

Chapter 6

TVET and ICT Acquisition Process

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The terms ‘information society’ and ‘knowledge society’ do not reflect any more the essence of the modern society which, through the increasing use of the social media and networking, is becoming more and more social and communitarian. This trend is global in nature.

The development from the knowledge society to social society is accelerating. We find daily new ways to find and create new or updated information. These new mind-expanding methods, tools and ways of collaboration are demanding us to change and develop the educational traditions. The computing is getting more and more part of the daily life outside the school. Social networks, cloud computing and connectivity are the keywords of today. The young generation is very familiar to create, collaborate and communicate in the Internet. These are the skills needed also in the industrial and business life.

The major change in approaching the ICT skills acquisition process today is that learning – especially by the utilisation of enabling technology – instead of separating ICT training to institutions and curriculum, it can be seen as permanent part of work and lifelong learning. Since the learning and work environment is constantly changing, the need of ICT support personnel is vital.

Today, vocational education plays a crucial role in the social and economic development of a nation. The emphasis on specific objectives and tasks, however, varies from country to country. Accordingly, the organisation and administration of vocational education is based on different models. It can be incorporated at the secondary or post-secondary level, and it can be combined with an apprenticeship or be followed up with further training. Increasingly, vocational education can be recognised in terms of prior learning and assigned with partial academic credit towards tertiary education. The skills and competences necessary can be acquired either in workplaces or in vocational schools, and most often, a combination of both

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are used. Vocational education is usually overseen and/or regulated by the Ministry of Education, the Ministry of Labour, or by relevant sectoral ministries.

Managing work in which responsibilities have been distributed to a high degree is a major challenge. The communication between employees and their managers may be based only on virtual contacts. In short-term assignments and in mobile work, it is difficult to update and upgrade one's competences. This would, however, be crucial to the future employability of knowledge workers. On the other hand, it is difficult for managers to support continuous learning of individual employees and to emphasise shared learning of all employees in the network of a team or an organisation. There is a growing need for flexible structures and practices that facilitate lifelong learning (Varis 2011).

Learning at work and Web-based social software have an increasingly important role in competence development. The requirements of speed and possibilities of virtual work have emphasised the emergence of new business models, such as open source. Instead of strictly protecting the development work up to the launch of a product or service, the idea or project is openly discussed and collectively developed from an early stage on the Internet. Based on open source, anyone can contribute an idea or provide improvements to the project in order to benefit the total development. The development resources can thus be multiplied.

Transforming Boundaries

The current transformation also penetrates boundaries that emerged and were shaped by the forces of the previous techno-economic paradigm. One of the most important of these boundaries is the one that separated industrialised countries from developing countries. The global knowledge-based economy slices geographical regions in new ways, where national borders have decreasing relevance. Instead of geographical proximity or local availability of resources, the underlying organising principle is based on global networks.

The distinction between developing countries and developed countries is therefore becoming increasingly misleading. This change can now readily be seen, for example, in countries such as the Republic of Korea, India and the People's Republic of China (PRC), where regional hubs connect with global production networks. A similar reorganisation can also be seen in the leading industrialised countries, where geographic specialisation is now essentially based on diversification in the context of global systems of production.

ICT literacy and numeracy are vital for TVET. The health and safety of workers often depend upon their ability to read instructions (e.g. on fertiliser bags) and to make accurate calculations (e.g. of mixing ratios and application levels). The wider skills of scientific and social literacy are also important, for example, for equipment maintenance and repair, understanding technological change (scientific literacy), group work, dialogue and negotiation with colleagues and supervisors, gender and ethnic tolerance and other skills needed to build harmonious relations in the

workplace (social literacy). The application of such literacies to the world of work and active citizenship need to become core dimensions of vocational education if it is to respond to the imperatives of social sustainability.

The usage of the terms ‘skills’ and ‘competences’ is inconsistent. Skill is sometimes seen as representing only lower-order attributes (e.g. keyboard skills), but most often as including also higher-order attributes (like thinking skills). Competence is often construed as the application of skills in specific contexts, but also as synonymous with skill.

Workers face two overlapping challenges. The first is to acquire the skills necessary to enter an increasingly digital and competitive job market, and the second is to continually improve those skills and learn new ones as a part of their lifelong learning. Many studies suggest that workers around the world are not able to sustain this pace, and it is widely believed that schools are failing to keep providing employees who are adequately prepared to exploit new knowledge and skills. Considering that the first skill to be acquired in the working life is bridging information gaps, there is a wide consensus that all workers should be able to:

- Master appropriate tools to gather information
- Understand the context of that information
- Shape and distribute information in ways that make it understandable and useful
- Exchange ideas, opinions, questions and experiences

The paradigm of learning in the corporate setting is rapidly shifting from skills development to capability management. The strongest factors driving this change are the ever-increasing need for faster innovation cycles and for abilities to support a strategic competence renewal. The current learning paradigm can be expressed as the 70-20-10 formula of learning:

- 70% of workers’ capabilities are built through on-the-job development and real-life experiences.
- 20% are built through coaching, assessments and increased self-awareness.
- 10% are acquired through structured learning deliveries, such as instructor-led trainings and e-Learning.

Learners will soon realise that, once they adopt this formula, each day will be a learning day (Salminen 2005). The need to separately plan times for learning and for work will disappear; learning will be incorporated into the daily work routine. Basically, what this formula requires is developing the right mindset for learning rather than making choices between learning events and modes of delivery. There will always be room for skills-based competency development. Certain enabling skills will continue to be delivered in a classroom, not to mention those that are acquired via interactive leadership development, where discussions and networking play a major role. In a similar fashion, e-Learning is here to stay as an easily scalable and cost-efficient delivery channel for theoretical solutions.

As a new working culture emphasises the importance of lifelong learning, corporations are beginning to provide workers with means to customise and direct their own learning experiences. There is still a long road to travel in terms of improving employment opportunities for individuals and expanding the innovative

capabilities of companies; however, workers, employers and trainers are all becoming more responsible in trying to ensure the continuous development of the knowledge and skills acquired.

The traditional focus of vocational education on skills needed for manual work is being challenged by the mixture of competencies required in the workplace today. Many traditional forms of work are undergoing major changes, and as a result the division between manual and mental work is vanishing. Sustainable vocational education should concern and affect both manual and mental competencies.

New Pattern of in Service Training

The teachers in service training in ICT have been in many cases pumping the info and the skills to teachers' memory. The scope has been to train the teachers to be experts on software skills or methods. The problem has been that the teachers cannot attend the training continually. There can be gaps of years between one teacher's in-service training sessions:

- Traditionally defined courseware is not an effective e-Learning strategy
- E-Learning ware is more related to pedagogy than an actual product
- It emphasises computer-mediated communication and is student centred
- Teacher's/trainer's responsibility of the learning process
- Discussion groups, chat, blogs, wikis, webinars
- Tools available through open source
- Demand for students' self-directness

Smart Training for the Smart Society

The problem of teachers' in-service training has always been the shortage of training time. The short training courses are fulfilled content, which the teachers then try to implement to their work. But too much is too much. The paradigm of teachers' in-service training has three main components. Firstly, teachers need to learn the virtual learning skills, and, secondly, the training has very small chunks, which the teachers can try out at their work right after the training session.

The third component is to share the experience by teachers instructions, narrative stories of the processes or by cross evaluations of the results of the experiences. The training model contains six training sessions. The first three 2–4 h sessions are face-to-face sessions. On these sessions, the basic skills of new pedagogies, the new learning environments and social media skills are trained. Each face-to-face (f2) training has three components:

- Basic training of the skills
- Ideas how to use learned skills to teachers' own curriculum (daily work)
- Personal implementation plan of one new learning method

Each 2f training session has cross evaluation and experience sharing part, when all the good and bad experiences of the try-outs will be shared. This is a powerful method because humans learn from mistakes, so to make a mistake is a gift.

On the first phase of the training, the virtual meeting room is presented, practised and learned. The second phase of the training jumps in the Internet. That means no travelling any more but participating to the trainings in the virtual meeting room. The next three sessions will contain and concentrate on the activation models of the learners and the concrete outcomes of the learners, which the teachers then can use in their evaluation process. These sessions are kept in the virtual meeting room and will be recorded. The recordings can then be used afterwards, for example, hands-on manuals. The trainees are also encouraged to create short instructions to learners and colleagues.

During the second phase of training, the trainees will also plan a peer training plan for their 5–10 colleagues. These plans are cross evaluated by the trainees and then executed by each trainee in their own school. These experiences will also be documented to support the training processes.

The third phase of the training process is to train the colleagues. For each trained trainer, there will be one group of 5–10 trainees. The training itself contains three sessions. The sessions are short 2–4 h.

In the first session, the trainer presents her/his case study, which were done in the training. With this example of practical experience, the trainees will then start to plan how to implement similar skills to their own class or personal curriculum. Also the virtual meeting room is presented and explored.

The second session is for cross evaluation of the plans. In the session, all the trainees will present their plans and discuss and develop them for the practical experience. The virtual meeting room skills are strengthened. After the second session, the trainees will execute a pilot of their plan in the real classroom work. After the pilot, the trainees will write a short report as a teachers guide for colleagues.

The third session will happen in the virtual meeting room, where all the trainees will participate and present their experiences from the pilot. Sharing the experiences and good practices, the training will continue. The key idea is that the trainees will commit themselves to the training process for at least 2 years or, for example, in four training sessions.

After the basic training, the trainers and trainees can take the next level of the courses together supporting each other. The next level trainings include different subjects and disciplines pedagogical, didactical and ICT practices.

This model has been developed in the Central Finland region and has spread all over the country. The model is very simple to localise and implement in different teaching and learning cultures and all the curriculums.

In brief, the evolution of *ICT literacy* in different regions has developed in the following stages:

Stage 1: Building access and connectivity

Stage 2: Introducing basic Internet use as well as more sophisticated and sustainable digital competences

Stage 3: Developing trust, confidence and multiplatform use. Using social media for problem-solving, cooperation and community building

The world of work is facing similar challenges everywhere on the globe. New possibilities of using ICTs in education and training will improve workers' chances to get vocational qualifications. The development of the educational structure will also bring changes: the need of face-to-face training can be reduced, the training material can be reused numerous times and it can also be updated easily. Formal vocational education is becoming more integrated into everyday working life. Vocational qualifications are nowadays increasingly measured by competence tests. Also, competence-based qualifications have a great role in the in-service training of employees.

Recent trends in ICTs and TVET put emphasis on the innovation strategy for education and training. Attention is given to skills and needs used by modern firms, working population, and also in arts and science education. In TVET, there is a tendency to highlight the 'learning by doing' approach. Today, managing work in which responsibilities have been distributed to a high degree among the network of workers is a major challenge. Communication between employees and their managers may be based only on virtual contacts. As a consequence, the demand for TVET is increasing, and education and learning are adopting new forms. The challenges of vocational education are quite similar in countries that vary widely in their current economic level of development. Entrepreneurship, which is closely connected with ICTs, is a very important factor in both the global and local economies.

The nature of TVET in the emerging global social and communitarian society can be classified in knowledge work, service work and technical work. New skills and competences in different fields can be acquired both in small modules and lifelong learning environments by using open educational resources (OER) and through cooperation with the industry and SMMEs. Instead of being limited to traditional testing, skills can be evaluated through product demonstrations and performances.

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