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UNIVERSITY OF APPLIED SCIENCES
Professional Teacher Education Unit

Towards Vocational Top Expertise

Tuomas Eerola (ed.)

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HAMK University of Applied Sciences
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Foreword

The book 'Towards Vocational Top Expertise' brings you information about top expertise that draws on research, practical development efforts and experiences in education and training. The book is a whole that extends from the theoretical level to everyday work in educational institutions and workplaces.

While the articles mostly discuss promoting top expertise as part of vocational education and training and vocational skills coaching, the issues it covers are also highly relevant to knowledge management at workplaces. The principles of all instruction and supervisory work also apply to the coaching of top experts: keeping pace with professional growth, helping people discover their personal resources, giving timely feedback, and providing support when resilience is called for.

Finland is well-known for its success in comparisons of competence. The articles give visibility to the Finnish approach to vocational top expertise, the guiding principle of which is that trying your best is possible for everyone pursuing vocational studies.

The book is intended for a diverse readership at home and abroad. WorldSkills competitions are the most inclusive international meeting place for young professionals and their support teams. At these competitions, you can make new friends and have fun – all the while raising the profile of vocational education and training. Research in top expertise conducted in this context is the theoretical frame of reference the articles in this book have in common.

The authors are experts and instructors in the themes of top expertise. I would like to thank the authors for their high-quality inputs and for sharing their expertise. Writing about your own work also helps you to identify targets for development in your own competence, and as a result, it helps you to improve in your work.

The foundation of education provided by universities of applied sciences is research-based knowledge. Such knowledge is not plentiful in the area of coaching top expertise. Top experts are highly sought after as specialists in many roles, and as such are very busy. Top expertise is often reached following an individual path, and each vocation has its own special features. For this reason, publishing research-based and generalised information is a challenge. This is a feat that we have now accomplished, however, for which I would like to extend my warmest thanks to all the authors, these heralds of top expertise.

This book is the product of cooperation between professional teacher education at HAMK University of Applied Sciences and a number of development and research projects. I would also like to thank all actors who participated in the projects for your good cooperation and your willingness to combine your resources for a shared goal.

Our Professional Teacher Education Unit has a special relationship with top expertise. It is one of our priority areas, and for more than five years now, HAMK Skills Trainers´ Academy has been operating in connection with the unit, mainly on Ministry of Education and Culture funding.

Over the years, the steering group of the Academy has bonded into a specialist panel on vocational top expertise, the inspiring approach and high work ethics of which showcase top expertise at its best.

I extend my thanks to the Academy's steering group for its support and encouragement. In particular, I would like to thank Counsellor of Education Seija Rasku, a representative of the Ministry of Education and Culture and the executive committee chairman of Skills Finland as our funding provider, who has supported Finnish vocational skills coaching and competition activities in a versatile manner and always lent her in-depth expertise to our work.

Hämeenlinna, 23 April 2013

Seija Mahlamäki-Kultanen
Director
HAMK Professional Teacher Education Unit

RECOGNISING AND SUPPORTING POTENTIAL TOP EXPERTISE (INDIVIDUAL LEVEL)

Päivi Pynnönen, M.A., special needs teacher, works as a Senior Lecturer at the HAMK Professional Teacher Education Unit. She has been engaged for many years in professional special needs teacher education and as an instructor at the Skills Trainer's Academy. Her special area of competence is teaching communication and interaction skills. She has been involved in developing vocational skills competitions and coaching activities for those in need of special support from the beginning as a member of development and steering groups. Her particular interests include individualisation of teaching and special challenges of interaction.

Anu Raudasoja, PhD (Ed.), works as Head of Education for professional special needs teacher and study counsellor programmes at the HAMK Professional Teacher Education Unit. She is the Project Manager for the Erityisen hyvää oppia (Particularly Good Learning) project and is responsible for workplace-oriented professional special needs teacher education and promoting special needs teaching practices at educational institutions. Her interests include special needs teaching and guidance practices and pedagogical management.

HUIPUT KEHIIN (Roll out the Talent) project
The article was edited as part of the Roll out the Talent project administrated by the HAMK Professional Teacher Education Unit. This project set out to construct permanent cooperation networks for developing top expertise. The target area and project partners were four vocational education and training providers with their networks of business and industry partners. For more information on the project, visit: www.hamk.fi/huiputkehiin.

Recognizing and supporting a student's special strengths

Päivi Pynnönen & Anu Raudasoja

Debate on teaching talented students often sparks strong emotions in Finland. Our educational system is underpinned by strong values of fairness, equality and protecting the weak. These values also invoke the arguments used to justify the provision of special instruction for talented students with special strengths. Equality means taking the special needs of all students into consideration in the teaching, including the needs of talented students as well (Uusikylä, 2008; Tirri, 2011).

Talent has been defined and understood differently in various eras and societies. In the early 20th century, talent was commonly considered synonymous with intelligence, which was measured by intelligence tests. The intelligence that such tests measure, however, mainly shows the individual's level of intelligence in terms of verbal or logical thinking. Today, intelligence is seen as something more multi-dimensional. The best known multi-dimensional model of intelligence is the one developed by Howard Gardner (1993). Gardner defines intelligence as "the capacity to solve problems that are valued in one or more cultural settings. When individual characteristics and cultural expectations meet, the individual is said to have special intelligence." Gardner's model comprises eight areas of intelligence. *Linguistic/verbal intelligence* is sensitivity to spoken and written language, an ability to learn languages, and the ability to use a language.

Logical/mathematical intelligence is an ability to analyse problems logically and to perform mathematical operations. *Musical intelligence* comprises skills in performing and composing music. *Bodily-kinesthetic intelligence* is an ability to use your whole body, or excellence in fine motor skills. S*patial intelligence* is an ability to recognize and perceive patterns or regularities in a space or a defined area. *Naturalist intelligence* is an ability to recognize and classify natural objects, such as plants and animals, and to enjoy the beauty of nature and activity in a natural setting. *Interpersonal intelligence* is an ability to understand the intentions, motives and desires of others and to work well together with others. *Intrapersonal intelligence*, on the

other hand, is an ability to understand oneself and to regulate one's emotions and ways of acting (cf. Uusikylä 1994; Mäkelä, 2009; Tirri, 2013).

Based on Gardner's model, Tirri and Nokelainen (2011) have developed a gauge for self-assessment of intelligence, and based on their research results, a learner's idea of his or her own intelligence is an important factor that influences learning. Each one of us is born with our own, unique genetic inheritance that underpins our intelligence. Intelligence can be visible in one or more areas, or it can be latent. Developing intelligence into a special talent requires practice and effort. The talents individuals choose to develop and the way in which they develop them depend on the individual's interests, home background, schooling, and the values and expectations of society and culture surrounding them. When cultural expectations and valuations and an individual's capabilities meet, the talent is seen as useful. In Finland, a talented surfer is unlikely to have equal possibilities of developing his talent and feeling useful and appreciated as a talented ice-hockey player (cf. Uusikylä, 1994; Mäkelä, 2009; Tirri & Nokelainen, 2011).

In vocational education and training, an effort is made to recognize the students' intelligence and special vocational strengths in order to develop any individual potential into vocational top expertise through study and practice. The definition of top expertise is also linked to the values of society, to cultural factors and to vocational fields. According to studies of vocational skills competition, "a vocational top expert is a person who, in addition to having vocation-specific skills that have advanced to an autonomous level, has natural talent and is exposed to favourable environmental factors and driven by a desire for sustained participation in goal-oriented and guided coaching. This coaching develops the optimal exploitation of mental resources through knowing and controlling intrapersonal characteristics" (Nokelainen, 2010).

Recognizing special strengths

Educational institutions strive to recognize and cater to the needs of different learners. Recognizing each student's strengths as a learner is vital, as learning cannot be based on weaknesses, only on strengths. The purpose of teaching talented students is to give instruction that corresponds with their capabilities and development needs, so that the student's talent potential can be brought into play and underachievement avoided. The student's holistic development must be addressed in all teaching. In addition to knowledge and skills, it is important to consider the student's social, ethical and emotional development. In many countries, the goal of recognizing talented students is to isolate them in their own institutions, classes or special programmes. In Finland, the purpose of recognizing such students is to ensure that their needs can be optimally catered for and supported in mainstream education. An effort is made to put the required support measures in place for talented students so that there would be no need for differentiated teaching in separate classes or institutions and that all students would learn to work together and

appreciate their differences as a resource. When planning the teaching we should remember that a student may be talented in a single or multiple areas, but very few are talented in everything. The student may simultaneously be highly talented in one area and extremely weak in another. Each student has his or her personal talent profile, and these profiles can be a very uneven mix. For example, a student may be highly talented in mathematics, while reading and writing may continuously be a great challenge to his or her learning. A talented student may also display learning difficulties or behavioural problems (Mäkelä, 2009; Laine, 2010).

Based on Carol Dweck's theory (2006), intelligence can be approached with two different mindsets that influence our motivation for learning. These can be described as a fixed mindset and a growth mindset. People with a fixed mindset believe that traits related to intelligence are based on inborn or permanent characteristics. According to them, only those lacking talent need to practice. If you are good at mathematics, for example, you have no need to practice arithmetic. Failing is a sign of inability and lack of talent in some area. As mistakes are a sign of stupidity and inferiority, a failure often makes the student feel shame, and failing may incapacitate him or her from making an effort in his or her studies (Tirri, 2013).

For people with a growth mindset, success and a person's characteristics are the result of practice and work, in which case failing is an elemental part of progress and learning. Instead of shame, failing may give rise to a wish to try again, because after having made a mistake, one would now know how to correct it or do better next time. Teachers should guide their students towards seeing themselves and their fellow students as developing individuals, not persons doomed to the characteristics of a certain type or level of intelligence. By his or her feedback, a teacher may inadvertently reinforce the student's idea of fixed or changing characteristics, or support the idea of the importance of study and practice in developing talent. The teachers' mindsets and feedback influence the students' ideas of their own possibilities of developing their personal competence potential. All learners should be offered the possibility of individual learning and growth. Teachers play a key role in creating these opportunities (Dweck, 2006; Tirri, 2013).

To recognize the special strengths of the students, it is a good idea to observe both those whose talent is already visible and those who have potential. The aim here is seeking talent that remains latent. An individual test, subject or learning situation does not directly give an accurate overall idea of a student's knowledge and skills. The teacher should create opportunities for students to demonstrate their talent. According to Mäkelä (2009), talented students can be optimally recognized at an educational institution when:

1. You combine different types of information about the students, including information about their cognitive knowledge and skills, vocational knowledge and skills, creativity and motivation, and descriptions of their learning and behaviour.

2. You combine several sources of information, including the outcome of an initial interview, points scored in tests or examinations, grades, and the opinions of the student, a group supervisor, a special needs teacher, parents, work supervisors, classmates, etc.

3. When you create possibilities for recognizing talent in a number of different locations and at different times in various classes, projects, on-the-job learning, vocational skills competitions, summer jobs, hobbies, etc.

Karppi's master's thesis (2012) indicates that professional teacher students find the teaching of talented students a very positive prospect. Talented students, as all other students, need consideration and instruction that matches their skills and needs. It is easy to recognize talent among other students, but a lack of resources and the emphasis the Finnish educational system places on teaching the weaker students set limits to practical implementation. The results also show that the ideas of talent and special teaching for the talented as a source of inequality are giving way to a mentality geared towards special teaching that highlights making use of the students' maximum potential through teaching. In the study, student teachers explained that they can take a talented student into consideration in their teaching through such methods as extended and adapted on-the-job learning, various group divisions and adaptation of assignments.

Supporting special strengths

Under the Finnish Constitution, everyone shall be guaranteed equal opportunity to receive educational services in accordance with their ability and special needs, without being prevented by economic hardship (Section 16 of the Constitution 731/1999). The Basic Education Act further states that education shall be provided according to the pupil's age and capabilities (Section 3 of the Basic Education Act 628/1998). It is also part of the underlying values of basic education to cater to different learners in the teaching. The aim of general upper secondary education is to support young people's capacity for developing themselves during their lifetime (Section 2 of the general upper secondary schools act (lukiolaki) 629/1998). In vocational education and training, the students' skills must be assessed at the very beginning of their studies. A personal study plan is drawn up for all students, in which the student's skills and their standard should be established in order to recognize the student's strengths and to facilitate the accreditation of prior learning. The recognition of learning lays the foundation for setting the student's personal goals and for determining the type of guidance and support that will be required (Section 10.1 of Decree 603/ 2005). The education provider shall inform the students of the types of evidence and documents they must produce for the recognition and accreditation of learning and of the dates by which they should apply for such recognition and accreditation (Section 3, Decree 603/2005). To recognize skills, an assessment discussion takes place between the student and

the teacher(s). Different assessment techniques must be developed to recognize skills with the aim of avoiding overlapping studies and shortening the study time. If the recognition of learning shows that the learning outcomes of a certain module, or some of the outcomes, have been achieved, accreditation of learning can take place. The accreditation is recorded in the personal study plan (Section 30 of Act 601/2005, Section 12a of Decree 603/ 2005).

Learning environments at educational institutions should make it possible to recognize and support the students' special strengths. For that purpose, the content of the instruction provided at the institution should be of high quality, and the learning environments and methods it offers should be versatile. If the educational institution's expectations concerning the students' standards of learning are too low, this might lead to a situation where none of the students perform to a high standard. The institution should thus offer its students alternatives for learning that present different types of challenges, including the possibility of taking part in vocational skills or cultural competitions (Perho, 2010). According to studies, competitions are an important element that inspires and enhances the motivation of the more talented students in particular – whether we are talking about academic skills, such as mathematics (Tirri & Nokelainen, 2011) or manual vocational skills (Nokelainen, Korpelainen and Ruohotie, 2009).

The document Education and Research 2011–2016, a development plan, states that vocational qualifications should be more flexible to make it possible to make individual choices and to study for qualifications one module at a time when appropriate in terms of the world of work and individual needs. Work-centred study methods and alternative study models should be used in vocational education and training, for example by combining different forms of vocational education and training. In addition, procedures should be developed for lowering the threshold to participation in apprenticeship training. Contractual cooperation between vocational institutions and youth workshops will be increased to enable vocational students to study in a workshop or in some other alternative learning environment and by creating multi-employer apprenticeship training.

Key concepts in teaching the talented include individualisation and differentiation of instruction. These refer to special teaching arrangements by which the teacher proactively adapts the outcomes, content, learning environments, and methods of teaching to respond to the student's individual needs, striving to create the best learning possibilities for each student. Special arrangements for the talented can be divided into organisational and content-related differentiation. Organisational differentiation includes accelerating the progress of teaching and grouping it so that it is suitable for different students. Content-related differentiation solutions, on the other hand, include teaching enrichment and solutions that complement teaching. The goal of enrichment is that in one way or another, the student's personal study plan is made more extensive than it would normally be. In vocational education and training, for example, the students can complete per-

sonal projects or study abroad. They may be oriented towards entrepreneurship or pursue their studies as extended on-the-job learning where various tasks are pedagogised. Student may also take combined studies that are extended outside vocational studies in their vocational field to include general upper secondary and/or vocational upper secondary studies in a different field. Talented and skilled students are often also used as assistant teachers in class at educational institutions. It should be noted, however, that using students as assistant teachers undermines their possibilities of being assigned tasks that correspond to their learning potential. This method may deprive a more talented student of challenges in studying. Differentiation and individualisation should take the form of different tasks and work, rather than continuously assigning the student more of the same work (cf. Mäkelä, 2009; Laine, 2010; Perho, 2010)

In order to individualise learning processes, the teacher needs a didactic mentality and functional ability with a large scope. Responding teachers in studies of top expertise felt that the role of teachers at vocational educational institutions is crucial in attracting interest in the relevant vocational field and vocational skills competitions. The vocational skills competition coach also plays an important part for a young person who is developing his or her vocational skills to reach the top level. Internal goal orientation (interest in the contents of a vocational field) is more important than external goal orientation (interest in demonstrating one's vocation-specific skills to others) in developing an interest in a vocational field. It is also more important after coaching as the student's vocational skills develop. External goal orientation is more important than internal goal orientation during the preparation period (Nokelainen, Korpelainen and Ruohotie, 2009). The aim of vocational skills coaching is to find efficient means for developing vocational skills until they reach the top level. Vocational skills coaching helps to develop models for top expertise and encourages all those taking part in coaching in continuous self-development and creation of innovative working methods. Coaching draws on various forms of on-the-job learning and the available resources to improve the capabilities of the young person being coached for doing well in a demanding vocational skills competition and later in working life (cf. Talikka & Henriksson, 2011).

According to Numminen (2005), self-efficacy in a student refers to an individual's idea of his or her own ability to cope with a certain task in a certain situation. For example, his or her ideas of self-efficacy influence the orientation a student chooses for his or her studies, the student’s dedication to the studies, to what extent he or she keeps on trying after a failure, or how persistent he or she is when faced with adversity. Ideas of self-efficacy develop gradually in various situations where the students interact with their surroundings. They are influenced by the students' personal experiences of success and failure, and also by their observations and by comparisons made between their performances and those of others. Feedback from persons who are important to the individual, such as teachers, also has an impact on these beliefs. The walls and equipment of an educational institution are of secondary impor-

tance in proportion to the human interaction and social support for learning. According to Uusikylä (2012), a teacher always needs the "three c's" in his or her work: creativity, courage, and caring (freely interpreted: genuine pedagogical love). If learning takes place in a motivating and encouraging atmosphere where the student feels appreciated, this contributes to enabling the development of the student's talent into a capability and special talent, which in the professional world are demonstrated as the competent action and excellent working skills that comprise top expertise.

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Individual study paths in upper secondary vocational education and training

Anu Raudasoja & Päivi Pynnönen

The purpose of individual study paths is to ensure that the student can complete a vocational qualification in a manner that takes into consideration his or her individual needs, areas of emphasis and learning methods. The construction of individual study paths has presented vocational institutions with the challenge of developing not only the curricula but also the way the studies are organised and completed. On-the-job learning, vocational skills demonstrations and linking studies to workplace needs have necessitated a reform of vocational education and training and increased cooperation with business and industry.

A study commissioned by the Finnish National Board of Education shows that education providers offer students various alternatives for putting together individual study paths. These study paths make it possible for the students to take general upper secondary studies or a second upper secondary vocational qualification. Not all students aim for a second qualification, but they can emphasise their competence by means of extended on-the-job learning by completing a module from another qualification or by expanding their qualification to comprise more than 120 credits. The students may also include periods of study and on-the-job learning abroad in their qualification. The students may shorten their study time by recognition of prior learning and by completing some of their studies as e-learning in their free time. A part of the qualification may also be taken as a competence-based qualification or through apprenticeship training (Hievanen et al., 2013, 46).

The role of career guidance in constructing individual study paths

In adapting Eskola (2010, 8), career guidance means supporting students in developing their abilities at various stages of their education by means of guidance. The career guidance model provides the teacher and the student with a concrete and systematic model for the kind of issues that should be addressed in career guidance. Good career guidance begins even before the

student moves on to professional studies, but it can also begin as soon as the student starts at the vocational institution. It is important to make it clear for the student from the very start that the aim of the studies is the world of work and employment or, alternatively, further studies, which are supported by means of career guidance.

Through teaching and guidance, teachers should be able to cater to different students and their individual strengths (Koistinen, 2010, 265). In order to address the individual needs of students, a teacher needs to be able to assess the student pedagogically by observing his or her actions and by means of personal guidance discussions. To develop his or her skills, the student needs the right kind of support and adequate practical training. For the student, a supportive learning environment and systematic guidance play a key role in study success. The aim of study counselling is to support young people in their choices and to give them guidance that enables them to reach their goals in a self-directive manner (Koistinen, 2010, 2).

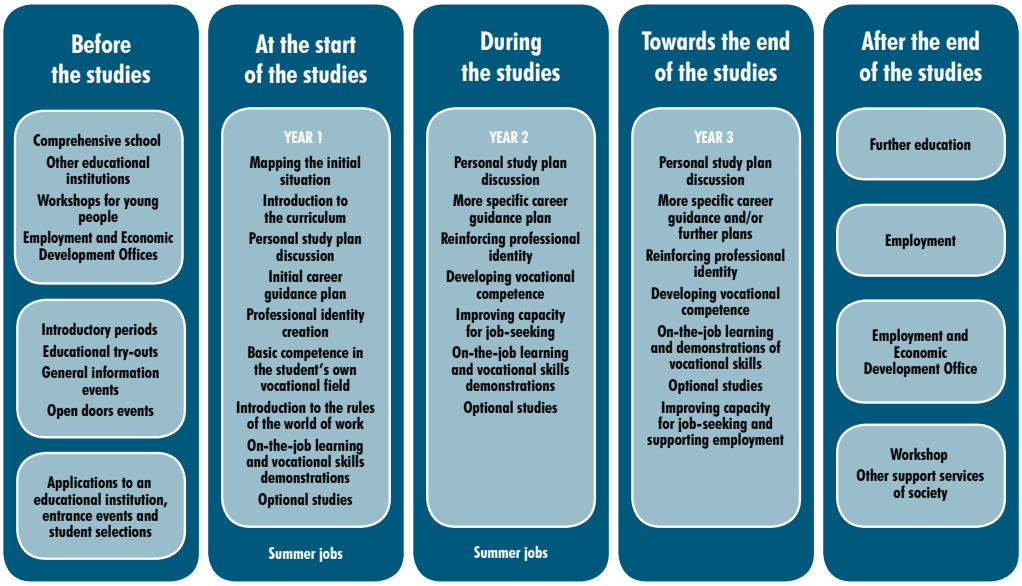

FIGURE 1. Adapted from Kärnä and Raudasoja's career guidance model (2010, 81)

At the centre of the career guidance model is the personal study plan discussion with the student. In the first discussion, the student is introduced to the curriculum and the choices it offers, and his or her strengths and interests are mapped as a foundation on which the teaching will be built. As the studies progress, the career guidance plan is regularly complemented, for example as regards on-the-job learning and optional studies. A vital part of the guidance is that the teacher imparts to the student adequate competence and skills for finding a summer job or weekend work, which may also be recognized and accredited as part of the studies. The career guidance model stresses the teacher's guidance competence and knowledge of the core curriculum.

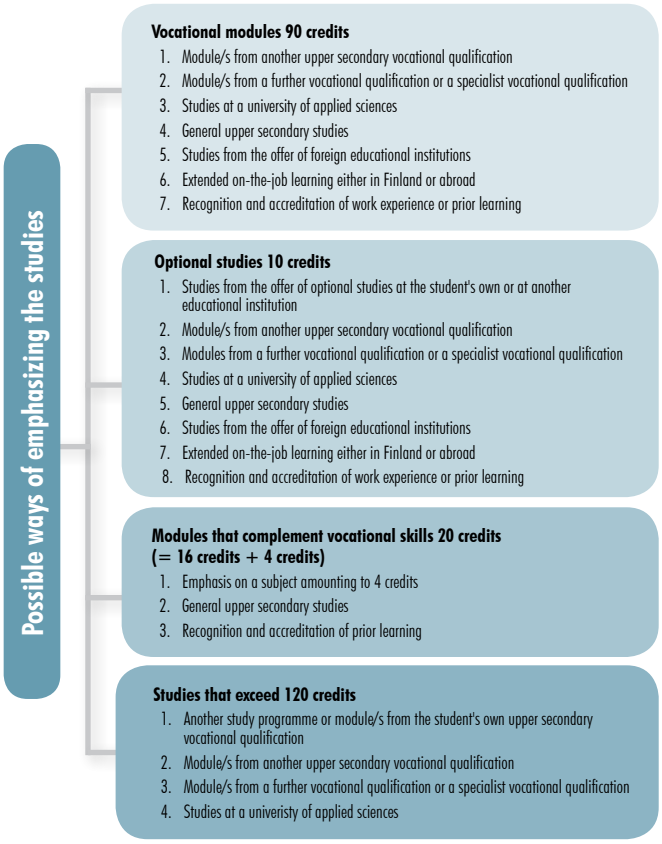

FIGURE 2. Possible ways of emphasising the studies offered by an individual career path

The national core curriculum gives the students extensive possibilities for constructing individual study paths and thus developing top expertise. The students can emphasise their studies through upper secondary vocational qualification modules, modules that complement vocational skills, or optional studies, making use of an educational offer of their own or from another educational institution and extended on-the-job learning.

Some educational institutions have planned study paths for their students with a ready-made emphasis, which the students can choose once they have secured a place in the institution. The following are examples of study paths with an emphasis:

- ✓ Taitaja path for those preparing for vocational skills competitions
- ✓ Multi-skilled path for those taking two upper secondary vocational qualifications

- ✓ On-the-job learning path for those progressing rapidly
- ✓ A path for those interested in entrepreneurship
- ✓ A path for those interested in internationalisation and language studies
- ✓ A path for those aiming for studies at a university of applied science.

There are plenty of options and models for creating study paths. From the student's perspective, it is important that he or she is introduced to various alternative models and content-related solutions, based on which he or she can start plotting out his or her personal path.

Making individual study paths possible by pedagogisation

Pedagogisation offers one alternative for constructing an individual, work-based study path for a student in cooperation with employers. According to Lasonen, pedagogisation means developing the workplaces to make goal-oriented and conscious learning by working and getting feedback on the work possible (Lasonen, 2001, 30).

To assist the planning of pedagogisation, a curriculum-based planning tool for producing and accumulating learning (OSSU) can be used. The national core curricula for upper secondary vocational qualifications are itemised in tables to show the required skills by module. The itemised curricula support the planning, follow-up and evaluation of workplace-oriented teaching. The itemised curriculum makes skills visible and their recognition and accreditation possible. (http://www.mastohjaus.fi/pajatoiminta.html). The OSSU planning tools were originally designed in the MAST project for workshop studies, but they also perform excellently in supporting the planning of on-the-job learning and preparation of personal study plans.

TABLE 1. An example of itemisation for the vocational qualification for a vehicle mechanic

Servicing a car or a motorbike			
Required skills Servicing a car or a motorbike is part of the compulsory vocational studies of a Vehicle Mechanic and a Small Machinery Mechanic. The extent of the related competence package in the study programme is 30 credits.		**Assessment**	

Upper secondary vocational qualification level skills in servicing a car or a motorbike consist of the following areas of competence:						
	I am familiar with	Is familiar with	I have achieved the goalst	Has achieved the goals (levels 1 – 3)	Ready for a demonstration (personal assessment)	Ready for a demonstration (supervisor's assessment)
Washing and waxing a car or a motorbike and checking for any damage in the chassis.						
Recognizing deficiencies in anti-corrosion protection that come up in connection with the service, skills in advising the customer on further steps.						
Completing an overhaul of a car or a motorbike.						
Completing a scheduled maintenance of a car or a motorbike following the manufacturer's service programme.						
Replacement of distributor head service parts.						
Replacement of break service parts.						
...requirements continue						

Implementation model for pedagogisation adapted from Merikoski (2012):

1. Workplace learning environment analysis

    - Pedagogisation starts with drawing up a learning environment analysis of the workplace, where notes are made of the work carried out, the equipment and the environment at the workplace. The results of the learning environment analysis are compared to the OSSU planning tool contents and outcomes. The comparison reveals which parts of the curriculum can be implemented and what skills the student will learn at the workplace in question.

2. Preparing a plan for building up skills and coaching as part of the personal study plan

    - The need to build up vocational skills is established using the OSSU planning tool
    - The student, the workplace supervisor and the teacher jointly record the skills to be learnt in the student's personal study plan following the study plan aims.

3. Intermediate assessment and guidance discussion

    - Based on the learning outcomes aimed for, the student, the workplace supervisor, and the teacher record the objectives achieved and any modifications needed, and the activities continue on this basis.

4. Final assessment

    - The student, the workplace supervisor, and the teacher assess the achievement of learning outcomes and record the skills the student has learnt as recognized competence.

This adaptation of the pedagogisation implementation model was prepared in a project titled Erityisen hyvää oppia (Particularly Good Learning). It was developed for students, teachers and workplace supervisors to support work-based and on-the-job learning. It can also be used to pedagogise workplace-oriented projects and in preparation for vocational skills competitions. Pedagogisation using OSSU tools is one model for planning and implementing work-based teaching.

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HUIPUT KEHIIN (Roll out the Talent) project
The article was edited as part of the Roll out the Talent project administrated by the HAMK Professional Teacher Education Unit. This project set out to construct permanent cooperation networks for developing top expertise. The target area and project partners were four vocational education and training providers with their networks of business and industry partners. For more information on the project, visit: www.hamk.fi/huiputkehiin.

Professional growth as part of preparation for top expertise

Tia Isokorpi

Background

Achieving top expertise requires goal-oriented and long-term preparation. This article describes the "frame of reference" that makes personal professional growth and examining one's development possible. This is the frame of reference I use for the conscious and systematic guidance of teachers' professional growth. It can be applied in any vocational field in the education and training of both young people and adults.

By top expertise, I mean the extent to which each one of us can exploit our talents and potential. In a wider sense, professional growth is about how students learn, even after finishing their education and training, to develop further in their fields and careers and to be successful in their lives. Vocational education often does not offer the kind of guidance and counselling that instructs students in holistic and long-term preparation for their careers. An approach that enables students' professional growth and uncovers and develops their potential is lacking in pedagogy.

The objective of pedagogy that promotes top expertise and professional growth is that the student grows professionally, feels well and is empowered during and as a result of the education and training. Experiences of well-being and empowerment are a must for anyone wishing to become a top expert. In the course of my guidance and counselling activities, the students' experiences of empowerment have emerged as if by accident, and for this reason I wanted to have a closer a look at how the students are empowered during their studies. I also strive for imparting to the students a capacity of successfully maintaining and developing these skills throughout their working careers and lives.

Pedagogy that promotes top expertise and professional growth creates conditions where learning is optimal and holistically touches on the cognitive, emotional and behavioural levels of the student and the teacher. The focus

of pedagogy is on the student's skills, abilities and resources – in other words, on strengths – not on weaknesses. Learning takes place through what is positive and meaningful. We should aim for more of that which feels good, which brings joy and pleasure.

This type of learning makes it possible to attain the highest level of vocational competence and, at the same time, ensure your personal well-being. Students are coached to become aware of their own actions, to increase their sense of being in control of themselves, their studies and life in general. The aims also include developing vocational competence and professional growth so that students are able to set positive targets for themselves and to find the existing resources in themselves in order to use their capabilities and to fulfil their needs.

Revealing inner motivation

Professional growth and development are to a great extent about developing your mental traits, about willingness to continuously develop your actions. This mental preparation applies to both students and teachers. Teachers must consider and reflect upon the same traits in themselves that they are guiding and coaching in their students. The teacher "lives through", or internalises, the contents of guidance provided by him or her. Professional growth supports the psychological and personality development of both the students and the teacher. For the teacher, guiding professional growth is a shared journey. It also involves a personal growth process for the teacher. Each student "teaches" the teacher. Professional growth is about examining yourself as a person, a teacher and a counsellor, and maybe also as a vocational skills coach. The growth process brings increased self-knowledge, enhances your personal strengths and, above all, gives you courage to face any challenges to your personal growth. This will also help the teacher in encountering the students better.

Reinforcing student's autonomy

Professional growth cannot take place by an order of the teacher. As a natural consequence of giving up the issuing of orders, the student's feelings and exercise of autonomy are reinforced. The teacher needs to place limits by his or her actions, while leaving students the space to assume responsibility for their own studies and actions as well as for what they say and what they feel. Autonomy can only be born of sufficient freedom. A group will be helpful in developing autonomy. I draw on procedural, interactive and functional methods as well as the intensive use of learning journals in groups. These methods help students in assuming responsibility for their own learning and professional growth.

In order to be responsible for their own growth, students must be able to personalise the contents to be studied, or in other words, examine them from the perspective of the self. Professional growth is about learning from your experience. A requirement for experiential learning, and learning in general, is the triggering of self-reflection. Without self-reflection, no conscious personal change or development can be expected. During self-reflection, introspection and digesting information increase a student's understanding of his or her personal experience and its significance. Self-reflection is also about making conscious that which is unconscious. Valuing your experiences, achievements and progress is a basic condition for success in all learning. In a teacher's work, this means methods where the students get "in touch" with themselves.

Pausing to learn

Professional growth is a step-by-step process. It would be good if studies did not contain separate assignments or “attainments” to be completed. During the studies, students learn to focus on the essential – on what is meaningful to the self. More tranquil periods are also needed during studies to allow students an opportunity for deeper learning. Keeping a learning journal helps students understand issues that they may not have realized and perceived yet during contact teaching. Writing makes learning more effective. The students themselves have noted that whereas ordinary assignments would be completed in a more lackadaisical manner, the journal is a more in-depth method of work. It is important for the studies to contain themes that students can apply in their work and lives, even at a later date. For many students, this way of learning has brought about a change in the way they live. The students have noted that previously, they just got on with their studies. Now they have had to pause. In this way of studying, you have to encounter not only yourself but also others.

Development programme for empowerment

In this article, I am applying the outcomes and principles resulting from a project titled Guiding an Adult Learner at a University of Applied Sciences. The development programme for personal and vocational identity empowerment was created to support professional growth as a result of a two-year national cooperation project of teachers at universities of applied sciences (Isokorpi, 2009; Isokorpi, Kokko & Hämäläinen, 2009; Nuutinen, 2009; Saari, 2009). Studies have established that the methods devised in the programme to develop empowerment can help support your professional identity at a workplace where you are faced with the challenges of rush, continuously increasing requirements, competition, changing work and professional structures, and the objectives of self-regulation and innovation. In this development programme, empowerment is understood as an experience of

inner power, increased self-confidence, and mastering of social skills. All of these are also important elements of top expertise.

It is a good idea to use the group in teaching and guidance. Adults learn well in groups, and so do young people. A well-functioning group creates a communal spirit, communality, and also empowers its members. A trusting and accepting atmosphere contributes to generating and keeping up the motivation to study. The group acts both as a support and a mirror for students for planning and implementing their studies and for their professional growth. The aim of the group process in preparation for top expertise in vocational education can, for example, be that the students produce and examine stories about their studies, future jobs and possible competition activities. What they look at is their self, their relationship with work and vocational skills competitions, their relationship with the student group, the group's relationship with the self and the views of being a student and undergoing coaching. The teachers consider themselves and their relationship with their job and the coaching of competitors. The teachers also examine their relationship with the student group and the group's relationship with itself.

A personal and vocational identity manifests itself as dynamic, lifelong growth. Each one of us has a personal development story that is unique and individual. The process of professional growth lasts throughout the studies. The professional growth model has four stages on which the students focus one at a time.

1. The ME stage

The first stage of professional growth is the ME stage. The objective of the ME stage is that the student becomes "engaged" in the learning process. It also helps the student to become motivated and committed to studying. For example, this can take place by the student becoming conscious of and understanding more deeply the life course and "paths" through which he or she has come to the studies. The ME stage deals with issues related to the student's self-knowledge and discovering his or her competence. The highest level of professional growth for each one of us is that we can uncover our potential and feel well at the same time. To achieve this, for example in the form of concrete everyday actions, students must be challenged to think, to set themselves goals, and to assume responsibility for what they do. These operating methods demonstrate belief and trust in the students. Trust in teaching and promoting growth means that students are allowed to solve their own problems and to learn to use their imagination without immediately being offered ready-made answers. This happens in the case of each student. The group may comprise students who are at very different levels. Each one progresses in line with their personal objectives. The students can use each other as models for learning, which promotes their personal learning. This type of pedagogy guides stu-

dents in self-knowledge, it boosts their self-confidence and improves problem-solving skills. It enhances their ability to take on challenges.

During the ME stage, students become aware of the types of learning strategies that help them learn and become aware of how they learn. At this stage, the students should give up their old roles as learners and find inner peace to pursue their studies. Preliminary contemplation of your own professional frame of reference and requirements is also part of the ME stage. Student teachers, for example, consider the ideas of humans, learning and knowledge on which their own work as teachers is based. What could this mean for a student in your own field? The ME stage also includes issues related to starting a group. The students' ability to act in a group advances and expands during the process, and at the next stage of professional growth, or the YOU stage, the focus will be on what the students learn about themselves in a group. What can you learn in a group that you would not learn by acting alone?

2. The YOU stage

The YOU stage consists of learning from others in the study group, accepting others, and accepting and valuing diversity. A precondition for getting a group to function well is fostering a trusting relationship between group members. Thus, the objective of the second stage of professional growth, the YOU stage, is that the students are able to act in a peer group, trusting themselves and others. During the YOU stage, they consider the establishment of a relationship of trust and working in pairs and small groups. They focus on consciously sharing and drawing on competence and giving and receiving feedback. A learning culture that consciously makes use of the group and the competence of the group members fosters creativity, enriches interaction and promotes well-being. A learning culture of this type also makes it possible for each student to fulfil his or her personal potential to the full. The teacher has an important role in helping the student to get "turned on" to the studies. For example, this can be achieved by highlighting the student's strengths and successes. Once the student's inner motivation to study has been sparked, the next step in the process is that the student assumes responsibility for his or her learning process while supporting other group members in finding their enthusiasm for studying. Enthusiasm increases enthusiasm, and it promotes creativity and helps to overcome obstacles.

All this is based on mutual trust. Trust is also about an ability to live together, about being able to put yourself in the other's shoes and to care for him or her. The most basic human need is to feel that you are accepted just as you are, or in other words, valuable in yourself. This boosts a healthy self-confidence. In my opinion, boosting self-confidence also means enhancing trust. People with a healthy self-

confidence are capable of enriching interactions with each other, and they have the courage to discover their own creative way of meaningful action.

As regards to preparation for top expertise, a group of this type may be a study group, a group taking part in a vocational skills competition, or a national team. Reinforcing mutual trust between the students is crucial. Trusting others no longer happens automatically; it must be practised. A requirement for this is that the teacher believes in and trusts the student.

3. The US stage

The purpose of the US stage is to extend the interaction and self-knowledge skills learnt in the previous stages outside the student's own study group. I feel confident in saying that during the first two stages, the group members learn highly constructive ways of interacting with their own group. Now it is time for them to apply these skills outside their own group. For student teachers, this means that the students reflect on what they are like in their work communities. Can they be what they would like to be, or are external demands and expectations placed on them? Even if there were conflicts and tensions in the work community, the students themselves can strive to act constructively based on what they have learnt in the ME and YOU stages. In addition, student teachers will consider what kind of teacher identities are being created in their work community.

During the US stage, students also focus on developing their metacognitive and self-regulation skills. These skills are an essential part of top expertise. Student teachers will consider what type of frames of reference their personal teaching and guidance work will be based on. They will also consider challenges related to professional ethics.

4. The THEM stage

During the THEM stage, the students consider acting in networks in their own field and developing such networks. They survey their own networks and the way they act in them. Who are they, and in what way are they part of their networks and their professional community? The students also consider the issues and challenges of developing their own field. The contemplation of professional ethics that began during the US stage goes on. As professional growth continues throughout our working careers, the students also consider their own needs for further development. It is also important for student teachers to consider how they, in their own work, promote the interests of their students (potentially customers) and how the students' (the customers') values are taken into account in professional work.

Assessing professional growth

Professional growth is assessed at the end of every stage before moving on to the next one. The teacher will assess and discuss his or her personal professional growth during the studies. The learning journal will be used as a tool not only for documenting growth but also for assessment. The students will write down their reflections at each stage in the learning journal, which is read by the teacher. The students receive feedback from the teacher, which makes the learning journal an interactive method. The significance of feedback in learning and growth is unquestionable. The issues of professional growth are also jointly discussed in the group at the general level, preserving the confidentiality of the students' contemplations. In the last session before the studies are concluded, the group is debriefed and the training evaluated. The students assess and describe what they have learnt about themselves during the study process. The students give their opinions about the time professional growth takes. They assess their learning, their actions and their interactions in the group, including significant relationships in the group and their personal experiences in the group. The students evaluate the actions of the group as a whole. The students also specify their future development targets.

Outcomes of the professional growth process

The programme for developing empowerment is highly productive. Student groups have been enthusiastic, active and committed to learning, both on contact days and in distance work. In the early parts of the process, the students end up questioning their own prior learning. This experience triggers new learning. The students take active part in the studies. They are rarely absent from the contact days. I believe that the students are drawn to take part in the contact days by a well-functioning and empowering group. In addition, the discussions and processes are continuously linked to concrete everyday teaching and guidance situations.

An open and secure atmosphere is soon created in the group. The students can honestly tell the others what they think and feel and how they act in their everyday work. I have consciously instructed them to speak in the first person singular. Functional and interactive guidance methods require active, mindful and concentrated participation of the students.

The pedagogical thinking of student teachers is successfully triggered. The students pick up new ideas concerning teaching methods and try them out in practice. As the professional growth process progresses, the students begin to conceive teaching more and more through pedagogical methods, whereas before they only thought about the themes they taught (substance). An in-depth learning process has been triggered.

One of the most important student experiences was that in a group, everyone is allowed to be an individual. This is what I have aimed for as a teacher. Everyone can state their views and give their opinions in a safe atmosphere. Interaction is open and straightforward. The group emanates caring for and appreciation of others. Support, help and understanding are available in the studies without asking. Even if the backgrounds and basic assumptions of the group members were widely different in their work as teachers, the greatest common denominator in a group is enthusiasm about the studies and motivation for becoming a good and inspiring teacher. There is a feeling of solidarity in the group.

In order for the group to become a community that lives together, receiving feedback plays a major role. When guiding students myself, I give continuous feedback. The motivating effect of feedback has been unquestionably proven. Feedback must be concrete, and it must guide and motivate the student to go on. Praise and encouragement are vitally important in feedback. At best, feedback can be empowering for the teachers as well as the students. Feedback should also be something that you can go back to in the future. This is important in terms of professional development.

Appreciating and respecting human diversity is part of trust. Trust does not come from trying but from caring. Trust is associated with being present and accepting people. Being authentic is part of trust. The teacher plays a key role in creating trust. Trust begins with first impressions and being visible. Trust comes from greeting others, making eye contact and saying 'thank you'. Trust is transparency in intentions and character – trust in the good intentions of others.

Trust is also about how much you trust yourself. Trust is created from success. Trust in yourself is also reinforced by the positive attitudes, acceptance and support of your surroundings. Trust goes together with believing that people are good. Those who have adequate resources and a healthy self-appreciation have the ability to create a trusting atmosphere around themselves that makes people feel safe. In many students, pausing and opening up a path of development that draws on their personal resources has been internalised as action. Student teachers also mentioned that they would like to pause more to take stock of what they have experienced during their teacher studies. This pause for the students and the growth of their professionalism and identity as a teacher are also reflected by the fact that they no longer do what their colleagues do, but develop their own conscious and justified ways of working as a teacher (as autonomous pedagogues). Their professional growth continues, and the process progresses to a deeper level.

Professional growth means becoming an expert in one's own field and an equal member of the work community who also acts to develop that community. The students find networking highly significant in the work of a vocational teacher. Student teachers said that the challenges related to being a teacher could incapacitate you if you let them take over. The students realise that

they do not always have to know how to do everything on their own. However, their capacity for working as a teacher and their professional identity will have developed. They feel more assured and relaxed in their work. They have gained self-confidence in teaching. Understanding that in the work of a teacher, the teacher must be interested in people is part of developing a teacher's identity. Pedagogical competence is above all about inspiring and motivating your students. You do not have to hand down solutions to the students, as your job is to make the students think, realize and assume responsibility for their studies.

Professional growth is also demonstrated as growth as a human being and the skill of caring for oneself. The students have learnt to accept imperfection, both in themselves and in others. They have learnt to observe themselves in a new way, including their innermost selves. A process of self-knowledge and deepening professional identity is clearly triggered in the students. In their opinion, it was important to learn to recognize their own way of acting and its impact. It is also crucial to understand the impact of one's operating environment on oneself. All these development targets are essential in top expertise. In fact, they are preconditions for becoming a top expert.

Overall evaluation of the process

In the opinion of the student teachers, the pedagogical implementation that was used was a good, soft method in which they start with themselves. Professional growth is essential, and observing it was found to be interesting. This was a wide-ranging entity where the themes were put together piece by piece. They found the process essential for promoting a teacher's growth. Thanks to the implementation, the students are able to look at everything in a more humane way. I also personally feel that professional growth was mostly manifested in recognizing different and diverse learners and accepting different people. The themes that were covered widened the students' horizons and expanded their ideas of learning. The students felt that the interactive learning journal was an excellent tool for examining their professional growth. Processing and working on professional growth supported them in finding their bearings at work and in life in general. As a significant aspect of growth, the students said they no longer had as high demands on themselves as before.

The teacher's role

Guiding the process of professional growth means that the teacher makes the journey with the students. It is important that the teacher has a positive attitude, not only towards the students but also towards the issues to be covered in guidance. As I said in the beginning of this article, the teacher also

goes through a personal process of professional growth. A positive attitude helps, and it catches on with others. It makes studying easier.

The students emphasised the teacher's commitment to the group. The teacher as a person (according to the students, the teacher's attitude) has exerted a great deal of influence on them and clarified their thoughts about the issues to be covered. The teacher's actions include supporting students through the difficult stages of study. Many student teachers mentioned that they would not have graduated on time without the teacher's support. Support and encouragement should be given both individually and to the whole group together. Patience and acceptance are highlighted in the teacher's action. The teacher provides an excellent model for setting limits and giving freedom. The teacher also provides a model for caring about the students.

What the students find significant in the teacher's actions is that the teacher helps them believe in each student's possibility of becoming a good teacher, should they wish to do so. Professional growth has taken place, as the studies no longer merely involve collecting attainments. To guide the process of professional growth, the teacher needs to prepare carefully and focus on the students' processes during the training.

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II

THE ROLE OF EDUCATIONAL INSTITUTIONS IN ENABLING TOP EXPERTISE (OPERATING ENVIRONMENT LEVEL)

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The article was edited as part of the Roll out the Talent project administrated by the HAMK Professional Teacher Education Unit. This project set out to construct permanent cooperation networks for developing top expertise. The target area and project partners were four vocational education and training providers with their networks of business and industry partners. For more information on the project, visit: www.hamk.fi/huiputkehiin.

Top experts on the interfaces of work and education

Martti Majuri

Radical changes in cooperation between vocational education and employers

Significant changes have taken place in the cooperation between vocational education and training and employers in the last 15 years. After the entry into force of amendments in legislation on vocational education and training, the national core curricula have been updated since 1998. A minimum of 20 credits of on-the-job learning were included in the study programmes in all fields, which had to consist of goal-oriented and supervised study. This change was felt to be important for business and industries, trade unions, and the educational sector itself. The unions thus drew up a recommendation in 1998, according to which companies and the public sector should promote on-the-job learning by taking in students to learn at the workplace. Business and industry have had a strong interest in making sure that the top expertise needed by Finnish employers is available.

Around the mid-2010s, skills demonstrations were included in the core curricula. In these demonstrations, the students' skills are assessed in working environments that are as authentic as possible, preferably in connection with on-the-job learning. The demonstrations carry significant weight in student assessment.

Now, in the year 2013, new plans are being discussed for an even stronger orientation to working life in the studies. These plans strive for further individualisation of the studies. In the so-called 2+1 model, the last year of study would be spent in apprenticeship-type training. In other words, students would complete the majority of their third-year studies at the workplace.

Based on a trial project of extended on-the-job learning, the implementation and quality assurance of on-the-job learning are being developed in cooperation between education providers and employers (for example, students spend part of the week at the educational institution and part of it at

the workplace). Individual variations are possible in the extent of studies taken at the workplace, depending on the employer and the student's jointly determined needs. For talented students, this also enables solutions where their study paths may consist (even more flexibly than today) of WorldSkills coaching and vocational skills competitions, workplace coaching, online study and studies at an educational institution.

The unions stress that also in the future, the primary form of education for young people who complete their basic education and aim for vocational education and training should be institutional upper secondary vocational education. Individual study paths where upper secondary vocational education and training, workshop activities and apprenticeship training are flexibly combined create new types of possibilities for acquiring a basic vocational competence and for young people's transfer from education to the labour market, regardless of whether they experience learning difficulties or whether they have the makings of a top expert.

Working on the interface

For educational institutions, the changes have brought many opportunities but also challenges. In addition to preparing curricula and organising instruction, the educational institutions now also have the duty of ensuring that the students have possibilities for on-the-job learning. Education providers have also had to organise training in these changes for their teaching staff. These efforts have been supported by major continuing education projects funded by the National Board of Education and schemes supported by the EU. Professional Teacher Education Units have had an important role as providers of continuing education. The HAMK Professional Teacher Education Unit has also invested in continuing education for teachers at the national level.

Education providers' duties have included organising training for workplace supervisors. Even if performing this task has been supported by project funding, the actual training of workplace supervisors has to a great extent been carried out by teachers. There is a particular need to make workplace supervisor training part of teachers' normal duties and a natural element of the yearly plans, for example in connection with on-the-job learning periods. Besides more conventional models, creative combinations of coaching models for competition activities, consultative training and mentoring have been tested in connection with workplace supervisor training. There is still plenty of scope for development before we can guarantee that young people also receive adequate supervision and guidance at the workplace (Majuri, 2007).

During the students' on-the-job learning periods on the interface between two organisations, various actors have the opportunity of learning from each other in circumstances that are as authentic as possible. Students, and talented top experts in particular, get a chance to test their abilities in an authentic working environment, and at best, the workplace supervisor also gains

new perspectives on his or her work. The development of supervisory work and skills in coaching and guidance also increase the intellectual capital of the company.

In terms of the teacher's work, the changes have been significant. The majority of teachers have found the changes to be relevant. Extended networking with the world of work and more goal-oriented cooperation with employers have also brought along an opportunity of maintaining one's own competence and changed the teacher's work positively (Aarola & Majuro, 2006) The combination of on-the-job and institutional learning has been found to be a meaningful method of learning, which promotes the student's learning when appropriately planned and implemented. The students have experienced on-the-job learning and vocational competence as particularly motivating ways of learning. When this is combined with vocational skills competitions, the bar is set higher and may significantly help some students in developing top expertise while they are still students. Companies have the possibility of supporting a potential new employee's career on his or her way to top expertise while gaining employees with outstanding competence.

Challenges to institutional management

The management of an educational institution also faces challenges in order to discharge vocational education's duty to develop the world of work and, as a part of it, on-the-job learning and vocational competence, to a high standard. It is necessary to move away from work planning by teachers based on timetables and individual classes and head towards a holistic idea of teaching and working in which the teacher is an expert in his or her field and the accountable leader of the process. His or her work alternates between training workplace supervisors, joint planning with workplaces, teaching at the institution, assessment of vocational competence, and online guidance and counselling of students. For those taking part in competition activities, the work includes coaching processes, institutional level competitions, semifinals and Taitaja competitions, and for the best, Euroskills and WorldSkills competitions.

An institution's management has the duty to develop staff competence to enhance teachers' cooperation with employers. While the majority of teachers have found these changes positive, some have opposed them. As a remedy, placements in enterprises, continuing education and new types of training for the teachers have been required. Management-level cooperation with business and industry representatives in various organisations has laid a crucial foundation for the teachers' networking efforts in various fields. By taking an active role in foresight on regional needs and business development, educational institutions can influence their own future and that of companies. One form of cooperation could be preparation for future top expertise.

The employers see on-the-job learning as a vital means for developing and updating education. On-the-job learning is a form of networking where the student, the teacher and the workplace supervisor alike can learn. At the same time, this is also an opportunity to develop the background organisation of each actor by systematic evaluations (Majuri, 2001; Tynjälä & al., 2006; Eerola & Majuri, 2008; Majuri, 2007).

In the networking culture model, the relationships between teaching, supervision and learning have become merged. The learning of students, teachers, managers, and business and industry representatives goes beyond learning in educational organisations and at workplaces and extends to learning that benefits the entire region (e.g. Nykänen & Tynjälä, 2012). The range of applications of on-the-job learning, demonstrations and competition activities offers some of the students, teachers and workplaces an opportunity to develop their top expertise: top vocational competence and skills and top companies. The learning environment thus comprises competition activities, on-the-job learning environments, online environments and institutional teaching.

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Erityisen hyvää oppia (Particularly Good Learning)
The article was edited as part of the Particularly Good Learning project administrated by Bovallius, which promotes the development of special needs teaching practices and, relying on a new workplace-oriented curriculum, educates professional special needs teachers for Southern Savo. This project is funded by the ESF. For more information, visit www.bovallius.fi.

Developing teachers' competence through placements in enterprises and mentoring

Tuomas Eerola & Anu Raudasoja

Teachers' placements in enterprises

In vocational education and training provided in cooperation with employers, besides pedagogical skills, it is felt to be essential to keep up-to-date on teachers' competence regarding the world of work and to establish personal contacts with employers. The teachers' competence is also vital from the perspective of developing top expertise. In order to maintain their competence regarding the world of work, teachers' placements in enterprises have been used extensively in recent years. These placements are periods of a set duration which the teacher spends at a workplace indicated by his or her field or teaching duties, developing his or her competence in a goal-oriented manner, creating a cooperation network for his or her field or educational institution, developing the world of work or otherwise implementing regional cooperation in upper secondary vocational education and training.

Study results (Eerola, 2007a) show that the objectives of placements in enterprises are associated with maintaining the teacher's world of work competence, promoting on-the-job learning, and constructing cooperation networks between the institution and employers. Participants find the placements a productive form of cooperation from the perspective of both maintaining the teacher's competence and building up cooperation between vocational education and employers. The placements are regarded as an excellent tool for improving the quality of vocational education. They also appear to inspire teachers and improve their well-being at work. The effects are felt to be long-term. However, the study results indicate that, in regard to the willingness and opportunities for taking part, there are differences between educational institutions, sectors and teachers. Key challenges and problems in implementation practices are related to the cost-intensive nature of the placements as an obstacle to their mainstreaming, to taking into account the organisation's objectives besides the personal goals of the teacher, and to the more methodical implementation of the placements together with employers. As a rule, however, the experiences have been so positive

that placements have been incorporated in the HR strategies of many education providers.

Teachers primarily embark on placements to develop their competence. Directors of educational institutions would like to see not only the teachers' personal goals but also the development targets of the institution being stressed in the objectives of the placements. Directors feel that the placements should produce more foresight information. In their opinion, marketing and raising awareness of vocational education and training as well as bringing up and discussing the institution's needs should increasingly be included in the objectives (Majuri & Eerola, 2007b).

Teachers' placements in enterprises increase the employers' interest in vocational education and training and the activities of educational institutions. Employers have welcomed the teachers and are prepared to work in partnership with them. However, the employers expect the institutions and teachers to take the initiative. Employers are not interested in going to the institutions to tell them what they should teach, and teachers in their role of experts are expected to be aware of the needs of companies and other workplaces in the region (Eerola & Majuri, 2006).

The placements also appear to be an instrument which educational institutions can use to fulfil their duty of developing the world of work in their regions. Employers themselves are not always able to say what kind of experts they will need in the future (cf. Filander & Jokinen, 2004). In the years to come, it will thus be necessary to work on competences together. Increasingly, a preference for placements abroad has emerged. The placements have also been found to be a good method for increasing the number of skilled international actors (Virtanen & Jauhola, 2004).

Even if there are wide variations in implementation of the placements, study results (Eerola, 2007a) indicate that three principal implementation models exist, which have been named according to their key aims. In practice, a number of goals are often set for the placements, and the implementations are variations of the main models described here.

Implementation Model 1

Maintaining the teacher's personal competence

Typical characteristics

- a longer period at one or two workplaces,
- emphasis on personal objectives related to substance or world of work related competence,
- the teacher takes part in work at the workplace and possibly staff training organised by the company,
- a long-term dialogue is initiated between the teacher and the mentor,
- benefits at the level of the teacher's personal development plan and his or her own work.

Implementation Model 2

Developing on-the-job learning and curricula

Typical characteristics

- periods of variable lengths at one or several workplaces,
- field-specific objectives related to implementing and developing on-the-job learning and skills demonstrations are emphasised, often also aiming for sourcing on-the-job learning environments of a higher quality,
- the teacher observes the work at the workplace, talks to workplace supervisors, possibly provides training for them and finds out about sector-specific competence needs,
- the aims often also include developing the curriculum in the field,
- benefits at the department and work community level.

Implementation model 3

Creating a cooperation network

Typical characteristics

- short periods at several workplaces,
- the objectives of the institution, field of education or work community are emphasised – including a perspective related to developing the world of work in the region,
- the teacher visits a number of companies, establishes contacts, finds out about and anticipates the educational needs of workplaces, and markets vocational education and training,
- he aims often also include joint projects between the institution and the companies,
- benefits at the educational field and institutional level.

At best, teachers' placements in enterprises can generate new communities of practical activity between educational institutions and the world of work (cf. Wenger, 1998; Wenger, McDermott & Snyder, 2002) with the aim of developing vocational education and training and the world of work in the region. The placements lead to national and international interfaces between organisations and sectors, which are a requirement for creating innovations (cf. Toiviainen & Hänninen, 2006). At best, the placements trigger extensive learning that benefits all organisations taking part in the activities (cf. Engeström, 2004).

Improving teacher competence by mentoring

A project titled Erityisen hyvää oppia (Particularly Good Learning) set out to use mentoring to develop vocational teachers' competence in employer contacts. Each teacher found himself or herself a person active in the labour market to serve as their mentor for the duration of the 18-month training. The vocational teachers trained the mentors as workplace supervisors following a model devised for supervisor training implemented at the workplace, and the mentoring model created in this project thus is a combination of two earlier models.

Through the mentors, a perspective on the everyday life of the world of work and professions was opened up for the teacher, which is crucial for a teacher's professional development (Mäntylä, 2005,13). The teachers used pre-arranged themes to prepare for the meetings with their mentors, even though there was no strict manuscript for the meetings. The experiences gained inspired the teachers to continue closer cooperation with employers to improve education, to guarantee the quality of on-the-job learning, and to improve the students' position in the labour market.

The mentor had an opportunity to introduce to the teacher his or her organisation and its operating culture, considering the general development challenges of the sector, and sharing his or her competence through reciprocal dialogue. He or she established a working relationship with vocational education and training and received information about questions related to education and future prospects in his or her field. In some cases, the mentor had the opportunity of taking part in and influencing the development of institution-specific curricula and the setting up of a portal for on-the-job learning from the workplace perspective. The term used by Mäntylä (2005, 13) to describe a mentor, or 'työkummi' (workplace godparent), turned out to be a name that worked well in practice and that could be used more extensively in the future.

During the mentoring programme, vocational teachers introduced their mentors to the core contents of the training programme for workplace supervisors drawn up by the National Board of Education in 2005, supported by a workplace supervisor's folder. The content areas of the training were vocational education and cooperation with employers, student-centred guidance, on-the-job learning and implementation of skills demonstrations, and student assessments at the workplace. The vocational teacher returned the assignments set for the meetings to the teacher responsible for mentor training, who assessed them and entered the credits in the study records. Vocational teachers and mentors, having completed the training, obtained a workplace supervisor training certificate. In this model of workplace supervisor training, the teacher visits the workplace to train workplace supervisors one content area at a time. The implementation of this model is sure to continue in some educational institutions in the future, thanks to the good experiences. Some educational institutions have set their targets at training all teachers as work-

place supervisors to ensure that they have a clear idea of what workplace supervisors can do and what can be expected of them.

The mentoring model developed in the Particularly Good Learning project is a cost-effective method of maintaining the competence of vocational teachers and enhancing cooperation with employers. Educational institutions have started looking at the competence development of teachers in a wider sense than before, and the decentralised model implemented at workplaces is one option for acquiring competence besides conventional training seminars.

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Competitions in vocational skills – an instrument for developing vocational education

Tuomas Eerola

This article examines the evolution of vocational skills competitions into a significant development instrument for vocational education, describes national and international vocational skills competitions for young people, highlights the benefits of the competitions and addresses criticism levelled at them.

The success story of vocational skills competitions

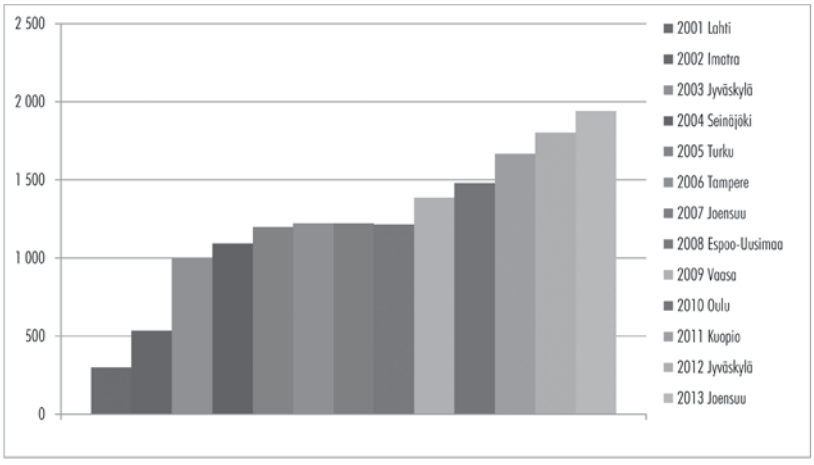
Competitions have always played a key role in developing top expertise. Taking part in competitions encourages a person to strive for ever improving expertise – in physical and mental skills alike. Top performances often require both. Competitions were introduced as an instrument of developing vocational education in Finland as early as the post-war period. At that time, industrial working skills competitions were launched, organised for the first time in Lohja in 1948 (Purhonen, 2005).

In 1988, Finland joined the organisation that arranges the world championships in vocational skills: International Vocational Training Organization (IVTO), today known as WorldSkills International (WSI). At that time, the world championships in vocational skills for young people were known as the International Vocational Training Competitions (the Taito Olympics in Finnish). They are now called the WorldSkills Competition (WSC). On 19 – 20 April 1988, the first national Taitaja skills competitions were organised in Hämeenlinna in cooperation between the Finnish Federation of Vocational Institutions (SAOL), the National Board of Vocational Education, and the Confederation of Finnish Employers (STK). The main responsibility for the practical arrangements was assumed by the Hämeenlinna Vocational Institute and the Hämeenlinna Teacher Education Institute. Three sectors were featured in the first competition: the mechanical, metal, and clothing sectors. In 1989, a Finnish team took part in the International Vocational Training Competition for the first time.

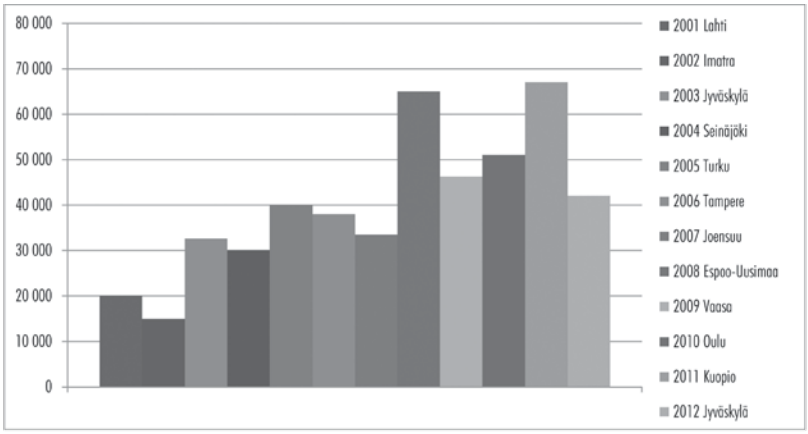
Skills Finland is an association that was established in 1993 to organise and develop vocational skills competitions in Finland. The objectives of the association are to promote the appreciation and awareness of vocational education and training and vocational skills in society, to improve the learning outcomes of vocational education, and to increase the students' interest in continuous improvement of their vocational skills as well as enterprising. The association strives to achieve these objectives

- ✓ by monitoring the status of vocational education and the appreciation of professional skills in society and by submitting initiatives and proposals on these issues;
- ✓ • by conferring the right to organise the annual national competition in vocations skills Taitaja;
- ✓ • by sending a team of young Finnish people to international vocational skills competitions and by supporting young Finnish people in the preparation for and participation in vocational skills competitions;
- ✓ by giving grants;
- ✓ and by information and publication activities in its field.

The competitions in vocational skills for young people are a success story of the early 2000s in Finland. The national Taitaja competition saw its breakthrough in Lahti in 2001, where almost all of the various events took place under one roof in a large fair for the first time. Today, Taitaja with its semi-finals and finals has become a major annual event and a showcase and festival of vocational skills that offers information and experiences for everyone.



Taitaja, Semi-finalists



Taitaja, Number of visitors

Young people from Finland have also done well in international vocational skills events. Successful young people and their coaches set an inspiring example in their own fields, at their workplaces and among youngsters making decisions about study paths. The entire field of vocational education can benefit from the good practices that have led to this success.

The competitions in vocational skills have become a significant instrument for development that has an established position as part of vocational education and training. When talking about the competition activities, we should not overlook the SAKUstars cultural competitions, which have a significant role in promoting young people's motivation to study, creativity and all-round well-being and as demonstrations of the multiple forms in which talent comes. The Finnish Association for the Development of Vocational Education and Training (AMKE) has set up an Expert Network for competition activities to promote, harmonise and develop all types of competitions in vocational collages.

Important investments have been made in organising vocational skills competitions, in preparing for them and in using them to develop the quality and attraction of vocational education and training. In recent years, a number of projects have been completed to promote the competitions, many of which have been supported by the European Social Fund. Of these should be mentioned projects administrated by Skills Finland aiming to develop excellence in vocational skills. (HUVA, HUKI, KILTA), research projects administrated by the University of Tampere (MoVE, AVE, PaVE) and education and dissemination projects managed by the HAMK Professional Teacher Education Unit (AKVA projects).

The training of experts in competition activities developed in the project on Improvement of Vocational Skills through Coaching and Competition (AKVA) was mainstreamed as part of the activities of the HAMK Profession-

al Teacher Education Unit by establishing the HAMK Skills Trainers´ Academy in 2008. The basic task of the academy is to promote excellence in vocational skills by means of education and research. The activities of the academy are also part of the quality assurance of vocational skills competitions. Key areas in which the academy is active include the training and coaching of specialists in competition activities, and coaching, disseminating and mainstreaming good practices that promote excellence in skills, internationalisation of competition and coaching expertise by means of import and export activities, and R&D that supports excellence in vocational skills.

National and international competitions in vocational skills for young people

Taitaja9

Taitaja9 is a competition in manual skills intended for 9th grade pupils in basic education. This competition for teams of three aims to raise awareness of practical subjects – particularly technical work, textile work and home economics – in a fun and inspiring way. Taitaja9 is a guidance counselling tool for the transition point between basic education and upper secondary education.

This competition is a fun and interesting way of introducing students to various professions. It provides 9th grade pupils with information and experiences in vocational education and training and supports them in making career choices. The competition contributes to boosting cooperation between basic education, vocational institutions and companies. The annual finals of Taitaja9 coincide with those of the Taitaja competition. The teams for the finals are selected through regional heats.

Taitaja – Finnish championships in vocational skills for young people

The Taitaja competition is a unique meeting point for the world of work, educational institutions and students. It highlights manual and practical skills – top expertise in practice. Taitaja is the Finnish championships in vocational skills for young people. The participants must be students in vocational education and training and not over 20 years pf age. Taitaja finalists are selected in semifinals organised in various parts of Finland, with nearly two thousand young people taking part every year. In the finals, 400 young experts in their fields demonstrate their skills for tens of thousands of spectators. The number of skills in this competition is increasing. There are over 40 skills today, and new ones are being added. In addition to the official skills, the finals feature trial skills and professional demonstrations. Taitaja is the largest event of vocational education in our country, and rights to organise it are granted conferred by Skills Finland.

TaitajaPLUS

TaitajaPLUS is a vocational skills competition for special needs students. They are organised as part of the annual Taitaja event. All students for whom an individual education plan (IEP) has been drawn up in an educational institution can take part in TaitajaPLUS competitions. The aim of TaitajaPLUS is to promote awareness of vocational special needs teaching and support the employment of special needs students.

TaitajaPLUS competitions do not set an age limit for the participants. They can reach the finals through semifinals that are organised as necessary. The type and number of TaitajaPLUS events may vary from year to year. The aim is, however, that over the years as many vocational education and training programmes as possible would be featured as events in TaitajaPLUS.

WorldSkills Competition

The world champions of experts under the age of 23 are crowned in the WorldSkills Competition (WSC). Participation and preparation for this competition promote the internationalisation of upper secondary vocational education and training and international comparison of skills. This aim is also supported by an extensive network of international actors and experts and a discussion forum that have sprung up around the competition. The right to organise the biennial Worldskills competition is conferred by WorldSkills International (WSI).

The Finnish team at the WorldSkills competition consists of young top experts selected through a three-tiered coaching system and heats. The three-tiered coaching comprises a basic level, a top level and national team coaching (Talikka, Pylvänen and Henriksson, 2011). Participants in basic coaching are selected through the Taitaja competitions or directly through educational institutions and companies. The participants train in top expertise coaching units and companies. Both in educational institutions and companies, coaching is provided by a skill manager and coaches. In addition to the competitors, the WorldSkills team includes experts serving as judges in the competition and a support team. In 2005, Finland was the first Nordic country to host a WorldSkills competition, which was held at the Helsinki Exhibition and Convention Centre.

EuroSkills

The right to arrange the European championships, which are organised in alternating years with the world championships, is granted by WorldSkills Europe, founded under the name European Skills Promotion Organisation (ESPO) in November 2007. Finland is a WS Europe member and has played

an active role in the organisation of EuroSkills since the 2008 event in Rotterdam.

Participation in EuroSkills is open for young people under 25. In addition to individual events, the competition also has team events and multi-professional team events. EuroSkills offers opportunities for international on-the-job learning periods for the students and workplace periods for the teachers. EuroSkills implements the EU's Life Long Learning programme. The objective of EuroSkills activities is to promote labour force mobility, raise the profile and improve the quality and attraction of vocational education and training, and act as a network in which the member states can compare vocational education and spread good practices. The EuroSkills network is thus a good source for finding partners for multinational development projects. EuroSkills activities aim for a skilled and strong Europe.

International Abilympics

The right to organise the Abilympics held every four years are conferred by the International Abilympics Federation (IAF), which Finland joined in December 2005. The requirement for participation in the Abilympics is that the competitors have a disability that interferes with their daily life, for which they must produce a medical report. The participants have to be 15 or over. Vocational skills competitions for the disabled and special groups raise awareness of and promote the attraction and appreciation of vocational special needs teaching and enhance cooperation between education and employers.

Benefits of vocational skills competitions

Finland's strategic goals in international competitions are not limited to medals, fame and honour. Of course, young people who do well in the competitions deserve to be honoured. They have stepped forward and demonstrated their skills to the whole world. They are excellent examples of what can be achieved by hard work and successful coaching. Indeed, we teachers, coaches, workplace supervisors, experts and the support teams should always do our best to boost young people to success. However, we also have the strategic goal of developing vocational education and training in Finland. Many countries send to international competitions those young people who are expected to win prizes. In this case, the objective of national competitions may be to serve as heats for the world championships. Finland takes a different view. A wide front of participants is sent out to these competitions. In order to develop a specific field, we even feel that it is more important to send a representative to a skill where we do not expect particular success than to a skill where we are hoping to do well. The success of the Finnish team should thus not be evaluated based on the number of medals and diplomas, but the success of the entire team. The essential point of this approach (besides coaching young people for the competitions) is ensuring that information and expertise trav-

el in the opposite direction: from international competitions to benefit the field of vocational education and training. The national Taitaja competition in Finland is an instrument for developing vocational upper secondary education; the teams for international competitions are selected through our own coaching system. The young people who do not make it to the national team are also looked after. The aim is that the coaching would also lead the young person in question to take a further or specialist vocational qualification. This way, his or her path towards excellence in vocational skills continues in any case.

On one hand, national competitions in vocational skills promote the individualistic nature of vocational education, and on the other, its orientation towards the world of work. The popularity of vocational education and training is increasing in Finland. More and more motivated young people with diverse talents who wish to strive for their personal best are coming to vocational education and training after completing basic education. Preparation and participation in competitions offer these young people a study path where their individual strengths and development targets are recognized and they are offered the type of guidance and encouragement they need. Vocational skills competitions spur young people to continuously improve their skills and thus support the objectives of lifelong learning. In the competitions, the young people can demonstrate their skills and compare them to the expertise of others of the same age. Vocational skills competitions also support the objectives of entrepreneurship education. Individual study paths as well as coaching and guidance methods developed within the framework of the competition activities can be applied to benefit all those pursuing vocational studies.

The students prepare for the competitions and their skills are assessed in cooperation with the world of work. For companies, vocational skills competitions are a natural opportunity to get to know and be involved in developing vocational education and training while solving recruitment problems and improving staff competence. When preparing for competitions, forms of cooperation are sought that optimally point the way to excellence in vocational skills. These contacts and cooperation practices can also be made useful for all of those pursuing vocational studies and for company staffs. The test projects set in the Taitaja competition and the assessment of vocational skills are continuously discussed in national working groups on the various events. The competition test projects make it possible to react fast to changes in the world of work. The competitions thus also have an impact on curriculum work. The test projects and the associated assessments of vocational skills are saved in an open database where anyone can use them as training exercises or even as tasks for a vocational skills demonstration. The competition test projects are a concrete demonstration of the skills required for excellence in upper secondary vocational education and of how the skills are assessed.

Competitions in vocational skills improve the recognizability, attraction and appreciation of vocational education and training. For educational institutions, the Taitaja competition is an opportunity to market the education they provide and to compare learning outcomes. The competitions also promote inter-institutional cooperation and networking among teachers. Surveys conducted by HAMK Skills Trainers´ Academy in cooperation with the Finnish Association for the Development of Vocational Education and Training AMKE indicate that the majority of coaches at the Taitaja semi-finals find these semi-finals an important annual networking event for the teachers.

Organising the competition clearly boosts the regional attraction, internationalisation and media visibility of vocational education and training and generates a great number of new partnerships. The teachers also improve their competence. The actual organisation of the competitions involves a number of support functions, which offer possibilities for project learning and opportunities for the students to demonstrate their skills; data links, heating, water, ventilation and power supply networks, fair stands, information points and guides, marketing, catering, first aid, logistics services, TV and video production and so on are needed to organise a competition. Young top experts also encourage others to continue improving their vocational skills.

Criticism against competition activities

During my long-term involvement in vocational skills competitions and in training competition experts, I have also met with criticism levelled at the competition activities. Critical views are valuable when we are striving for continuous improvement of the activities. For the main part, the criticism is directed at three aspects: whether competing is an ethically appropriate method or style of learning, the costs incurred, and teachers who focus excessively on or even "go mad for" the competitions.

Competitions are one good way of looking after all students – including the most talented ones. Taking part in and preparing for the events offer a competitive young person an important study path towards professional top expertise. Success in competitions should not, however, be overemphasised. Taking part in semifinals is useful, even if the finals are not reached. In any case, each young person will encounter competition on his or her career path, for example when applying for a job.

A lot of money is invested in competition activities, and sometimes it is felt that this money is spent on coaching a handful of students only, rather than supporting more wide-based development efforts. Surveys conducted by the HAMK Skills Trainers´ Academy indicate that almost all vocational educational institutes are involved in the competitions in one way or another. They feel that the competitions significantly contribute to promoting an orientation towards the world of work, individuality as well as the attraction and internationalisation of vocational education and training. It is crucial that we

have methods for exploiting and making visible the good practices generated by the competition activities to benefit all those pursuing vocational studies.

For a vocational teacher, the competitions are an environment that encourages and supports skills development in many different ways. Colleagues sometimes feel that enthusiastic teachers focus too much on competitions and the participants, forgetting about the other students. It is important that as many teachers and supervisors as possible take part in competition activities. Participation is an efficient way of disseminating good practices, and the duties related to the competitions can thus be divided more evenly between several persons in the work community. A natural way of becoming involved with the competition activities is to go and look after a student at the Taitaja semifinals. Or why not take part in induction training organised by the HAMK Skills Trainers´ Academy?

Conclusion

> *"Talented children should not be idolised or raised above the others. However, they should have the same right that should be guaranteed to everyone, a right to balanced growth and to developing positively both their emotional life and their abilities. As talent is a relative concept, the number of those who are talented will always be few; as standards improve, the top moves further out of reach. Talented individuals are a richness, and they should not be envied. While equal, we are all different. We also all have our talents, in one way or another" (Uusikylä, 1994).*

Talented students should not be put on a pedestal, but they are entitled to the guidance they need. Vocational skills competitions offer an inspiring study path towards vocational top expertise. However, competitions have become an instrument of development that is more significant and has a wider impact than just a study path offered to a talented student. The competitions have evolved from the hobby of individual activists to a coordinated tool of development (Kaatrasalo, 2010). In these development efforts, we are spurred on by the goal set in the government programme of Prime Minister Katainen of making Finland the most competent nation in the world by 2020.

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Finnish Association for the Development of Vocational Education and Training http://www.amke.fi

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Vocational skills competitions and the pedagogical career path of a teacher

Pirjo Tuominen

Teachers at a vocational institution have a variety of possibilities for developing their work while making progress on their vocational career path. The focus of their interest may be either international or national activities. The aim, however, is to develop their competence through pursuing pedagogical training and developing the content of teaching. This perspective of lifelong learning is examined in this article through guiding a young student towards vocational skills competition activities.

"The knowledge, skills and competence requirements of the world of work and everyday life are growing and changing at an increasing pace. We need wide-based education, civic and life management skills as well as versatile and extensive vocational competence and workplace skills. In addition to this wide scope, we need strong and deep vocational skills in the relevant vocational field." (Osaava ja luova Suomi. Opetus- ja kulttuuriministeriön tulevaisuuskatsaus, Ministry of Education and Culture publications, 2010:15). This direct quotation from the Ministry of Education and Culture's foresight analysis carries a strong message on the diversity and challenges that are in evidence in the work of both a vocational teacher and a workplace supervisor. Updating your vocational skills both in order to maintain your pedagogical competence and to keep up with workplace development is a continuous challenge in a teacher's work. Vocational teachers themselves can also have an active influence on what the most suitable and meaningful way of responding to this challenge is. The most natural course of action in developing their work is to integrate development in everyday work or teaching, its planning, its implementation and its development. One objective that stands out is ensuring that the students are committed to their future professions and to mastering the required skills.

Students' strong vocational competence and fast progression to the world of work support a national objective – making Finland the most competent country in the world by 2020 (Education and Research 2011 – 2016). Possible pedagogical operating models that can be used to attain this objective

include steering the student towards vocational skills competitions. Participation in vocational skills competitions supports a young student's individual choices and the use of various learning environments during the studies as far as possible.

Preparing for a vocational skills competition is an alternative way for a young student to build up his or her vocational competence. The same could be said about the teacher. Taking part in competition activities enhances the teacher's pedagogical competence, which increases his or her motivation and interest in the competitions.

Vocational skills competitions stress competence sharing, development efforts and evaluation of what is being done. When guiding students on their way to vocational skills competitions, the teacher encounters issues that he or she would otherwise never come across in daily work.

When guiding top expertise, for example, the teacher is forced to consider both pedagogical and financial solutions, highlighting his or her personal creativity and innovativeness. This was also clearly reflected in the survey jointly conducted by the HAMK Skills Trainers' Academy and the Association for the Development of Vocational Education and Training (AMKE). The survey was directed at teachers guiding students who had reached the semifinals. The respondents felt that the semifinals were an excellent opportunity for sharing experiences and thus developing one's vocational skills, and for networking with actors in the field. When working together and in a group, the group members learn a lot from each other, and they share competence cooperatively.

Pedagogical support from training and cooperation with employers

Versatile and extensive basic coaching requires cooperation between the workplace supervisor, the student and the teacher. The teacher can develop these activities that aim for supporting the skills of a top expert, for example, by pursuing additional training. The objective of the "Guiding top expertise and developing teaching" training courses organised by the HAMK Skills Trainers´ Academy is to provide teachers with practical tools both for the basic coaching process of a young student and for developing the teacher's personal pedagogical competence. Mastering key competences in his or her vocational field and building on this foundation, support for top expertise will benefit both the teacher and the young student to be coached. It would not make sense to provide coaching that only aims for competitions, as this would entail a narrow focus on competition activities, and other competence and vocational development would be overlooked. The actual coaching for the competition is a minor part of the process that prepares students for the Taitaja competition. Skills Finland's publication Matkalla huipulle – Huippuvalmennuksen työkalut notes that some ten per cent of training and other work that prepares students for the competition comprises actual coaching for the com-

petition. Other preparation includes developing skills by attending teaching, mental preparation, practising key competences for lifelong learning, and other activities following the curriculum.

During the training, the possibilities of supporting top experts at the organisational level are also examined cooperatively. Many pedagogical solutions that reinforce guidance activities require management approval. Educational institutions have different solutions for supporting top experts, and sharing these solutions together with the participants opens up new perspectives for implementing basic coaching. Going through these processes is a learning curve where a person's innovativeness and ability to develop benefit the entire organisation. At the same time, pedagogical development will increase well-being at work and job satisfaction, which will be reflected as productiveness. During on-the-job learning periods, practising skills for a vocational skills competition does not only take place naturally, but it also constitutes a good form of cooperation between the educational institution and a company. Ensuring the commitment of a young top expert to the company during an on-the-job learning period will benefit both the company and the student. This significant form of cooperation can never be emphasised enough. Practising their skills in an authentic work environment is the very thing that builds up young people's s competence, not only as regards practising the substance but also exercising key competences for lifelong learning. The student may later find a job with the employer who provided the on-the-job learning opportunity, and the company will gain not only a skilled employee but, should they wish, also more general visibility as a supporter of a top expert. In this cooperation, tripartite planning of the vocational skills coaching, the tasks to be performed, and feedback discussions will ensure the participants' commitment to the process and make it meaningful. In this sense, implementing the coaching process already approaches personal workplace supervisor training from the perspective of the workplace supervisor.

From a national talent to an international expert

National competition activities offer both an employee at a workplace and a teacher at an educational institution a way of progressing in their vocational career paths to the international level. When you take part in Taitaja competitions, you will unavoidably become familiar with the organisation of Skills Finland and the materials, training courses, etc., produced by it. Gradually, you will familiarise yourself with the coaching organisation and other activities related to the implementation of the competitions in each event . The significance of competition activities has multiple dimensions, and with adequate motivation and commitment, you can build up your pedagogical competence by taking part in international level competition activities.

At the international level, the expert's tasks are versatile, and a specific training process exists for them. All the required competence cannot be ob-

tained through training, however, and in part, competence is handed down as tacit knowledge from more experienced colleagues. Experts who have been involved for years have moved on in their careers through national competition activities to expert tasks in international competitions. And we also have a few examples of how networking has led to an expert being invited to foreign educational institutions or companies to teaching or training tasks. Persons having experienced this have enormous quantities of tacit knowledge that is sometimes difficult to communicate and put into words but which includes plenty of competence. Mentoring should be used more in the work of both a teacher and an expert as a resource that passes on competence. The pedagogical career path of a teacher is a good example of how lifelong learning can be a natural part of your basic task. Using various learning environments and reconciling them with changes in society enables mobility, not only in your own vocational field but also in wider contexts.

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III

STUDY METHODS AND LEARNING STYLES AIMING FOR TOP EXPERTISE

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HUIPUT KEHIIN (Roll out the Talent) project
The article was edited as part of the Roll out the Talent project administrated by the HAMK Professional Teacher Education Unit. This project set out to construct permanent cooperation networks for developing top expertise. The target area and project partners were four vocational education and training providers with their networks of business and industry partners. For more information on the project, visit: www.hamk.fi/huiputkehiin.

How key competences for lifelong learning can support top expertise

Pirjo Tuominen

Key competences for lifelong learning have many objectives in terms of supporting the competence of a young student. It is an essential part of supporting top expertise to pay attention to how these skills can be taken into account and integrated in teaching and guidance. In this respect, we are looking at this issue from the perspective of the students, of developing their competence and of how they have chosen National Skills Competition, Taitaja activities as their individual study path. Mastering vocational competence and the associated skills and knowledge is a synthesis where those skills that are called key competences for lifelong learning are extremely prominent. These key competences for lifelong learning are not taught as separate studies, and they are integrated in the teaching of vocational qualification modules and modules that complement vocational skills as a natural part. These key competences for lifelong learning can be examined both from a national and an international perspective. The national foundation is provided by the core curricula of upper secondary vocational qualifications published by the Board of Education, and the international foundation is the frame of reference provided by European Union member states for competences for lifelong learning. In a nutshell, we can say that the basic assumption and objective of both is an active citizen who is motivated to keep up with changing working conditions and to seek an innovative approach to managing his or her own life.

The contents of key competences for lifelong learning picked out in the core curricular of vocational qualifications play an essential role when preparing for competition activities. Some of these key competences for lifelong learning are a mandatory part of assessing the tasks in Taitaja competitions, and thus also visible in the structure and contents of the task. Skills Finland, which administrates and develops National Skills Competition, Taitaja activities, has brought up this important area and mainstreamed it as part of task contents, and consequently, part of the assessment. In Taitaja competition tasks and their assessment, key competences for lifelong learning in-

clude sustainable development, safety and well-being at work as well as entrepreneurship.

Key competences for lifelong learning on the Taitaja path

Following the core curricula for vocational qualifications, a total of eleven key competences for lifelong learning are assessed as part of learning and competence. When assessing young people's skills demonstrations, four key competences for lifelong learning are assessed separately (learning and problem-solving, interaction and cooperation, vocational ethics and health, safety, and ability to function). The National Board of Education has selected these four skills to be assessed specifically in connection with skills demonstrations. These four key skills of lifelong learning support in particular the key competence in each vocational field. Naturally, their contents are made suitable for the substance of the relevant area of competence. The remainder of the key competences for lifelong learning are assessed in connection with other learning and competence (Table).

Other vocational competence and action as well as life management are strongly underpinned by mastering all key competences for lifelong learning. Teachers and top experts should be aware of how these skills can be applied and drawn on in an as early stage as possible to improve vocational skills. Substance-related competence, regulating one's emotional state, and pressures created by the surroundings will influence the student's performance. Besides practising skills, the attainment of the goal can be facilitated by the mental growth of a young top expert. Recognizing and regulating one's emotional state is part of the contents of the training programme "Guidance of top expertise and development of teaching" provided by the HAMK Skills Trainers' Academy. Key competences for lifelong learning support the student's competence during his or her personal study path. Together with the teacher, the student draws up a plan that will be followed to progress towards the Taitaja competition. At this point, it is important to note that the study path of competition activities also brings additional competence to other students in the group and possibly motivates them, too, to start on the Taitaja path. As the student is preparing for the semifinals or finals of a vocational skills competition, he or she has practised the skills of his or her field numerous times. When revising the assigned tasks, partial performances of the tasks or other work that supports the performance, the student simultaneously ends up developing other skills that have a bearing on life management. It is precisely the key competences for lifelong learning which facilitate practice that supports this competence. The key competences for lifelong learning are mutually supportive; they intertwine. The very thing that you need in competition activities is to master a broadly based competence in order to achieve balanced and successful performance. The key competences for lifelong learning thus cut across all learning and practising of skills.

The challenge lies in how these key competences for lifelong learning can be made visible in a personal study plan that aims for a vocational skills competition. An adaptation in which practising the substance and reflection and feedback on performances alternate increases the student's motivation to perform well. The relationship between the student and the coach also has a major impact on maintaining motivation. In the best case, it could be described as the relationship between an apprentice and a master. In this situation, the master teaches and guides the apprentice's learning of skills and working techniques but also shares his or her competence. Guidance is thus naturally embedded in doing the work, and at the same time, the apprentice learns something that cannot be learnt in class and from textbooks. A supervisor or a coach who has been working in the field for an extended period has accumulated a type of certainty and competence that only emerges when working together. This way, good practices and ideas as well as working models can be shared. This passing on of tacit knowledge that enriches the competence of a top expert can be considered a by-product of the process.

Salakari describes this part of the process clearly by describing how, at the beginning of the coaching, the coach almost leads the student by the hand, and how the student is gradually assigned more independent responsibility for his or her performance. The best way of learning the content to be studied is active participation. In the meantime, the supervisor observes the performance and draws attention to competence areas that require additional practice or special skills. Working in this manner comprises extremely close cooperation, which also extends to the support team. It would be natural for the other teachers in the support team and the on-the-job learning supervisors to follow the same working method. In that case, the similarities between guidance methods would provide the young learner with the best possible support (Salakari, 2007.) As a wide scope of content can be learnt in the apprentice-master model, it is natural to also look at learning from the perspective of formal, non-formal and informal learning, and to examine in what way they are relevant to coaching for a vocational skills competition.

Vocational education and training impart qualifications for certain professions, as well as eligibility for further studies. It is usually possible for all students pursuing vocational studies to take part in competitions. In that case, the basic coaching takes place and is implemented as part of professional studies, both at the educational institution and as a by-product of on-the-job learning. This is a natural possibility that is open for everyone. When participating in competition activities, the young person also has the possibility of taking a skills demonstration both in the semifinals and the finals. In this connection, we are talking about education that prepares the students for a qualification for which they will obtain a certificate, and it thus comprises formal learning. On the other hand, it is often difficult to make a distinction between non-formal and informal learning in the coaching process. Both contain learning experiences that are obtained through hobbies, the media or even interactive situations. In other words, it is difficult to draw a line between these two types of learning in the case of Taitaja coaching.

However, when a student is committed to basic coaching, a coaching plan is followed, and its goal orientation and progress will be monitored. From this perspective, following a coaching plan is thus closer to non-formal learning. In all these forms of learning, various practical working methods and knowledge-based competence are interlinked. The students engage in projects, on-the-job learning, individual and group work, etc., where the key competences for lifelong learning are an essential part of the implementation. The teacher or the supervisor plays a major role in ensuring that the key competences for lifelong learning are part of implementing the task. Pedagogical planning and cooperation are needed to make sure that the student can, in his or her reflection, apply a skill learnt earlier and thus improve his or her performance.

The table below shows the key competences for lifelong learning following the core curricula of upper secondary vocational qualifications, including concrete examples of how they can be implemented in basic coaching. The table gives a few examples to illustrate how the key competence for lifelong learning in question manifests itself in supporting top expertise. The table does not exclude other examples or suggestions; and these samples are based on material compiled together with the participants during the training course on "Guidance of top expertise and development of teaching" organised by the HAMK Skills Trainers' Academy.

Key competences for lifelong learning	**Manifested in the following ways when preparing for Taitaja competitions**
Learning and problem-solving	Skill in drawing on and applying in unexpected situations the challenges that come up, solutions related to performing a task, smooth use of time and materials.
Interaction and cooperation	Self-expression, consideration for others and competence in encountering different people and interactive situations during the entire preparation process. Also courage to ask for support when needed.
Vocational ethics	Integrity, commitment and openness towards other competitors, the support team, fellow students and one's own team.
Health, safety and ability to fuction	Ensuring one's own physical and psychological well-being and coping. Paying attention to a safe operating environment and working methods.
Initiative and entrepreneurship	Entrepreneurial spirit is facilitated by motivation and a willingness to take part in competition activities and to develop in them in order to attain one's goals. Stamina and willingness to compete and develop one's performance.
Sustainable development	Sensible and economical use of working and operating methods and sharing good practices to benefit everyone. Applying one's competence.
Aesthetics	A tidy and pleasant working environment and maintaining it. Courtesy towards others through one's own action.

Communication and media skills	"Say what you think and think what you say", both in Finnish and in a foreign language, and also in a genuine interactive situation or in the social media.
Mathematics and natural sciences	Calculations, definitions or problem-solving skills required to solve the tasks indicated by the competence needed in each profession.
Technology and information technology	Rational and versatile use of machines and tools supports and develops the performance.
Active citizenship and different cultures	Encountering other people in a fair, equal and appropriate manner, networking during semifinals or competitions.

Lifelong learning and the significance of key competences for lifelong learning in the context of the world of work and vocational competence secure a continuum of competence in our changing society. During their time of study, young people become committed to developing their profession and maintaining their vocational skills in the future. The aim is that the future professionals will share their competence during their careers, follow the changes in their field and actively promote well-being in the environment they work and live in.

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Dialogical methods for developing top expertise

Helena Aarnio

Freely defined, top expertise can be understood as excellent individual and collective action. The path to developing top expertise is long and has multiple steps, and making progress in it requires persistent and sustained efforts. According to Ruohotie (2003, 9), the elements of professional top expertise are profession-specific knowledge, skills in applying knowledge to practical problem-solving, and metacognitive skills of higher-order thinking. Profession-specific knowledge means mastering the complexity of information and information structures and a depth of understanding. Thinking skills refer to an ability for critical analysis, creative use of knowledge, and anticipation of future development. Self-regulation skills and motivational capabilities that affect self-regulation are also important. Self-reflection of the person to be coached for top expertise plays a key role in developing professional top expertise. According to Nokelainen, Ruohotie and Korpelainen (2008), supervisors and coaches play an important part in this process. It is thus essential to understand what thinking and reflection together mean, what tools are available for this and what, on closer inspection, we aim for in thinking together in the context of developing top expertise.

The art of thinking together refers to dialogical competence, which can be developed consciously through dialogical methods. This will help the learner to be more efficient, productive and sensitive when making progress in the steps of professional development. Dialogue will help intensify reflection, which is part of efficient learning (see Schön, 1983), highlighting the significance of the learning community. The objective of this article is to elucidate the idea of a learning community that works dialogically and in which the participants' competence potential can be better realised as a result of reflection based on dialogical methods. If the teacher or the coach is lacking in key dialogical competence, a lot of the potential for top expertise will be lost.

What is a learning community that works dialogically like?

In a dialogical learning community, the participants do more or less equal amounts of talking and listening, they put self-emphasis or unnecessary

defences aside, they continue a dialogue even when it feels difficult, they are alert and sensitive to the other participants, and they describe the way they think without "hidden agendas". They have realized that they have the same value as human beings. Acting in this way is based on dialogical competence. It is part of social skills, acting in different social contexts where verbal communication plays a key role in the activities and their development. One basic assumption of dialogue is that learning takes place through active participation in a community. Dialogical participation can be understood in an everyday sense or on the basis of scientific information. All conversation is not dialogue (Bohm, 1996). Dialogue is based on equal co-construction of understanding. It is shared thinking and getting well acquainted with certain subject and activity. (Aarnio & Enqvist, 2002). Dialogue is a demanding form of conversation, and there are many conditions for its coming into existence. Thinking together dialogically means a mindful, inquiring and wondering conversation in the here and now, in which authentic thoughts and feelings as well as personal desires and wishes (intentions) can be accessed by means of a dialogical attitude and ways of acting.

Dialogue can be practised alone with individual learners or in groups of learners. Woolley, Chabris, Pentland, Hashmi and Malone (2010) studied the collective intelligence of groups of two to five participants, in other words, the group's ability to perform a wide variety of tasks. According to their results (ibid.), collective intelligence is not dependent on having one or more intelligent individuals in the group, but it has a direction related to such factors as the social sensitivity of the group members and equal turn-taking in the conversation. Groups where conversation was dominated by a few people had less collective intelligence than groups where turn-taking was more equal. It could thus be concluded that collective intelligence also culminates in dialogical competence in a learning community. Dialogical competence can be divided into four areas, which are 1) Dialogic attitude (State of mind for engaging in dialogue), 2) Making dialogue non-fuzzy (Preparatory orientation to dialogue), 3) Creating a dialogical moment, dialogue tools, and 4) Creating an overall view and new understanding (Building a general view through dialogue (Aarnio, 2012; Aarnio, Enqvist, Sukuvaara, Kekki & Kokkonen, 2008). The areas of dialogical competence include dialogical ways of acting, and dialogical methods have been developed for learning these (see Aarnio, 2012).

What dialogical methods are there for developing top expertise?

The following dialogical methods (Aarnio, 2012) are examples of ones that are suited for developing top expertise.

1. Methods that foster a dialogic attitude include the As equals and Open, sincere expression methods. The As equals method helps participants understand how they can create a trusting, safe and relaxed atmosphere in a learning situation that shows respect for themselves and others. The Open, sincere expression method increases the partici-

pants' understanding of openly and honestly voicing their thoughts, which is particularly demanding in difficult problem-solving situations and conversations.

2. Methods that make a dialogue non-fuzzy include Dialogue tickets, Word-for-word listening, Imprisoned by preconceptions, and Suspend and wonder. The Dialogue tickets method teaches, in particular, thinking together symmetrically. It helps understand what it means for each participant to speak and listen in turn. The Word-for-word listening method gives the participants an idea of how to receive information carefully and how significant this is. The Imprisoned by preconceptions method helps participants recognize and become aware of their current ideas and basic assumptions and perceive their links to possibilities of thinking and acting in a new way. The Suspend and wonder method teaches participants to put aside their current ideas and basic assumptions in order to free them to genuinely wonder together about why things are in a certain way and to develop activities from a new perspective. These methods help make the conversation "bright", lively and fresh.

3. Methods for creating a dialogical moment include The art of inquiry – the power of questions, Catching hot words, and Delve deeper. The art of inquiry – the power of questions method helps participants to open the way others are thinking, to assist others in developing their thinking, and to promote shared creation of knowledge. The Catching hot words method helps participants to find crucial key phrases in what the others are saying, or so-called 'hot speak'. The Delve deeper method instructs the participants in explaining the key phrases of what the others say, to grasp the subsurface layers of thinking. This is essential for opening new tracks in thinking and action.

4. Methods that create an overall view and new understanding include Let's weave a synthesis and Find the missing pieces. Weaving an overall view, or a synthesis, by making use of each participant's way of thinking helps to analyse what has been learnt and reveals the current status of thinking and action. The Find the missing pieces method reaches authentic questions that take the learning to a higher level (Aarnio, 2012).

Dialogical methods help in reaching the subsurface sources of thinking and action, revealing both the learner's personal strengths and his or her obstacles to learning and weak points. When the learners verbalise their actions, their zones of proximal development are simultaneously engaged (Vygotsky, 1978). Dialogue that draws on collective intelligence in a learning community takes place in the zones of proximal development, in thinking and acting in the here and now, and timely assistance and support that meet the right needs can thus be provided. The aim is at the realisation of each learner's potential by using their full capacity of reflection. In so-called core re-

flection, the following issues are addressed: (1) What problems can you perceive in this experience, this situation? (2) What would you like to achieve in an optimal situation, and how do your behaviour, your feelings, your mental images of yourself and beliefs obstruct the attainment of this goal? (3) What core qualities are needed to achieve the ideal situation and to overcome the restrictions? (4) How can these core qualities become reality? (Korthagen & Vasalos 2009, 8.) In a conversation that draws on collective intelligence and progresses dialogically, it is possible to tackle these questions, making core reflection more likely.

Core reflection

The mastering of complex information structures, critical thinking and creative application of knowledge that are part of professional top expertise are linked to the nature of the learning and development process. This comprises versatile dialogues, experiments, analyses, comparisons, assessments and creation of something new, in which process reflection plays a key role. Reflection is traditionally understood as thinking about an experience or a situation, often with the aim of staying at the rational knowledge-based level. According to Korthagen and Vasalos (2009, 5), this is not enough in a powerful professional development process. The subsurface motives should be reached and they should be modified. They (ibid.) specify six levels of reflection: (1) the environment (what the entire context is like?), (2) behaviour (what do I do?, how do I act?), (3) competencies (what can I do?), (4) beliefs (ideas and beliefs that I hold), (5) professional identity (who am I/what am I like), (6) mission (what inspires me, what do I want?). Reflection that reaches the fifth and sixth level addresses the so-called cores. The levels of identity and mission are left out in ordinary reflection, and thus possibilities for deeper professional learning are lost. Personal strengths thus remain hidden, and the obstacles and difficulties that block the path to optimal development are never revealed and overcome.

If reflection in a learning or coaching situation reaches the cores, we are present in the here and now. This applies equally to thinking and emotions as well as to what the learner intends, wants, desires, needs or strives for (intentions) in his or her development. This way, the learners can recognize cognitive, emotional and motivational aspects, personal strengths and internal obstacles that prevent them from being realised (Korthagen & Vasalos, 2009). In dialogical reflection and scaffolding, generalising interpretations and explanations of the learner's actions are done away with, as the conversation is lacking in automatic talk that comes in certain types of ready-made 'downloadings'. Consequently, the learners' problems and difficulties are genuinely encountered in the here and now. The learning of self-regulation skills, which is important in developing top expertise, learning is connected with mindful presence (see also Horelli & Haverinen, 2009). In a state of mindful presence, learners are aware of the intentions of their actions, they are able to focus their attention on the desired objects, and their attitude is positive. Reflection stemming from full presence implemented through dialogical meth-

ods, which is important in developing top professional expertise, requires preparation and coaching (see Aarnio, 2012). Experiencing the genuine joy of discovering a learner's development potential is worth striving for. For this purpose, it is worth pausing to reflect and to create the best possible future in a dialogical learning community.

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STEM subjects – important, but not attracting much interest?

Jouni Enqvist

The strange situation of STEM contents

In Finland, Europe and the United States, especially in the so-called successful welfare economies, education in STEM contents is facing a rather confusing situation (in this article, STEM refers to math, science and technology as part of the learning contents, especially in technical field education: S= Science, T= Technology, E= Engineering, and M= Mathematics). A number of recent studies (see, e.g., Osborne & Dillon, 2008) indicate that these fields, and teaching in them, are considered important and necessary, in particular for the nation's success and to keep up with global competition. Students of various ages also generally consider STEM subjects to be important. The problem is, however, that they are not interested in studying STEM contents (see, e.g., PCAST, 2010). They are unwilling to work and make an effort in these subjects, or to pursue careers where STEM contents are needed.

Surprisingly, one of the main findings of the extensive ROSE (Relevance Of Science Education) study that examined the status of science teaching in Europe (Sjøberg & Schreiner, 2006) was that the more highly developed a country is, the less interested the students are in studying science. How can we expect to achieve top expertise in technical fields (for example, in Finland) if students are not interested in science, and young people at the age of 15 (girls in particular) have no enthusiasm for studying them? In addition, there are signs that show that the standard of math skills in our schools has clearly dropped in recent years (see, e.g., the article “Pisa-tutkimus vain osatotuus suomalaisten matematiikan taidoista” ("The Pisa study is only a partial truth about Finns' math skills”), 2005), even if Finland has scored results in international comparisons (including the Pisa study) that are good in a certain sense. Where could we find a foundation for fulfilling the wishes expressed in the report “Suomi tarvitsee maailman parasta insinööriosaamista” (“Finland needs the world's best engineering expertise”, 2009)?

This inconsistency associated with the STEM area of competence is also crucial because the lack of interest is not a global problem, but one that expressly concerns highly developed nations in Europe and the United States. International comparisons have revealed that the math and science skills of American students are no longer the best in the world (see, e.g., PCAST, 2010). This has sparked national concern in the United States about what lies beneath the average test results and lack of interest. It is surmised that schools lack teachers who are excited about their fields. On the other hand, in countries such as China, India and Asia in general, there is considerable enthusiasm and potential for learning STEM contents. As top expertise in the STEM fields is a critical factor for the vitality and development of national economies, it is clear that in all highly developed countries, including Finland, it is desirable to produce adequately wide-based top expertise in the STEM fields. For example, too many American students act as though they had decided early on in their studies that STEM subjects are boring, difficult or unwelcoming (PCAST, 2010). The same trend can be seen in Europe (see, e.g., Osborne & Dillon, 2008).

The critical nature of the issue is further emphasised by the fact that this is also about democracy and equality. The world is becoming increasingly technological, and global natural phenomena and the forms of interaction between humans and the environment are becoming increasingly complex. Developed societies are entirely dependent on high technology and various technological applications. Ordinary people should have at least some understanding of these processes in order to live as fully competent citizens in an ever more complicated world. Or would we perhaps like to hand over the understanding of, and performing the calculations for, all these difficult questions to some mathematics and sciences elite on the other side of the world? Surely this is not what we want?

The only possible basic assumption is that we must have means for interesting a larger number of students in learning STEM contents and getting an increasing share of them to strive for top expertise in the subjects. There obviously is a variety of reasons and explanations associated with different areas of life for the problem brought up in the beginning of this article. Of these explanations, the special focus of this article is on those that teachers can influence by their actions, through implementation of teaching and curriculum-based solutions. Is there something in the methods and techniques used to teach mathematics and science, some sort of built-in feature that results in difficulties and puts students off? Maybe this is the case, and we should do a lot more to take these special features into account in various teaching and learning situations.

The nature of STEM contents

STEM contents have some features that play a role in learning and teaching (PCAST, 2010). What is characteristic of mathematics and science in par-

ticular is a strongly cumulative, pyramid-like structure and progression in the work. In practice, each step forward in mathematics is based on prior knowledge and skills. As a consequence, students who encounter problems with certain content areas early on usually face increasing difficulties as they progress in their study of mathematics. Conceptual understanding, or the understanding of abstract structures, is more important than regurgitating facts.

The characteristics of STEM knowledge also include strong specialisation, as a result of which the students cannot easily find a natural way of associating this specialist knowledge and methods with everyday contexts. How, then, could the teacher forge links to these issues in the teaching and make STEM contents personally relevant to the students?

As a result of scientific progress and technological advancement, especially in the fields of natural science and technology, STEM knowledge constantly changes and develops, and it also contains plenty of cross-disciplinary knowledge (PCAST, 2010). The discipline expands rapidly, and we have to modify our own understanding as a result of this new knowledge and advanced technological tools. This brings plenty of interesting new outlooks and possibilities to the STEM fields. It also places great challenges on teachers and students in terms of the contents.

The makings of a STEM teacher's identity

In the light of what we have discussed above, the situation in STEM subjects appears rather gloomy. The idea is, however, that teachers can, through their own actions, have a decisive impact on both the students' attitudes towards STEM contents and their work approach, their enthusiasm, and the creation of potential top expertise in STEM subjects. The teacher's actions play a key role in sparking enthusiasm and interest in the student (Maltese & Tai, 2010). There is also a wide consensus on, and clear evidence of, the fact that teachers have significant influence on the learning of their students and that the quality of teaching explains a great share of the variations in learner achievements (National Research Council, 2010). In this situation, vital building blocks include (1) the teacher's adequately deep Content Knowledge (CK) and (2) the teacher's Pedagogical Content Knowledge (PCK).

1. Once the teachers' content knowledge of the subject to be taught (mathematics, for example) is deep enough, they are able to explain the various concepts, operations, procedures and operating methods to the students from multiple perspectives (PCAST, 2010). This will enable the students to find their own optimal ways of understanding the issues, even difficult ones. The teachers must be able to justify content-related arguments appropriately and answer the students' difficult and inquisitive questions constructively, rather than just replying "because it's a rule". Teachers with deep content knowledge of

the subject to be taught are brave enough and prepared to encourage the students to develop relevant questions. These probing questions will then naturally lead the students towards deeper sets of problems, which will enable – following the ideas of dialogical thinking) – more intensive and reciprocal collaborative work. In-depth, up-to-date content knowledge also ensures that the teacher is aware of what rapidly developing technologies and, in particular, the advancing IT applications, mean for the STEM contents (PCAST, 2010). How could these change the preferences and priorities of the content to be studied, what should be left out, and what will it replace it? The teacher must also find connections between the contents of the subjects to be studied and the real world to help students feel that STEM subjects are relevant and meaningful for them.

2. While there is plenty of evidence from research and other sources to show that the deeper a teacher's content knowledge is, the better STEM teacher he or she is, we also know that the competence of a great teacher comprises not only content knowledge but also strong pedagogical knowledge and skills. At the centre of this issue is the concept of pedagogical content knowledge (PCK) formulated by Lee Shulman (1987). PCK highlights the special pedagogical issues of teaching a certain substance, for example, mathematics. The concept of PCK has been analysed and described in concrete terms by many researchers, including Magnusson, Krajcik and Borko (1999) and Williams & Lockley (2012). How does PCK manifest itself in practice in the actions of a great teacher?

   Skilful STEM teachers have a handle on the students' initial assumptions of the substance to be studied, say mathematics. They recognize the mindset that the students bring with them to the learning situation. They understand what makes certain concepts related to the content difficult or easy to learn and are able to act accordingly. They have an idea of what methods of presenting the concepts and illustrations work in a situation of a specific type. They know which approaches are perfect for the content discussed at any one time and how the elements of the content to be discussed can be organised and structured. They have knowledge of factors that can facilitate or, on the other hand, obstruct the learning of a particular content. In STEM subjects, it is vital for the teacher to plan and implement learning situations that reflect the student's current way of thinking and conceptual misunderstandings. This way, the teacher can understand what some erroneous idea held by the learner is based on and thus help the learner in precisely the right issue. Gradually, a change will take place in the student's thinking, whereby remembering is starting to be replaced by conceptual, structural understanding. Thus PCK is the area of competence

that determines whether the teacher is a great teacher. Pedagogical content knowledge is the foundation on which a competent teacher builds a collaborative learning situation.

Elements of productive STEM pedagogy

Above, we discussed the special characteristics of STEM content and the competence of a skilled STEM teacher. But what are the elements of good STEM pedagogy for today? There is strong research evidence (see, e.g., National Research Council, 1999) suggesting that active, cooperative, collaborative and inquiry-based methods promote learning, the retention of information and skills in higher-order thinking. Based on extensive research material, Zemelman, Daniels and Hyde (2005) have collected best practices for teaching mathematics and science. They claim that the essential elements are the following: (1) Ensuring that learning is concrete and active by using software, materials and tools that help make concepts more explicit; (2) Using interactive and cooperative working methods; (3) Using discussion and inquiry; (4) Using the formulation of inquiring questions and making conjectures; (5) Using justification of thinking; (6) Striving to make thinking more transparent in connection with problem-solving, for example by writing; (7) Using problem-solving approach to instruction, making content integration a part of instruction; (8) Using technological tools, including computers and calculators; (9) Promoting the teacher's role as a facilitator, in other words, their role in facilitating learning; (10) Highlighting caring for the students; and (11) Using continuous assessment as part of constructing teaching situations. On the list of best practices, teachers usually find items 1 and 8 easy to understand and have also tried them in practice to at least some extent. On the other hand, items 2–7 and 9–11 are less familiar to many in practical teaching. Most of the less familiar practices concern dialogical competence in interactive situations (Aarnio, Enqvist, Sukuvaara, Kekki and Kokkonen, 2008). Pedagogical activities following the DIANA operating model created for vocational education combine all the best practices on this list (Aarnio & Enqvist, 2002).

All in all, it is currently a precondition for beginning studies and being successful in them that the student finds the content authentic, or relevant to him or her, personally meaningful. Studying must be learner-centred, and it must have a strong association with real life and real world contexts. Such problem-based integrative methods will thus become more prominent than before in which, for example in education in the technical sector, mathematics, science and information technology are naturally embedded in all those content areas with which they are also associated in real life (see, e.g., Furner & Kumar, 2007). One example of integrative implementation of this type of a problem-based learning process is the STEM pedagogical operating method that I devised in HAMK Professional Teacher Education Unit (Kurikka et al., 2010), a key part of which is the TPM cycle (T=Technology, P= Physics, M=Mathematics). The TPM cycle is a kind of extension of the so-

called five-step mathematics cycle (OECD 2003, 38). In the TPM cycle, the initial problem is an interesting real-life technological issue. While the students are solving this problem, they come across various mathematical and scientific contents, which are then brought up and discussed whenever they naturally emerge as the students are working on the initial problem. During an optional module of the Professional Teacher Education Unit and in a group oriented towards the technical field, student teachers put together learning processes in line with the TPM cycle, and the outcomes of the implementations thus created have been encouraging. Item 7 on the aforementioned list of best practices (Zemelman, Daniels and Hyde, 2005) has an interesting link specifically with the TPM cycle in learning mathematical and technical subjects.

Studying math and natural sciences content unavoidably requires a certain amount of effort and hard work from the students. Unfortunately, there is no shortcut to understanding these issues. In her study, Dweck (2007) interestingly points out how the students' ideas of the quality of their intelligence have an impact on how they work and make efforts to learn new and challenging content. The differing attitudes of students toward their own intelligence (either as a fixed trait or as developing) steer both their attitudes and their working methods regarding the content to be studied. Those who believe that their intellectual ability is a fixed trait, are afraid to make an effort, as they feel that intelligence should lead to success on its own accord. They turn down challenges they find difficult, and they may even stop working altogether. Students who believe in the possibility of developing their intelligence, on the other hand, become enthusiastic and have the dedication and persistence to work hard to obtain new skills (Dweck, 2007). In this question, which is crucial for learning, a skilful teacher will highlight the possibility of developing intelligence and reward students for their efforts and persistent work.

Top expertise in a STEM teacher means that he or she manages to encourage students to approach STEM issues. Enthusiastic teachers are influential, and they even have a kind of love for their field. They manage to make the students feel that the learning contents are relevant and meaningful to them. In the spirit of Vygotsky's zone of proximal development (1978), they succeed in helping their students just at the right moment, at the right point, in the right manner, and to the right extent. And finally, they also know how to let go just at the right time, when the students can manage the theme in question on their own. There is a way forward.

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Social media: enriching guidance environments

Sanna Ruhalahti

Digitalised environments based on social networking are part of our everyday life, both as learners and as human beings. These digital-era environments have brought into our lives peerness, ubiquity and the means of exerting influence of a new type. This article discusses social media in the frame of reference of top expertise.

It has been said that social media enhances what you already are. In professional publications in the educational sector, using social media for teaching, guidance and counselling is typically passed over with nothing but a few examples. The field of vocational teaching still has some way to go to a versatile and extensive everyday use of the new media and mobile information networks. Comparing these with the more traditional tools of teaching, guidance and counselling is difficult and challenging. They are a multidimensional technique that allows you to work flexibly wherever you are, a way of being present outside the walls of the classroom and the workshop.

When will skills in using the social media be part of the vocational competence required in the labour market? This is an important and topical question. Skills in using the social media challenge our operating culture and the ways in which we work. It is said that in the future, work will be more transparent than today. Studies indicate that willingness to exchange vocational information is increased by the valuable information and social capital obtained from one's peers, and the fact that these vocational communities have facilitated the joint production and creation of information. It has been observed that acting in a community helps to ensure that the participants have a wide scope of thinking and that they question their own practices (Kajan, Koivisto, Mattila, Pöntiskoski, 2011).

Open online services combine working together, presence, exerting influence and a low threshold of use. To be active in these environments, you do not always have to agree on schedules, and everyone can contribute whatever resources they have. Working and acting together is documented, and

your mailbox is not clogged with constantly updated drafts or an avalanche of messages. Online chat that supports processes and working together provides timely peer support and empowers learning and competence development. Versatile use of the social media also creates interesting and enriching opportunities for coaching and preparation. In this article, I will give a few pointers, but let the personal creativity of each top coach be the limit for the real possibilities of these new applications.

Ubiquitous coaching

"Ubiquitous" is derived from the Latin "ubique", which means 'everywhere'. In other words, this catchphrase says that something is everywhere, but it does not say what. The term "ubiquitous computing" was defined by Mark Weiser at Xerox laboratories in the late 1980s. The aim was to create technology that would always be present and that would be so easy to use that you would not even notice it.

At their best, social media environments and communities offer possibilities for goal-oriented and methodical action. Making use of these environments in guidance and coaching will contribute the following resources to the activities:

- ✓ timeliness
- ✓ flexibility
- ✓ reflectiveness
- ✓ sharing of information in the learning community
- ✓ problem-solving
- ✓ working collectively in a community
- ✓ documentation of processes.

Making use of these empowering qualities of the social media (Figure 1) in professional communities is the foundation of modern development, work and presence.

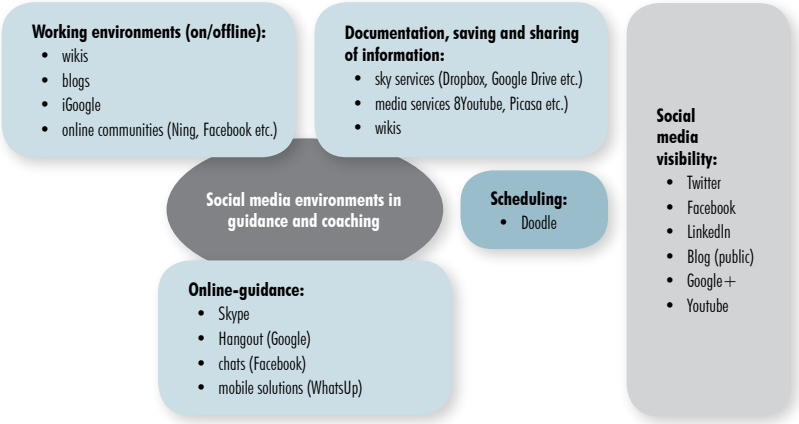

FIGURE 1. Social media applications suitable for guidance

Communal online services and applications are at the core of the social media. As tools, online communities, media services, blogs and wikis are a part of social media use, also in the worlds of learning. Various communities serve as forums for collective development and intelligence, versatile blogs enable new types of competence sharing and reflectivity, and wiki environments also enable process documentation, not forgetting the possibilities of the real-time linkage of versatile media services.

We must also be aware of the fact that learning across information networks is not about taking traditional study to seemingly new environments, but about deeper learning. Deep learning, on the other hand, requires effort. Study guidance is taking on a new meaning, and guidance as something that promotes and supports the learning process should not be overlooked.

New ways of monitoring the learning community's problem-solving or production of cognitive understanding are offered for counsellors. Responsibility for learning cannot be left up to technology in this environment, and learning will always take place through the student's personal action and thinking, as well as through the social interaction that supports them, for example in some of the key formats of the new social media: blogs and communities.

Social media introduces new dimensions to guidance, counselling and coaching; to interaction as well as to publication, networking and learning together. At best, it allows the teacher to support and coach many types of students over multiple channels.

Top experts on Facebook

Facebook, the community service of social media, is a conglomeration of numerous networks, which is said to reach its members almost daily. From the perspective of learning and learning communities, Facebook is very interesting.

A Facebook group: A learning community can be set up by anyone logged on to the community, and moderating it is very easy. The threshold to acting and taking part is often very low. Determining how you can join the group and how public it is can be easily done by using the group settings.

FIGURE 2. On the Facebook pages of the Huiput Kehiin project, members can comment and start discussions on top expertise.

A Facebook page: The page functionality of this service can be used to rapidly get together persons taking part in the same event or occasion. Organisations, information communities and various events can create their own Facebook sites, which usually are usually always public. The pages draw people in and keep them alert with their status updates. The page functionality can, for example, be used to document your own competence by using the page as a portfolio.

Blogging by top experts

Of all social media tools, blogs in their versatility are some of the best applications. Blogs can be used and organised in different ways, and various multimedia material can be linked to them. Multimedia activities are a natural part of documenting, describing, reflecting upon and analysing your own competence. The group may use a shared blog, in which everyone has equal read-

ing, writing and editing rights. In a collective community of this type, each member has his or her own significance and role. One way of using blogs is that the teacher/counsellor has an administrator's blog, while the community members all have their personal blogs (Figure 2).

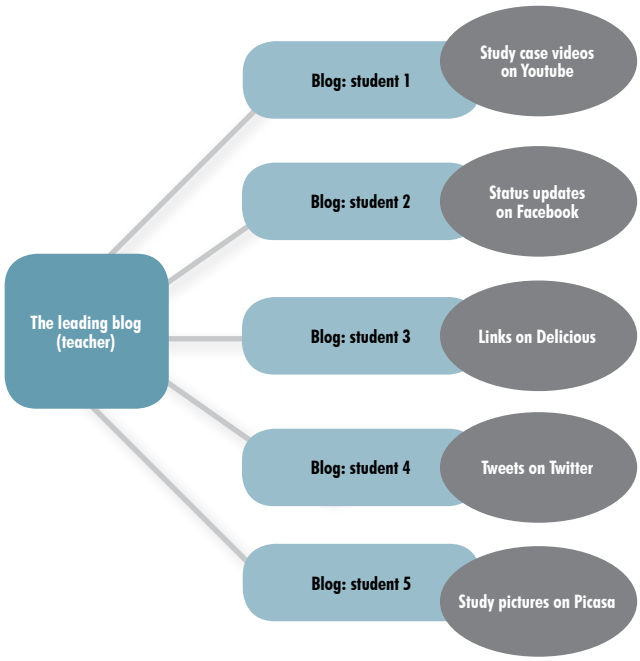

FIGURE 3. Blogs as a learning community

When using blogs, attention should be paid to working communally and providing careful instructions. Reflective work can also be achieved through peer collaboration, and every participant's thinking is expanded as their area of competence develops. Blogs are also highly suitable as working environments for structured teaching and various processes, as they are highly accessible and can thus be used for many activities. In the majority of various blog platforms, the settings allow you to set the publicity status, and in part, they also allow working in private.

Social media visibility

The type of use you make of the various tools is significant in all social media solutions. Accepting social media as part of your work and everyday self will bring the teacher new experiences. However, drawing on the environments the social media offers makes guidance and counselling more interesting for today's actors, both young and slightly older, and it brings add-

more conventional methods. Comparing social media tools with other teaching instruments and environments remains a challenge, as this phenomenon is highly multidimensional. Each teacher must personally weigh these issues, and make their individual personal choices and set their limits on social media visibility.

In order to look ahead, you sometimes also have to look behind you. At best, making guidance, counselling and coaching an everyday part of social media environments is an empowering experience on which you would not wish to miss out. To achieve this, the teacher must work with his or her full personality, and outside the classroom as well.

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Top excellence and learning entrepreneurship

Heikki Hannula

This paper was produced within the YVI project. YVI (2010 – 2013) is a Finnish national interdisciplinary development and research project that aims at developing entrepreneurship education for teacher education, both vocational and general. The project is financed by the ESF and the Finnish National Board of Education.

Introduction

Recent research indicates that entrepreneurship is something that you can learn and grow into, rather than a characteristic you are born with. Both the interest of researchers and the government's strategic intent are pointing in the same direction. While research formerly was mainly interested in characteristics and genomes that favour entrepreneurship, it now increasingly focuses on processes expected to support learning entrepreneurship and personal growth into an entrepreneur (Kyrö, 2001). Government actors, however, have sought to promote entrepreneurship at the international, national, regional and even local level alike. The Green Paper – Entrepreneurship in Europe was published by the European Commission in 2003, and it can be seen as one of the starting points for these efforts. Various countries have gone on to translate the policies set out in this document into various expressions of strategic intent, including government programmes as well as development plans and other publications by ministries of education and culture. A number of projects aiming to promote entrepreneurship and entrepreneurship education have been drafted and implemented on their basis.

As a phenomenon, entrepreneurship means not only external entrepreneurship in the form of independent business activities but also an entrepreneurial attitude. The latter refers to acting in an entrepreneurial spirit both in your tasks at work and in your hobbies and other activities. Organisational entrepreneurship, on the other hand, means that an entrepreneurial attitude is embedded in the organisation's operating culture. Internal entre-

preneurship is linked to the dynamics of the forms of entrepreneurship discussed above, and it finds its expression in their dialogue (Kyrö & Ripatti, 2005, 17–18).

Top excellence, too, can manifest itself not only as working for someone else but also as running your own business. It is also something that you can learn and grow into. It may find its expression both in individual and organisation level activities. The processes associated with both top excellence and entrepreneurship have attracted plenty of attention in recent years. An attempt has also been made to combine these two; this is indicated by the fact that entrepreneurship has been introduced as a new category in competitions where top performers test their skills. In addition, an effort has been made to give a separate score for entrepreneurship when assessing the various categories. Entrepreneurship has also been included as one of the themes of certain seminars and meetings focusing on top excellence.

Characteristics of top performers include advanced vocation-specific skills, natural talent, favourable environmental factors, and motivation for long-term training and development of competence. It is also vital for a top performer to be able to handle feedback from the environment, both at times of success and failure (Nokelainen, 2010). Some of the same and similar attributions are also associated with entrepreneurship (Gibb, 2005). At a general level at least, we can say that while we develop top excellence, we also develop entrepreneurship and vice versa.

Promoting entrepreneurship thus also benefits the development of top excellence, regardless of whether the top performers have ambitions to work as specialists employed by others or if they will draw on their competence and expertise as independent entrepreneurs. A precondition for enterprising always is some type of competitive advantage compared to other companies in the field. For example, this competitive advantage may be based on the enterprise's location or inexpensive price levels. But above all it can be based on unrivalled excellence (Porter, 1985).

Starting points for learning entrepreneurship

Previously, the time following the emergence of entrepreneurial intention has been prioritised in the teaching and planning of entrepreneurship-related learning. Currently, however, the focus is shifting towards the time preceding the intention (Kyrö, Lehtonen & Ristimäki, 2007). Currently, a key task of entrepreneurship education is to offer the students ideas and insights into how they could employ themselves as entrepreneurs, rather than to feed them easily digestible information about setting up a business and running an enterprise. This also entails a completely different pedagogical perspective. Instead of just receiving information the student learns, for example, to tolerate uncertainty and ambiguity (e.g. Kyrö 2006), to spot and capitalize on op-

portunities (e.g. Shane & Venkataraman, 2000) and to act in various networks (e.g. Saraswathy 2008).

According to Kyrö (2001), learning entrepreneurship comprises understanding an individual as a unique, risk-taking, creative and innovative, free and responsible actor. In other words, the starting point is the individual, who still acts as part of the community around him/her and interacts with it. He/she seeks for possibilities in his/her environment and strives to exploit the opportunities that offer themselves. Seizing opportunities is always more or less fraught with the risk that things will not go the way you would like. As an offset for the freedom, entrepreneurship is always associated with responsibility for the consequences of your actions and choices.

The level of construction of learning we strive for also plays a role. Koiranen & Ruohotie (1995) applied the taxonomy describing individual differences of construction developed by Snow, Corno & Jackson to learning entrepreneurship. The learner is the subject of his/her own learning, and he/she must have the ability to mirror the learning experiences on his/her current constructions (knowledge structures). To understand learning, we can distinguish the learner's cognitive, affective and conative structures, all of which support a professional performance and thus also learning this performance.

Affective structures describe the learner's temperament and emotional level. The key features in the affective area are characteristics, mentality, general and specific personality factors, values and attitudes. When learning entrepreneurship, it would thus be important to support such aspects in the learner as the energy born from emotion, belief in what you are doing, empowerment, commitment, feeling of freedom and trust.

In the conative area, the starting points are the learner's motivation and will. These are in particular visible as achievement orientation, control of actions (self-regulation), orientation to oneself and others, career orientations, personal styles and objects of interest. The learner's motivation thus is a must in learning entrepreneurship. Motivation is a state of alertness in the actor that makes him/her act in a certain way. It also determines the direction of the action (Koiranen & Ruohotie, 2001). The conative area thus offers perhaps the most potent possibilities for learning entrepreneurship (Kyrö, 2006).

In the cognitive area, we can mainly distinguish between the learner's procedural or skills-related knowledge, and declarative knowledge associated with mastering factual information. Both of these are connected to general and specific intelligence-related factors and the learner's beliefs (Koiranen and Ruohotie, 2001). Entrepreneurship necessitates a variety of skills and knowledge, some of which are shared by all entrepreneurs. Some are determined by such factors as the operating sector or the size range of the business. However, learning entrepreneurship is not just about learning knowledge and skills but a highly versatile and multidimensional process in which

the learner's ability to control his/her own learning and actions, or self-regulation and ability to self-regulate, are a significant part of the learning process (Kyrö, 2006).

Promotion of learning entrepreneurship in vocational education

Entrepreneurship is part of all Finnish vocational upper secondary qualifications. It is also included in all qualification requirements, as entrepreneurship studies account for at least five credits in all modules. The students can also take entrepreneurship and/or entrepreneurial activities as optional studies. Entrepreneurship is also part of further and specialist vocational qualifications taken as adult education, as the students must demonstrate entrepreneurial skills in the examination. While the universities of applied sciences prepare their own curricula independently, they, too, have included a great number of entrepreneurship related outcomes in the strategy documents that direct their activities (Hannula, Seikkula-Leino & Lepistö, 2011).

When we look at learning entrepreneurship, we should be clear about what we wish the students to learn. We may wish them to learn a) about entrepreneurship, b) for entrepreneurship or c) through entrepreneurship (Scott et al. 1998.) Information about entrepreneurship can for example be communicated by directing the students to read selected articles in the press or books, or on the Internet. More interesting concepts, however, are learning for entrepreneurship, which can be developed through such activities as simulations and practice enterprises, and learning through entrepreneurship, which can in particular take place by acting in an entrepreneurial spirit or even as an entrepreneur. Learning through entrepreneurship requires authentic learning environments in which the students act in an entrepreneurial spirit and as entrepreneurs. Through these methods, the students can also learn affective and conative constructions that are meaningful for entrepreneurship.

In secondary education, vocational learning is to a great extent functional, and links to workplace contexts are strong, for example through on-the-job learning and demonstrations of vocational skill. This makes analysing all links to entrepreneurship rather challenging. In work-oriented learning environments and pedagogical solutions, entrepreneurship is often included as a given (Järvi, 2013, 19 – 20).

For example, Junior Achievement Young Enterprise activities offer interesting opportunities. This is an international educational model for entrepreneurship, the key products of which are the Company Programme and the 24h camp. In the Company Programme concept the students, supported by a minor capital investment, produce goods or services that customers are prepared to pay for. The activities involve a certain risk, but as the companies to be establish normally are rather labour-intensive and no major capital investments are required, the risks typically are very minor. On the 24h camp, the students learn to plan and work together. They are usually tasked to plan en-

terprise activities in teams. The entrepreneurship category in Professional Skills competitions also simulates these activities.

Along with the socio-constructivist ideas of learning, learning has increasingly been taken to authentic learning environments, or the workplaces. In Finland, the model of entrepreneurial on-the-job learning (the TOY model) is an interesting possibility of promoting entrepreneurship. In this model, a vocational student can complete an on-the-job learning module that is part of his/her studies, or a part of it, by acting as an entrepreneur. The practice company activities are an international model where the students manage an enterprise, while a tutor and the FINPEC, which coordinates practice enterprise activities in Finland, offer various impulses to support learning and, if necessary, act in various roles as the stakeholders of the practice company.

Learning support models at universities of applied sciences include Proacademy at Tampere University of Applied Sciences and Tiimiakatemia at Jyväskylä University of Applied Sciences. Their key idea is that learning takes place in genuine enterprises set up by student teams. The students are given learning tasks that aim to develop their enterprises, and as they work on these assignments, they acquire the information they need. Communal sharing of information and reflection also play a central role. In recent years, many other universities of applied sciences have also developed their own models that support learning entrepreneurship, and it thus appears that plenty of activity is on-going in this area. This also is the aim stated by the Finnish Ministry of Education and Culture in its publication Korkeakoulupohjaisen yrittäjyyden edistäminen (Promoting entrepreneurship at the third level) (2009).

The national YVI project implemented in 2010 – 2013 aimed at developing entrepreneurship education in teacher education. This way, an effort was made to support the activities of organisations engaged in teacher education to better embrace the objectives of entrepreneurship education. The YVI learning environment developed by this project is, however, meant as a resource for all Finnish teachers. The learning environment offers a wide range of both information and links in a well-structured format. Its purpose is to support the networking of not only teachers and students but also of organisations that support entrepreneurship and entrepreneurship education. The organisations of entrepreneurs and business life have also been closely involved in this project.

In other words, plenty of diverse efforts have already been made to promote entrepreneurship and entrepreneurship education. This does not mean, however, that no further work is needed. On the contrary; while the networking cooperation discussed above, for example, is off to a good start, the opportunities it offers for developing both entrepreneurship and top excellence are only in their initial stages. Another great challenge is associated with the organisation of teaching aiming at entrepreneurship and top excellence. These are only too often perceived as the activity of some small circle,

and anything to do with these issues is passed on to this circle as the first preference. However, they should be part of each vocational teacher's core competence. Each vocational teacher encounters both potential top performers and entrepreneurs in his or her work. It is also part of the core competence of each vocational teacher to be able to support the strengths of their students, whether they point to top excellence, entrepreneurship or something else. On the other hand, all students are entitled to an opportunity to achieve these goals. A vocational teacher has every possibility to support the success of his or her students, and entrepreneurship and top excellence are part of it.

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Learning by teaching

Markku Kuivalahti

It is often said that teaching others is the best way to learn. This argument has also been put into figures by claiming that you learn 10% of what you read, 20% of what you hear, 30% of what you see, 70% of what you discuss, 80% of what you experience and as much as 95% of what you have taught to others. On what is this conclusion based? Could it offer a basis for a pedagogical model?

In IT, learning by teaching has been applied to software testing. It is easy for a software coder to become blind to his or her own work and any errors in it. If the programmer reads the code and explains it aloud to another person, it is much easier for him or her to detect any mistakes and shortcomings. It is not even necessary for the listener to understand everything about the program. His or her presence alone is enough to make the blind spots visible.

Using peer teachers is an old didactic method, which historically was in particular resorted to in order to make up for meagre teaching resources. More competent students were made teach, or at least guide, those with less advanced skills. Learning by teaching is not the same as giving a paper or a lecture. On the other hand, learning by teaching can also be applied on a smaller scale as a team work technique. This is referred to as reciprocal teaching, distributed expertise or the jigsaw method.

In the role of a teacher, the student is able to influence what is being taught and how the teaching is arranged in practice. In other words, the student genuinely acts as a teacher. The student does not work alone, however, as he/she is constantly tutored by a supervising teacher.

In the role of the teacher, you can analyse the issue to be taught from a variety of angles as you seek answers to the following questions:

- ✓ what am I teaching
- ✓ how am I teaching
- ✓ what are the targeted learning outcomes
- ✓ what are the criteria for competence
- ✓ how can I make my teaching student-centred
- ✓ what pedagogical models and methods could I use
- ✓ how will these models and methods promote learning
- ✓ how can I motivate my students to work for their learning
- ✓ how can I draw on the students' strengths in the teaching
- ✓ how can I take individuals and their different learning strategies into account in my teaching
- ✓ what type of material will I use to support learning
- ✓ what kind of learning environments will I use
- ✓ how will I give feedback
- ✓ how can I link theory to practice.

Few studies can be found in the reference literature on how learning by teaching can be put to practice. In the 1980s, Frenchman Jean-Pol Martin (2007) started developing the pedagogical model that in Germany is known as Lernen durch Lehren (LdL). In particular, Martin applied his method to the teaching of foreign languages.

In accordance to the socio-constructivist idea of learning we learn the best when we can personally construct information structures on the basis of knowledge that we have acquired earlier. (Tynjälä, 1999.) According to Vygotsky (1982) we all have our individual zones of proximal development, which expand as we learn something new. The goal of our cognitive development is socialisation; in other words, an individual's knowledge is constructed in social relations.

Each student can be seen as a resource for learning. Especially in adult education, it is usual that the students have decades of experience of studying

and working, and it would make sense to draw on this experience in teaching. Even if the students lack in-depth knowledge of the theme to be studied or pedagogy, reflecting previously acquired knowledge and skills on a new theme will enable interdisciplinary cross-pollination.

Individual learning in a group

At its best, socio-constructivism is about genuine interaction and dialogue between the students. ”Dialogically constructing an overall image means that during the discussions and knowledge creation, we listen carefully to everybody's ideas” (Aarnio, 2013). Supporting the individual learning process by means of social interaction works particularly well in adult education, but it is worthwhile also practising this learning process in the education of young people.

The efficiency and depth of learning depend on the extent to which the students are interested in the learning assignment as well as motivated to study the associated phenomena from their own perspectives and create a shared understanding of the issue by means of dialogue. The best results are obtained when the student can personally select the theme that he or she starts examining. The risk is that the student learns one aspect well but looses interest and fails to take part in the construction of others. If there is no joint debriefing regarding the learning outcomes, the student will remain a teacher to him/herself only.

When learning takes place in a specialist group, many bridges are built between theoretical information and practical work. This will produce more intensive learning experiences and practical in-depth knowledge. What has been learnt formally, informally and non-formally is merged and cumulated through joint processing.

The level of coherence within the group has a direct impact on the end results. If a good chemistry and genuine cohesion exist between the group members, they will spur each other to good achievements. The patterns of participation behaviour displayed by group members can be classified following the old nursery rhyme: tinker, tailor, soldier, sailor, beggar man. The soldier leads the activities, the sailor tries to get everyone to pull together, the tailor is a silent worker, the beggar man reaps the benefits of work done by others and the tinker is a seemingly active fusspot. (Kuivalahti 1999, 127.) A well-functioning group should consist of a soldier and a sailor, and preferably several tailors. Beggar men and tinkers can be taught to become productive members by means of group discipline and dynamics.

Examples of students acting as teachers

In the mid-1990s, Bachelor's degree studies in IT included a course titled Instructor training. We decided to really challenge the students. Working in pairs, the students immersed themselves in a certain module of the Computer Driving Licence examination, prepared a curriculum for it, provided the training as evening and weekend classes and, finally, assessed the competence of their students. The students were adults who needed IT skills in their jobs. A qualified tutor teacher approved the curricula, supervised the teaching and gave feedback on it. A small participation fee was collected, and the money was used to support teaching. The experiences were extremely positive. The activities were authentic and motivational. A pair of students had an average of 15 students at a time. They took turns teaching and going around the class instructing their students. The customers, too, were happy with the efficient learning method.

In 2011 – 2012, we used learning by teaching in professional teacher education provided by HAMK. This experiment was part of an entrepreneur training project (YVI) led by the University of Turku. (YVI 2013.) Nearly 50 students from regional groups in Lahti area took part in the experiment. The average age of the teacher students was 40 years, and their educational background varied from a vocational qualification to a doctorate. Most of them worked as teachers, but they had no pedagogical qualifications. Some of the participants worked in training tasks in business life. The majority of the teachers worked in vocational upper secondary education, while some were engaged in adult education or universities of applied sciences. The total work experience of the group at large was some 1,000 person-years. This was an excellent backdrop and made it possible to draw on the students' strengths in the teaching.

We decided to apply problem-based learning (PBL). Based on their personal interests, we divided the students into expert groups of nine. Each group was responsible for teaching a single course that was part of the teacher education including planning, implementation and assessment. The work was based on the teacher education curricular (OPS), which contained a description of the content, learning outcomes and materials for each course. The scope of the theme taught by each group was five credits.

In the planning, PBL tutorial sessions were used, in which the supervising teacher acted as a tutor. We saved all minutes, plans and other material on the Moodle platform of the course, which all participants could access in the role of a teacher. The implementation of each course was usually based on two persons being responsible for the teaching during one contact teaching day. However, the entire group was involved in planning the content and learning assignments and assessing the learning outcomes.

In the beginning, resistance to change could be detected in some students. They would have preferred to learn in the traditional manner, with an expert giving them lectures based on the latest pedagogical theories. "How do we

know that we are teaching the right things in the right way?" was a common question. According to Kyrö (2006), this is a natural stage in learning to cope with risks. In the process model for learning to cope with risks, preparedness for learning to live with risks is achieved through the stages of confusion and action. Learning to cope with risks takes place by acting alone and together. The initial confusion is replaced by experiences of success.

Excellent feedback has always been received from students on teacher education, and we now anticipated severe criticism. Our shared journey of 18 months had shown, however, that having the students acting as peer teachers was a good choice. We accumulated a wide range of learning experiences, and the teacher-students had an opportunity to practice authentic teaching while still students. The average scores of the feedback even exceeded the averages for reference groups that received traditional teaching.

Principles of the pedagogical model of learning by teaching

Learning by Teaching (Lernen durch Lehren (LdL)) is a pedagogical model where the student genuinely takes on the role of a teacher. The group size used in Lahti (nine members) turned out to be too large. The students should be divided into expert groups of four. Each group is tasked to teach a single, limited module to their peers. The principles of progressive inquiry, such as problem-based learning (PBL), are well suited for planning the activities. Problem-based learning is a well-structured pedagogical model that comes with thorough instructions.

As a trigger can be used the learning outcome and content description of the theme to be taught and the competence criteria in the curriculum. Learning takes place both as individual work and collectively in group sessions (tutorials). A chairperson, a secretary and an observer are selected for the session. These roles are rotated from one session to another. The supervising teacher attends the sessions in the background as a silent adviser, a tutor. He or she always gives feedback at the end of the session and provides guidance for future work. (Poikela, 2002.)

In the first tutorial, all knowledge that the students already have on the theme is collected. The best way of doing this is a brain-storming session, in which the group members write all concepts relevant to the theme that they are familiar with on sticky notes. The terms are then grouped and structured around themes. From these themes, the group's shared learning task is derived. Each group member selects a theme that is of interest to him/her and finds more information about it during the following distance learning period.

In the second tutorial session, each member presents the new information about the theme they have discovered, thus deepening and expanding the shared knowledge of the group. The number of these sessions may be be-

tween two and five, depending on how demanding and extensive the subject is. The end result is an implementation plan for the theme to be taught. The group will follow this plan when teaching the theme to their peers, using the selected teaching, instruction and assessment methods. The task of the tutor teacher is to monitor the group's work and to give advice as necessary. The tutor should, however, avoid forcing his/her personal opinions on the group members and offering ready-made solutions. In order for the learning to be effective, the students should have as free hands as possible.

Learning by teaching results in many types of peripheral learning. Transferring the decision-making power to the students while providing them with guidance gives them more responsibility and improves their commitment and motivation. Positive experiences as a teacher will build up their self-confidence. Their skills in public speaking will develop as the student stands in front of the classroom and realises that he/she can cope. Teaching in pairs will help quiet and shy students to progress. Healthy pedagogical competition will emerge between the groups regarding the implementation. Teaching will become enriched, experience-based and diverse. The students will learn to search for information critically as they compare the sources they find. In addition to the theme to be taught, the students will learn about practical pedagogy and didactics.

Learning by teaching as part of coaching top performers

Learning by teaching should also be tried as part of coaching for vocational skills competitions. The trainee is forced to structure and analyse his or her theme from many angles when preparing to teach his/her peers. All students will thus benefit from top level coaching, which otherwise would be the privilege of few. Peer groups can be useful for demonstrating and practising for future competition tasks.

This type of peer activities are particularly well suited for producing innovations. New and different solutions for the competition tasks can be developed by the students. On the other hand, the trainee assuming the role of a teacher will get deeper into the tasks as his or her fellow students take part in solving them under his/her leadership.

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Closing words

This book makes visible the work carried out by the HAMK Professional Teacher Education Unit and its cooperation networks to develop vocational top expertise. The book is intended for all those interested in developing vocational competence and vocational education and training in educational institutions and companies alike. The issues are examined from the viewpoint of young people's professional growth into top experts.

Each article contributes a vital perspective on developing top expertise. The authors of the articles, Principal Lecturers and Senior Lecturers at the HAMK Professional Teacher Education Unit, expound in this book in a unique way on their experiences in professional teacher education and the results of studies they have conducted in their individual areas of expertise. The aims of the publication also include disseminating the results of these development and research projects.

Developing top expertise is examined at the levels of the individual, the operating environment and the methods. The shared theoretical frame of reference for the articles is the definition of a top expert formulated by Professor Petri Nokelainen: "A vocational top expert is a person who, in addition to vocation-specific skills that have reached an autonomous level, also has natural talent, favourable environmental factors, and a willingness for long-term participation in goal-oriented and guided coaching that seeks to develop the optimal exploitation of mental resources through regulating intrapersonal properties."

Editing this book has been one of the highlights of my career as Principal Lecturer. In my role as editor, I have also learnt something new about developing vocational top expertise. I also believe that other readers will gain new ideas for supporting the professional growth of young top experts. I hope that the articles will inspire the reader to also get acquainted with the sources of additional information listed at the end of the articles.

Hopefully, this publication will also help fuel the discussion about how we can best recognize potential top experts, guide and encourage their growth, build learning environments that support the development of top expertise, and apply guidance and counselling methods that optimally support the development of top expertise.

I would like to extend my warmest thanks to the authors for embracing this project with such enthusiasm. Thanks are also due to Seija Mahlamäki-Kultanen, Director of the Professional Teacher Education Unit, and Research Director Martti Majuri for the support I received while editing this book. Equally, I would like to thank Service Coordinator Sara Kaloinen for the graphic design of the book, and Matleena Jokinen for its layout.

Hämeenlinna, 23 April 2013

Tuomas Eerola
Editor

Developing Excellence in Skills - Programme for VET Teachers and Trainers

HAMK Skills Trainers' Academy at HAMK University of Applied Sciences, Vocational Teacher Education Unit offers training for high-level skills trainers and competition specialists. HAMK Skills Trainers´ Academy improves the quality and attraction of VET, the competence of VET teachers and trainers and also the national and international collaboration between VET institutions and the world of work.

HAMK Skills Trainers' Academy offers three training modules (A, B and C) to develop excellence in skills:

Modules	Content / Themes	ECTS*
A Orientation level	**Orientation to the Development of Excellence in Skills** Vocational Education and Training in Finland LIL (Learning and Improving Learning) Emotional Intelligence Skills - the Crucial Success Factor in Vocational Coaching Research Point of View - the Profile of Vocational Excellence	6
B Organisational level	**Development Project of Excellence in Skills** Benchmarking: Benchmarking of Finnish Education System and Skills Competition System, Competition Specialist Training in Finland, Improving Assessment Tools Consulting: Consulting and Mentoring to Support Client Organisation's Development Project	This module can be also conducted using the ECTS credits.
C Personal level	**Excursion or on-the-job learning period in Finland** Excursion to the Finnish National Skills Competition Finals or On-the-job Learning Period in a Finnish Organisation	This module can be also conducted using the ECTS credits.

* ECTS (European Credit Transfer and Accumulation System)

The target group of the training modules:

VET teachers and trainers, managers in vocational institutions, workplace instructors and people working in personnel development in companies or in vocational institutions.

Implementation:

The module A will be carried out as web-based studies. The module B includes benchmarking, consulting and web-based studies. The module C consists of journey to Finland and a written report.

HAMK UNIVERSITY OF APPLIED SCIENCES
Vocational Teacher Education Unit

Skills trainers'academy

Module A: Orientation to the Development of Excellence in Skills (6 ECTS)

The aims and content of the training module:

The participants get acquainted with the development of excellence in skills and the Finnish way of developing excellence in skills.

The execution plan of the training module:

Themes

The module consists of the following themes which are divided into four phases:

1. Vocational education and training in Finland
2. Learning and improving learning
   - Learning: How do I learn? What is learning?
   - Improving learning: What is improving learning?
   - Growth of expertise: What is expertise? How does expertise develop in rapidly changing working life?
   - Web-based learning environment
3. Emotional intelligence skills - the crucial success factor in vocational coaching
4. Research point of view: The profile of vocational excellence

Implementation

This module will be carried out as web-based studies in four phases:

1. Students read written materials under the guidance of the teacher.
2. Students read materials which are available online and have a group discussion about learning and improving learning under the guidance of the teacher. The objective of the group discussion is to find answers to the above questions.
3. Students read 1-2 books and share their own good practices and experiences about the theme to the other students and teacher. Students discuss about these practices under the guidance of the teacher.
4. Students acquaint themselves with research reports and write an essay about how to apply the research results into practice.

The learning environment for this learning module is Moodle platform and the web tools to be used are discussion forums, wiki tools, task tools and quiz tools.

Learning materials

Bransford, J., Brown, A. & Cocking, R. 1999. How people learn: Brain, Mind, Experience and School.

Goleman, D. 1999. Working with emotional intelligence.

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Ireson, J. 2008. Learners, learning and educational activity.

Kaloinen, S., Pynnönen, P. & Saarinen, H. (ed.) 2010. Competitions for everyone.

Koli, H. & Silander, P. 2003. Designing and guiding an effective learning process.

Saarinen, H. & Eerola, T. (ed.) 2007. WorldSkills 2005 Helsinki - World Championship Competition in Vocational Skills.

Research reports

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www.hamk.fi/skills www.hamk.fi/aokk/en

Module B: Development Project of Excellence in Skills (6 ECTS)

The aims and content of the training module:

The participants get ideas and tools to develop excellence in skills.

The execution plan of the training module:

Content

HAMK Skills Trainers' Academy acts as a development partner and supports the client organisation's development activities. The training module is based on client organisation's development project and the module will be tailored together with the client organisation. The purpose of this training module is to improve vocational education and training, including vocational special needs education and training, and to activate or support the national skills competition system.

Optional content for the learning module:

1. Benchmarking

- Benchmarking of Finnish education system and skills competition system, and comparing it with one's own national system.
- Competition specialist training in Finland
- Improving assessment tools

2. Consulting

- Consulting and mentoring: guidance with web-tools to support customer organisation's development project

Implementation

This module will be carried out by offering consulting at the location of the client in one or more periods. The duration of the consulting period can be 1-2 weeks. The consulting process can be supported by using web-tools. The content of the learning module, the scheduling and execution phases will be negotiated with the client organisation.

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www.hamk.fi/skills www.hamk.fi/aokk/en

Module C: Excursion or on-the-job learning period in Finland (2-6 ECTS)

The aims and content of the training module:

The participants get personal experiences in Finnish national skills competitions Taitaja, Taitaja9 and TaitajaPLUS or in Finnish on-the-job learning.

The execution plan of the training module:

Excursion

VET teacher or trainer visits Finnish national skills competition Taitaja which is the largest annual vocational training event for young VET students organised in Finland. Taitaja is organised every spring and the finals takes 3 days. In the finals, over 350 participants compete for the Finnish championships in about 40 skills. In addition, there are also other events in the competition, like skills shows, try a trade opportunities, an educational fair and various conferences. The excursion gives a good opportunity to share experiences and to acquire new ideas. The duration of the excursion is one week and the module includes a written report.

HAMK Skills Trainers' Academy

- offers background information about Finland and Finnish culture
- organizes appointments and visits in Finnish institutions
- organizes VIP tours at competition venue
- gives a presentation about developing excellence in skills and competition specialist training
- gives feedback for the written report

On-the-job learning period

Teacher or trainer takes a part in on-the-job learning period in an organisation in Finland. The duration of the period is 3 weeks and the module includes a written execution plan and a report. On-the-job learning period is a good way for teacher or trainer to exploit and develop skills in vocational teaching and training.

HAMK Skills Trainers' Academy

- organizes the place for on-the-job learning period
- offers background information about on-the-job learning period in Internet
- offers information about Finland and Finnish working culture
- acts as a mentor for teacher or trainer during the on-the-job learning period

Contact us for further information!

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