate IV and Diploma, among which, Certificate is the benchmark and the Diploma is higher requirement.

Keywords: Australian vocational education teachers; qualification and standards; TAA training package; competency modules

Australian vocational education teachers’ admittance system

Training package is an important official document and teaching code in Australian vocational teaching and training system. It stipulates the necessary competencies that a vocational teacher should possess and has two levels: Certificate IV and Diploma.

Vocational education teachers’ qualification and training regulated by government

Australian vocational education pays great attention to teachers’ development and has a set of sophisticated staff cultivation plan, management system and incentive mechanism. It does not focus on the teachers’ diploma and title but on how to make them lifelong learners.

The admittance conditions for vocational education teachers

Australia has built strict teacher admittance system. There are three necessary conditions to become a vocational teacher: The first one is professional qualification certificate. Vocational teachers should at least have the same level with their teaching. Generally, they should at least have college degree or above. The second one is vocational teacher certificate, which is Certificate IV in TAA training package (recently, this certificate is newly titled as CIV TAE)¹. Certificate IV includes the detailed requirements for teacher’s delivery and assessment competencies. Generally, most of the teachers should have diploma of college degree. ²The third one is at least 3-5 years’ professional working experience.

Australian vocational education teachers’ qualification and standards – TAA training packages framework system

TAA training package is composed of 8 competency modules and 55 competency units. ³The core concept of this competency system is to make vocational teachers rear learner-centered idea, pay attention to students’ learning process and give students the utmost support.
TAA training package’s competency modules

The 8 competency modules of TAA training package are: Learning Environment, Learning Design, Delivery and Facilitation, Assessment, Training Advisory Services, Coordination, Management and Quality of Training and/or Assessment Services, Language Literacy and Numeracy Practice, and Imported Units, such as communication and coordination competency. These competencies are described in Figure 1 and all the competency units in the two qualification levels in training package are covered.

1. Learning Environment Coordination
This module includes competency units of effective working, creating inclusive learning atmosphere and insuring safe and healthy environment. Besides, teachers with college degree should actively take part in specialty development and improvement.

2. Learning Design
This module consists of two main competency units: one is understanding and using training package and the other is designing lesson plan. Besides, teachers with college degree should have the competency of designing professional lesson plan (talents cultivation scheme) and developing teaching resources.

3. Delivery and Facilitation
This module is composed of competencies of arranging class delivery, work-centered
teaching and individual teaching. Besides, teachers with college degree should have higher teaching theory and competencies of net-work and project teaching.

4. Evaluation/Assessment
This module is different from traditional pure knowledge assessment, but lays emphasis on competency. It includes units of affirming standards, organizing assessment, designing assessment tool and collecting materials and data. Besides, teachers with college degree should have competencies of more rational thoughts, detailed scheme and comprehensive analysis.

5. Training Advisory Services
This module refers to delivering teaching information for learners exactly and timely as well as recording and presenting assessment result for them.

6. Management and Quality of Training and/or Assessment Services
This unit is higher requirement for teachers with college degree and it includes five competency units.

7. Language Literacy and Numeracy Practice
This module asks teachers to fully consider learners’ level and character in teaching and to express exactly, scientifically and to be easy to understand in writing/speaking.

8. Imported Units
This module is a supplement to those core competency units. The training package imports 5 competency units for certificate IV and 11 for college degree.

The functions of TAA training packages and their related qualification levels
The training package prescribes requirements for teaching and assessment and it is the guideline for teachers’ admission and their further education. Certificate IV is the benchmark. It contains 12 compulsory units (core units) and 10 supplementary units in which No. 2 must be chosen. College degree diploma is higher requirement, to which 5 compulsory units and 26 supplementary units (No. 7 must be chosen) should be added.

Evaluation of vocational teachers’ qualification and standards
Through analysis, we find Australian vocational teachers’ qualification and standards have the following features.

1. Focus on teachers’ coordinating development of delivery and evaluation competency:
   This qualification and standard highlight school-based and work-based competencies, especially the systematic technique assessment. This is the essence and the soul of the training package.

2. Focus on teachers’ synchronous development of teaching design and management competency:
   This qualification and standard extrude the integrated cultivation of teacher’s competency of teaching design, even professional project design. It also combines competency of coordination and management together, which runs through the whole process of talent cultivation.

3. Focus on vocational teachers’ key competency:
   This is the common feature of Australian training package. It embodies that student is teacher’s serving object, that is, “client”, and therefore, student and teacher should build a good client relationship.
China’s first vocational teachers’ standards in Chongqing

Since 2005, based on the local practice, Chongqing’s Sino-Australian Vocational Education and Training Program has developed Chongqing Secondary Vocational School Professional Teachers’ Competency Standards(Trial). The standards cover the following 9 competency realms (competency modules) and their 30 competency units: profession morality, industry contact, curriculum design, delivery organization and implementation, student accreditation, exchange and cooperation, profession safety competency, students management and speciality development (see in Figure 2).

![Chongqing Secondary Vocational School Professional Teachers’ Competency Standards Graph](image)

**Figure 2: Chongqing Secondary Vocational School Professional Teachers’ Competency Standards**

The four perspectives of competency realms, competency units, competency elements and competency manifest index bring forward detailed requirements for vocational teachers who are further divided into elementary level, secondary level and higher level. The requirements increase successively and the requirements of higher level cover that of lower level.\[13\]

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Research on operation mechanism of new apprenticeship in cultivating model in hospitality management of high vocational college

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Summary: This paper introduces a case of a new apprenticeship program implemented between a vocational college and a hotel. The students will work as apprentices in the real work environment 3 days per week (hotel), and learn theory in college 2 days per week. It is called “3+2” working-learning alternate cultivating model. As an actual result, the students taking part in this program get higher employment abilities than those learning at school. The paper shows the problems the program still has to deal with and how successful promotion of students, colleges and enterprises works.

Keywords: Hospitality industry, new apprenticeship, school-enterprise cooperation, cultivating model

Background

In the past, in-company training without vocational schools was the main model to qualify people professionally. The major characteristic was "learning by doing". Apprentices learned practical knowledge, skills and attitudes by taking part in the work process. Along with the industrial revolution and large-scale mechanized production systems, this apprenticeship system had to change to meet the new challenges. Vocational colleges and universities became the central institutions. Since the 1980s, we have realized the advantages of the old apprenticeship system and the weakness of vocational colleges and universities. They are not able to cultivate professional ethics, excellent working habits and identification with one’s vocation. According to the modern requirements, many countries (especially developed countries) fused the characteristics of the traditional apprenticeship system and the modern vocational school education, and so created a new kind of apprenticeship. Its main feature is to “implement school-enterprise cooperation, working-learning alternation cultivating model”.

The hospitality industry has been very prosperous in China in the recent years. All big international hotel groups started their business. Chongqing as the biggest city in western China is very popular among them. There have been 15 five-star hotels in Chongqing until 2010, and at least 5 five-star hotels are to come in 2011. It is obvious that human resource is the most competitive factor, focusing on qualified and skilled staff. In China, high vocational colleges aim at the hotels’ human resource demand.

The hospitality management graduates from high vocational colleges must have excellent specialized theoretical knowledge and also excellent practical skills to meet the market requirements. This makes us responsible for the very high requirement of practical training. In the traditional cultivating model, classroom teaching and simulative practice were not completely able to develop the students’ vocational competence. The new kind of apprenticeship which combines college education and hospitality employment is the best way to qualify people.
Implementation of “3+2” working-learning alternate cultivating model

“3+2” Program summary
Chongqing Industry Polytechnic College (CQIPC) and Chongqing Yangtze River Holiday Inn implement a cooperation to qualify hospitality management students. The students work as apprentices in the hotel 3 days per week, and learn theory in college 2 days per week. Every student has three different positions in different operational departments during 4 semesters. It is called “3+2” working-learning alternate cultivating model. In the program, all of the three partners (college, hotel and student) benefit from the cooperation and so motivate its promotion.

<table>
<thead>
<tr>
<th>benefit points</th>
<th>students</th>
<th>enterprises</th>
<th>colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>◆ advance working skills</td>
<td>◆ get suitable staff</td>
<td>◆ reduce teaching costs</td>
</tr>
<tr>
<td></td>
<td>◆ adaptability in workplace</td>
<td>◆ cultivate HR in support</td>
<td>◆ advance teaching quality</td>
</tr>
<tr>
<td></td>
<td>◆ work experience</td>
<td>◆ reduce HR cost</td>
<td>◆ good relationship with the industry</td>
</tr>
<tr>
<td></td>
<td>◆ good understanding of enterprise culture</td>
<td>◆ solve staff shortness</td>
<td>◆ good social reputation</td>
</tr>
<tr>
<td></td>
<td>◆ priority of employment</td>
<td>◆ advance staff satisfaction</td>
<td>◆ good advertisement to attract more students</td>
</tr>
</tbody>
</table>

Table 1: Benefit points of three partners in the school-enterprise cooperation
Chongqing Yangtze River Holiday Inn participated in the whole qualification process of students. College and hotel created the cultivation plan and relevant curriculums together. Students developed their vocational competence at the workplace by solving real work tasks.

“3+2” Program cultivating plan in 3 years
To ensure the students finish the theoretical courses and practical training to fulfill the competence standards of already qualified staff working in Chongqing Yangtze Holiday Inn, CQIPC made a 3-year cultivating plan as can be seen in the following table.

During the four semesters of “3+2” working-learning alternate program, students had 3 days apprentice training per week in the hotel. On the whole, students have 62 weeks of apprentice training there. This is more than half of the whole cultivating plan. It is very important that the hotel makes an adaptive arrangement to operate the apprentice training program.

Aiming at a complete vocational competence, we decided to integrate four different training positions in the operation department including Front Office Department, Food & Beverage Department, HKSP Department. Students undertake service jobs for the guests, and also some lower-level management jobs.

“3+2” Program apprentice training plan in hotel
The managers of each department were responsible for the successful training and assigned an excellent employee as tutor for the student. The following table is an example of a student’s apprenticeship program plan in the hotel.
Semester Contents & Schedule Total Time

Semester 1  theoretical courses and simulative practice in college (20 WEEKS) 20 WEEKS

Semester 2 Theoretical courses in college (2 WEEKS) Orientation in hotel (1 WEEK) “3+2” working-learning alternate between college and hotel (16 WEEKS) Conclusion, assessment, evaluation in college (1 WEEK) 20 WEEKS

Semester 3 Theoretical courses in college (2 WEEKS) Orientation in hotel (1 WEEK) “3+2” working-learning alternate between college and hotel (16 WEEKS) Conclusion, assessment, evaluation in college (1 WEEK) 20 WEEKS

Semester 4 Theoretical courses in college (2 WEEKS) Orientation in hotel (1 WEEK) “3+2” working-learning alternate between college and hotel (16 WEEKS) Conclusion, assessment, evaluation in college (1 WEEK) 20 WEEKS

Semester 5 Theoretical courses in college (2 WEEKS) Orientation in hotel (1 WEEK) “3+2” working-learning alternate between college and hotel (16 WEEKS) Conclusion, assessment, evaluation in college (1 WEEK) 20 WEEKS

Semester 6 Work at a fixed position as a trainer (19 WEEKS) Graduate from college (1 WEEK) 20 WEEKS

Table 2: “3+2” program cultivating plan

<table>
<thead>
<tr>
<th>Semester</th>
<th>Department</th>
<th>Position</th>
<th>Tutor</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>F.O</td>
<td>Telephone of GSC</td>
<td>Tom (supervisor of GSC)</td>
</tr>
<tr>
<td>3</td>
<td>F&amp;B</td>
<td>Waitress of Café</td>
<td>David (head waiter of Café)</td>
</tr>
<tr>
<td>4</td>
<td>HSKP</td>
<td>Room attendant</td>
<td>Linda (supervisor of Floor)</td>
</tr>
<tr>
<td>5</td>
<td>F.O</td>
<td>Receptionist of Front Desk</td>
<td>Grace (supervisor of F.D)</td>
</tr>
</tbody>
</table>

Table 3: “3+2” program apprentice training plan in hotel

When students successfully finish these four training categories, they get a fixed contract in the hotel in the 6th semester.

Problems in the “3+2” program

The implementation of the “3+2” working-learning alternate apprentice program has brought difficulties. The reasons lie in the hotel staff, teaching regulations of the college, and the students’ and their parents’ skepticisms towards this new kind of apprenticeship. Through a questionnaire that the students filled in after the first semester, we found out that they identified themselves less with their vocation than before. There are 3 main reasons for this situation:

- The department employees give the students simple and repeated work. As a result, the students get bored; lose their interest in the work process and also their identification with the profession.
It is difficult to implement the perfect training plan created by the hotel managers. When it gets busy, students are assigned to do service work and lack time to be trained promoting their competences.

As the students spend their major time in the hotel, they fear that they don’t have enough time for theory in college or other activities.

As we know, students are the motile factor in this apprenticeship program. Therefore, we need to create a good environment to inspire the students’ vocational interest.

**Possibility of experience share**

In the 3 years of CQIPC and the Chongqing Yangtze River Holiday Inn cooperating with each another, we gained some experience about how to implement the new apprenticeship program:

- As a college, we should prudently choose an adaptive enterprise as a partner. The general manager of the enterprise should fully approve the working-learning alternate cultivating model and greatly support the program. The enterprise should employ a large number of people and have a collectivist management, so that there is flexibility of personnel demand to offer more training opportunities to the students.

- In order to implement the “3+2” program step by step, college, students and hotel have made great efforts by establishing some innovations in the original regulation system. Holiday Inn introduced a series of innovatory regulations for the “3+2” program, especially the “General Manager Responsibility Regulation”, “Tutor Guidance Regulation”, “Student Individual Apprentice Training Plan”, “Special Assessing Regulation”, “Conclusion Conversation” etc. The hotel offers the students the opportunities to participate in the service for large-scale international activities. Students can also participate in the evaluation of “Compass Prize” in the Holiday Inn. IHG (Intercontinental Hotel Group) offers “IHG Academy Scholarship” for the trainees. The hotel provides employment and practice opportunities in other cities, such as Beijing, Shanghai, and Shenzhen. These special regulations and opportunities inspire students to stay enthusiastic about joining work and increasing their vocational identification.

- Choose a responsible teacher as the program coordinator of the “3+2” program. At the beginning of the apprenticeship, students often undergo psychological changes. It is important for the program coordinator to offer good counseling to the students and to improve their confidence in vocational training.

- Establish the regular meeting system for both sides (college and enterprise) to ensure a good and timely communication.

**References**


Framework for effective collaboration between public training institute and industries in vocational education and training of apprentices

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Summary: This study analyzes the key determinants of the effectiveness of collaboration between public and industrial training institutes. It aims at developing potential factors and eventually a framework that can be alternative solutions to enhance cooperation between the stakeholder in the apprenticeship training. The close collaboration of industry and institute can develop a competent and highly skilled workforce. Consequently, quality work based training in vocational education and training for the apprenticeships performance can be realized. Therefore, evaluation feedbacks on the quality of teamwork of the experts, trainers, teachers and apprentices are used to develop a framework for effective collaboration. This sample consists of 30 interviews, 100 survey questionnaires and four focus group discussions and workshops.

Keywords: Goal-setting, partnerships development, management of cooperation, impact of learning and skills development and evaluation

Introduction

Active cooperation between companies and institutes can have a significant impact on the vocational learning progress of apprentices or trainees (Deitmer 2003). Therefore, transformation of learning and teaching strategic and obvious capacity for effective actions requires the establishment of stronger interaction between workplace experiences and systematic theory based learning on the institute (Heinemann/Maurer/Rauner 2009; Deitmer 2003). This arrangement is strongly linked to quality work-based training. Accordingly, Krewerth et.al (2008) showed the importance of collaborative working as a method of increasing learners and trainers’ professional development. A closer cooperation, between the institute and the company, is essential for student to assess quality learning experience, and work-learning task (Heinemann / Maurer / Rauner 2009). The purpose of this study is to identify the key factors that have the potential to develop cooperation and the framework for effective collaboration between public training institutions and industry. With the better coordination and arrangement, partners can ensure that the work process and technology transfer in the industry can be realized and studied in depth by the apprentices.

Goal setting

Firstly, research has identified that the goal-setting would affect the successful
cooperation. According to Bergstrom (1995), Rinehart, Laszlo & Briscoe (2001), Arotake (2003), Deitmer et. al (2003) and Head (2005), goal setting binds people together and inspires them to fulfil their deepest aspiration. Having these values, it is much easier to realign and utilize all resources to maximum effectiveness (Wood & Gray 1999, Bergstrom et. al 1995).

Partnerships development
Secondly, the factors that influence the development of partnerships for the implementation of apprenticeship program in VET are structured the joint committee. This is to align the process and implementation so as to achieve strategic goal (Wood and Gray 1991, Shelbourn et. al 2005). Having trust and mutual respect, an environment that not only permits but also promotes learning will be provided (Deitmer & Heinemann 2007, Deitmer and Ramli, 2007).

Management of cooperation
Thirdly, this study has identified factors that influence the management of collaboration. Established memorandum of understanding which includes an agreed term of reference of shared understanding, shared planning and shared - integrated instruction. It specifies the circumstances in which consultation will occur. It also encompasses areas of core business and policy development, role and responsibilities (Arotake 2003, Schrage 1990, Montiel-Overall 2005).

Impact of learning and competencies
Fourthly, it has determined the impact of learning and competence factors that influence the ability of successful cooperation. The learning has developed highly qualified workers with qualification, expertise, self-organized and support form of learning through work process acquisition and understanding the complex knowledge required by employers in modern organization (Rauner 2007, Spoetll 2008, Fischer, Boreham & Nyhan 2005).

Evaluating the collaborative performance and dual system in use
Fifthly, evaluating performance of a collaborative partnership and the dual system used to affect cooperation. The innovative tool (ERC) applies formative evaluation where the team member hears feedback from partners. They will evaluate individually and consensually. They give feedback on what is working well and what is not working well in the course of implementing the apprenticeship program (Deitmer et. al 2003). Organization should rely on appropriate evaluation measures for better performance (Stahl, Gustavsen, Ennal & Nyhan 2007, Helen English Association, Brian Head 2004, Donham 1999).

Development of a framework
Finally, to develop a framework or model for effective cooperation should be based on the identified factors. A strong relationship required constant communication to develop high quality vocational education between employers and training provider specifically instructors and coaches from different agencies. In this context, partnership is based on characteristic of work (Rauner and Bauer 2003; Deitmer 2007, p139; Deitmer and Heinemann 2007; and Deitmer and Ramli 2007). The main debate is on the element like (1) communication, (2) cooperation, (3) trust, (4) evaluation and (5) feedback.

Results
The correlation analysis among key components affects the effective collaboration. The factor analysis is done by using spearman’s rho (r) to conform for correlation (see Figure 1). All the elements have a positive correlation value between 0.609
and 0.746. These correlation values indicated that the magnitude of the correlation was significant. In general, this link shows that the expected elements of successful collaboration will be more effective with the increase of performance of all factors involved in the studies.

![Diagram](image)

Figure 1: The strength of the correlation between factors contributing to effective collaboration

The total amount of 100% (see Figure 2) of the effectiveness of collaboration predictor factors is mostly contributed by goal setting (28%), partnership development (17%), management cooperation (19%), the impact on learning and competence (23%), and evaluating of collaborative performance and dual systems in use (13%).

![Graph](image)

Figure 2: The overall weighting and scoring of focus group

**Discussion**

Significant correlation between the effectiveness of collaboration and the five factors has shown that the more often they communicate about the goals, business requirements, teaching and learning activities, the cooperation among them will be more strengthened. This result supports the finding by Deitmer et al (2003),
Montiel-Overall (2005), Stahl (2007), and Deitmer and Ramli (2007). The result of focus group workshop (see Figure 2) also connotes effectiveness of collaborative projects; particularly those related to the implementation apprenticeship scheme which may depend on the factors above. Hence, the predictors of the effectiveness of cooperation in the implementation Dual System for apprenticeship schemes conformed to the previous study. This study provides information on the sub-factors that need to be addressed by institutions and industry in order to increase cooperation among themselves with respect to the effectiveness of collaboration predictors. They are clear goal, trust, role and responsibilities and level communication, assessment on cooperation and feedback. They are grounded in a framework and supporting factors in an effective collaboration.

References


Reforming VET teacher education
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Summary: For many years school authorities and their school administrations have encountered a significant number of workforce planning challenges in Alberta, one of Canada’s provinces. Challenges include active labour markets, pending educator and teacher retirements, higher student enrollments, class size concerns, high attrition of beginning teachers, declining number of individuals studying in the education field, and a substantially lower number of people who are qualified to teach Career and Technology Studies (CTS) subjects. The CTS program of studies and related curricula for secondary school education (i.e., grades 7 to 12) are part of Alberta’s vocational education and training (VET) system. Of particular importance is how to improve the quality of university VET pre-service teacher education programs.

Keywords: Pre-service teacher education, Bachelor of Education degree, secondary education, VET teacher qualification

Introduction
School authorities and their school administrations have encountered a significant number of “workforce planning challenges” (Government of Alberta, 2010, p. 2) in Alberta, one of Canada’s provinces. Challenges include active labour markets where individuals are opting for occupations outside of the teaching field, increasing number of educator and teacher retirements and higher student enrollments, larger class sizes, more beginning teachers leaving their teaching careers within the first five years, fewer individuals studying in the education field, and a substantially lower number of people who are qualified to teach Career and Technology Studies (CTS) subjects (Government of Alberta). The CTS program of studies and related curricula for secondary school education (i.e., grade 7 to 12) are part of Alberta’s vocational education and training (VET) system. A major concern is how to improve the quality of existing university VET pre-service teacher education programs, which will potentially increase the number of individuals qualified to teach VET subjects in the secondary school system.

The purpose of this discussion is to investigate how university VET pre-service teacher education programs can be redefined and reformed in Alberta to advance VET teacher content specific and pedagogic competencies. Specifically, this discussion’s focus is the Bachelor of Education (B.Ed.) program that prepares individuals to teach Alberta’s VET secondary school subject areas: Business, Administration, Finance and Information Technology (BIT); Trades, Manufacturing, and Transportation (TMT); Health, Recreation and Human Services (HRH); Natural Resources (NAT); and Media, Design, and Communication Arts (MDC) (Alberta Education, 2010). Students enrolled in the B.Ed. program with a major or minor specialization in one of the VET subject areas have varied work experiences as well as diverse formal and informal education credentials. For example, there are: a) individuals who have a concentrated interest in a VET subject area with minimal work experience or education but have a willingness to learn what is needed in
order to teach their selected VET subject, b) individuals who have non-credentialed training and significant work experience, and c) individuals who have industry and institutionally recognized credentialed qualifications (e.g., journey certification by means of successful completion of an apprenticeship program, two-year diploma, or three- or four-year bachelor degree) and related work experiences.

**Methodology**

This discussion draws on data collected for the *Alberta Career and Technology Studies (CTS): Teacher recruitment, retention, and education* study. This three-year study (2009-2011) is a province-wide research project designed to propose and establish strategies to build a CTS teacher recruitment and retention framework that support Alberta’s Ministry of Education’s *Education Sector Planning Framework for Action* initiative and to initiate and implement ideas to improve practices for pre-service, professional development, and graduate education. This study is comprised of four parts: on-line survey questionnaire (2009-2010), interviews and focus groups (in progress), classroom visits (2011), and VET project collection (2011). The appropriate ethics review boards and participating school authority superintendents, school principals, and VET teachers have approved this research. The data set for this discussion is the on-line survey questionnaire responses (n>220) and one-to-one interviews and focus groups (two or more participants) (n=25) with 37 participants.

**Results**

Analyses of the data collected indicate that for Alberta’s VET pre-service teacher education programs there are three distinct categories of individuals who are interested in earning their B.Ed. degree. Students in this B.Ed. degree program with a major or minor specialization in one of the VET subject areas want to learn how to teach VET subjects in Alberta’s secondary school system. Individuals enrolled in the VET pre-service teacher B.Ed. degree program are: a) the amateur with an intense interest in developing and/or honing craft skills and knowledge, b) the professional who perhaps has some credentials and typically broad work experiences in his/her chosen VET field, and c) the skilled tradesperson who has extensive work experiences and industry and institutionally recognized credentialed qualifications (Watt-Malcolm & McPherson, 2010). For this third category, credentialed qualifications include completion of: a) a government apprenticeship program where successful completion earns the individual a journey certification or ticket, b) a two-year diploma, or c) a three- or four-year bachelor degree.

Each of the three categories requires a particular approach for pre-service teacher education to ensure that individuals gain the required pedagogic knowledge and skills, and, in some cases, the content specific information and technical skills to teach VET secondary education subjects (e.g., the amateur). Studying the categories and possible pedagogical approaches also contributes to how VET teachers’ professional competence is viewed. An examination of the requirements for these three categories encourages contemplation about what it means to promote subject specific and work process knowledge. Lastly, it is here that universities can consider different ways to provide meaningful training and education for pre-service VET teachers and their subsequent qualifications and certifications.

The roles of VET teachers in Alberta’s secondary schools can be identified in two ways. First, the vocational teacher is part of a professional body that is bound by a code of ethics governed by the Alberta Teachers’ Association. These codes are principles that outline acceptable behaviour between teachers and their students,
colleagues, and employers as well as to their profession (Bezeau, 2007). Second, teachers also have obligations and responsibilities because they work with youth. Other aspects that guide the teaching profession are collective agreements, educational policies, teacher certification, and professional development. It is within this context that data were collected for the Alberta Career and Technology Studies (CTS): Teacher recruitment, retention, and education study. When participants were asked the on-line survey question: Do you feel your teacher education program prepared you for your current CTS teaching assignment, 62 per cent of those who responded to this question (n=215) indicate that their programs did not prepare them for current VET teaching assignment but 78 per cent agree that VET is their subject area of choice (n=213). Nonetheless, many of the teachers who responded to this question state that they did not originally plan to teach one of the VET subjects. There was a mixed response about how previous work experiences have contributed to their current VET teaching assignments. Some of the respondents have journey certifications or had jobs that help them in their classroom and shop environments. Many agreed that more emphasis on the Alberta CTS program of studies for pre-service teachers is required, a point that is clearly the responsibility of the university.

The study results also support a pedagogical approach that considers distinct program pathways to build the exploration as well as the development of VET skills and knowledge. Further analyses of the on-line survey, interview, and focus group data add substantial weight for initiatives to encourage skilled and credentialed individuals to consider teaching as a career including initiatives that target individuals who have credentialed qualifications in VET subject areas that require specific skills (e.g., welding, automotives, cosmetology, cook, carpentry, health care, media, information technology, etc.). Because of these study results as well as other considerations, the University of Alberta, at present the only Alberta university that offers pre-service teacher education preparation for all the VET subject areas as outlined by government, is establishing initiatives both internally and collaboratively with other post-secondary institutions (i.e., colleges, technical institutes, and universities) and focusing on building strong relationships with Alberta Education, Alberta Teachers’ Association, school authorities, school administrations, VET teachers, and potential students.

Since VET teachers are charged with the task to educate youth in their area of expertise, these teachers have additional expectations, an important consideration for pre-service teacher education programs. VET teachers need to: a) continuously upgrade their skills and knowledge especially where production processes and technologies frequently change and there are subsequent amendments to work practices (Danish Technological Institute, 2007; Cort, Härkönen & Volmari, 2004), b) ensure all students wherever possible are treated equitably, have access, and learn social responsibilities (Chappell & Johnston, 2003), c) convey to their students how VET subjects relate to other curricula such as math, science, art, and social studies, d) be aware of job-related norms, safety regulations, and provincial, territorial, and federal employment and occupational policies, and e) be attentive to sharing with their students possible occupations and future education opportunities. The B.Ed. degree program must advance pre-service teachers’ subject specific and work process knowledge in VET areas as well as address these expectations.

The interview and focus group participants also contend that there is a need to revitalize VET in Alberta – to keep it current and attractive for youth. I argue that this same viewpoint is true for teacher education programs. It is crucial for the VET pre-service teacher education program to foster an environment that invites teachers to be passionate about their VET subjects, offer continuous quality professional
development opportunities, promote willingness on the part of teachers to keep
current and to innovate, and to develop strong connections with the community,
other educational resources, and Alberta’s post-secondary institutions (e.g., technical
institutes such as NAIT and SAIT, community colleges such as Grande Prairie
Regional College, Red Deer, Keyano, Portage College, Lethbridge College, etc., and
universities). The need for universities to offer quality VET teacher education is the
underpinning of many participants’ comments.

Conclusion
Similar to other countries, and with other subject areas taught in Alberta, there are
tensions between the relations of VET subject-related courses to the pedagogical
techniques. There is a lack of recent quality Canadian-based research specifically
addressing VET teacher education and the preparation of VET teachers. Evidence is
required to gain relevant knowledge about: a) why teachers specialize in vocational
and technical subject areas given, for example, the low status attached to these
curricula, b) if teachers decide to enter the VET classroom, what competences
do they require, c) how can a VET teacher education program develop these
competences, d) how can these competences be assessed and evaluated, and e) what professional development is required for VET teachers to keep their skills and
knowledge up-to-date. I also argue that in Canada and, more specifically, in Alberta,
the questions listed above raise concerns about what pedagogical practices work
best in a VET classroom and shop environment and the need for studies to analyze
what pedagogic approaches have the greatest potential to offer pre-service teachers
quality teacher education programs.

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Alberta Teachers’ Association.
Training needs analysis in economic teaching
on the suitability of the Test of Economic Literacy (TEL)

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²University of Duisburg-Essen, Essen, Germany

Summary: Economic and financial literacy is one of the central topics in everybody’s life, and, the more, in vocational and professional orientation of the adolescents. Instruction in economics requires highly skilled and well informed teaching staff. For this, further teacher training has acquired a pivotal role in the quality management of schools. However, this requires specific training adapted to the specific needs of the individual teacher. Given the scarce resources in time and money, a training needs analysis (TNA) of the already active staff is necessary. This paper presents a study on options and limits of (self-)evaluation by a standardised test, in this case the TEL, test of economic literacy.

Keywords: Self-evaluation, teacher training, economics education

Improvement of teaching economics: A challenge of growing importance in general and vocational education

Teaching economics: A task of general and vocational education
Knowledge in economics and economical behaviour subsequently has received increasing acknowledgement in the past decades. It is considered to be crucial in every day’s life. Along with the dominance of neo-classical theory of economics, the implied model of homo economics may even have been over-estimated since the times of Thatcherism and Reaganomics. Nevertheless, economics, finance, business and household administration are not only the topics of general education but also make important contributions to vocational education: No craftsman is able to run a business without fundamental financial knowledge, no worker will understand that the wages are not only a given date, fixed by people that hold the power, no adolescent facing the need of earning life has the capacity of making a rational choice of his or her future job, vocation, or profession.

Another important point: the outcomes of learning and instruction at lower secondary level determine the individual input of vocational education and training – and thus a lot of its quality. The better the students get instructed on the topics of economics, finance, and administration at lower secondary schools, the higher the possible level of instruction at vocational college can be, not to mention the increased rationality in vocational or professional choice.

Describing economics as an important social sub-system, it appears quite evident, that its role in the field of education needs to be improved, particularly in the domain of general education. In this field, economic, financial and administrative education have received weak curricular consideration, traditionally dominated by mathematics, science, languages, history and geography. Improvements, however, can only be achieved by the development of the teaching staff. Even after a successful ending of initial teacher education, this sooner or later will ask for further teacher training.
Further teacher training and training needs analysis (TNA)

Improvements in instructional competence can be pursued by purposively reinforcing already given strong points, aiming at the accentuation of a given profile of a school or a teacher. Contrarily to this positive model of strength, there is the deficit model of further teacher training: In many cases it may appear even more important to equalise remaining weaknesses. However, a central trait of further education is its voluntary basis. People should not be forced into additional training or even stigmatised by participating. In order to give full respect to this, teachers should be in a position to decide upon in which economics domain they would like to reinforce their knowledge or their abilities. This freedom implies that suitable diagnostic instruments are required. The instruments should enable teachers to evaluate themselves and draw appropriate consequences from the results obtained.

However, an appropriate testing needs to be both valid, reliable and easy to use. There is only a few standardised tests in the domain of economics, finance, and business administration. One of these tests, the Test of Economic Literacy, once developed by Soper / Walstad 1987 has been translated into the German language and re-validated by Beck / Krumm 1998 (Wirtschaftskundlicher-Bildungs-Test, WBT).

The study presented in this paper has chosen the German version as a starting point. For its strict control of answering time, in its present form the TEL can hardly be used as an instrument of self-evaluation. Anyhow, it rather appears to be a technical problem of software implementation.

The question of evaluation vs. self-evaluation must be the last to be solved, so it has not been considered in this study. The primordial question is the suitability of the test as a tool of TNA: The TEL had been designed as a standardised tool for the evaluation of students at lower secondary level. This is the main reason for the non-representative exploratory to design this study. The testing has been tried out with teachers of lower secondary schools. If suitable for the purpose of TNA at all, the test could be used in TNA for teachers in higher secondary schooling at vocational colleges, too. As a by-product, the study has provided an analysis of a number of traits of the different participant groups in respect of the diverging results.

Methodology: Application of the TEL / WBT to teachers

The Test of Economic Literacy (TEL) and its German adaptation (WBT)
The TEL examines at all levels of the taxonomy of cognitive goals except for level 5 (synthesis). The contents of the test are (1) basics in general economics, (2) microeconomics, (3) macroeconomics, and (4) international affairs. In detail, it checks for knowledge on scarcity, opportunity cost, productivity, economic systems, institutions, trade, money, markets, prices, offer and demand, concurrence, income distribution, growth (international and domestic), employment, inflation, economic policy, exchange rates, and trade obstacles. It is presented in two different forms (A and B) which are supposed to be equivalent. This can be controlled by the use of anchor-items which are identical in the two forms.

The test is lacking, however, any item on the knowledge of accountancy, business administration, or finance, nothing to say anything concerning private households or even business ethics. Nevertheless, instead of developing a new test right from the beginning, it seemed justified to make use of the TEL in its German version. This validated version needed to get adapted to the latest developments in some details (items A/B 26, 31, 35, 44; A 30; B 28, 32). For instance, many national currencies have disappeared and have been replaced by the Euro. Another example is the use of the GDP (gross domestic product) instead of the GNP (gross national product) as
the main indicator for economic growth in German statistics. Of course, the sample of the study was too small to check the validity of the reformulated items, but by external validity this not only is a neutral but a necessary change. Teachers’ knowledge ought to be at the peak of the latest developments. Teachers’ still arguing with the German Mark or the GNP would have significant training needs.

The pilot study
This pilot study on economics education of economics teachers was carried out and evaluated in 2008-2010 by the universities of Chemnitz (Chair of Vocationomics) and Duisburg-Essen (Chair of Economics Education). It aims at finding out about the suitability of the TEL on testing the knowledge of economics teachers in lower secondary classes. The test was applied to 176 subjects.

The testing was carried out in three sample regions. For practical reasons these were the regions of Western Saxony (Chemnitz), of Westphalia (Essen/ Münster), and of Holstein (some of the team members being allocated at the University of Kiel). Whereas the split between Saxony and Westphalia was intended for methodical reasons, Saxony being located in the east of the Federal Republic of Germany and thus in the area of former GDR, Westphalia in an old industrial western region. For participation was voluntary, it proved to be extremely difficult to generate sufficient participation in the western region, despite incentives offered for participation and strict confidentiality. The western part of the sample was subsequently completed by participants from the northernmost part of Germany. In the end, the minimum quotas required both in the western and the eastern regions finally were overly fulfilled; in Saxony, all relevant teachers in most participating schools were tested.

The use of the TEL was augmented by a demographic information questionnaire, asking for the sort of studies previously pursued: not teacher in economics has undergone specific studies, because the topic has previously been scattered throughout a number of different other subjects, especially geography. Not every member state of the Federal Republic has got sufficient capacities at universities (if any) to provide enough teachers to economics instruction.

The hypothesis connected to this variable was to expect better results for those teachers who have undergone specific studies in economics and business administration. The locus of the school was the next variable (east-west), and routinely gender variables together with age variables. As the schooling system in Germany is vertically stratified, this was a variable to be considered; it was expected to get better results by the teachers employed at the schools with a higher level of performance. The independent variable was the score of the TEL.

In order to explain some of the differences in testing results, the mean values were tested by two-tailed t-tests in case of dichotomy. In case of variables of ordinal scale values, single-factorial variance analysis was applied. In case of unequal sample sizes a Welch test, wherever necessary a Kruskal-Wallis test was computed.

Results

Central outcomes: TEL and its suitability for TNA
Given a theoretical maximum of 50 points, the scores went from 16 to 46 with an average of 32.2 points. It cannot be rejected that the scores follow a normal distribution (as tested by Kolmogorov-Smirnov, $\alpha=.05$). An analysis of distractors showed insufficient results in 10 items of form A and no lesser than 18 items of form B. The forms do not produce fully equivalent results with the teachers, the scores in form A being higher than those in form B (only for $\alpha=.01$). An analysis of discriminance shows a good value for the extremely difficult items, whereas the more
simple items appear to be too simple at the level of teachers; they do not indicate differences between 'good' and 'bad' performers.

The central result of the study is that the TEL needs revision before more than some items can be used on the purpose of TNA. Its four domains (basics, micro, macro, international) are too broadly defined to give precise hints at individual strengths and weaknesses. There is hardly any explanation that participants scored lower in the domain of 'basics' as compared to the domain of 'microeconomics'. In both forms, the domain of 'international affairs' is the part with the lowest scores.

All in all, the appropriateness to teachers of lower secondary teaching of the TEL could be shown in many items. The TEL in its present state can be used for TNA, however, it must be clear that it does neither give a reliable nor a clear image of the expertise of teachers now. A re-calibration in the given domains for the examination of teachers is necessary. The more, an extension to the domains of finance and administration is needed. Finally, an adaptation to the needs of self-evaluation would have to follow.

**By-product: Demographic specifics of the sample**

On the specific traits that have been investigated (α=.05 unless indicated), there were significant discriminances only in a few variables. The male probands achieved higher scores (μ̂m=33.95, μ̂f=30.41, σ=5.80). Different to the expectations, there is no significant divergence among three cohorts of age. The mean scores of participants from Saxony (east), Westphalia (west) and Holstein (north) respectively are μ̂s=30.34, μ̂w=34.12, and μ̂h=32.48. The hypothesis of indifference must be rejected for teachers from Saxony and Westphalia (α=.01), whereas no further difference cannot be confirmed.

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Master education of vocational instructors

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Summary: Competence necessary for TVET teaching and training staff covers two fields: the field of industrial or trade section and the field of education and training. Most vocational school teachers don’t reach the standard of this dual competence when they firstly find the work as a teacher. The existing system of academic education is difficult for vocational instructors to achieve this integrated competence. It is recommended to establish a new degree, Master of Vocational Education, for pre-service professional education of vocational instructors. The education program for master of vocational education should be different from other master degree education in enrolment condition, theory study, and practice. It could be carried out through the cooperation of universities with enterprises and vocational schools.

Keywords: TVET instructor, master education, dual competence

Introduction
Teaching force is the key to the quality of vocational education and training. The lack of professional education for vocational school teachers results in the poor quality of the teaching force. In China, only a very small part of vocational school teachers have received pre-service professional education for TVET. In-service training is the main way for a new teacher to start teaching career life. That means most of TVET teachers don’t reach the standard when they firstly find the jobs as teachers.

On the other hand, there is no professional competence standard of TVET teaching and training staff in China. The condition of recruitment of professional teachers in vocational schools is usually bachelor degree or master degree in some special fields. Vocational schools cannot recruit teachers with competence according to the requirement of TVET (Zhang et al, 2005). After being employed by vocational school, new teachers have to be trained in two aspects: the capacity to become a teacher and the capacity in practical operation.

Necessary competence as a TVET teacher
Different from teachers in basic education and higher education, TVET teacher is a special career in education. TVET teachers should have the competence in technology, management and education. The competence focuses on a cross between education and some other professional disciplines. It involves
– Competence in working process: knowledge and skills as a technician;
– Competence in teaching process: knowledge and skills as a teacher.

Such a combination of competence could be called “dual competence”. Vocational instructors, first of all, must have a good command of the basic knowledge, professional theories and practical operation skills in some industrial fields. Secondly, teachers must also know well with the education theories and pedagogies (Yan/ Zhang/Wang, 2002). Vocational instructors should have the ability to apply the pedagogic theory in the teaching process. It will take a long time, more than 4 years’
undergraduate university study, for future teachers to learn such a big amount of complicated interdisciplinaries knowledge, theories and skills. It is necessary to be educated through master degree education.

TVET instructors must have the professional teaching ability to combine vocation, technology and education. This kind of ability is different from either that of engineers or technicians, or that of general teachers. Moreover, this kind of ability is also not the linear superposition of the ability of teacher and engineer, or the sum of the knowledge of education and engineering.

Education and development of TVET teachers
At present in China, there are many ways to improve TVET teachers’ education background. Most of the teachers accept in-service education for master degree, such as Master of Engineering and Master of Education. The problem is, these education and training cannot help teachers to reach the standard of the dual competence as TVET teachers.

Master of Engineering aims to develop competence of applying science in engineering and of engineering management for technicians and engineers. The contents for Master of Engineering are quite different from the work of TVET teaching in knowledge, theory, skill and ability. Therefore, the education objectives, researching fields, teaching contents and assessment standards for master education are not consistent with the requirements of TVET teachers. Master of Education was designed for persons who work in basic education and educational management. This educational objective should be developed for the education of TVET teachers. Vocational education must include the common theories, knowledge and methods of education, while general education surely does not cover the contents, methods and fields of vocational education.

The comprehensive capacities of TVET teachers should be incorporated into the process of teaching and training professional and educational knowledge and achieve the full combination of both. Such a training goal could not be achieved by the existing education system in the form of Master of Engineering or Master of Education. The success of vocational education in Germany proves that a team of qualified TVET teachers is necessary. In Germany, it takes two phases of study and each one needs to pass two examinations to become a vocational school teacher (Ruetzel/Fasshauer 1999). It is reasonable and possible to set up a special and new degree form, which could be named as “Master of Vocational Education” in China.

This kind of master education is based on educational background, career standards and development needs of TVET instructors. This degree education is especially for vocational school teachers. It is a postgraduate level degree, after 4 years’ bachelor degree study. The students will have a good command in basic theory and systematic professional knowledge in some academic fields. Its education process consists of teaching, practice and assessment methods, including a master dissertation. It is also an interdisciplinary degree. That means, the teaching contents, curricula and instructors are in the intersection of education, technology, and vocation (Jiang, 2005). Its goal is to cultivate TVET instructors with core competence of vocational education.

Master education program for TVET teachers
Objective for Master education of TVET teachers
The aim of Master education program for TVET teachers is to cultivate high quality vocational educators. They could be vocational school teachers, training instructors
and administrators for both secondary vocational schools and higher vocational colleges. They also could be instructors who are working in enterprises as education administrators and human resource managers. In vocational aspect, students should get hold of the basic theory of one subject and the professional knowledge of one system, familiarize with the working process and technology of all related industry, possess the practical experience of the relevant work. In the education aspect, students should know well about the basic principles of education and teaching methods, they should be qualified with teaching ability in one major.

*Education background necessary for Master education*

The discipline for Master education program should be based on occupation classification and industrial section. It is not good to cross the major to register or enroll graduates from other majors. Students should be restricted to apply for the major which is the same or relevant to what they learn in undergraduate education. For example, only those students who own a bachelor degree in civil engineering have the opportunity to apply for vocational master education of civil engineering. Based on the major knowledge, students can develop the comprehensive abilities of a qualified TVET teacher, which consists of learning of technology, education and vocation, and then they can shoulder the teaching responsibility in their major or relevant work. Only the explicit major classification can assure the professional development of Master education program for TVET teachers.

*Theoretical study in education and vocational education*

It is suggested that the curriculum of Master education program for TVET teachers should put emphasis on theory of education and vocational education. The courses will include:

- Technical and Vocational Education
- Technical Education Psychology
- Vocational Development and Work Analysis
- Vocational and Technical Education Curriculum Theory
- Professional Didactics
  Moreover, institutes can also hold other courses and lectures, such as:
- Education Management and Human Resources Development
- Educational Economics
- International Vocational Education Comparison
- Education Research Methods
- etc.

*Practice in two places: vocational school and enterprise*

Corresponding to dual competence of TVET teachers, Master education program should include two phases of practice. One is an internship in vocational school for teach-practice phase. The other is an internship in enterprise as technician or junior manager for product-practice phase. One semester is needed for teach-practice phase, which could be arranged in the third term. Enterprise product-practice phase could be arranged in the fourth term.

During internship in enterprise, students should attend training for the intermediate or higher technical titles which related to their majors and pass the examination. Based on the experiences in vocational school and in enterprise, the final academic papers could be prepared at the same time. The topic of the paper should cover the fields of teaching activities in vocational education and technology in some industrial sections.
Cooperation of universities with companies and vocational school

A group of instructors for TVET teachers is needed in the Master education program. The right place to carry out the education is university. In order to get deep knowledge about enterprise production activities, universities should cooperate with relevant companies. Under the framework of this cooperation, experts in enterprises can bring their experiences to Master students, and students have the opportunities to practice in the production site.

In China, there are many headmasters of vocational school who are not only good school managers but also experts in vocational teaching. They can play an important role as instructors for Master students in internship. They also can be invited to be tutors or vice tutors in universities. In this way, Master education program for TVET teachers can closely meet the need of development and innovation of vocational education. Students can learn more about the reality of present vocational schools. It is helpful to improve the quality of Master education for vocational school teachers.

Conclusion

It is necessary for TVET teaching and training staff to have a good command in two aspects of competence: one is in the field of industrial or trade section and the other in the field of education and training. This kind of “Dual Competence” could be realized through postgraduate study for Master degree. It is recommended to establish a Master education program for pre-service professional education of vocational instructors, which is a step-by-step bachelor education for the candidate. The program will cover theoretical study and practice in two places. The whole education process could be carried out through the cooperation of universities with enterprises and vocational schools.

References


Industrial arts for career plan in junior high school

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Summary: In Japan, vocational education is carried out by university departments, vocational schools and high schools that offer commercial, technical and agricultural courses. There are, however, lots of students who cannot find employment after graduating from university. These graduates enter vocational school then. Along with career guidance, industrial arts is able to play a major role as a primary phase in vocational education at junior high school. In career guidance, students were encouraged to do a research on their own, and industrial arts provided them with a wide range of areas with deeper understanding. Besides, encouragement in Adlerian method was introduced, so they can foster their self-esteem. This study is supposed to help students develop a career plan, enhancing the awareness of vocational education such as career guidance and industrial arts in junior high school. The questionnaire and interviews were used to assess the validity of this hypothesis.

Keywords: Vocational education, industrial arts class, achievement, self-affirmation, career option

Introduction
For a long time, Japan has maintained the lifetime employment system, which highly-educated people can work at a big company and can also educate people with high educational background. Therefore, educational institute for vocational education is quite limited.

In the 1980s and the 1990s, the lifetime employment system collapsed and job hunting for university graduates went into a tough situation. Status of informal job offered for new graduates is 68% and now vocational education for young generation is required. In junior high school, there is career guidance as preliminary phase for vocational education. It is included into the moral and the period for integrated study. In the moral it is treated as theme of diligent labors and in the period for integrated study a week working experience is carried out. Nevertheless, few junior high school third-year students have a specific plan for their career.

In the course of study, industrial arts has 35 hours per year for first and second-year students, and 17.5 hours for third-year students. The aim is to develop the ability for making things, fostering the ability for utilization of industrial arts and practical attitudes for a better society. Also all the students are required to study many different techniques utilized in today's society: material and processing techniques, techniques for transformation of energy, techniques for fostering living organism, and techniques for utilization of information. As seen above, description of vocational education is not mentioned in the course of study.

The purpose of this study was to develop the curriculum of industrial arts and career guidance in junior high school, promoting the awareness of vocational education.
Methodology

Q-U (Questionnaire Utilities) showed that points of career options were below the national average in the Arakawa 4th junior high school 32 first-year students. There the curriculum of career study was developed. Also, the industrial arts classes aimed to make the students study a wide range of areas. Below is the attempted procedure.

Development of framework

First-year students: study of career guidance through books, one day job experience
Second-year students: graduates’ talk, third-year students’ talk, visiting high schools
Third-year students: visiting high schools
First and second-year students did a booklet and held presentations, and third-year students distributed the newspaper for having visited high schools.

Industrial arts classes

First-year students: handiwork with burned Japanese cedar, making of bookshelf, making of brass paperweight
Second-year students: making of steam-car, making of radio with dynamo
Third-year students: cultivation of eggplants, writing letters by using a computer

Below are the students’ career options after graduation:

- High school general course: 17 students (53.1%)
- High school specialized course: 15 students (46.9%)
- High school technical course: 9 students (28.1%)
- High school commercial course: 2 students (6.3%)
- High school agricultural course: 1 student (3.1%)
- High school physical training course: 1 student (3.1%)
- High school homemaking course: 1 student (3.1%)
- Five-year high school: 1 student (3.1%)

Figure 1: a) Students’ career options after graduation
b) numbers of students offered for admission

- Number of students offered for admission is as below:
  - General course: 132 schools 30 162 students (76.9%)
Comprehensive course: 8 schools 1888 students (4.8%)
Specialized course: 48 schools 7149 students (18.2%)
Commercial course: 12 schools 2254 students (5.8%)
Technical course: 16 schools 2993 students (7.6%)
Agricultural course: 5 schools 630 students (1.6%)
Homemaking course: 4 schools 280 students (0.7%)
Others: 11 schools 992 students (2.5%)
A total of full-time high school: 188 schools 39 199 students

Students’ career options after graduation is considered as 77% for general course, 18.2% for specialized course, and 4.8% for comprehensive course.

One year after graduation, the questionnaire was completed by the graduates. The outcome according to the questions was as follows:

**Question 1:** What was the area you would like to learn in the industrial arts classes? (Multiple choice)
*Answers:* wood processing: 5 students, metallic processing: 7 students, cultivation: 7 students, machine: 8 students, electricity: 7 students, information: 1 student, others: 1 student

**Question 2:** What was the most impressive class for you? Why? (Multiple choice)

**Question 3:** Were the industrial arts classes in junior high school useful in the high school life?
*Answers:* strongly agree: 6 students, agree: 16 students, rather not: 6 students, disagree: 4 students

**Question 4:** Were the industrial arts classes useful for career decision?
*Answers:* strongly agree: 5 students, agree: 14 students, rather not: 7 students, disagree: 6 students

**Question 5:** Who was your adviser? (Multiple choice)
*Answers:* parent(s): 18 students, teacher(s): 17 students, friend(s): 12 students, elder(s): 4 students, cram school teacher(s): 2 students, others: 0 students

**Question 6:** What was the key factor for career decision? (Multiple choice)
*Answers:* open campus 17 students, visiting high school: 11 students, second hand information: 6 students, junior high school industrial arts: 7 students, brochure: 3 students, others: 0 students

**Consideration**

32 students’ data is not enough. More research was launched on the basis of questionnaire from more high school students. This data, however, shows that practice of vocational education plays a key role in the career options after graduation.

To the question of “What was the most impressive class for you?”, 21 out of 32 students gave an answer of “Eggplants” followed by “Handiwork with burned Japanese cedar”, “Making a radio” and “Bookshelf”, “Steam-car”, and “Brass paperweight” and “Computers”. The main reasons were “fun” and “difficult” which expressed their joy and achievement for making things. Also, 22 students answered
“Useful” to the question of “Were the industrial arts classes in junior high school useful in the high school life?”, and 19 students provided a positive answer to the question of “Were the industrial arts classes useful for career decision?” To the question of “What was the key factor for career decision?”, 7 students gave an answer of “Junior high school industrial arts”.

Impressed by junior high school industrial art classes, students were able to study a wide range of areas. Therefore, it will be necessary for the students to study a wide range of areas. There are still some issues as the way of providing students with a sense of achievement and of organizing a class where students help each other.

Conclusion

This time many students chose the specialized course in their career options. This shows that they figured out what they can do there, listening to high school teachers in school visits. Moreover, they were able to have a specific plan for their career, watching high school students’ lives closely. This choice comes from their wishes that they want to learn more there.

It is required to study a wide range of areas in junior high school industrial arts so that students can listen to high school teachers’ talk and understand what they can do at high school.

However, the question in the career options will be common to all the subjects in junior high school. Therefore, improvement in each subject is needed so that students can have confidence in themselves. While working together, teachers have to promote the awareness of vocational education for young generation.

Lastly, students who answered a questionnaire reached a coming of age. They learned lots of things as fun of making things, achievement of accomplishing tasks, joy of working together, and self-esteem that I can do it.

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CHAPTER IV

MEASURING COMPETENCE DEVELOPMENT
Competence development of apprentices and TVET students: A Chinese-German comparative study

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Summary: In the Beijing region, the occupational competence of students of different vocational schools was tested. The results show an overall relatively low competence level with remarkable differences between schools. One of the main findings shows that there is no competence development comparing 2nd and 3rd year students – it seems to be difficult to mash learning at school and at the workplace. Moreover, the students show a strong degree of heterogeneity concerning their competences. Often, at the same class we find students that differ more than a year in their competence development.

Keywords: Competence development, competence measurement, China

The Project

The COMET (competence measurement in the electro-technical occupations) project in China was introduced in the Beijing region with a variety of purposes.

First, the COMET model of competences is applicable to the construction of learning tasks as well as test tasks.

Teachers train the use of COMET-style open learning tasks. These tasks explicitly refer to eight categories that determine the quality of work tasks as carried out by experts:

- Functionality
- Clearness/Presentation
- Orientation on Work and Business Process
- Orientation on Use Value/Sustainability
- Cost Effectiveness
- Social Responsibility
- Ecological Responsibility
- Creativity of the Solution

Computing the overall score of the students’ solutions to the open test tasks allows a first measure of competence. These scores are then further modeled according to four levels of occupational competence: nominal competence, functional competence, processual competence, holistic shaping competence.

Training Chinese teachers to rate the open test tasks that are used for competence diagnosis had two aims. During the rater training, the teachers became acquainted with such tasks which enabled them to develop learning tasks that show the same features. Moreover, this training ensured the inter-rater reliability necessary to allow a valid and reliable measurement of the students’ occupational competences.

Competence measurement was carried out at eight different vocational schools in the Beijing region. Students were tested in two consecutive years to enable a longitudinal study. Testing aimed mainly at clarifying the following issues:
What is the overall competence standard in Beijing vocational education?
- What are the differences between different types of school regarding students’ occupational competence?
- What are the differences between different schools and classes?
- What are the differences between individual students, i.e. what is the degree of heterogeneity in a given class the teacher has to face?
- What does the threshold between the two years of school and the third year at company mean in terms of competence development?
- How does the students’ self-perception change during their trajectory from novice to expert in a profession?
- What factors are enabling and constraining the development of occupational competence?

Results
Here, we just want to highlight some of the results obtained and show the interpretations and conclusions these results allowed.

1. No competence development from the second to third year of training
Just below three quarters of the students only reached the nominal level of competence. 27% reached the level of functional, 2% the level of processual competence. At the vocational colleges as well as the skilled workers' schools, 2nd year students are doing better than 3rd year students (Fig. 1).

Almost two thirds of the second year students only reached nominal competence, one third functional competence and 3% processual competence. In the third year, 87% of students reached nominal, only 12% functional and 2% processual competence. Though on a higher level, a similar finding – no growth in competence from the second to the third year of training – was the result of the first COMET cycle in Germany as well.

Figure 1: Students’ levels of competence, according to year of training
2. Test results according to school type - vocational colleges better than skilled workers’ schools and vocational secondary schools

57% of students at vocational colleges are on the level of nominal competence. 39% get to functional competence, and 4% reach the level of processual competence (Fig.2). This is in line with the German results that showed the level of previous general schooling being an important predictor of the test scores.

![Fig. 2: Competence level according to school type](image)

3. Heterogeneous classes at the vocational colleges

If we show the four vocational colleges’ results on class level, the average values of the classes spread from 8.1 to 25.2 points and show big differences in competence development with this range of 17.1 points (roughly a year of schooling).

At the best classes, the high-performers reach scores of more than 30 points. At the classes that do better on average, the spread between the individuals is remarkably high – e.g. more than 19 points between the best and worst 10% of the best class. The teachers here face a high degree of heterogeneity in terms of their students’ competences. Here, forms of project-oriented learning using COMET-style learning tasks could be helpful to enable the students to learn from each other.

4. In-company training at the third year

Training at both learning venues in a dual system shall complement one another. This holds for forms of integrated duality as well as for forms of alternating duality (PRC). If work at the company is seen as having nothing to do with professional development, it is possible that the companies do not make use of the learning potentials inherent in work. Then, trainees have to work on tasks that limit vocational training. Third year students in China accept to a higher percentage the statement that the workload at the company has a negative impact on the training.

According to the trainees, the companies’ organisation of work and business processes aims only to a lesser degree on acquiring occupational competence. The trainees’ ‘leeway’ – the possibility to decide between conflicting aims of work tasks on your own – is one important measure for a work organisation that allows to acquire competence. But detailed instructions, that only leave a limited space to manoeuvre,
are clearly more common for Chinese trainees than for German ones.

5. Relation of competence and the companies’ learning environment

There is an interesting relation between occupational competence (operationalized as the total score at the first test task) and evidence on the learning environment. Here, the analysis is limited on the two school types vocational college and skilled workers’ school.

Vocational college and skilled workers’ school students show a significant relation between test result and the way they feel involved into the companies work tasks. This relation is especially strong for the skilled workers’ schools. Whenever the trainees have the possibility to take part in challenging work and business tasks during their in-company training, competence development jumps up. If trainees do not have this possibility, and they are assigned only to easy, unskilled labour, competence development does not take place. In many cases, then, the competence level reached at school even decreases.

Overall conclusions

1. The students and teachers show a remarkable interest in open, complex test tasks. This may be interpreted as a strong motivation to acquire professional competence.

2. The curriculum at school, the (implicit) curriculum at the company, the practice of learning, and the cooperation between learning venues do not form an adequate basis for the effective acquisition of professional competence. The potentials of alternating duality are not used.

3. The quite strong differences in performance between the different school forms express the practice of selecting students according to general cognitive abilities. A successful inclusion into a community of practice at the company is able to compensate these differences.

4. (1) The students’ high motivation and willingness as well as their interest in a training related to practice, (2) committed teachers, and (3) a VET research open for innovation are good preconditions to introduce modern forms of learning and teaching, a curriculum that covers both learning venues (integrated VET curricula), and a better cooperation of learning venues.

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Measuring vocational competences in electronic engineering: Findings of a large scale competence measurement project in Germany

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Summary: Since 2008, the COMET project – large scale competence diagnostics in the electro-technical occupations – aims at measuring occupational competences. Using a competence and measurement model, associated instruments on commitment and vocational identity, open test tasks were developed to measure occupational competence. Since then, the project has been conducted in with over 800 apprentices in the German Länder Hessen and Bremen and been enlarged in scale and scope to German technical colleges as well as China. This paper will focus on three findings: heterogeneity of competence levels as well as profiles, competence differences between different technical colleges, and the use of the COMET approach as a learning model in VET schools.

Keywords: Competence measurement, large scale assessment, competence model

The COMET approach to measuring competences

COMET measures occupational competence by using complex open test tasks, derived from the world of work. Here, no simple ‘yes’- or ‘no’- solutions are possible. Rather, different legitimate solutions vary according to criteria like cost-effectiveness, creativity, etc. The project identified 8 of such criteria (Fig.1) (Rauner et al. 2009a). The eight competence criteria listed in Figure 1 are assigned to levels of competence, which are of fundamental importance in assessing the proper performance of occupational tasks.

![Figure 1: Criteria and levels of occupational competence](image)
The experience gathered in three years of piloting the preparation, implementation and evaluation of cross-sectional and longitudinal studies involving 700 test subjects in 2008 and 1,500 in 2009 may be summed up as follows:

- Complex open-ended test assignments have proved their worth. The individual assignments, which test subjects are given a maximum of 120 minutes to complete, serve to measure occupational competence and, in the case of longitudinal studies, the development of occupational competence in realistic conditions, with reference to the principles and objectives of vocational education and in a manner that permits international comparison.

- The COMET competence and measurement model lends itself to comparative studies in which groups of test subjects are drawn from various training systems (the test subjects have hitherto come from the dual system of vocational education and training, technical colleges and specialised vocational colleges).

- Educationalists from the relevant specialised disciplines estimate that it would be necessary to amend some 15 to 20% of the checklist items in order to adapt the measurement model for occupations in the realm of personal service provision.

- The collection of data on identification with an occupation, commitment and the design of in-company and college training make it possible to develop recommendations on vocational-training practice.

**Heterogeneity of competence**

Occupational competence in the electro-technical occupations differs according to a variety of factors. First there are differences according to branch, apprentices at industry scoring consistently higher than those working at craft companies. To some degree, this difference is explained by selection processes: the industry sector hires apprentices with a higher level of prior schooling.

Additionally, there are differences between VET schools. These differences seem mostly to be due to socio-demographic factors, schools in the countryside scoring slightly higher than schools in big towns. The bottom graph of Fig. 2 shows an example of the overall level of heterogeneity (in these graphs, the highest and lowest 10% are cut out to avoid contortions by outliers): the difference between the highest and lowest 10% of test persons is 27 points. As a rule of thumb, we calculate with 15 points of difference as the results of one year’s training. This means, that the test persons show differences in their competence development corresponding to almost two years of training.

A third level of heterogeneity shows if we analyse on class level. Fig. 2 shows the overall score at different classes of two VET schools that do not differ significantly from each other (controlled for occupation). As one can see, the mean values (MW) differ heavily, the 14 points between class 2 and class 17 implying a difference of almost one year of competence development. Moreover, the difference between the top and bottom 10% at class level is striking as well. In most classes we find differences of more than 20 points, sometimes even 30 points. For the teachers, this means a significant challenge. They have to develop forms of teaching and learning that allow to assist strong as well as weak students.
Professional competence in different vocational colleges

The test results show that (German) technical colleges have a remarkable potential for qualification by virtue of their integration into a learning pathway that starts with a dual vocational training programme, includes at least one year of professional experience and is continued by a study programme that emphasises work and business process orientation. The results regarding competence levels as well as average test scores (Fig.3) suggest that professional competence of graduates of a professional and work process oriented programme is higher compared to those who have completed a semi-academic programme.

<table>
<thead>
<tr>
<th>Test group</th>
<th>Average score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronics technicians for power engineering and building systems</td>
<td>19.2</td>
</tr>
<tr>
<td>Electronics technicians for process engineering</td>
<td>26.5</td>
</tr>
<tr>
<td>Students at technical colleges Hessen (total)</td>
<td>31.2</td>
</tr>
<tr>
<td>- Students FSB1</td>
<td>34.9</td>
</tr>
<tr>
<td>- Students FSB2</td>
<td>36.5</td>
</tr>
<tr>
<td>- Students TA</td>
<td>27.5</td>
</tr>
</tbody>
</table>

This outcome is not in line with the expectations of the teachers at the TA, who give a much higher estimate of their students’ competence level. This view has been confirmed by an equivalence check that was carried out between the training programme offered at the TA and a corresponding degree programme at a local university of applied sciences.

An analysis of context data showed that TA students are only to a limited degree committed to core values of professional work that are of paramount importance in the development from novice to expert. For example, they strive less for quality in...
their work and do not discuss as often superiors’ orders that do not make sense to
them. Regarding the integration of higher vocational education into the system of
academic studies, these findings point at the problem that ab ‘academisation’ of VET
may risk to support vocational knowledge on the cost of weakening professional
competence.

Test assignments as learning tasks
As the KOMET competence model is based on categories inherent in experts’
performance in the world of work, tasks based on this model can be used to design
learning projects at VET schools. In the view of German VET teachers, these tasks
are an important vehicle to implement the didactic approach of learning areas at
classroom level. Students carry out learning projects in groups, afterwards rate their
solutions according to the COMET criteria, and discuss their solutions as well as their
rating. This didactic approach has relevance for a better co-operation of learning
venues as well, as the tasks are suitable for learning projects carried out in co-
operation between schools and companies.

References
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2010 (forthcoming).
Competence development program (CDP) for Beijing TVET teachers

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Summary: The Competence Development Program (CDP) for Beijing TVET Teachers is a local government special project, which aims to improve TVET teachers’ professional teaching and pedagogical practice competences. Beijing Municipal Education Commission (BMEC) and Beijing Finance Bureau jointly launched the project in the year of 2007. The project would run until 2010. CDP includes 9 plans, such as: in-service training, teacher team building, training bases building, teacher recruitment supporting, etc. CDP covers all TVET schools in Beijing to enhance the overall quality and development of vocational education and training.

Keywords: Competence development, TVET teachers, Beijing local government TVET program

Introduction

Background: Beijing TVET reform and development

Technical and vocational education and training (TVET) is not only an integral part of the education system, but also a major strategic issue affecting people’s lives. TVET in Beijing has gone through the stage of expansion, and entered a new era of quality improvement. It is currently at a critical stage of development, faced with both unprecedented opportunities and challenges. TVET plays an important role in the education system of Beijing. In recent years, especially since the 2006 Beijing TVET Working Conference, the municipal Party committee and municipal government have attached great importance to TVET, and set forth a series of supporting policies based on the reality of Beijing. The municipal budget substantially increased the investment in TVET to enhance its infrastructure, continue the educational reform, and give financial support to TVET students. The implementation of these policies has broken new ground for Beijing TVET development.

The future orientation of Beijing TVET is the structural optimization, quality improvement, and sustainable human resource development. This includes that TVET of intermediate level and advanced level should be well linked; TVET schools and general schools should exchange information; both pre-job education and on-the-job training should be emphasized; schools and companies should closely cooperate. The independent, flexible, well-structured, and multi-functional modern TVET system should be able to provide rich contents, good quality, and international vision for both TVET teachers and students.

Teachers are the key to the development of education. The competence of teachers is the core competence of TVET. Therefore a strong teaching force serves as a vital basis and prerequisite. However, the status quo of the schools is far from the objectives such as proper scale, sound structure, and high capacity. Most teachers were directly transferred from general schools, with neither relevant teaching methodology nor experience with companies. The underdeveloped competences of teachers have become the bottleneck of Beijing TVET development.
To address this problem, in March 2006 the Beijing municipal government decided to implement the “Competence Development Program for Beijing TVET Teachers”, and listed it as one of the major tasks and key programs of the reform and development of Beijing TVET during the “11th Five-Year Plan” period.

On Dec. 28th 2006, BMEC and Beijing Finance Bureau jointly released the Advice on the Implementation of the Competence Development Program (CDP) for Beijing TVET Teachers. On Jan. 18th of the following year, the kick-off ceremony of CDP was held at the hall of BMEC, heralding a new era of TVET teacher development of the capital city.

Goals and targets
The general goal of the program is: to create an enabling environment for teachers to develop themselves and realize their potential by improving the TVET schools’ mechanisms for recruiting, employing, selecting, and training their teachers, so as to enhance the overall competence of the teaching force.

During the “11th Five-Year Plan” period, Beijing will strive to achieve the following targets:
- setting up about ten training centres for teachers, drawing on the strength from both schools and companies to create a sound system for training teachers;
- selecting 1200 young and promising teachers to form 50 teams of innovation for the promotion of competitive and innovative spirit;
- sending 500 teachers abroad for training;
- supporting the schools to recruit teachers from companies to optimize the structure of the teaching force;
- sending teachers to companies in several phases for real practice;
- encouraging teachers to obtain vocational qualification certificates.

Comprehensive design
CDP, covering all the aspects of the development of teachers, is a multi-dimensional comprising nine plans – three for teacher selection, three for financial support, and three for training. This comprehensive design takes into consideration the multiple needs of the teachers, thus is conducive to an all-round success.

The program covers all types of TVET schools. It does not divide itself according to conventional classification of schools. Instead, CDP follows the trend of the orientation convergence of different types of TVET schools, and crafts unified measures for their development.

TVET can be divided into intermediate and advanced levels. The fast-growing advanced schools have overtaken the intermediate ones and become the dominant force. The structure of the teaching force has changed accordingly, with teachers of both levels of schools as the mainstay of TVET. The program is based on this new pattern, putting all the teachers into a whole new system, facilitating the communication and interaction of schools of the two levels.

A unique mode for organization and operation
The training of teachers, the priority of CDP, is undertaken by TVET institutions for detailed implementation. This arrangement can make full use of and tap the potential of the resources of the schools to give teachers more relevant training, and satisfy their particular needs. The implementing institutions include teacher training centers and training-program schools. The centers, directly selected out, are responsible for groups of schools of similar majors; the program schools, having evolved from the teams of innovation, supplement the centers with training for single majors.

The operation mode of training is a cooperative group, with a certain school as
the leading party, each school making their due contribution. It can create a win-win situation by integrating the available resources, including those of companies.

*Highlighting the distinctive features of TVET*

It is one of the long-term goals and tasks of TVET schools to develop a highly competent professional teaching force with unique strengths. Most schools have not achieved this goal, which is reflected in the source and structure of the teaching force, and in the methods, channels, and contents of their training.

In view of the development pattern of TVET teachers and the characteristics of the teaching force, CDP highlights the necessity of being professional and distinctive in every step, striving to establish a system that can produce the needed teachers through recruiting new teachers from companies, sending teachers to companies for acquiring first hand experiences, and requiring the teachers to obtain vocational qualification certificates, among others.

*Advocating for the involvement of scientific research*

The CDP is a complicated system with professional requirements; the relevant research support is therefore necessary to ensure the success of the Program. For this reason, Research Institute of Vocational and Adult Education, Beijing Academy of Educational Sciences was chosen to take charge of matters in this regard. Almost every aspect of the Program is started with research work. The research-based plans are first applied to some pilot projects and then expanded to the entire Beijing region after some experiences have been gained.

*Inviting companies to participate in the competence evaluation of teachers*

The competence evaluation of teachers is an important component of CDP and the basis of the implementation of other plans of the Program. An overall, objective and fair evaluation is necessary for making the selection of teachers more rational, the training more effective, the funding better targeted. Involving the designing of criteria, the choice of methods, the development of instruments, and other professional preparation, the evaluation needs a wide participation of TVET schools, research institutions, and relevant companies in particular. Only with the concerted efforts of all parties can a sound evaluation system be gradually established and completed.

Ever since the Program was launched, the BMEC has cooperated with Mercedes-Benz, Festo and other international enterprises in conducting pilot evaluation of the comprehensive competence of teachers in majors like auto repair and mechatronics, based on which standards and evaluation program on teachers’ competence have been revised and improved, serving as models for the competence evaluation of teachers in other majors.

*Enhancing international cooperation*

The Program has now established cooperative relationship with several international institutions, making full use of their advanced resources for vocational education so as to promote the leap-forward development of Beijing TVET teachers. In particular, all the international cooperations emphasize the three integrated aspects: accompanied researches, related trainings and outcomes transformation.

**Results**

*CDP for Beijing TVET teachers has greatly promoted the development of vocational schools and the competence of teachers in these schools.*

The Program is designed to improve the faculty structure and teachers’ competence so as to meet the current and future need of vocational education. It was put forward
in early 2006. Since then, it has finished research and design, building the recruiting and training system, mass training and moved to a new stage of incorporating research, training and implementation.

The Program has attracted a lot of attention from vocational schools of other municipalities and provinces. The 150-million-yuan program is the first one of its kind in China which shows that the Beijing municipal government attaches great importance to enhancing TVET teachers’ competence and promoting the development of vocational education. All the vocational schools and teachers in these schools have benefited most from the program. Their passion and action reflect that the program is very popular and has brought a lot to those teachers and schools. Teachers are particularly satisfied with the large-scale training. The successful implementation of CDP has actually set a good example for other vocational schools across China in training teachers.

With half of the 11th Five-Year Plan period behind us, we are going to work with more passion in the two years ahead to make the Program an excellent one through meticulous organization, careful design and strong feedback mechanism. We will make more achievements so as to contribute more to the development of Beijing TVET.

References
A research on job performance competency of general technology teachers in ordinary high schools in China

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Summary: This research is carried out to explore the conditions of job performance competency of general technology teachers (GTT) in ordinary high schools in China. The results of the research indicate: ① The job performance competency of GTT is demonstrated from the following aspects in a high to low manner. The overall test value is 5.07. The job performance competency of GTT in ordinary high schools in China proves to be positive. ② Through survey and statistics, an analysis of the major factors (gender, age, educational background, employment type, teaching experience, associated location) affecting job performance competency of general teachers is made, and the concrete relationships between the various factors and the five aspects of job performance competency are obtained. ③ In the process of cultivating or retraining GTT, the five aspects of executive capacity and performance degrees should be taken into consideration while formulating the corresponding cultivation plan.

Keywords: China, general technology teachers, job performance competency

Introduction

Necessity of the research

General technology curriculum in ordinary high school in China is on the reform and experimental stage. It is a brand new curriculum. In the past cultivating system of middle school teachers, there was no specifically professional faculty for the cultivation of technology teachers. Therefore, in the earlier reform, it was temporarily taught by teachers of other professional fields.

However, affected by their own professional basis, teachers of other professional fields boast different understanding about technological concepts and professional technology knowledge and their curriculum executive capacity show great differences. Therefore, so far as the long-term development is concerned, a country needs to offer professional training courses to the technology teachers. Before this, however, it is necessary and effective to improve the job performance competency of the current high school general technology teachers for the development of technology education.

To improve the job performance competency of the current GTT, it has to first verify the level and extent of the job performance competency of GTT.

Through the study of literature materials, it has been found that related researches about the job performance competency of GTT are still on the initial stage. Meanwhile, the general technology teachers' varied personal characteristics (gender, age, educational background, teaching experience, subject background, location)

\(^1\) GTT is short for general technology teachers.
have certain impact on the job performance competency, but there is no research about it at all. Therefore, the research of the job performance competency of GTT and the related affecting factors is necessary and timely.

**Objectives of the research**

The research aims to explore the impact that various affecting factors have on the job performance competency of general technology teachers, which provides judgment information for the self-evaluation of the job performance competency of GTT and reference frames for the training and cultivation of GTT.

**Contents of the research**

Contents of the research are mainly divided into two parts: ① The exploration of the level of the job performance competency of GTT in current high schools; ② The exploration of the impact that the major affecting factors have on the job performance competency of GTT.

**Methodology**

**Object of research**

The object of this research is GTT of the current high schools in China. The general information of the object of the research is shown in Table 1.

<table>
<thead>
<tr>
<th>Classification</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male: 72 (72%)</td>
<td>Female: 28 (28%)</td>
</tr>
<tr>
<td>Age</td>
<td>21-30: 28 (28%)</td>
<td>31-40: 47 (47%)</td>
</tr>
<tr>
<td>Educational Background</td>
<td>Bachelor: 97 (97%)</td>
<td>Master: 3 (3%)</td>
</tr>
<tr>
<td>Employment Type</td>
<td>Post Taking Over: 19 (19%)</td>
<td>Post Change: 43 (43%)</td>
</tr>
<tr>
<td>Teaching Experience</td>
<td>1 year: 23 (23%)</td>
<td>2 years: 13 (13%)</td>
</tr>
<tr>
<td>Associated Location</td>
<td>22 areas (provinces) in all: Zhejiang, Jiangsu, Jiangxi, Anhui, Fujian, Hebei, Liaoning, Henan, Shanxi, Beijing, Shanghai, Chongqing, Guangdong, Shandong, Hunan, Xinjiang, Tianjin, Hainan, Yunnan, Ningxia, Guizhou, Heilongjiang</td>
<td></td>
</tr>
</tbody>
</table>

**Table 1**: General information of the object of the research

**Research tools and material analysis**

The data processing and analysis of the questionnaires is conducted with SPSS 16.0. The reliability coefficient of the research is 0.973.

<table>
<thead>
<tr>
<th>Executive Capacity Areas</th>
<th>Number of Questions</th>
<th>Reliability Coefficient α value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall job performance competency</td>
<td>41</td>
<td>.973</td>
</tr>
</tbody>
</table>

**Table 2**: Reliability coefficient of job performance competency areas
Table 3: Research statistical methods

<table>
<thead>
<tr>
<th>Research Contents</th>
<th>Statistical Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General information of the research objects</td>
<td>Descriptive analysis—frequency and percentage (%)</td>
</tr>
<tr>
<td>2. The levels of the job performance competency of GTT</td>
<td>Descriptive analysis—frequency and percentage (%) and mean value (M), standard deviation (SD)</td>
</tr>
<tr>
<td>3. The degrees of factors affecting the job performance competency of GTT</td>
<td>Cross-over analysis—testing of independent sample T, variance analysis of the univariate</td>
</tr>
</tbody>
</table>

Table 4: Overall level of the job performance competency of GTT

The above contents are the analysis results of the overall job performance competency of GTT in China.

Factors affecting the job performance competency of GTT

This part is an analysis of the impact of GTT’s own characteristics (affecting factors) on the job performance competency in five areas. The affecting factors include six aspects, i.e. gender, age, employment type, educational background, teaching experience and associated location. The statistical results on the job performance competency of GTT in the five areas are shown in Table 5:

<table>
<thead>
<tr>
<th>Affecting factors</th>
<th>Gender</th>
<th>Age</th>
<th>Employment Type</th>
<th>Educational Background</th>
<th>Teaching Experience</th>
<th>Associated Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. instructional design capacity</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. instructional enforcement capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. instructional evaluation capacity</td>
<td>**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D. application capacity of teaching facilities</td>
<td></td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E. curriculum research and professional development capacity</td>
<td>*</td>
<td>**</td>
<td>*</td>
<td></td>
<td></td>
<td>**</td>
</tr>
</tbody>
</table>

**: obvious level of the scope of 0.01, *: obvious level of the scope of 0.05

Table 5: The impact of various factors on the job performance competency of GTT
Conclusion
The following specific conclusions are reached by summarizing the research results:

1. After the questionnaire survey of the five aspects of the job performance competency of GTT in ordinary high schools in China, the job performance competency of GTT is demonstrated in a high-to-low manner, covering ‘instructional design capacity’, ‘instructional enforcement capacity’, ‘instructional evaluation capacity’, ‘application capacity of teaching facilities’ and ‘curriculum research and professional development capacity’. Combined with the behaviors of GTT in these five aspects, the overall testing value is 5.07, which proves that the job performance competency of GTT in ordinary high schools in China shows a positive side.

2. The item of ‘the capacity to fully understand and analyze the general technology in the country’s curriculum standard and textbooks’ in the instructional design capacity, the item of ‘the capacity to conduct proficient guidance of basic theories and relevant practices in the system of diverse technology contents’ in the instructional evaluation capacity, the item of ‘the capacity to conduct self-evaluation and analysis of series of teaching activity process of planning-process-result’ in the instructional enforcement capacity, the item of ‘the capacity to rationally purchase teaching aids and facilities according to the investment scale of the school’ in application capacity of teaching facilities and the item of ‘the capacity to establish technology education and research plans’ in curriculum research and the professional development capacity of GTT fare badly in the statistical and analytical results of the questionnaire survey. It poses some impact on the improvement of the overall level of job performance competency.

3. Through the analysis of the six major factors (gender, age, educational background, employment type, teaching experience and associated location) influencing the job performance competency of GTT, the relationships between the various factors and the five aspects of job performance competency are obtained. Among them, the factors that have an obvious impact on the job performance competency of GTT are age, teaching experience and associated location. The factors that have an obvious impact only on the curriculum research and professional development capacity of job performance competency of GTT are gender and employment type. The factor that has no obvious impact on the job performance competency of GTT is the educational background. All the affecting factors have a different impact on the job performance competency of GTT. Therefore, in the training and cultivation process of GTT, we should attach special attention to them.

References
Development and field-testing of a competence-based instrument for assessing financial literacy of adolescents

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Summary: In modern globalized economies, financial literacy, i.e. the ability to reasonably decide upon and use financial resources, is becoming more and more essential for every person who is responsible for managing his or her financial affairs in everyday life. Thus, the promotion of financial literacy remains a core concern for every educational system. This necessity, in turn, presupposes the availability of adequate tools which allow identifying existing learning needs. Against this background, the aim of this paper is to portray the conceptualisation as well as a first field-testing of a competence-based instrument for assessing financial literacy of adolescents.

Keywords: Financial literacy, economic education, competence measurement, authentic assessment tools

Introduction

In modern globalized economies, financial literacy, i.e. the ability to reasonably decide upon and use financial resources, is becoming more and more essential not only for professionals in the sector of investment and banking but for every person who is responsible for managing his or her financial affairs in everyday life. This increasing importance is attributable to several demographic, societal and economic trends such as the baby boom and increases in life expectancy, changes in pension arrangements and income, growing involvement in financial markets as well as the complexity and increase in the number of financial products (e.g., OECD 2005). Accordingly, financial literacy may be deemed as an indispensable prerequisite of individual and collective welfare.

However, as will be further elaborated in more detail, available research studies (e.g., Reifner 2006; Lines/Schagen 1996) indicate that citizens of all nations and ages seem not to be very well prepared to effectively cope with the existing financial demands. Especially for the poor, this gap between the overarching significance of financial questions on the one hand, and their deficient preparedness on the other hand, has the potential to further divide them from their more fortunate fellow-citizens. Given this extremely undesirable and politically charged state of affairs, the promotion of financial literacy remains a core concern for every educational system, and should start as early as possible, i.e. especially with adolescents and young adults. This necessity, in turn, presupposes the availability of adequate tools which allow identifying existing learning needs. Against this background, the aim of this paper is to portray the conceptualisation and first empirical field-testing of a competence-based instrument for assessing financial literacy of adolescents. To this end, the remainder of the introduction will contain a brief review of prevailing prior research. Moreover, the rationale and the theoretical foundation which guided the conceptualisation of the competence-based assessment instrument will be set forth. In the next section, the methodology of the field-testing will be described. Finally, preliminary results of this
Review of prior research

Research concerning the assessment of financial literacy is typically conducted in form of surveys and exhibits two different approaches (OECD 2005). The first, most prevailing approach is characterised by the use of self-reporting questionnaires, i.e. asking respondents to rate their subjective perceptions of their financial knowledge, understanding and skills, as well as their attitudes towards financial issues and their receipt of financial information.

This approach is used for example by surveys undertaken in Japan, in the United Kingdom or in France (e.g., AMF 2005) which all involved adult populations. The other, yet rather not so widespread approach includes objective tests that measure participants' knowledge and understanding of financial terms. An example for a survey of this type is the Jump$tart Coalition for Personal Financial Literacy questionnaire (e.g., Mandell, 2008) which was employed with high school and college students in the United States and in South Korea. Moreover, a few surveys used a mixed-methods approach (e.g. an Australian survey conducted by the ANZ Banking Group 2008). Such an approach is considered as particularly useful since it allows comparing how respondents feel about financial issues with how knowledgeable and/or skilful they are about them.

Although not all of the existing surveys are tailored to the target group of adolescents, and sometimes even have weaknesses with respect to their conceptual and psychometric foundation, they consistently indicate that the level of financial literacy among respondents is commonly rather low. For example in the South Korean and American surveys, high school students had failing scores, they answered fewer than 60 percent of the objective test items correctly. In addition, financial literacy is correlated with education and income levels. As for example the UK survey suggests, individuals in the lower social grades and income band, as well as young people aged from 18 to 24, are likely to be the least receptive consumers. Last but not least, respondents tend to overestimate their financial knowledge and skills. Especially this latter result may be deemed as a strong indicator that self-reporting of financial literacy is not reliable enough but that mixed approaches are needed (OECD 2005).

Conceptualisation of the competence-based assessment instrument

The conceptualisation of the intended assessment instrument should not only be free from commercial interests and ideological biases, but – first and foremost – also be based on a theoretically and pragmatically sound specification of the underlying construct.

As scholars in the field of financial literacy (e.g., Pang 2010) recently suggested, this specification should be considered from a more holistic stance, i.e. not only focus on single and detached knowledge portions but integrate behavioural, cognitive, motivational and attitudinal facets. Moreover, it should be adaptive to curricular and instructional decision making. In due consideration of these issues, a competence-oriented perspective, as expressed for example by Weinert (2001), is adopted. Moreover, pertinent action regulation theoretical (e.g., Miller et al. 1960) as well as knowledge psychological approaches (e.g., Anderson et al. 2001) are espoused. With reference to these sources, financial literacy is conceived as a domain-specific

1 The research activities presented here are part of a larger research project concerning the issues of how to diagnose and support the development of financial literacy in different groups of learners. This project was initiated at the University of Mannheim (Germany), and will be now expanded to Switzerland. The author wishes to warmly thank Ms. Dipl.-Hdl. Julia Holderbach who was involved in the project during her diploma thesis. In addition, special thanks go to Prof. Dr. Hermann G. Ebner for his conceptual input and support as well as to the students who participated in the field-test.
potential that enables a person to effectively plan, execute and control financial activities. As such, it is based on the availability of individual dispositions, i.e. (different kinds of) knowledge, motivations and attitudes etc.

In order to further substantiate this first construct definition, an in-depth task analysis was carried out. With this respect, an already approved procedure in the field of business and economics education (e.g., Aprea et al. 2010) was applied, which led to (a) a refined description of the sequential and hierarchical structure of financial activities, and (b) an elaborated characterisation of the cognitive, motivational and attitudinal demands that these activities impose. More specifically, three phases of financial activities, i.e. financial planning, financial decision making and financial controlling with their respective components and psychological requirements are discerned. In accordance with the adopted theoretical framework and with prior research, it is furthermore hypothesised that the successful conduct of these phases and the activation of the required knowledge and skills, respectively, is embedded in and mediated by a set of more general individual motivations and attitudes (e.g., thematic interest, attached value and personal awareness of the specific topic at hand, in this case money and financial concerns).

Methodology

Based on the above mentioned considerations, a first draft of an assessment questionnaire was developed. Besides general questions on demographic characteristics and on some further topic related information (e.g. money on hand, availability of a bank account), this questionnaire contains subjective (i.e. self-reporting) as well as objective (i.e. performance test) items. In the subjective part, participants are asked to indicate how much importance they generally attach to money and financial concerns. Moreover, their interest in financial themes and contents as well as their awareness of the necessity to carefully plan and control financial decisions is requested. Additionally, a self-evaluation concerning their confidence to effectively cope with prospective financial demands is contained. In order to assess these aspects, four respectively five-level Likert scales are used. The objective part is focused on test items which mirror the requirements of the decision making phase of financial activities, covering the respective knowledge and skills, as resulting from the task analysis. This phase was chosen as a primer for test construction because it was estimated as containing the most difficult components. The test development activities were inspired by an authentic assessment approach (e.g., Dochy 2001). Thus, the items are composed as a sequence of realistic, narratively represented financial decision tasks, containing multiple-choice, short answer and calculus formats. The tasks were cross-validated by two content experts (one business school teacher and one lecturer in financial economics).

In order to check for feasibility and comprehensibility of the questionnaire as well as to obtain a first validation of the instrument, the draft version was submitted to a field-testing with a total of 198 students from the 8th and 9th grade of four lower-level (n=101) and mid-level (n=97) secondary schools in Baden-Wuerttemberg (Germany) involved. Approximately half of the students were female, and their age ranged from 14 to 17 years. This target group is of specific interest with respect to financial literacy, since most of the students are expected to soon start an apprenticeship, and thus will be in charge of financial independence and responsibility.

Results

Besides psychometric item analyses, descriptive and inferential statistical analyses of students' answers were conducted which inter alia revealed the following results:
(a) **Subjective part.** Students predominantly attach much importance to money and financial affairs. However, other than might be suggested, they exhibit a rather low thematic interest in financial issues. Similarly, their awareness of the importance of carefully planning and controlling financial decisions is quite moderate. As in most of the surveys mentioned above, students moreover felt fairly well equipped to effectively cope with prospective financial demands. In most cases the estimates significantly differ between male students and their female counterparts.

(b) **Objective part.** Similarly in compliance with prior research, participants' rather optimistic self-evaluations were not mirrored by the objective test items. Especially with respect to tasks that involve compound computation of interest and risk assessment, students' test scores proved to be particularly low. In addition, the effect of educational level is also visible in this research, since for nearly all objective assessment tasks students from the mid-level secondary school classes significantly outperformed their lower level comrades.

Given the preliminary status of the research and the relatively small and restricted sample, cautious interpretations of the data are of course imperative. With this limitation in mind, however, it might be concluded that the competence-based approach can be a viable way for probing financial literacy of adolescents and detecting the respective learning needs. In particular, the results corroborate the assumption that raising adolescents' interest and awareness of financial concerns may be considered as a key challenge for financial education, mainly because of its importance as a substantial prerequisite for learning. The same applies with respect to task-specific knowledge and skills, especially for the less privileged subjects in this age group. However, in order to further substantiate these conclusions, additional validations of the instrument as well as in-depth studies of the structure and the development of financial literacy in adolescents are needed.

**References**


Competency development between motivational structures and working relationships

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Summary: The further development of scientific education at German colleges constitutes a challenge for vocational and business education. The quality of scientific further education depends not least on the extent to which advanced training measures consider the specific situation of different groups ready to further education. What does such an orientation look like? Theoretical attempts are derived from the biography-oriented approach of personnel development, employability, lifelong learning as well as from graduates and evaluations research. Results show that motivational structures of further education students are much more complex than the causal chain “knowledge acquisition” \( \rightarrow \) “promotion” \( \rightarrow \) “increase in salary” indicates.

Keywords: Further education, motivational structures, re-orientation versus specialization orientation, transfer of competencies, working relationships

Research question and theoretical framework
Regarding further education offers at German higher education institutes, a lot has changed during the last years. Nevertheless, German institutes for higher education still have to catch up when compared internationally (Hanft/Knust 2007). Quality of further education depends on how far the study program is adjusted to the needs of the different groups of people investing in further education. In order to realize that, study motives and job situations of the students have to be examined. The reference framework underlying the study is composed of theoretical approaches to process-oriented and transfer-oriented training (Winkler/Mandl 2009), biography-oriented personal development (Wittwer 2003) and to graduates and evaluation research (Willich/Minks 2004).

In the academic discussion it is often assumed that further education participants aim to acquire new skills in order to be promoted and ultimately increase their income. Against this background, it is not surprising that previous studies dealing with further education motives and behavior worked out promotion-, security- and social-related expectations (Bardeleben et al. 1996). Following this argumentation, it can be assumed that the central motive structure of participating in further education is the chain of causality of “acquisition of knowledge and competencies” \( \rightarrow \) “Promotion” \( \rightarrow \) “Increase in Income”. In the last years, the amount of fixed-term contracts has increased. A part of employees is forced to self-organize their work more and more. They are asked to display more initiative and a higher amount of self-economization and self-control. In this context, the thesis that the work situations of the participants affect their behavior concerning further education suggests itself.

Methodological steps
The database of this study consists of different surveys in Germany. One part is
made up of the representative, nationwide graduate's questionings of HIS (stands for College Information System) (year 2001, N = 9638). In this context, graduates are inquired 12 months (first wave) and again 5 years after graduation (second wave). The survey comprises 66 closed questions.

The second data source is a survey organized by the author. He acquired participants (specialists and executives) of a non-consecutive master program of the Institute for Applied Work Science (IAW) of the Ruhr University Bochum (years from 2005 to 2010, N =158) before starting and after completing their graduate program. The study program “Master of Organizational Management” is a second degree, comprising 4 semesters. Applicants can only participate in the program when having a first degree from a University or University of Applied Sciences as well as at least two years of professional experience. It is a postgraduate study program which is thought to be combined with working life. The overall goal of the study program is to enhance the employability of employees possessing a first degree who want to extend their managerial competencies.

The main fields of study cover work organization and work structuring, managing work processes and personnel, information and technology management as well as personnel development and qualification. After their graduation, the students shall be able to evaluate change management problems and to develop coping strategies. They should display an interdisciplinary understanding of work processes and be able to integrate results from different disciplines. This goal is supported by the interdisciplinarity of the study environment. Students as well as professors are of different subject orientation. Natural scientists, engineers, economists, humanists and social scientists all can and do study at the IAW. To make sure that the students do not only gain theoretical knowledge, a practice-oriented approach was chosen. The study concept includes practical working weeks in which newly acquired skills are applied.

The Master program was accredited without constraints in the year 2008. The university entrant’s questionnaire encloses 37 items (IAW study) and leans partly upon the HIS-questionnaire (HIS study I). The IAW master program is requested primarily by academics who have completed an economics, humanities, natural sciences or engineering degree successfully. To enable a proper comparison of IAW study and HIS study, only those HIS study respondents were selected who have either studied economics, humanities, natural sciences or engineering. With a total of 1061 interviewees, such classification was possible (HIS-Study II). The following evaluation procedures were used: t tests, Chi square tests (X² tests), factor analysis, correlations as well as effect strengths (Cohens d). In the context of the IAW study, several preliminary studies were conducted. 159 study beginners participated in a survey from 1998 to 2004; 56 graduates participated in surveys in 1998 and 2003. These studies serve as pre-tests.

Results
The participants of the IAW study (N = 158) were on average 33.27 years old (SD = 7.595 years) when inquired. 55% were female. Those who took part in the second wave of the HIS survey (N = 8117) were averagely 31.51 years old (SD = 3.51). 59% of them were women (HIS study I). In the selected group of participants of the HIS study (N = 1061) 64% were female and 36 % male (HIS study II). They were averagely 31.82 years (SD = 3.77) old. So concerning gender and age, no significant differences between the studies were found.

By means of a factor analysis (KMO=.640; Bartlett test (sphericity) X²_{45}=185.202, p<.000) it was analyzed if clusters of motives crystallize which were decisive for the
students’ decisions to invest in further education (IAW study).

Beginning with 17 motives, four motive dimensions could be found: (I) Re-orientation, (II) job security, (III) improvement of professional opportunities and (IV) specialization orientation. Participants who intent to qualify for a position outside their current organization are led by the motive dimensions of job security \( r = .254^{**}, p < .003 \) and improvement of professional opportunities \( r = .264^{**}, p < .002 \), but not by the motive dimension of re-orientation \( r = -.197^{*}, p < .021 \).

Participants who decided out of motives of specialization characterize their job situation by the fact that they intend to qualify in selected issue-areas \( r = .220^{**}, p < .010 \). Additionally, gender-specific differences were explored. It was found that women were led by the motive of inclination rather than by job orientation \( t_{138} = 2.529, p < .013 \). In contrast to that, men’s primary motive to participate in further education was specialization \( t_{137} = -.30, p < .004 \).

The aim to achieve a higher salary played a minor role when compared to the other 15 queried motives. The selected group of members of the HIS study (HIS study II) regarded the following motives as central for further education at the university: (1) Improvement of professional skills \( M = 1.66, SD = 0.975 \), (2) improvement of professional opportunities related to the first degree \( M = 1.91, SD = 1.316 \), (3) more interesting / challenging job \( M = 2.24, SD = 1.216 \), (4) personality development \( M = 2.51, SD = 1.228 \) and (5) reaching a better position \( M = 2.64, SD = 1.283 \). The motive to achieve a higher income was only the 9th position \( M = 3.11, SD = 1.32 \). A similar impression arises regarding those who have participated in training outside the university. For them, the motive of income increase is only in 10th position and even less distinct in comparison to the previous case \( M = 3.40, SD = 1.32 \).

Further, participants of both the IAW study and the HIS study were asked to characterize their workplace characteristics, working conditions and environment. The same 31 characterizing items were used in both studies. A factor analysis regarding the HIS study allowed to classify the participants' work situations into two main components. The first component is characterized by an innovative working environment (loading=.691), a cooperative atmosphere (loading=.796) and by the fact that employees' proposals for improvement are considered seriously (loading=.793). In contrast, work situations of the second component are defined by a non-innovative atmosphere (loading= -.727), too much bureaucracy (loading=.889) and predefined work (loading=.832).

To assess differences regarding further education between these cases, a one-way ANOVA was calculated. It was found that employees belonging to the first component invest rather in further education than those of the second component \( F(2, 1245) = 4.244, p < .033, \eta^2 = .097 \).

**Discussion**

The analysis indicated clearly that the often assumed thesis of the causal chain “knowledge and competence acquisition” \( \rightarrow \) “promotion” \( \rightarrow \) “increase in salary” falls short. In fact, one of the further education participants’ priorities is becoming able to engage in more interesting and challenging tasks in the future. The realization of that goal is not necessarily connected to promotions and an increase in income. The manifold structure of the motives which lead to further education at universities displays that there are multilayered reasons that reach far beyond the one-dimensional relationship between further education and promotion. Further research could explore the interesting issue of potentially diverging motives of further education of natural scientists/engineers, economists and humanities scholars.

It could also be shown that different job situations indeed affect the further
education behavior of employees. The empirical study reveals that further education offerings are attended rather in job situations characterized by innovative working conditions than without those. It might be that those academics who work in an innovative environment engage more often in further education because of the expectation that they are more likely to use their competencies later on than those confronted with a bureaucratic work environment. The type of work situation which the actors are confronted with has a major impact on the possibility and success of a transfer of competencies. Further education programs that aim to support a transfer of competencies must face the challenge to take the participants' different work situations into consideration. Against the background of an interest in the participants' long-term satisfaction with the further education program, this aspect has to be considered. Eventually, the transfer of competencies does not succeed without the involvement of the supervisor in order for competence transfer to happen successfully. Furthermore, another question of research is left open. The quality of the further education program, e. g. practice-orientation and support, may affect the motives of participating in further education. A comparative study of diversely oriented programs could grant insight into this relationship.

The results of the study show that a further education orientation based on the different participants' needs is much more complex than it seems at first glance. Nevertheless, a professionalization and quality assurance of academic further education at universities must be promoted from a vocational and business educational point of view. To achieve that, a comprehension of the motive and the work situation structure of academics willing to engage in further education is essential.

References
Updating the assessment criteria for national technical qualifications in South Korea

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Summary: In South Korea, every NTQ has its own assessment criteria for the certification and the criteria are being used to develop test items. Accordingly, a periodical inspection on assessment criteria is very important to secure the field suitability and applicability of the qualifications. For this, a sunset period to each assessment criteria is installed since 2007 and it is revised when the new period turns up. Nonetheless, there are many problems and schemes to resolve them that have been introduced. It is expected that more effective and timely update of the assessment criteria may be available if these schemes are employed.

Keywords: Assessment criteria, sunset period, National Competency Standards (NCS)

Introduction
The National Technical Qualifications (NTQ) is a qualification system of technical skills and service area installed and operated by the government. It was first introduced in 1973, having been managed by the National Technical Qualifications Law. There are 26 job areas in total being classified by five levels (Craftsman, Industrial engineer, Engineer, Professional engineer, and Master craftsman) in 512 types. The examination for a qualification consists of the written test and the performance test. The assessment criteria indicate the range of subject assessment by qualification types describing the answering methods of assessment questions and criteria of test contents range. There is a regulation to develop assessment criteria for the enactment and revision of each qualification in accordance with the National Technical Qualifications Law. Items and forms of assessment criteria are separately presented in between the written test and the performance test in the enforcement regulations of the National Technical Qualifications Law. When there is any enactment or revision of assessment criteria, there is a regulation to carry out the job analysis reflecting the job condition of a field. In case the National Competency Standards (NCS) is developed, it can substitute the job analysis.

The assessment criteria play a role in producing required labor forces by standardizing the relevant job’s performance competency (Kim H.S. et al, 2002; Kim, D.K & Park D. Y., 2006). Thus, the assessment criteria must be developed and utilized to enhance the field applicability and also updated frequently (Kang S.H et al, 2003; Cho J.Y. et al, 2009; Ministry of Employment & Labor, 2010). Meanwhile, it is a regulation in South Korea to set up the sunset period in each assessment criteria to improve field applicability of the criteria and to update the assessment criteria before its expiry. The sunset periods of South Korea is from three to five years which is similar to those of the UK (three-five years), France (three years) and Japan (three years). And, the job analysis is carried out by field specialists in developing the assessment criteria, and since 2005 the employment of the NCS was expanded. It has been five years since the sunset period system was introduced, and there have
been some circumstantial changes such as the development of the NCS and its employment. Accordingly, a thorough analysis on the development and employment of the current assessment criteria must be made first and then, a realistic and scientific measurement against problems and improvement points derived from the analysis must be raised.

**Methods**

An analysis of the current condition of development, employment and update of the assessment criteria was carried out, and a scheme to update the assessment criteria was developed to improve the reasonable employment and update of the NTQ assessment criteria.

For the analysis of the employment and update condition of the assessment criteria, literature review, interview and investigation research were executed. For the literature review, precedent studies on the assessment criteria, and policy documents and statistical resources were examined. To figure out the actual condition, interviews were made to six staffs in Human Resources Development Service of Korea (HRD Korea) which was in charge of assessment, two specialists for developing the assessment criteria, and two exam writers. The investigation research was carried out to find out the suitability of assessment criteria sunset period by types. The objects of the research were committee members, operated by the Ministry of Employment and Labor, who were responsible for reviewing the enactment, revision, revocation of the NTQ types and for reviewing the assessment criteria. The committee is comprised of 52 areas in total with 10 members in each area. The total inspection to all 520 members was made.

The update scheme draft of the assessment criteria was prepared through the examinations of precedent studies and related law and through the result of current status analysis and investigation research. The draft was reviewed by two assessment criteria development specialists in order to figure out the validity in developing the assessment criteria and choosing the sunset period. The field applicability was reviewed by two exam writers, while three staffs in the HRD Korea who were responsible for the assessment criteria examined the applicability in the systematic aspect.

**Results**

*Usage status of the assessment criteria*

The job analysis result or resources from the NCS were employed for the development of the assessment criteria. However, there was a confusion of terms as the names of types were different to those used in the job analysis or the NCS. For example, key item, sub item and detailed sub item are compatible to competency unit, competency unit element and key item respectively, but they were expressed in different terms.

The assessment criteria are employed to develop examination questions. And four or five times, questions are made to be stocked in the item pool. Afterwards, the questions are selected and verified from the item pool to perform an examination. As a result of the interview, the assessment criteria were not sufficient to grasp the frequency of application of the relevant technique and skill and to understand the level of difficulty in jobs. Thus, they wished to have additional information on the level of difficulty and to have means to control the rate of exam questions.

*Updated status of the assessment criteria*

The sunset period is regulated by a law in updating the assessment criteria. 80.9% of the
types had five years sunset period. When the suitability of sunset period by qualifications types was examined, 25.7% answered it too long, while 7.5% answered it short. In particular, there was a high rate in answering 'long' for areas where rapid changes were made such as IT and materials areas. Thus, there was a requirement to reset the sunset period reflecting the speed of technical change after five years of the sunset.

As to the sunset period for the sub job areas, 15 areas (13.2%) out of 114 areas had a different sunset period between the areas. As the result of specialists’ interview, same sub job areas employ the same specialists’ pool in updating job analysis and assessment criteria. Considering the fact that the update must be made at the same period to prevent the duplication of the assessment criteria and to achieve the standardization of the terminology, the adjustment of the sunset period between qualification types in the same sub job areas was required.

As to the annual update types according to the sunset period, 153 types in 2011 are to be revised, and 18 types in 2013 are to be revised, which means there is a great deviation by years. This is because that all types began its sunset period from 2007 altogether, and the applicable sunset period are usually 5 years which requires the revision work in a certain year. Thus, the institution in charge of revision work had a difficulty in securing annual budget as they had to work for revision in a certain year.

79.0% out of 195 assessment criteria that were revised between 2008~2010 were revised due to the expiry of the sunset period. On the other hand, only 21% had a frequent revision according to the revision of laws or the change of technology. Considering that the sunset period is a minimal period to update, it seems that frequent revisions have been made insufficiently so far.

Direction of improvement and new update scheme for assessment criteria
The forms of the current assessment criteria and revision of types shall be suggested. To maximize the use of the NCS, the rename of the types of current assessment criteria can be recommended to those used in the NCS. To provide necessary information to exam writers, the three point measure of industrial field applicability is added into the written examination, and five point measure is suggested to reflect the level of difficulty, the level of importance and the level of frequency in the performance test.

In updating the assessment criteria a scheme to apply the NCS might be suggested. When every field has its own standard in the future, the reorganization of qualification types might be made through the NCS analysis, and the assembly of these can substitute the current assessment criteria. In this case, the assessment criteria and types of the NCS should be matched to review or confirm to each other.

The current sunset period can be reset to reflect the speed of technical change, and the sunset period of the same type of sub job areas. Moreover, it is also recommended to arrange the sunset period so that similar number of updates (85~95 types) can be made years.

For a frequent update of the assessment criteria, a frequent monitoring system to review the field applicability might be introduced for frequent updates. Specifically, if more than 10% out of the assessment criteria are required to be changed after reviewing the field applicability by the exam writing committee member, it might be subject to revision.

Conclusions
The assessment criteria for qualification should provide accurate information to users, and should contain competency to be applicable to the industrial field. Accordingly, the contents of the assessment criteria must be reviewed frequently and
complemented reflecting newly developed technology. In this respect, it is desirable to set the sunset period for a minimal periodical update. However, there have been less frequent revisions, but majority updates were made obligatory after the expiry of the sunset period. And, the result of the operation of the system for the last five years, it appears that reset of the period and rearrangement of update period might be required. Thus, it is necessary to provide accurate information to users of the assessment criteria, and to change types in order to make a connection with the NCS. The sunset period might be set up by considering the speed of the technical change, and the administrational and financial conditions for actual updates, and a device to enable frequent updates is a needed tool.

Implications
A prompt update of the assessment criteria is important to secure the field applicability of qualifications, and various alternatives must be prepared to enable it. To set up the sunset period is a device to secure the field applicability at the very least by requiring obligatory updates. And, as there might be a technical change during the period, it might be useful to install a frequent monitoring system working together with the sunset period. And, the NCS resources might be employed positively in the update. Different from the job analysis, it does not generate any separate costs, and has the merit of operating by linking job-training-qualification together. Accordingly, foreign countries may introduce the above scheme in running their qualification system.

References
Developing a competency model of human resource management (HRM) in vocational education for creative industry

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Summary: This paper evaluates the competence and contribution of vocational school graduates for creative industry which has become a regional policy in West Java (since 2007). From the preliminary study in Bandung, we found that the contribution from vocational education graduates is too small (23.6%). In order to improve it, we need to figure out the competency model which fulfills the criteria of creative industry by doing research and development at three public senior high schools and four colleges. The data is collected through interviews, questionnaires, focused group discussions (FGD) with experts and trials in limited scope. Finally, our research produces an integrated learning model with life skill orientation. This model is derived from key competence groups in a competency-based curriculum. This model will become one of competency models and it has the major role in the knowledge economy in Bandung, West Java.

Keywords: Human resources, competency, creative industry, knowledge economy

Introduction

Bandung, with a population of 2.7 million people, is the economic center in West Java. The development of the city is supported by three main economic activities. These activities are divided into three groups of industry: Trading (commercials), Processing and Creative Industry. One of the economic activities, which has been developed and relates to knowledge economy, is creative industry. In Bandung, this industry is developing faster than other ones. The data from Institute of Statistical Processing (BPS-2009) shows that the creative industry grows almost 27% per year since regional government policy was launched in 2007. It became the pilot project of creative industry.

Therefore, this industry needs human resources with good competence. We realized that the number of graduates from vocational school (only 23.4%) in West Java is fewer than from general school.

The readiness of the education in providing competent human resources who have high qualification is still low. According to this problem, we want to describe the relation between competence and performance required in employment that relates to knowledge economy; what kinds of competency needed by the vocational school to improve the quality of the graduates; how vocational schools develop and implement the present curriculum; to what extend the graduates can contribute in developing regional economy; to what extend the graduates can contribute to the creative industry; and, what kinds of competence needed by creative industry especially in West Java.
Creative industry and life skills

Creativity, word of multiple definitions, intuitively refers not only to the ability of creating the new, but also to the ability of reinventing, diluting traditional paradigms, uniting disconnected points; and leading us to find solutions for new and old problems. Meanwhile, Life skills, means problem-solving behaviors used appropriately and responsibly in managing personal affairs. As problem-solving behaviors, life skills can be used to face many life situations. Appropriate use requires an individual to adapt the behaviors to time and place. Responsible use requires maturity, or accountability. As behaviors used in the management of personal affairs, the life skills are applied to five areas of life responsibility identified as self, family, leisure, community and job (Hims, 1973).

Creative industry is seen as a set of specific economic sectors. In Indonesia, the creative industry consists of advertising, architecture, arts and antique markets, arts and crafts, design, fashion, cinema and video, leisure software, music, performing arts, publishing, computer and software services, radio and TV. Bearing in mind that the comparative advantages of each country are different, the list varies and may, sometimes, include tourism, gastronomy, folklore, jewelry, and others.

Major competence in knowledge economy, creative industry and growth of economy

The Knowledge Economy emerges from two defining forces: the rise in knowledge intensity of economic activities, and the rise in globalization of economic affairs. The rise in knowledge intensity is being driven by the combined forces of the information technology revolution and the increasing pace of technological change.

Competency is a description of something which a person who works in a given occupational area should be able to do. It is a description of an action, behavior or outcome which the person should be able to demonstrate (Ouston; 2000). A competence is the ability to use skills and knowledge effectively to achieve a purpose (Warn and Tranter; 2001).

According to these definitions, we know a competency is more than just knowledge and skills. It involves the ability to meet complex demands, by drawing on and mobilising psychosocial resources (including skills and attitudes) in a particular context.

Furthermore, to develop a competency in creative economy Ana Carla Fonseca Reis (2008) said that the needs of the ability to communicate effectively is a competency that may draw on an individual's knowledge of language, practical IT skills and attitudes towards those with whom he or she is communicating. In any case, the creative industries are at the heart of the creative economy. From the knowledge economy, the creative economy uses the emphasis on the trinomial technology, skilled work force, and the generation of intellectual property rights, which explains why, for some authors (Knell; Oakley, 2007), the creative economy sectors integrate the knowledge economy, even though the latter does not lend culture the same degree of emphasis the creative economy grants it.

The objective of this paper is to give a description about major competence in knowledge economy and especially in creative industry.

Methodology

By using qualitative methods and quantitative approaches according to Borg and Gall (1989:624) “research and development is a process used to develop and validate educational product”. According to this theory, our research divided into three activities, which are: first, preliminary study is analysing and assessing the problem about competency needed in creative industry; second, designing and
developing concept of competency by discussing, using delphi methods and focused
group discussion; and the last, trying the concept out in limited scope and wide
scope. Finally, we find out the result by validation test (for groups; organize pre and
post test, experiment and arrange control groups). Thus, the educational model of
competence will be described as follow:

![Figure 1: The educational model of competence](image)

**Results**

Competences required in the creative industry are communication skills (negotiation
skills, language) and Math skills (IT). According to research and development in
public and private institutions, the field of vocational education (in three public
vocational high schools and four colleges) and creative industry which are located in
Bandung West Java, we found the major competence related to life skill such as soft
skill and hard skill. The description of soft skill refers to scheme on the following page.

These competencies are applied in vocational school by adding one year
education in higher education that has been appointed by the government or adding
more credit units in college in the middle and in the last semester.
Table 1: Soft and hard skills and relevant competencies

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<tr>
<th>Competence</th>
<th>Sub-competence</th>
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<tr>
<td><strong>SOFT SKILLS</strong></td>
<td>Knowledge of language</td>
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<tr>
<td>Effective Communication</td>
<td>• Decision Making</td>
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<td></td>
<td>• Creative Thinking</td>
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<td>• Negotiation Skills</td>
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<td>• Critical Thinking</td>
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<td>• Problem Solving</td>
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<td>• Interpersonal Relationship</td>
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<td>• Self Awareness</td>
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<td>• Empathy</td>
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<tr>
<td><strong>HARD SKILLS</strong></td>
<td>Logical thinking base Maths</td>
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<tr>
<td>IT Skills</td>
<td>Graphics (Clothes, Batik, etc)</td>
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<td>Animation (Advertising, Brands)</td>
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<td>Programmer of System (Accountant, E-learning, etc)</td>
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<td>Networks System</td>
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</table>

**Conclusion**

It can be drawn into conclusion that our result suggests the model competencies for the best results and gets recognition from company or creates a new young entrepreneur. It is very important to improve ability in soft skills and foreign language, especially English, because they will make us easier to adapt with the new environment or to innovate something. Every vocational school must respond and prepare a new program of how to create a new innovator who will contribute in developing a city (region), especially in creative industry. Unfortunately, in this creative industry, vocational school graduates in Bandung are just workers (job seeker), not an entrepreneur (job creators). Quantitatively, the number of graduates from vocational schools is fewer than public school but their quality is very good as a creative worker. To be able to compete with other workers from abroad, every graduates should be directed to get professional certification that has been recognized internationally related to their competency in particular areas of profession. Our recomendation is that competency model which we found will be appropiate if we gave it in one particular program that is organized after graduation both from senior high school and higher education.

**References**


Costs, benefits and quality in TVET: Method, results and contexts of implementing a self-evaluation tool for companies in Germany and South Africa

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Summary: In 2006, Bremen University’s TVET Research Group (I:BB) introduced a self-evaluation tool (QRC= quality, return, costs) for companies to assess the cost-effectiveness as well as the quality of in-company training offered in their firms. This instrument has been successfully applied in various regions and sectors in Germany. Among the central findings is the fact, that on average, apprenticeships are producing net returns. Moreover there is a positive correlation between cost-effectiveness and the quality of in-company training. In 2011, a first international project has been launched in Johannesburg, South Africa. This article will give an overview of this instrument and summarize its major findings as well as the relevance of the instrument for South African conditions.

Keywords: cost-benefit analysis, quality measurement, self-evaluation

Introduction
Economic efficiency is always one of the major driving forces behind entrepreneurial decisions. The question of whether to train apprentices or to employ trained personnel is thus determined by the most efficient way to secure a company’s demand of well-trained staff.

On a macro-economic level, this is an important question, since countries with a dual system of vocational education and training tend to have a competitive advantage in an international comparison (Hamilton and Hamilton 1999). Within systems of integrated dual VET, apprenticeship depends largely on the extent to which training places are offered by companies. However, very few companies manage to set up a precise cost-benefit calculation when it comes to the training provided within their company and cost issues are often over-estimated, especially in times of a general economic recession. This lack of precise information and transparency was one of the main reasons to set up a measurement instrument, especially designed for the use of individual companies/company managers.

Apart from the project’s aim to provide an easy-to-use “VET controlling system”, it was intended to receive a solid data base where the accumulated results could be utilised on an anonymous basis for further comparative analysis in different economic sectors and regions. Likewise individual users not only receive their individual results but also a benchmark relating to the cumulative results from companies of their own economic sector. A third motivation for this project was the creation of a consultancy instrument, which could be used by chambers of commerce or other VET advisory bodies. Up until today, four German states (Bundesländer) have been participating in this project. Moreover, QRC has been introduced nationwide as a consultancy tool in the German elderly care sector with both ambulant and in-patient establishments.
The QRC-method:
QRC uses an online questionnaire that is divided into 3 major blocks:
A: Company details: This is general information about the size, branch, number of employees, apprentices, vocations trained etc.
B: Costs and benefits: The measurement of the gross costs is based on the procedure developed at the Federal Institute for Vocational Education (Rauner 2008, Beicht and Walden 2002).
C: Quality assessment: Derived from vocational pedagogy, the quality of apprenticeship is evaluated taking into consideration six quality criteria: (1) experience-based learning (2) professional level of training (3) autonomous learning (4) learning in the business process (5) professional competence and (6) occupational commitment. While the first four quality criteria evaluate the training process, the latter two relate to the effects that the process of apprenticeship has on the trained person.

The QRC tool provides a visual format of all results from the questionnaires for each individual company, indicates relevant benchmarks and combines the results of the cost-benefit analysis with the quality assessment in a quality-efficiency matrix.

Figure 1: General results from the cost-benefit analysis of one company

Figure 2: Quality assessment of in-company training. Results of one company with QRC

Quality performance is illustrated in diagrams (Figure 2), where the evaluation of each quality criterion is shown on a level between 1 and 5 (school marks). Such diagrams are given for each year of apprenticeship in order to show the development of an individual performance from the first to the final year of apprenticeship.

Interim Results
The results and interim results of all QRC projects can be summarized as follows:
a) On average, companies are gaining net returns while providing in-company training. Nevertheless, we found a wide range of cost-benefit ratios, which can be illustrated by Figure 3. According to our studies, there where average net return per apprentice and year of about 1300 Euro (data of QRC projects 2008-2010).
b) Whether in-company training is cost efficient or not depends to a large extend on the amount of time an apprentice is working on real job orders. Workshop training might be of high quality, but it does not lead to cost efficiency.
c) Apprenticeship is more likely to produce net return, if the duration of apprenticeship covers a full three year period.
d) There is a positive correlation between the quality of in-company training: a higher quality of training very often corresponds with positive cost-benefit ratios (Figure 4).
The South African context

South Africa is a relatively young democracy (1994) with a skills development levy into its 12th year. The skills levy is a 1% of payroll tax to medium and large employers and is managed by a group of 21 Sector Education Training Authorities (SETAs). One of the primary objectives of SETAs is to collect the skills levy from employers within their sector in terms of the provisions of the Skills Development Levy Act of 1999 and make the money available within the sector for education and training. This goes to employers, training bodies and learners in the form of discretionary grants and bursaries, towards accredited occupational qualifications. Within this context, apprenticeships have increased in popularity as a learning pathway towards a recognised trade test since 2006 (Figure 5).

This increase is largely in response to supporting the economic growth imperative. The increased popularity and interest in this form of dual VET has stimulated the debate on how to continuously improve the quality, returns and costs associated with the apprenticeship system.

Whilst the possible benefits (Figure 6) above offer an important opportunity to improve the QRC profiles in the South African manufacturing sector and beyond, the SETA needs to interpret these values with due consideration of the additional discretionary grants and tax allowances incentives. This process with the possibility of international comparisons will ultimately assist the SETA in tailoring its incentives for greater returns.
Anticipated benefits of QRC to the South African Skills development system

<table>
<thead>
<tr>
<th>For the employer:</th>
<th>For the public Further Education Training (FET) College:</th>
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<tbody>
<tr>
<td>- To understand the training costs related to candidates entering an apprenticeship with different pre-apprenticeship qualifications. The preparation towards entering an apprenticeship varies in curriculum content and simulated practical exposure.</td>
<td>- To assist in the information sharing that builds the relationship between the FET and other stakeholders of the ecosystem.</td>
</tr>
<tr>
<td>- To assist in benchmarking QRC information between two different employers/companies training apprentices in the same trade.</td>
<td>- To assist with qualitative information that will promote their candidates to employers.</td>
</tr>
<tr>
<td>- To assist employers in the performance management of all roles players in their apprentice training system.</td>
<td>- To inform on best pre-apprenticeship qualifications and apprenticeship preparation activities.</td>
</tr>
<tr>
<td>- To understand the difference in costs between training apprentices in a single trade across different industrial sectors.</td>
<td>- To assist in benchmarking their curricula against those of private training providers.</td>
</tr>
<tr>
<td>- To interpret possibilities of improving productivity of apprentices.</td>
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</table>

<table>
<thead>
<tr>
<th>For the learner:</th>
<th>For the private training provider:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- To determine which pre-apprenticeship programs offer the best preparation towards favourable consideration by an employer when selecting apprentices.</td>
<td>- To assist in setting training fees according to market related rates.</td>
</tr>
<tr>
<td>- To guide apprentices on expectations towards productive hours contributions during the different stages of apprenticeship</td>
<td>- To use the QRC as a consulting tool that builds a service offering to employers.</td>
</tr>
<tr>
<td></td>
<td>- To interpret the possibilities of tailoring curriculum offerings for specific employer needs.</td>
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<tr>
<th>For the merSETA:</th>
<th>For accredited Decentralised Trade Testing Centres:</th>
</tr>
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<tbody>
<tr>
<td>- To utilise QRC information/data to encourage an increased interest training apprentices.</td>
<td>- To link first time trade test pass rates to QRC data and share this information with apprentice training stakeholders.</td>
</tr>
<tr>
<td>- To determine discretionary grant values based on comparative costs of each different trade.</td>
<td></td>
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<tr>
<td>- To utilise QRC data to determine allocations of funding towards trades in support of scarce and critical skills.</td>
<td></td>
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</tbody>
</table>

Figure 6: Anticipated benefits of QRC in South Africa

References


Prinsloo, F. (2011): Distribution of apprenticeship registrations over five economic sectors from 2007 to 2011. NAMB.


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1 School leaving certificates include a Matric (Grade 12) with maths and science; Senior Certificate (Technical) and courses at Further Education Training College certificates such as National Certificate Vocational levels 2–4; National Technical Certificate (Nated) levels 1–6.

2 Private training providers may also be accredited in-company training centres.
Developmental tasks, vocational development and career adaptability

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Summary: The ideas of age-appropriate developmental tasks, clear vocational development stages and initial vocational education and training (VET) pathways were predicated on eventually establishing and maintaining a stable career identity. Such trajectories have become problematic, but much initial VET does not reflect this tentativeness and often acts as if a young person has made a definite commitment to the sector or occupation and will find appropriate work. The argument here is that, given career instability and the tentativeness of much initial occupational choice, then the key ‘developmental task’ for young adults should be the development of ‘career adaptability.’ This concept is strategically important because it is concerned with the development of, and support for, the capability of an individual to make successful transitions where the labour market, organisation of work and occupational and organisational knowledge bases may all be subject to considerable change.

Keywords: Career adaptability; developmental tasks; learning and development pathways; occupational identities

Introduction

Havighurst (1950) believed there were clear age-appropriate developmental tasks to be accomplished at different life stages. In the vocational sphere early adulthood (up to age 30) was seen as ‘getting started in an occupation.’ Super (1963) built on this approach with his idea of vocational development stages, where early adulthood (up to age 24) was a time where tentative plans were made and occupational choices narrowed but not finalised. The later stages around establishing and maintaining a stable career identity have become much more problematic, but it is interesting that both Havighurst and Super saw the early adulthood stage as being tentative in relation to vocational development.

Much initial vocational education and training does not reflect this tentativeness and assumes a young person has made a definite commitment to and will find appropriate work in the sector or occupation. However, career identities are now much less stable than fifty years ago, so this, together with the tentativeness of much initial occupational choice, reinforces the idea that a ‘developmental task’ for young adults should be ‘career adaptability.’ The concept of career adaptability is strategically important because it relates to an individual’s capability to make a series of successful transitions where the labour market, organisation of work and underlying occupational and organisational knowledge bases may all be changing. This paper investigates the successful transitions of young people (up to age 30) either into their chosen occupations or into sectors other than those for which they were initially trained.
Methodology
Since 2000, the European Union has sought to become the most competitive and dynamic knowledge-based economy in the world, with member states committed to increasing cooperation in formal initial and continuing vocational education and training, and national policies often focused on exhorting employers to train and on encouraging sectoral bodies to formulate plans for skill development in their sector. What was missing, however, from such employer and sectoral-driven concerns was some sense of how individuals are putting learning and development to use in their evolving careers progression across the life-course, particularly insofar as this involves moving between sectors. So the European Commission commissioned a major comparative study of changing patterns of work-related learning and career development in Europe (Brown et al. 2010). The study sought to develop an understanding of the different ways individuals careers are unfolding over time, how different types of learning interact across the life-course and how they may facilitate mobility in the labour market. Focusing mainly on this study, but also drawing on three earlier studies, this research explored the extent to which young skilled workers were equipped to manage career transitions – were they career adaptable?

The methodology for the research underpinning this paper involved the purposive sampling of cases from a database of strategic career biographies of almost 2000 adults across fourteen countries in Europe (in two national and two European studies) on changing occupational identities and patterns of career development across the life-course. These data were collected either using interviews or extended surveys that traced patterns of engagement with learning and development through work, as well as in more formal education and training settings. For this paper the data analysis will focus on the detailed case histories of 50 young people who made successful transitions to experienced skilled worker status in their chosen field mainly but not exclusively from the United Kingdom, half of whom subsequently made a major career change (of occupation, sector, employer or country). Sectors represented include: aerospace and engineering; banking and finance; chemicals; health care; information and communications technology (ICT); media; and sports marketing.

Careers can be viewed as ‘the evolving sequence of a person’s work experiences over time’ (Arthur et al. 1989) and Ball (1996) highlights how, for individuals to take responsibility for their own career decisions, their ability to review and reflect upon their career transitions needs to be developed. However, it has been found that individuals who take opportunities that present themselves and try to turn them to their advantage are engaged in an opportunistic career transitioning style (Bimrose et al. 2008), which can also be critical in shaping careers. Our research sought to examine the dynamic element of how individuals become engaged with learning and development pathways, which involve upskilling, reskilling and sometimes transformational shifts in perspective as their careers develop, which is largely absent from current policy analysis. ‘Career adaptability’ provides real purchase on the readiness of young people to engage in different employment, education and training contexts precisely because it can be examined in terms of individual proactivity, relational issues and the quality, structure and nature of institutional support.

Results
Findings relate to the potential of the concept of career adaptability: to empower individuals to take positive decisions and actions regarding their skills development, as well as facilitating participation in skill development in a range of employment, education, training and other contexts. From the (50) detailed cases it was clear
that, subsequent to initial (vocational) education and training, experience developed through engagement with challenging work was a major vehicle for continuing development through to experienced skilled worker status. However, where participants had made successful career transitions before the age of 30, it was apparent that development that had occurred while working was often supplemented in a variety of ways, with individuals having different degrees of choice in the combination of learning activities (formal, non-formal and informal) with which they engaged. Individuals usually sought a degree of personal autonomy in how their careers developed (and in the meaning attached to career) but, in parallel, they often also looked for opportunities to exchange experiences with peers, colleagues and experts about possible lines of career development. In particular, individuals with a proactive approach to career development were more likely to engage in various forms of learning and development. Formal learning and development / CVT provision was also highly valued as a form of personal development, even without a direct career benefit: ‘I love learning - for the pure enjoyment of learning something new’. Findings offer reinforcement for the idea that individuals are responsible actors in creating their own career pathways through learning and development, linked to opportunities in education, training, employment and other contexts. However, at the same time, there is an urgent need to support individuals in navigating their ways through increasingly complex work and life contexts and, in particular, helping individuals become more reflective at the individual level through provision of career guidance and counselling as a key component of a lifelong learning strategy (see also, Biesta, 2008). Even within generally successful careers, anxieties were expressed about career development at a time of organisational change and structural constraints – people recognised that navigating a career path could be fraught with difficulties. Personal agency (pro-activity and responding to opportunities) is important but there is also value in helping individuals develop their own career story of where they have been and where they are going. Many are actively shaping their personal work biographies (and even then they may value help in doing this), while some of those who had not made further successful career transitions upon completing their initial training and finding their first job, sometimes felt they would like to develop a clear sense of career direction but were struggling to do so without support: ‘I don’t feel like my career has been very well planned and I don’t have a clear plan for how it will develop in the future, which means that it’s difficult for me to choose training or learning (particularly long-term or big commitments) to develop my career.’

Career options and choices are limited by context, but individuals can use career self-management to negotiate their own position within these constraints (King, 2004). Some young skilled workers were over-qualified for their jobs with their interest in learning being driven by personal development rather than career progression. Indeed, given the strong emphasis respondents attached to learning for personal development, it may be that messages promoting learning for employability are less effective than those which stress personal development, establishing personal networks and meeting new challenges. That is, messages should emphasise the immediate benefits of being a learner rather than where it leads - particularly if the opportunity structures available to an individual at that time are limited (Roberts, 1997).

Available pathways and different sets of expectations about career choice and occupational mobility are framed within clear opportunity structures that vary within and between sectors and countries. In ICT, for example, both learning and career patterns are highly individualised and as informal learning plays a key role, formal
qualifications and career progression are only loosely coupled. In engineering there is quite a strong linkage between learning and careers, as formal training has a key role for many in the close coupling between continuing vocational learning and individual career development. In health, the linkage between learning and careers in health was quite complex. In some cases, developing a career involved vertical mobility, whereas others were happy to continue in a single specialisation or engage in horizontal mobility. There was, however, strong continuity through highly formalised initial and continuing education and training pathways, with a wide range of development opportunities on offer for most people working in the health sector. As a consequence, individual career progression was often linked to formal qualifications. Career pathways were therefore strongly framed by organisational opportunity structures in the different national health systems. The use of the term ‘opportunity structures’ itself neatly expressed the tension between openness and flexibility and structured pathways. Two things stand out from scrutiny of these data. First, those who made successful subsequent early career transitions often exhibited career adaptability in terms of their (pro-active) personality, positive psychosocial factors (through the interaction with others, development of personal networks, mentors) and engagement with challenging opportunities. Second, those who had not made early career transitions split into two groups: those who were content with their ‘experienced skilled worker’ status and those who had reservations about their initial occupational choice. In all of these cases, focusing on ‘career adaptability’ as an important goal in initial and continuing education and training could be of considerable value in facilitating future career transitions of young skilled workers.

References


International comparative study on the formation of high school students’ vocational views and the challenges of vocational and career education

Based on the results of questionnaire survey to 10th grade students in six countries.

Moriki Terada

Graduate School of Education and Human Development, Nagoya University, Nagoya-shi, Japan

Summary: This paper aims to investigate the actual existence of high school students' vocational views and values and to clarify the challenges of their vocational and career education. Questionnaire surveys were implemented by a collective survey method to 1931 high school students in six countries including Japan. The questionnaire consisted of 30 items concerning vocational views, and 31 demographic variables. As result of factor analyses and analyses of variance, in every country, general students need to be trained vocationally or substantially. On the other hand, vocational students should be trained more notionally and career development oriented.

Keywords: Vocational views, career education, vocational education, international comparison

Introduction

In Japan and other Asian countries, such as China and South Korea, tendencies of low or weak vocational views and aspirations of the younger generation have sometimes been pointed out not only by politicians, but by researchers of the human sciences as well. These tendencies have grown in the past two decades. In general, these tendencies have a relationship with the expansion of the so-called “Free-ter” (part-time workers) or NEET (Not in Employment, Education or Training) phenomena of the younger generation.

So, Japanese governmental ministries, and some researchers, have continued to investigate and discuss about how these problems should be solved, and which career or vocational education is effective. The primary problem is to analyze precisely the important aspect of the younger generation's vocational views or values.

The author implemented an international questionnaire survey concerning vocational views and values of 12th grade high school students (approximately 1400 persons), in four countries, Japan (Nagoya and Mie), China (Shanghai), South Korea (Daejeon) and Indonesia (Semarang) in 2008, from August to September (Terada,2009). The questionnaire consisted of 22 items, which referred to such scales and concepts made by Super (1970), Odaka (1970), NHK (2004), and 64 demographic items concerning the actual decision of vocational choice. From this comparative survey concerning four countries, it became clear that every country's general students face to noticeable challenges in the development of vocational aspirations and views for the economical and leader oriented aspects. So, general students must be trained vocationally. On the other hand, vocational students are significantly weak in social contribution and self-realization scales. So, vocational
students need more focus self-career on development. Also, Japanese students were significantly weak and low in all scales. It lets us imagine students in developed countries or matured societies might be also similar. The initial survey was implemented only within Asian countries and involved only to 12th grade students. So, the author decided to survey to students in other grade’s, including students in other developed countries.

Survey objects and methodology
The questionnaire survey was given to students in 17 high schools in Japan (Nagoya, Mie), Germany (Hannover), United States of America (Columbus, OH), China (Shanghai), South Korea (Seoul) and Indonesia (Semarang) including vocational, general and comprehensive schools to a total of 1931 students at 10th grade (including 998 males, 928 females, and 5 who did not designate gender) and 36 students at 11th grade (only in Germany).

The scales of questionnaire were revised from 22 in 2008 to 30 concerning vocational views including Shimizu and Shulenbergs’ inventory (1990) and Schein’s career anchors (1978), and revised from 66 to 31 demographic variables. Surveys were fundamentally implemented as a collective one under the author’s direct attendance from 2009 August to 2010 March.

In following analyses, the author omitted two Japanese schools (the number of respondents is 569) as Japanese respondents became a disproportionate number in comparison with other countries, and divided the results of factor analysis concerning vocational views and values into two parts, because the author was unable to ask questions such as those addressing religious issues in the United States of America.

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<tr>
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<th>America</th>
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<th>Japan</th>
<th>South Korea</th>
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Table 1: Cross tabulation between school and country

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<th>Japan</th>
<th>South Korea</th>
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<td>103</td>
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<tr>
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<td>275</td>
<td>280</td>
<td>305</td>
<td>1358</td>
</tr>
</tbody>
</table>

Table 2: Cross tabulation between gender and country

Main results 1: Career decision and some influential variables
Career aspiration after graduation
Most students, including vocational students also, excluding Japan and Indonesia, tend to choose an academic track after graduation. Also, technical and vocational students haven’t unexpectedly decided their career after graduation.
Present wishing occupation

Approximately, 56 percent of all students answered as “I have” positively, but such answer as “I have not” or “I have not yet” were 16.7 and 27.5 percent. Such answers are higher in the cases of general students in Germany, Japan, South Korea and China.

Factors influencing on occupational choice: life events

Approximately, 70 percent of students have effective events which influence on their occupational choices. There is no significant difference between general and technical-vocational students on this factor.

Career models for occupational choice

The author insists that students have a positive career model on the one hand and there is also potentially a negative one. 25.6 percent of students have both positive and negative models, 34.2 percent have only positive models, but 30.8 have no career model, and 9.4 have only negative models. Approximately, 50 percent of Japanese and Chinese students have not only positive, but negative models too.

Factor analyses and international and inter-school comparisons

Factor analysis of vocational views and values

From the reason mentioned above in the United States of America, two analyses were done and shown parallel.

Results of factor analysis, based on the principal factor method and Kaiser’s Promax (oblique) rotation to data of 30 items regarding five countries excluding US America, and restricting each factor which is over 1.0 in characteristic values, five factors (orientations); “self realization”, “Religion-mission”, “Economy-life signifying”, “Society-contribution” and “Leader-wealthy class” can be extracted (Table 3). The author constituted five scales for the more detailed analyses from items in which the loading value is over 0.4 among each these factors. There was no problem with the reliability coefficient.

On the other hand, through analysis for 28 items excluding two religious ones, but from all six countries including the United States of America, three mostly same factors, “Self-realization”, “Economy-stable” and “Leader-wealth class” as analysis concerning the 30 items, but, of course, the former “Religion-mission” became the only “Mission” and “My-pace in life” as one new factor were added.

Analysis of variance between countries and schools

If we implement one analysis of variance between countries and schools for the data of six countries, and the 28 items, some results became clear. First, Japan is always lowest when compared to the other five countries. Secondly, general students are significant higher in “Mission orientation” than vocational-technical students (p<.05) as Figure 1 shows, and vocational-technical students are significantly higher than general ones in the scale “Economy-life stable” (p<.001), as Figure 2 shows.

In the analysis of 30 items for five countries, comparison among countries is always significant (p<.001). On the other hand, in analysis of school comparison, vocational-technical students, excluding Indonesia, are higher than general ones in the scale “Religion-mission” (p<.05) and vocational-technical students in all (five) countries are higher in the scale “Economy-life stable” than general, also in the scale “Society-contribution” higher than general students excluding Germany (p<.01).
In every country, general students are needed to be trained vocationally or substantially. On the other hand, vocational students should be trained more notionally and career development oriented. If we consider some tendencies of American high school students in this survey, developed countries don't always face weak and low motivated vocational views and values.

### References

The practice and research on the win-win school-enterprise cooperation mode linked by assets

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Summary: This study is about a school-enterprise cooperation in one school. The school provides venues and production equipments and businesses invest in productive projects and technical force to form an asset-ties of cooperation. On the one hand, the school has gained the support from experienced engineers and technicians in their teaching and learning, and teachers and students improved their professional abilities through participating in real-production projects. On the other hand, enterprises can reduce inputs and costs, increase profits, train and select their future employees through this cooperation. The long-term school-enterprise win-win cooperation was achieved.

Keywords: Real production projects, school-enterprise cooperation, practice teaching, school-enterprise win-win situation

Introduction

The evolution of school-enterprise cooperation in China’s vocational education

Before the 1990s, China was in the time of planned economy. Since most of the enterprises are state-owned, there was no need to establish cooperation between schools and enterprises. The cooperation was arranged by the government, where schools provide technological services for enterprises and enterprises accept students to practice unconditionally. The graduates are distributed to different enterprises by the government. The graduates from vocational schools are welcomed by the enterprises.

After the 1990s, the goals of the enterprises changed from completing the assigned tasks by the government to maximization of profit. The relationship between enterprises and schools became a relationship of interest. Enterprises started to say no to the request of accepting students to practice. Schools felt panic and found no way out, because schools could only provide education behind closed doors, and the distance between the vocational education and real world production became larger and larger. The quality of graduates and teachers was declining.

Entering the 21 century, along with the fast development of Chinese economy, enterprises and schools both felt serious lack of high quality human resources. On the one hand, enterprises could not employ suitable new employees; on the other hand, graduates of schools could not meet the need of enterprises, and the unemployment rate of the newly graduated students was high. The time for redeveloping the mode of constructing unions between schools and enterprises to run vocational education together is coming.

In the “market economy” environment, both enterprises and schools have recognized the importance of training personnel through the school-enterprise cooperation, but businesses still have concerns in the investment in vocational education and training for their “future” employees, because they cannot guarantee the trained graduates will work for their company after three years of study. Therefore,
we need to explore a totally new enterprise-school cooperation mode to attract businesses to join vocational education in the “market economy” environment to give attention to both short-term returns of enterprises and long-term supply of human resources for enterprises.

With property as links, clarification of property rights, the productbility practicing training bases were established, which are the production bases of enterprises, the real production training bases for students, and the research institute for teachers to do research and services.

**Case description**

1: In 2006, we started to establish a “Beixin Software Park” together with enterprises. Our school provided hardware and spaces for students practice and enterprise manufacturing and the enterprises provided research projects, administrative mode, engineers, administrative members and workers. Teachers from related departments form teaching group and research institutes with members from enterprises. The Software Park can meet the needs of the enterprises for production, at the same time, it can be used for students to do their practice work.

Now there are three enterprises in the Software Park that have established the software technology research institute, animation technology application research institute and multimedia technology research institute. Now there are about 130 students working full time inside the Park who are from 4 different classes. There are about another 400 students who do their practical work in the Park for 12 weeks each year.

<table>
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</thead>
<tbody>
<tr>
<td>2008</td>
<td>216</td>
<td>51</td>
<td>230</td>
<td>132</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>45171</td>
<td>47</td>
<td>237</td>
<td>205</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>215</td>
<td>101</td>
<td>77197</td>
<td>253</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>64</td>
<td>68</td>
<td>255</td>
<td>45</td>
<td></td>
</tr>
</tbody>
</table>

*Table 1: The number of students doing the internship practice in the Beijing Software Park*

2: On September of 2007, we started to establish the “Beixin Cultural Creative Media Center” inside the famous 798 Creativity Art Park. The reason why we built the Beixin Cultural Creative Media Center inside the 798 Creativity Art Park is that there is a good art environment there. This center was built by our college and Beijing Zhengdong Group(a shareholder of the 798) together. In 2008, the Zhengdong Group finished the building construction, which solved the problem of lacking the space for studio of our college.

In 2009, we installed the related equipments inside the studio. Our college is responsible for the managing work of the center. The center is a complete audio and video products production plant, able to complete the whole process of recording, sound recording, post-editing. It is the video production professional training base of our college. The base employed two professional arts companies to do the business, undertaking a variety of audio and video program production projects. The professional equipments and market running mode provide our students with real work practice opportunities. Students can get familiar with the real program making process and do their practice work according to the real work process here.
<table>
<thead>
<tr>
<th>Year</th>
<th>TV Station Number</th>
<th>Program Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td>2010</td>
<td>16</td>
<td>145</td>
</tr>
</tbody>
</table>

Table 2: Recording TV programs reception numbers in Beixin Cultural Creative Media Center

3: We established “the Beixin-Choiceway Mold Design and Manufacturing Base”. The cooperation combines research work and manufacturing together. We built inside the campus the Mold Design research institute. Teachers and staff from enterprises do the research projects together inside the institute to provide the services for enterprise directly. Students can do practice work in the institute and manufacturing plant. The manufacturing plant can provide enough practice positions for students and they can provide enough technical guidance for students too.

Possibility of experience share
The above introduced school-enterprise cooperation achieved the win-win goals of the schools and enterprises, so it can be sustained, developed, and it can attract more enterprises to join. Now several joint projects are brewing.

Through these cooperations, schools can get real production projects and research topics from enterprises, get to know the work flow, production organization, production processes and quality standards and the quality and technical requirements for their staff.

Management staff, engineering and technical personnel and skilled workers from enterprises are directly involved in the school curriculum design, new technologies teaching and practical program guidance. Students trained under the guidance of technical staff from the enterprise in accordance with enterprise standards, and their technical capacity increases gradually up to standard of participating in the actual production projects of enterprises.

Through doing real-production projects, teachers and students have gained valuable work experience in the process, and their professional ability improved. The “5” teaching reform goals eventually realized, i.e., the integration of teaching, learning and doing, program standard professionalization, social-oriented quality assessment, full range diathesis cultivation and educational resources diversification.

To meet the needs of business models of practice teaching, we make the following two adjustments of curriculum. First, set a special time to do the practice teaching. We made time available for practice teaching each semester for two weeks to a month, twelve weeks in the fifth semester for productive training; second, teaching cases and training projects are from the actual production projects. This adjustment is actively supported and vigorously promoted by the government and has also been recognized by the enterprises.

Through cooperation, enterprises can reduce the input of space and equipments to help enterprises solve the financial difficulties encountered by expanded reproduction. Equipments support and high grades students joining reduces production costs and increases profitability. Meanwhile, teaching and research activities carried out jointly with the school can also help enterprises to continuously reflect on and improve their management, organization and production technology, thus greatly enhance the scientific management level of business. Many research projects can be carried out with a relatively small investment when school teachers participate in and provide support. Companies can also train and select future employees through cooperation.
This model of school-enterprise cooperation clearly defines its property rights. Who inputs, who owns, and it is not a shareholding system. Both sides made clear their respective responsibilities and interests, their respective needs and benefits. From cooperation, schools can not only improve the quality of teaching, but can also gain a certain share of the profits which will surely be used for equipments maintenance and re-investment.

In short, input the state granted special teaching funds in construction of school-enterprise cooperation bases is more conducive to the cultivation of students.

References
A study of constructing a computerized career cognition competence testing system

Modelling of career planning cognition integrated model on career decision-making for technological university students in Taiwan

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3 National Chushan Senior High School, Taiwan, China

Summary: This study aimed to probe into technological university students’ cognition competence of career planning cognition model, including career self-traits cognition, career information source cognition, and job market environment cognition, on the difference of career decision-making and different demography variables. This study was based on a web based questionnaire survey with well reliability and validity examination. The subjects were 890 valid students samples from various colleges of four-year technological universities in Taiwan. Further, career planning cognition factors could predict the cognition on career decision-making. Also, this web based career cognition testing system will be useful to assist technology university students in career education and guidance.

Keywords: Career self cognition, career information resource cognition, job market career cognition, career decision-making

Introduction
Career development education is an essential issue for vocational education and training. Especially after the financial tsunami in 2008, every country’s government is placing more emphasize on the education and training policy of human resource development. Technology university students are the main source of work force, thus, Taiwan authorities are promoting a lot of strategies to support assistance for technology university students. However, the better career planning these students prepare, the more job opportunities they will have. (Venable, 2010)

Liu (2009) conducted a study to enquire technological university students’ cognition competence of career planning cognition model, including career self-traits cognition, career information source cognition, and job market environment cognition, on the difference of career decision-making and different demography variables. This research was an advanced study based on the above statement.

This study proposes one career planning cognition model of students of technological university which is mainly based on Swain’s career planning model for the curriculum design of college students’ career planning and the content above as the base of the research framework. (Swain, 1984) The figure was shown as in Figure 1. The left circle showed five kinds of career self-traits cognition, and the right circle showed career decision-making level according to six dimensions.

Methodology
This study constructed a web based career cognition testing system. It also explored
the correlation between career planning cognition model and career decision-making level.

**Tool: Web based questionnaire survey**

This study was based on a web based questionnaire survey with well reliability and validity examination. In this system, all the testees would be asked to log in an account number and pin, and then would conduct 2 practice items to get used to this web based testing system. All the testing items would be shown one by one and backward changing response was forbidden. The testing process would take approximately 25 minutes. After the testing, the system will immediately compute the result and demonstrate the score of the testees on comparison with a norm score.

**Subjects and statistics**

The subjects were 890 valid students samples from various colleges of four-year technological universities and technology institutes in Taiwan. Briefly, these samples were from colleges of engineer, management, design, human science, and nursing area’s learners. The data were analyzed by ANOVA, multiple regression, and path analysis.

**Results**

**Path model of career cognition and decision-making**

The main findings were as follows. The modeling of career cognition model was supported, which means that there were a significantly negative correlation between career self cognition and career decision-making uncertainty; there was a significantly positive correlation among career information source cognition, job market environment cognition and career decision-making level (see table 1).

<table>
<thead>
<tr>
<th>Model</th>
<th>Dependent variables</th>
<th>Independent variables</th>
<th>Coefficient</th>
<th>T value</th>
<th>F value</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Career decision-making Level</td>
<td>Career self-traits cognition</td>
<td>-.143***</td>
<td>-5.937***</td>
<td>22.276***</td>
<td>.154</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Career information source cognition</td>
<td>.242***</td>
<td>3.704***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Job market environment cognition</td>
<td>.206***</td>
<td>6.029***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Career information source cognition</td>
<td>Career self-traits cognition</td>
<td>.293***</td>
<td>5.225***</td>
<td>29.230***</td>
<td>.137</td>
</tr>
<tr>
<td></td>
<td></td>
<td>job market environment cognition</td>
<td>.345***</td>
<td>3.185**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Job market environment cognition</td>
<td>Career self-traits cognition</td>
<td>.337***</td>
<td>7.878***</td>
<td>62.061***</td>
<td>.144</td>
</tr>
</tbody>
</table>

**Note:** 1. Coefficients in the table refer to path coefficients which are the normalized regression coefficients

**Table 1: Path Analysis result of main variables**
This result showed universities should supply their students not only job market information, but also the career education and guidance. Thus, technology university students would have better career self cognition and decline the uncertainty of career planning decision making.

2. * p<0.05  ** p<0.01  *** p<0.001

Figure 1: Path relationship for career cognition and career decision making

Further, career planning cognition factors, such as career self-traits cognition, career information source cognition, job market environment cognition, could predict the cognition on career decision-making (see Figure 1). Especially, various college students showed different career cognition.

Web based testing system

Also, this web based career cognition testing system will be convenient and useful to assist technology university students in career education and guidance.

Conclusion

According to the result of integrated model analysis of career planning cognition on career decision-making, career planning cognition factors can directly influence career decision-making. It meets Swain(1984) career planning model and three main factors in the setting of goals for career decision-making, including a person’s self-exploration, exploration of jobs and education and relationship between individuals and environment.

It refers to career self-traits cognition, career information source cognition and job market environment cognition in this study. As Venable (2010) had mentioned about using technology to deliver career development services. Therefore, when probing into career decision-making, the study should generalize the common aspects of the classified things or concepts with regard to the influences and relationships among career self-traits, career information sources and job market environment cognition. In the future, this study could continue to inquire the theoretical and methodological issues with testing the Holland’s theory and social cognitive career theory.
References


Liu, Wei-Te (2009): A study of the career planning cognition integrated model on career decision-making for students of technological universities. *Journal of Asian Vocational Education and Training*. 2 (1),


The collective nature of guidance in workplace learning: Evidence from the Swiss VET system

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Summary: This paper focuses on pedagogical aspects of initial vocational training in the context of the Swiss VET system. It examines how first-year apprentices are guided and supported by experienced workers in the workplace, and how this guidance and support are distributed collectively in work teams. Drawing on an ethnographic and discursive methodology borrowing concepts and tools from applied linguistics, the paper concludes that particular attention should be given to the pedagogical quality of guidance in the workplace to improve the global efficiency of the dual apprenticeship system and to foster smooth and consistent transitions into work experiences for apprentices.

Keywords: apprenticeship, guidance, verbal interaction, workplace learning, participation

Introduction

Social theories of learning have recurrently underlined the collective and distributed nature of learning processes and the configuring role of “the others” in the ways individuals access and interiorize knowledge and develop skills. The Vygotskian concept of the zone of proximal development defined as “the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more able peers” (Vygotsky, 1978, p.85) is often regarded as a central reference point for approaches that see learning processes as involving a plurality of agents. From such a Vygotskian perspective, it is assumed that psychological development does not consist of a process of biological maturation but involves close interactions with the cultural environment and with more experienced individuals.

By transposing the concepts of guidance and the ZPD beyond the limits of the classroom, contemporary approaches to vocational learning have promoted new ways for understanding the relations between work and learning. In the field of research devoted to workplace learning, it has been recurrently argued that direct and indirect forms of guidance provided by experienced workers constitute important conditions for learning (Lave & Wenger, 1991). Workers do not learn on their own and just by completing activities and tasks. They can do so only when specific resources are being afforded to them. As Billett (2001) puts it, “the quality of direct interaction accessible in a workplace is a key determinant in the quality of learning outcomes. This extends to the availability of this guidance, the willingness of individuals to assist others and the skills experienced co-workers have in sharing this knowledge.” (p. 35)

Considering that apprentices often interact with a plurality of colleagues, experts, supervisors, peers, etc. when they engage in productive tasks in the workplace, this paper addresses the following questions: What kinds of guidance do apprentices receive from the various categories of workers they interact with? How do they manage the contradictions that might arise from this distributed nature of guidance at
work? In what ways do these distributed forms of guidance constitute opportunities or obstacles for their learning and professional socialisation?

Methodology

In a recently initiated research program conducted at the University of Geneva (Filliettaz, 2010), these various issues have been addressed by developing and promoting innovative methodologies borrowed from various trends in applied linguistics. Analysing discourse and verbal interaction among apprentices, trainers and workers, it is proposed, can contribute to a better understanding of the complex learning processes associated with transitions from school to work and illuminate the multiple challenges faced by apprentices at the beginning of their training programs.

The methodology selected for this research program draws upon concepts and analytic categories originating from various fields of linguistics, such as conversation analysis (Schegloff, 2007), interactional sociolinguistics (Gumperz, 1982) and multimodal discourse analysis (Kress et al., 2001). These fields have explored multiple avenues of linguistics and are often seen as offering competing or contradictory approaches for analysing discourse and interaction. Nevertheless, these frameworks also share common assumptions about language and social life. In particular, they view language not only as a way of transferring information from speakers to recipients, but as a historical and culturally shaped medium through which individuals take actions, achieve cooperation, align identities, and participate in social events.

Consistent with this broad discursive and interactional perspective, specific kinds of data were collected for this research program. Data collection was conducted in the form of ethnographic observations of a cohort of approximately 40 apprentices engaged in three different technical trades: i) car mechanics, ii) automation and iii) electric assembly. Observations took place in naturally occurring training conditions in the Geneva area.

With the consent of participants, observations were video recorded by the researchers. The complete data set comprises 150 hours of audio-video recordings collected in one vocational school, two training centres and seven different workplaces. These recordings document sequences of everyday training and work activities in which apprentices interact with a variety of experts, ranging from vocational teachers, dedicated trainers or experienced co-workers.

For the purpose of this investigation on collective guidance, two contrasted case studies have been conducted. Both situations were observed in workplaces where apprentices encountered real production conditions. Although belonging to different industries (car mechanics vs. automation) and presenting distinct organisational properties (a public utility vs. a private small sized business), both observed companies were related to technical occupations and hired apprentices attending a dual apprenticeship program in technical trades. Moreover, both apprentices were observed during the first two months of their practical training in the workplace. Finally, the two cases analysed involved a form of collaborative distribution of guidance and illustrate the wide range or interlocutors with whom apprentices may interact at work.

The data analysis, conducted in a fine-grained linguistic perspective, aimed at describing the specific interactional dynamics illustrative of these situated work practices and reflecting on the potentialities and limitations associated with these collective forms of guidance at work.
Results
The data analysis, which cannot be reported in details here due to space limitations (see Filliettaz, forthcoming), showed that despite general contextual similarities, the two cases considered illustrate rather contrasting forms of learning experiences at work. The ways apprentices were expected to participate in work-related tasks as well as the pedagogical qualities of the guidance they got from trainers or other experienced workers differed quite substantially.

The first case was observed in a car mechanics workshop and involved a first-year apprentice working together with an experienced mechanic to fix a problem with the chassis of a car. The work environment illustrated in this first case appeared to afford close and rich forms of guidance to the apprentice. This guidance was collectively distributed amongst a plurality of experienced workers, and related to different and complementary dimensions of work practices. The experienced mechanic the apprentice was working together with shaped local opportunities for the apprentice to participate in the repair process and provided detailed instructions regarding a procedure to follow. The chief mechanic of the workshop exerted a global supervision, ratified the apprentice’s work plan and drew his attention to security issues. Such a collective form of guidance had important implications in terms of participation and membership for the apprentice. It placed the apprentice in an active role, in which he was progressively given increasing responsibility and was seen as a legitimate partner of a work team. In other terms, the way information and decisions were shared amongst experts and mediated through the apprentice afforded local opportunities for increased participation in the local community of practice.

The second case was observed in a small business producing electric material for the building industry and involved a first-year apprentice who was expected to take full responsibility of entire production tasks very quickly. Although collectively distributed across various experienced workers, the forms of guidance provided in this context appeared as misaligned and competitive rather than collaborative and oriented towards learning purposes. Explanations provided by workmates contradicted instructions initially given by the official supervisor. The interactional dynamics specific to this second case placed the apprentice in a very uncomfortable position in terms of participation and membership. Not only was the apprentice placed in a position of observing a controversy between his colleagues, but this controversy also generated a conflict of loyalty. By electing to follow instructions from workmates, the apprentice encountered tensions with his own supervisor, which affected their interpersonal relations in the future.

Significance and practical implications
The two case studies briefly reported in this paper illustrate the configuring role of guidance for apprenticeship learning. They stress the collective and distributed nature of this guidance and the role of experienced workers in assisting apprentices in problem-solving tasks. This range of “guidance providers” goes far beyond official trainers and supervisors. It comprises a wide scope of workmates who may share their work environment with apprentices on a regular basis or on an occasional one. As also illustrated by the empirical analysis, the pedagogical qualities of these distributed forms of guidance may vary quite substantially. In some cases, they take the form of complementarities and continuities across evolving steps of work tasks. In other circumstances, they consist of misalignments or controversies between competing workers. Such a collective distribution of guidance may afford rich opportunities for learning. As seen in the data, it may bring to the awareness of
apprentices a wider range of conceptual, procedural and dispositional knowledge related to the tasks at hand. But conversely, it may also lead to confusion when discrepancies emerge between experts or when important dimensions of the tasks remain implicit.

From there, it appears that it is not so much the distributed nature of guidance itself that should be seen as a resource or a limit for participation in apprenticeship training. Rather, it is the conditions in which these distributions are enacted in specific contexts that shape the potentialities or limitations associated with collective guidance. Interactional approaches to workplace learning provide adequate methodological tools for understanding the fine-grained contextual arrangements that shape workplace environments. These approaches reveal the sequential and semiotic mechanisms by which trainers or experienced workers are “doing guidance” and afford opportunities for participation, knowledge acquisition and identity construction. They also show how apprentices elect to engage with the resources afforded to them and the reciprocal nature of these social and personal dimensions of workplace learning (Billett, 2001).

Hence, applying a discursive and interactional lens on vocational learning may help us to understand not only why but most importantly how workplaces can become expansive or restrictive learning environments for apprentices.

This empirical and methodological approach has important practical implications for reflecting on the effectiveness and efficiency of the dual apprenticeship system as it is implemented in Switzerland. It illustrates how workplaces provide potentially rich learning environments for apprentices, but how these potentialities may be enacted differently depending on the awareness and skills experienced workers have for sharing their knowledge and shaping opportunities for apprentices to participate adequately in productive tasks. In consonance with previous studies devoted to workplace learning and the pedagogy for practice, research results presented here show an urgent need to increase the level of pedagogical qualification and awareness of trainers in the workplace to enhance the overall quality of the guidance provided in companies.

References


