# Towards Innovative Virtual Learning in Vocational Teacher Education: Narratives as a Form of Meaningful Learning

Matti Haverila [mhaverila@aus.edu]

American University of Sharjah [http://www.aus.edu],
School of Business and Management,
P.O. Box 26666, Sharjah, United Arab Emirates

Marjatta Myllylä [Marjatta.Myllyla@tamk.fi]

Hanna Torp [Hanna.Torp@tamk.fi]

## Abstract

The purpose of the research was to get insights into the ways learning strategies typically used by adult learners can be taken into consideration when designing web-based courses to facilitate learning in teacher education. Teacher students wrote narratives in discussion forums by completing various types of group projects. The relevant theoretical frameworks regarding the transfer effect, learning strategies and meaningful learning are discussed. The narratives of the teacher students are then analysed. In order to achieve meaningful learning in online teacher education, careful pedagogical principles need to be followed. The learning environment should provide the students possibilities to utilize effective learning strategies like reflection, prior experience, conversations and authentic experiences in order to achieve better learning results. Finally conclusions and recommendations are presented.

## Keywords

E-Learning, Collaborative learning, Teacher Education, Asynchronous Interaction, Meaningful learning

## List of topics

- Introduction
- Transfer and innovative learning
- Meaningful learning
- Learning strategies used by adult learners
- Students' meta-cognitive learning strategies in practice
- Conclusions
- References

## Introduction

Innovation can be defined as a realization of an idea that can be a new product, service or practice (Korpelainen, Lampikoski 2003). Vocational teacher training implemented online can as such be interpreted as an innovation within the field of vocational teacher training, even though online education in itself is no longer a novelty. However, innovations are created in order to find new and better ways of doing things instead of merely changing things for the sake of the change. A solid pedagogical basis for educational innovations enhances the continuity of the process: successful innovation in teacher training is likely to result in more innovative approaches in the student teachers' own work. This is why we emphasize the crucial role of pedagogical quality in designing and implementing online education.

The interest in innovative virtual learning in Vocational Teacher Education began to receive increasing attention when the common SISU project (2005) of the vocational teacher educators was launched in 2003 in Finland. In autumn 2006 a pilot implementation of vocational teacher training carried out completely online as an application of exploratory learning was initiated. The research proceeded by evaluating the narratives produced by teacher students in small groups (Heikkinen, Syrjälä 2002). 40 online student teachers who were divided into study groups depending upon whether they participated in a 1 or 2 years study program. Practical training and observation of working life complemented the work of small study groups. Creating new approaches in teaching in cooperation between teachers and students was directed towards innovative transfer between school and working life.

Having been actively involved in designing online education for university-level student teachers for several years, we have a natural interest in the pedagogical quality of web-based courses and the practical ways of improving them in a virtual learning environment. We are interested in getting insights in the ways the learning strategies typically used by adult learners can be taken into consideration in designing web-based courses in order to facilitate learning. First the concept of transfer will be discussed. Secondly, to enable the development of the guidelines regarding the learning strategies, the concept of meaningful learning will be discussed. Thirdly the learning strategies used by adult learners will be addressed. Fourthly in the section "Students' meta-cognitive strategies in practice" an individual adult student case as well as the analysis of the narratives of the teacher students will be discussed. Finally the conclusions that can be drawn from the study including pragmatic and pedagogical considerations and didactic practices for teacher training will be presented.

As mentioned above we will also look at a real student case in this article to illustrate how the learning strategies work in practice from an individual student's point of view. The interview with the student reminded us of Jonassen's (Jonassen et al 1999) eight criteria of meaningful learning, which serve as a good basis for general guidelines for developing better quality online education. Jonassen's theses in conjunction with Dobrovolny's (2003) ideas on adult learners' learning strategies have also served as a theoretical framework in evaluating the pedagogical basis of teacher training at Tamk University of Applied Sciences.

## Transfer and innovative learning

Learning for transfer is one of the seldom-specified but most important goals in teacher education. The objective for the students is to gain knowledge and skills that can be used both in school and outside the

school, now and in the future. Transfer of learning deals with transferring one's knowledge and skills in the process of exploratory learning. Phillips and Broad (1997) indicate that transfer of learning is the effective and continuing application by learners of knowledge and skills gained during learning to their performance on the job or other individual, organizational or societal responsibilities. Baldwin and Ford (1988), on the other hand, claim that transfer of learning necessitates that learned behavior needs be generalized to the context of the work and preserved over time. The aim of the online vocational teacher training is to respond to the professional requirements of organizations offering vocational training, such as the challenges of professional development. The education also aims at providing the student teachers with the competence for making online education a permanent practice in their own teaching work.

Thompson et al (2003) indicate that research has shown that the real transfer of new learned skills and knowledge back to the workplace ranges from 10% to 30% (Balwin, Ford 1988; Broad, Newstrom 1992; Tannenbaum, Yulk 1992; Brinkerhoff, Gill 1995; Brinkerhoff, Montesino 1995). Thompson (Thompson, Brooks, Liza´rraga 2003) also indicates that factors that affect the learning outcomes are the design of the learning program, the characteristics of the learner and work-environment characteristics. While the characteristics of the learner and work-environment characteristics are more or less beyond the control of the teacher training, it is very important in this context to pay special attention to e-pedagogy and its effectiveness. Thompson (Thompson, Brooks, Liza´rraga 2003) continues by claiming that the incorporation of learning principles, the sequencing of learning materials and job relevance of learning content are the learning input factors that affect learning outcomes. Baldwin and Ford (1988) indicate more specifically that the improvement of the design of training programs occurs through the incorporation of the following learning principles: (1) Identical elements, (2) Teaching of general principles, (3) Stimulus variability, and (4) Various conditions of practice. The incorporation of identical stimulus and response elements into the teacher training improves transfer. The use of general principles in teacher training facilitates transfer when the teacher students learn, in addition to the relevant skills, also the general rules and theoretical framework on which the teacher training is based. Stimulus variability maximizes positive transfer when a variety of appropriate teacher training stimulus is used. Finally the concept of conditions of practice contains specific teacher training design issues like masses or distributed training, whole or part training, feedback, and over-learning. The concept of distributed training is closely related to virtual learning and means a learning delivery method that is independent of location and time, but still aims to attain the same expected learning outcomes. Masses training is not, however, free of location and time.

As a consequence of well-designed teacher training the educational institutions offering vocational training will have the possibility to get personnel capable of utilizing e-learning and adaptive to the requirements of the constantly changing working life. In the course of the training the students acquire professional competence together with tools for developing, maintaining and updating their competence on the basis of contemporary needs, especially with respect to information systems and the required software programs.

According to Haskell (2001) transfer of learning is our use of past learning when learning something new and the application of that learning to both similar situations *(near transfer)* and new situations (*far transfer*). The theory of near and far transfer does not help us much in the online education of teacher students. We know that near and far transfer is taking place. We know that some students readily accomplish far transfer tasks, while others do not. The low road or high road theory on transfer of learning, developed by Salomon and Perkins (1988), has proven to be a more rewarding theory. Low-road transfer refers to developing knowledge and skills to a high level of automation. It usually requires a great deal of practice in varying circumstances. High-road transfer involves cognitive understanding, purposeful and conscious analysis, mindfulness, and application of strategies that cut across disciplines. There is deliberate mindful abstraction of an idea in high-road transfer, and then ideally the abstraction can be consciously and deliberately applied in a problematic situation.

Transfer of learning is pervasive in our everyday working life, at home and in the society. Transfer takes place whenever our existing knowledge, abilities and skills affect the learning or performance of new tasks. But what are the principles of effective transfer of learning? How can workplace instructors design training programs to facilitate transfer? What can the shop floor supervisor do to encourage transfer of learning? How should trainees or participants prepare for transfer back on the job? Our question especially in this context is: "How can online education promote transfer"? For some practical guidelines, the concept of meaningful learning should be considered.

## Meaningful learning

There are many views, opinions and definitions on what brings meaningfulness to learning. The conversation that has been evolving around the topic for quite some time has started to spread from the classroom context to online learning. Whereas the earlier direction of dialogue was more from the technology towards pedagogy ("How could we utilize this technical invention in education?") today it is increasingly directed the other way round (These are our pedagogical needs. What technology should be used for this purpose?). Anne Nevgi and Kirsi Tirri (2003) cite David Jonassen (1995) and share his view on the role of technology in the learning process: technology is a tool that can enhance learning but it should remain in a supportive role and not become the target of learning and attention.

As Eija Mannisenmäki (2000) points out, fashionable terms like self-direction and collaborative and cooperative learning are often heard in online learning developers' speech. The question remains, however, what what measures should be taken in order to better realize these ideas in new virtual learning environments.

### Self-direction as a starting-point

According to Knowles (Knowles 1975; Knowles 1980; in Mannisenmäki 2000) self-direction is a natural characteristic of adulthood and must thus be taken into consideration as a starting point in educational planning. In self-directed studying individuals take initiative in defining their aims, applying learning strategies and evaluating their results. Knowles (Knowles 1975; Knowles 1980; in Mannisenmäki 2000) points out that there is strong evidence indicating that students taking initiative and responsibility of their own learning will reach better learning results than students who fail to do this. The nature of this kind of studying with individual commitment leads to meaningful learning. A self-directed student is willing and motivated. He/she also evaluates and observes her own learning process and along with progress becomes increasingly aware and responsible for his/her own work.

The importance of self-direction becomes especially emphasized in online learning (McLoughlin, Luca 2001). On a web course the student is forced to do things actively. Unless he/she takes action, no learning occurs. The student might be sitting in an auditorium where a lecture is taking place, but without paying attention. The instructor is speaking and showing him/her visuals, regardless of the attention of the individual student. The student might even get a false feeling of self-satisfaction ("I participated, I did at

least something") for attending, even if no learning had actually taken place. Horton (2000) believes that a web-based course activates learners. He points out that the students "cannot just sit back and listen to a lecture or passively watch a video, they must think and respond" (Horton 2000). Horton notes that although it is possible to design a web course that allows passivity, it is worthwhile to include meaningful interaction and interactivity.

### Cooperative and collaborative learning

Self-directed studying must not be mistaken with independent studying that the student does on his/her own without supervision or contact with fellow students. Moreover, a clear distinction needs to be made between using the Internet as a channel for distributing material and teaching an online course. One of the clear strengths of an online course is the opportunity for adding the element of social networking to distance learning. The teacher has an essential role in this, but also ways of interacting with other learners should also be provided. Salmon (2002) points out that groups of learners tend to exchange views and ideas, and that people enjoy learning from the experience of others. She emphasizes that to offer these benefits to learners, a considerable amount of group work needs to be included within any learning program.

Salmon makes a distinction between cooperative and collaborative learning whereas cooperation involves group members helping each other towards individual goals, collaboration refers to a group working together towards a common goal. She strongly emphasizes the significance of this type of learning.

Collaboration requires an active sharing of information and intellectual resources among the participants. The best experience of collaboration by participants for learning purposes enables them to experience both personal, individualistic, useful learning whilst contributing to a community of learners and the support and development of others. Participants can comprehend, evaluate, debate, question, integrate and synthesize information online, with suitable e-tivities and ongoing support (Salmon 2002).

It could thus be suggested that teaching online at its best can combine the finest features of both classroom teaching and independent studying. It frees the student from the strict constraints of time and place and thus enables studying for those who, for one reason or another, could not be physically present at the particular time and place at which a traditional course is taught. However, the student is not left alone with the course book - the support and resources of the group are constantly present, and in addition to that, the teacher is there to answer questions, give advice and direction.

### Criteria of meaningfulness in learning

Jonassen introduces a model with eight criteria of meaningful learning, based on constructivist approach [16]. These criteria seem to provide useful tools for facilitating transfer. According to Jonassen learning environments should keep students 1) active, 2) constructive, 3) intentional, 4) collaborative, 5) complex, 6) conversational, 7) contextualized and 8) reflective.

*Activeness* means that the student has a key role in his/her own learning. He/she is actively engaged in the learning process, processing information. Activeness leads to students taking responsibility in their own learning.

*Constructiveness* refers to the process in which the student integrates new information with his/her prior knowledge in order to make sense of the content. *Collaboration* comes from the students' natural tendency to form communities in which the members can benefit from each other's skills and social support. *Intentionality* refers to the learners' active attempts to achieve a cognitive goal. Striving to reach the goal makes the learner think - and thus also learn - more. By *complexity* Jonassen (1995) means avoiding oversimplification of problems. He believes that the students need to be engaged in solving complex problems; otherwise their view of the world becomes oversimplified as well and they remain in a lower level of thinking. *Context* refers to teaching knowledge and skills in real life instead of abstracting ideas in rules that need to be memorized. Jonassen points out that this method leads not only to better understanding, but also to more consistent transfer into real-life situations. *Conversation* takes place when students become members of a knowledge-building community and seek for ideas and opinions from each other. As a result of this process the students learn multiple ways of viewing the world and solving problems. When *reflecting* the students can articulate what they have learned and reflect on the processes. By doing this they will understand more and become more capable of using the knowledge that they have constructed in new situations.

Applying the aforementioned characteristics in the design of a virtual learning environment seems to provide tools for achieving the realization of self-direction together with collaborative and cooperative learning. This, in turn, facilitates the occurrence of transfer. When the students have better premises for processing information, integrating it with their prior knowledge, benefiting from each other's skills and seeking ideas from each other it is evident that a learning experience of this kind provides good ground for transfer. On the other hand, if these requisites are not achieved, students are in danger of "remaining in a lower level of thinking" (Jonassen 1995). In practice, these criteria can be taken into consideration at all stages of designing a web-based course. For example the navigation of the course can be designed to promote activeness; the learning tasks can include many ways of collaboration and conversation; tools for reflection might be provided in the form of a learning diary or equivalent; the questions can be formed in such a way that there is sufficient amount of complexity; simulations can add real-life context and learning environments can be designed to support learners in articulating what their goals are. The design of the electronic content and the learning environment has a tremendous impact on meaningfulness and realization of transfer in online studies. Further tools for implementing online education of a good pedagogical quality can be found by studying the learning strategies used by the students in question.

### Learning strategies used by adult learners

Being aware of the learning strategies typically used by the target group and taking them into account in designing web-based studies give the designers tools to considerably improve the efficiency of learning. As Irene Kristiansen (1999) points out, better learning requires that the students are able to employ effective learning strategies and thus develop their meta-cognitive skills. To make this practical in the design of the educational experience Lawler (1991) indicates six principles to be embedded into the adult learning situation:

1. Understand and reduce anxiety,

2. Elicit and incorporate expectations,

3. Acknowledge and utilize experience,

4.  Provide and encourage active participation,

5.  Identify and incorporate relevant content, and

6.  Facilitate change and growth.

Regarding the e-learning situation Dobrovolny (Phillips, Broad 1997) lists learning strategies used by adult learners and suggests how these can be taken into account when designing a web-based course. Dobrovolny asserts that adult learners use meta-cognition - the process of self-assessment and self-correction - to learn, and further that learners engaged in meta-cognition think about:

- Implementing their preferred learning strategies.

- Assessing their progress by answering self-assessment questions or practice questions, and determining the degree to which the instruction meets their needs or expectations.

- Implementing remedial learning strategies such as re-reading instructional information.

The design of the virtual learning environments affects the learners' ability to employ these strategies. In the words of Dobrovolny:

Self-assessment and self-correction assumes the ability to easily navigate a self-paced, technology-based course. If the navigation is difficult or confusing, a learner's self-assessment is "I'm lost!" Even when the content is interesting, accurate, and relevant to the learner, if the interface or navigation is confusing, the learner can't get to the content. It's like having a box lunch but the food is sealed inside a locked box and you don't have the key!

The techniques Dobrovolny (Phillips, Broad 1997) suggests for helping the students to effectively self--assess and self-correct include frequent embedded questions, self-checks, practice exercises and hands-on simulations. She also emphasizes the importance of providing feedback and correct answers to enable the students to correct their mistakes and learn from them. The usability of the virtual learning environment and the structuring of information should also be designed to facilitate re-reading the content. A table of contents, a searchable index, a site or content map and a user-friendly navigation system are crucial in this.

Dobrovolny (Phillips, Broad 1997) mentions that in addition to meta-cognition, adult learners typically use strategies like reflection, prior experience, conversations and authentic experiences to learn. Reflection includes techniques like visualizing the use of the new information to solve real-life problems, attempts to fit the instructional content into the big picture, comparing one's way of using the new skill with someone else's way of doing it and recalling sections of the course by frequently thinking about the practical applications of what has been learned. Designers can help the students use this strategy effectively by exemplifying how the learner might use the content, how the content fits into a larger framework, and alternative ways to apply the content. The examples should vary from simple to more complex, enabling the students to gradually improve their knowledge and skills. The students might be asked to create their own examples. Moreover, learning diaries, rhetorical questions, visualization of the relations between the pieces in the big picture and analogues are techniques that can promote reflection.

Building on prior experiences is the core idea of constructivism. Prior experiences might either cause confusion or validate the new information, depending on whether the new information seems to be in conflict or be consistent with the learner's previous knowledge. According to Dobrovolny (Phillips, Broad 1997), the web-based course should be designed to help students create links between the course content and their prior experiences or it should provide solutions to problems they have faced in the past. Analysis of learners and their needs (Lawler 1991) is a useful tool - however, it is not always possible to arrange. In such cases the designers might for example create practice questions that are based on a common experience the students are likely to have.

Conversations are an important learning strategy for adults, and as Dobrovolny (Phillips, Broad 1997) points out, the critics of online training tend to blame this type of training for lack of face-to-face contact. However, as it has already been pointed out, there are effective ways of creating good opportunities for conversation on a web course. In addition to online discussion with fellow students and the teacher, adult learners also discuss their training with other people, like friends, colleagues and family members.

Learning with the help of authentic experiences involves attempts to integrate the new information into one's day-to-day responsibilities. Learners are disappointed if the contents of the course are not applicable in authentic situations. Once they finish the course they are usually eager to use their new skills in real-life situations. This process can be enhanced by giving to the learner a list of possible situations they might encounter, and in which they could apply their learning. Another alternative is of course to ask the students to create the list by themselves.

## Students' meta-cognitive learning strategies in practice

In this study the teacher students produced a number of different narratives about themselves as teachers and addressed different ideas of humanity and learning environments on the path of meaningful learning. All the narratives were studied applying content analysis to find out how they focused on the self-conception of the students. The objective was to follow how the development process of professional self-image formed during online studies.

In social psychological theories of self (Lawler 1991; James 1961; Mead 1934), the self is divided into subject self and object self. The principal contention and concern is that basic self-consciousness addresses only the issue of how we can be aware of the self as object, whereas the really fundamental and deep questions concern consciousness of the self as subject (Bermúdez 2008). In online studying we assume that the subject self can transform into the object self in the process of collaborative writing of narratives as the student memorizes and observes his/her own actions and experiences (Heikkinen, Syrjälä 2002). The formulation of professional identity is dependent on the state of culture and society (Ĺhlberg at al 2001), which, in the time of postmodernism, is distinctively affected by taking action in different networks and by the uncertainty as an actor in these networks.

The narratives analyzed (20 students, several narratives) indicated that during the first months of studying the narratives describe the process of team formation, adaptation to common rules and the process of developing concrete and practical skills. The learning process for abstract skills appears absent in the early narratives. However, as the following real-life example demonstrates, a learning environment that takes the adult learners' meta-cognitive learning strategies into account greatly enhances the formation of professional identity and development of abstract thinking.

## Formation of professional identity: A student case

The case introduced here gives insights into the question on the meta-cognitive learning strategies used by adults in a virtual learning environment. To start with let us meet Antti, who is a 25-year-old car mechanic from Lahti, Finland. He has recently completed the basic studies (1.5 years) in social psychology at the Open University of Helsinki. The studies took place entirely online.

Antti's motivation for starting the studies derived from his dissatisfaction with his socioeconomic status. He had previously qualified from a vocational school as a car mechanic and worked currently at a car repair shop. Antti's social network consisted largely of people in a corresponding situation and thus he had very little knowledge about university studies. He had, however, a strong willingness to find out if academic studies would, after all, be possible for him. Doing shift work and having little experience in studying he found it quite challenging, but after finding out on the Internet about the possibility of taking the basic studies of social psychology online he decided to give it a try. Learning online seemed to him like an excellent option, as it would have been impossible to attend studies that required regular attendance because of the shift work. Moreover, he felt that the online environment saved him from the awkwardness of corridor conversations regarding previous studies and career.

The beginning was not easy. It was not only the virtual learning environment that was new, but the entire idea of academic studies. Antti described it as follows (translations by authors):

At the beginning of the studies a lot of energy and time went to getting used to academic language and learning strategies. At first I didn't even know what I was supposed to learn.

In spite of having no previous academic learning experiences and no awareness of learning strategies that he could have consciously applied, Antti instinctively utilized the strategies introduced by Dobrovolny. The following extract from his interview illustrates how he used meta-cognition, reflection and conversation to help him to learn.

> *Reading a lot, over and over again, helped me to get used to academic writing and of course to learning about the content. The discussions were very useful; there could have been even more of those. The good thing about the discussions in the virtual learning environment is that the conversations are saved there. If you had a brilliant idea you could always return to that later. In face-to-face conversations things are often forgotten afterwards. The learning diary was perhaps the best tool; it helped me in summarizing things and staying on track with what you had learned.*

The web course contained many collaborative activities with common learning goals that were conducted in the discussion area of the virtual learning environment. In some cases the teacher also participated by moderating the discussion in order to lead it towards the desired direction and to keep it on track. Antti felt that the discussions moderated by the teacher were more educational and beneficial than the free discussions with other students. In the beginning he found it quite difficult to express himself in the discussions - which he believed was partly because of his lack of previous experience on the field, and partly because the participants were still unfamiliar to each other and no sense of community had developed yet. He found the situation quite similar to a classroom situation in the beginning of a course when socialization had not yet taken place. However, the participants' personal profiles in the learning environment enhanced the sense of belonging to a group, and as discussions continued, the learning community became stronger.

In addition to the online discussion with fellow students and the teacher Antti also frequently talked about his studies with friends, colleagues and family members and sought the company of other university students to discuss the content of the studies in order to fit the new things into a wider context and to broaden his perspective. He pointed out, that explaining things to others made the picture clearer to himself.

Antti was able to complete the studies remarkably successfully in spite of his unusual starting-point, which caused him a lot of extra work. Moreover, he now has a strong urge to continue his academic studies and eventually to graduate with a university degree.

This brings up another interesting aspect of online adult education. Students with less experience in academic studies trying to apply effective learning strategies might feel insecure about attending lectures at a university. Antti mentioned that the certain facelessness of the web environment facilitated his stepping into the academic world. In the virtual learning environment, students do not have social roles and thus do not get stamped in the same way as in a classroom context. According to Antti's experience, personal characteristics and other students' expectations did not affect his learning results the way they had done in his previous studying situations.

> *In the personal profile everyone could determine themselves how much they wanted the others to know about them, or in what kind of light they wanted to be seen. It didn't matter if you were a single parent or a pensioner. Everybody was on the same line.*

Participating in online education provides students with little or no prior experience in academic studies a chance of starting their studies in a familiar environment. This is especially true in a country like Finland where the use of the Internet is very widespread within all socioeconomic groups, and the Internet is a familiar environment to almost all young adults. The university auditorium, on the other hand, is not so familiar to so wide an audience. Web-based open university education has long been easily accessible to everyone, but virtual learning environments bring noteworthy additional value to it by providing outstanding conditions for learning to learn and practicing the use of effective learning strategies.

## Adult students' learning strategies in teacher education

The second case to be introduced here involves a cohort of teacher students attending a vocational Teacher Certificate program at Tamk University of Applied Sciences. The program was a one-year program and consisted of 60 ECTS credit points. The studies included the following sections: (1) Basics of pedagogy (10 ECTS), (2) Research project (10 ECTS), (3) Teacher studies (30 ECTS), and (4) Optional studies (10 ECTS). The Basics of Pedagogy studies had to completed prior the actual start of the program. The Teacher Studies were mainly done using the Moodle Virtual Learning Environment (VLE), which included the learning materials, relevant Internet links and literature. In addition to the VLE, the teacher students gathered to physical sessions several times during the academic year. The VLE also included multiple discussion boards, which were centered on the relevant topics.

The Teacher Studies were divided into three different "viewpoints" as well as into a Teacher

Communication section. The viewpoints represented major concentrations of learning in teacher education. The first viewpoint the teacher students concentrated on was learning from the student's point of view. The actual assignment was the writing of a story about "meaningful learning". The teacher students were expected to write a story as a team assignment following the process-writing model. Here the teacher students were able use their own experiences as well as relevant theory (for example Jonassen, 2007). The second viewpoint took a point of view of the teacher and the objective was to create a poster as a group project about "inspiring teaching" (for an example see http://www.infacs.com/poster.html, Haverila et al 2008). Viewpoint 3 included the creation of a play as a team effort with the objective of developing an idea about group learning. The play included topics such as multiculturalism, plurality and special teaching needs as well as the teacher's role in the society. The Teacher Studies also included practice lessons and observations in each viewpoint.

The research project for the Teacher Certificate studies could be completed individually or as a team effort. In conclusion when thinking about the six principles (*Understand and reduce anxiety, Elicit and incorporate expectations, Acknowledge and utilize experience, Provide and encourage active participation, Identify and incorporate relevant content, and Facilitate change and growth*) for adult learning indicated by Lawler (1991), it can be said (post hoc) that the teacher education program meets the principles reasonably well. For example in order to reduce the anxiety, the Moodle VLE included a section, where the participants were able to introduce themselves to other teacher students. Also the teams were expected to create the rules for teamwork in the beginning of the training program. In addition the expectation was that all teacher students participated actively in various discussion boards on a regular basis.

### Reflection, Prior experiences, Conversations and Authentic experiences

The following narrative examples have been selected as representative examples from all viewpoints as described previously. Naturally it is not possible and not even meaningful to cover a majority of the narratives, and thus representative examples from each viewpoint were selected.

As mentioned earlier, Dobrovolny (2003) indicated that "Reflection", "Prior experiences", "Conversations" and "Authentic experiences" are learning strategies adult students use. Let's have a look at the first narrative example (Viewpoint 1: The writing of the collaborative story about meaningful learning), which includes all learning strategies intermingled.

> Student 1: *What is significant learning? I will approach this question first completely from "How do I feel?" and my own background point of view, and then I will look what others think about this. I am a developer of technology and I manage a research group of printed electronics and a corporate consortium with a mission to develop infrastructure for technology (this for background if I sound a bit stiff with my opinions).*
>
> *The development of technology is as a matter of fact a learning process of an individual, organization as well as the value network. In the development of technology I differentiate the terms "knowledge" and "competence" from each other. Knowledge is information and understanding of the subject matter, but there is no value linked into the utilization of it in practice. Competence enables you to do something, conceptualizing and foremost into the utilization of it.*
>
> Student 2: *Reasonably good answer from a "How do I feel?" point of view. I couldn't have done it better myself. But it is easy to agree with you. Also the "background" comments were good. We engineers are sometimes a bit stiff and really sure with our opinions. But maybe this training will be helpful in this regard. The "Exploratory Learning" book by Hakkarainen et al brings quite clearly forward the significance of individual, organization and the value networks' in the learning process. Also the significance of context was brought up in the book. Using Google I also found some additional information when I used "Significant Learning" as search words. Already the first source (http://www.vte.fi /opiskelu/merkitys.htm) found was very good. Furthermore I found also another interesting link about constructivism (http://web.missouri.edu/~jonassend/course.html).*
>
> *I will also attach an image (**Note**: Created by the teacher student). In my opinion the dimensions of the image broaden the field of significant learning in an interesting manner.*

This first narrative includes several elements mentioned by Dobrovolny. Student 1 is clearly referring to her own experience when stating her opinion about meaningful learning. Learning from each other's experiences is an important element in adult learning. There is an element of constructivism in the comment of Student 2 when he is referencing and reflecting other sources like books and Internet sources when trying to broaden the point of view brought up by Student 1. It is quite interesting to note that Dobrovolny's elements are all present in the same conversation. The use of an image also promotes reflection in this narrative by Student 2.

The second example is dominated by the conversational learning strategy (Viewpoint 1: The writing of the collaborative story about meaningful learning).

> Student 1: *In our story Kari is a teacher in the elementary school, who whilst wondering around is thinking about things. Due to his pondering nature and with the help of reflection he has tried to improve himself in his work. He also knows the vocabulary in the field and therefore we can use professional terminology in our story. On his way to work he sees and meets different familiar and unfamiliar faces. He evaluates these people in his mind and looks back on the matters occurred with them. Here we can write our story our selves and make peer evaluations, which we can do in the discussion forums.*
>
> *My proposal is that we build our story around this main idea. We have another discussion board where we can develop pedagogically suitable backgrounds for the characters. In this discussion board we can develop the story and the final characters. In other words you can tell in what kind of situation Kari is going to meet you.*
>
> Student 2: *I can be a colleague of Kari, who is wrestling with the identity of classroom teacher. That was a monster word.*
>
> Student 1: *We can get a nice scene for this to be placed in the teacher cafeteria. We can have a dialog of some sort about this.*
>
> Student 3: *My character can be the child of Kari, who is interested in something and not interested in something else. Kari could think about the connection between mathematics and the board game and pity how bad he is with roller-skating...*

> Student 4: *The character of the classroom teacher is as far as possible from me. But I guess one can always learn something. I have done peer evaluation in the discussion forum provided for that purpose; is this connected to that or is this something else?*

This a good example of the conversational dimension of the adult learning strategies laid down by Dobrovolny. The conversation is clearly progressing on the basis of constructivism by each student building on each other's input. The writing of the story offers an excellent opportunity for conversation in the Teacher Certificate training. It is not clear from the above discussion, but in many cases the postings in the discussion boards were enhanced by the discussions with spouses and colleagues. This is supported by the following one of the many example postings by a student in the discussion board:

> Student 1: *Hey, I inquired about this from my wife who works at a school, in fact in the secondary level. In other words they start the self-evaluation in their school already in the first grade, first about the issues, which are easy to handle and close to the child, like cooperation, "Was I a good mate?", "Where did I succeed?", and "Where could I improve?" This is closely connected to peer evaluation like "What pleased in the other person's behavior?" and "What hurt in the other person's behavior?"*

The third example is dominated by experience based learning strategy (Viewpoint 2: The creation of a collaborative poster about inspiring teaching). Let's have a look.

> Student 1: *That "pedagogical history of the learner" was attached only at the end, and I believe that it certainly has an effect on the success of exploratory learning. You understood the term in the same manner as I did. If I for example would try this exploratory learning method here in the Emirates, I can be sure that the student evaluations would rock bottom. The students here have a very strong surface learning pedagogical background. The exploratory learning method is intellectually and spiritually more challenging method than many others. It is rather difficult to be "lightly" involved!*

In this narrative the student is referring to his teaching experience with students in another country, which enables him to contribute to the conversation regarding the success of exploratory learning method. This comment validates the notion that pedagogical history is a relevant issue regarding the success of a pedagogical approach. Thus the teacher-training course was able to create a connection between the course content and the prior experience of the teacher student.

The fourth example is dominated by authentic experience based on learning strategy (Viewpoint 3: The collaborative creation of a "Play").

> Student 1: *It is a tempting idea to interview our counselor closer regarding the arm wrestling and ask as colorful details, and feelings as possible et cetera. I am afraid that we will be giving a too negative viewpoint of the immigrants if we take a stereotype as an example with learning disability, which only actually represents a very small minority of immigrants. In the same way if we choose a racist for teacher, we give an incorrect viewpoint of the attitudes of most teachers. It is true that we can see stereotypes or people in many cases, whose certain characters are over-emphasized and thus the play could become a narrow cross-section of a certain phenomenon.*
>
> *In the case of the African man I tried to calm down the student tutor with the thought that the man probably not thinks that the white women are really bad, because he already has children with two of them.*
>
> *To be truthful I have to say that in our school quite many students have a slightly pessimistic attitude regarding the studies of certain ethnic groups. Even though this might be based on experience, it can have a harmful effect on the studies of these youngsters.*

This narrative represents the authentic experience as an adult learning strategy. It is clear that the author has been involved with the training of immigrants and thus has authentic experience in this regard, which is very relevant for teachers who will be teaching immigrants. The virtual learning environment in this case enabled the presentation of authentic experiences.

The fifth example is dominated by reflection based learning strategy (Viewpoint: Communication: A cooperative discussion about when group work is meaningful).

> Student 1: *Teamwork is usually a rather meaningful activity, but especially so when the members of the team can learn from each other, and also when it is known in advance that it is important to evaluate the issue from many different points of view. In my own area, which is business, I can bring up an example of the creation of a business and marketing plan. In spite of the fact that the participants have a lot of experience about the subject matter, the end result will be much better if the project is done as a team activity. This is also the case if the participants do not have a lot of experience about the subject matter. In this case the role of guidance is, however, very important.*
>
> Student 2: *I have similar experience as you have so that the output of a well functioning team is usually better. In the case of a badly functioning team it can be the other way round.*
>
> Student 1: *You said that, "In the case of a badly functioning team it can be the other way round." This is true of course, but it can also be a good learning experience right?*
>
> Student 2: *You are right that one can learn from failures. I have faced such people who try to avoid teamwork because they have bad experiences about it. What can be done about this? How could we make the experience of teamwork fruitful for them?*

This narrative describes the difficulties of teamwork as a learning experience. The participants are reflecting each other's experiences in their postings. The issue at hand is a real-life problem to which the students are trying to find a solution. The postings above indicate a building-up approach to the task where the students contribute and build upon each other's experiences and knowledge.

The assessment whether all students met well the expectations regarding the use of all Dobrovolny's learning strategies ("Reflection", "Prior experiences", "Conversations" and "Authentic experiences") is difficult to make on the basis of the narratives above because the narratives provided are samples of the student discussions, however, believed to be representative samples, which should improve the reliability of inferences based upon them. It is true, however, that a well designed learning environment provides a

good framework for the use of the learning strategies mentioned. The students, who participated, although all teacher students, had different kinds of backgrounds regarding their prior relevant experience, capability to reflect, and conversational style. While these might hinder the use of the learning strategies in some cases, they might also enhance the use of the learning strategies in other cases. The key issue in the use of the learning strategies is the level of activity (Jonassen et al 1999) that students show throughout their learning experience. While the level of activity is certainly related to the learning environment, it also is related to the student. The learning environment can either support or hinder the level of activity.

Finally the learning transfer was an important concept in this study. As indicated earlier the criteria developed by Jonassen seem to provide natural tools for facilitating transfer due to the constructivist nature of the learning strategies. Students used their prior learning as a basis to learn new things and also as a basis for new application situations. Using the Jonassen criteria it can be concluded that the transfer effect seemed to occur. Adult learning strategies are in line with this thinking (learning from experience, utilization and sharing of prior experience etc.). When using the Jonassen criteria and the natural adult learning strategies in the design of the learning experience, the occurrence of the transfer effect is supported. In the case of Antti for example the evidence of transfer is that after the studies Antti believed that he was ready to apply the learned skills in university degree studies, whereas beforehand he had felt awkward about the idea of university.

It has to be noted, however, that the use of the Jonassen criteria provides only an indirect and partial way to assess the true transfer effect. The direct and complete assessment of the transfer effect, whether far or near, is a complicated process (Holton et al 2000) and should probably be done with a post hoc approach, which could even be longitudinal in order to see the true long term effects of the learning transfer. The full assessment of learning transfer includes secondary influences like learner readiness, and performance self-efficacy; motivational factors like motivation to transfer, transfer effort, and performance; and environmental factors like feedback, peer support, supervisor support, and openess to change. These factors affect individual performance, which leads to organizational performance (Holton et al 2000). In the model developed by Holton et al (Holton et al 2000) learning leads to individual performance. Thus learning is an important precondition for transfer, but that is not enough as the Horton et al model indicates. The measurement of the learning transfer in this research setting should be done in further studies.

## Conclusions

Although the term meaningful learning is difficult to define comprehensively, it could be suggested that in order to increase the meaningfulness of learning, the learning environment should provide the teacher students possibilities to utilize effective learning strategies like reflection, prior experience, conversations and authentic experiences in order to achieve better learning results. It is also possible to facilitate the occurrence of transfer by careful and pedagogically well-grounded design of both the content and the implementation of the online course. In the case of the teacher students the online studies bring yet another aspect regarding transfer into play. In postmodern world there is a need for constant updating of evolving knowledge and skills. Online learning environments - and later on even mobile ones - will not disappear nor will the development of education technology cease. Having gained student experience with online environments and working in such networks, the teachers to be will be able to respond much more readily to the changing professional requirements. Careful consideration should be exercised when applying the findings of this study to other e-learning situations.

Having a clear picture of what meaningfulness in education consists of will help the developers of online education in the design work and give a good basis for the course. At a more practical level the learning strategies and supporting them in the virtual learning environment become a question to be pondered. There are many ways of taking this into consideration in the design of the web-based courses and thus facilitating the learning process of the students. The online environment can also function as an environment for learning and practicing more effective learning strategies. The web brings many new aspects and possibilities to education - the above discussed issue of equality being one of them - and investing time and thought in good design is certainly worth the effort.

The evaluation of the material and courses produced for the teacher training at Tamk University of Applied Sciences suggest that the theoretical framework introduced provides a useful framework for developing online education and gives a good basis for pedagogically sound courses. Naturally, there is no one single right way of doing this, but there are many ways of applying the theories in the design and implementation, which facilitate the learning process and professional development of the student teachers. Having a comprehensive idea of the concepts of meaningful learning and being aware of the learning strategies of the target group provides a solid starting-point for innovative design work. Narratives provide a natural way to analyze teacher training. Life is often explained as departures and returns, as a book or weaving process proceeding with time and sparkling with a variety of different kinds of feelings. What do these kinds of narratives mean for teaching in the Internet or e-learning? The recently published report "In Good Growth – Developing Together Towards High Quality E-Learning in Polytechnic Universities" Leppisaari (2008) made recommendations following which it would even be possible to track the quality in e-learning and online teaching. One possible path, according to one of the recommendations made in the report, would be in the chaning of attitudes. Isn't it true that the feelings and our world of experiences are behind these attitudes? We have tried the narrative approach in e-learning with good success. The teacher education is a strong road to self-discovery, and thus a story, which finds its ingredients in learning together, and sharing different kinds of experiences, form a variety of attitudes.

## References

[1] Korpelainen, K., Lampikoski, K. (2003). The Change Power of Being Innovative (In Finnish). WS Sookwell Oy. Juva. 3. Edition.

[2] Baldwin, T. T., Ford, J. K. (1988). Transfer of Training: A Review and Directions for Future Research, Personnel Psychology, 41, 1, 63-105.

[3] Bermúdez. J. L. (2008). Self-as-Subject and Self-as-Object: Reply to Brook. In Nani, M. & Maraffa M. (eds.), (2000). A Field Guide to the Philosophy of Mind. Societa Italiana Filosofia Analitica, http://host.uniroma3.it/progetti/kant/field/bermudezsymp_replytobrook.htm

[4] Brinkerhoff, R. O., Gill, S. J. (1994). The Learning Alliance, Systems Thinking in Human Resource Development, San Francisco, CA, Jossey-Bass.

[5] Brinkerhoff, R. O., Montesino, M. U. (1995). Partnerships for Training Transfer: Lessons from a Corporate Study, Human Resource Development Quarterly, 6, 3, 263-274.

[6] Broad, M., Newstrom, J. W. (1992). Transfer of Training: Action-packed Strategies to Ensure High Payoff from Training Investments, Reading, MA, Addison Wesley.

[7] Dobrovolny, J. (2003). Learning Strategies, http://www.astd.org/LC/2003/1103_dobrovolny.htm.

[8] Haskell, R. E. (2001). Transfer of Learning, Cognition, Instruction and Reasoning. San Diego: Academic Press. Holton.

[9] Haverila, M.J., Arokallio. M., Viljanmaa, M. (2008). Inspiring Teaching, http://www.infacs.com /poster.html.

[10] Heikkinen, H., Syrjälä, L. (eds.) (2002). There are Many Stories in Me. Writings about Being a Teacher (In Finnish). Kansanvalistusseura.

[11] Holton, E.F., Bates, R.A., Ruona, W.E.A. (2000). Development of a generalized learning transfer system inventory. Human Resource Development Quarterly, 11 (Winter), 4.

[12] Horton, W. (2000). Designing Web-Based Training. Wiley, New York.

[13] James, W. (1961). Psychology: The Briefer Course, Gordon Allport (Ed.) New York Harper.

[14] Jonassen, D. H. (2007). Design of Constructivist Learning Environment, http://web.missouri.edu /~jonassend/course.html.

[15] Jonassen, D.H. (1995). Supporting communities of learners with technology: A vision for integrating technology with learning in schools, Educational Technology, 35, 4, 60-63.

[16] Jonassen, D.H., Peck, K.L. Wilson, B.G. (1999). Learning with Technology: A Constructivist Perspective, Upper Saddle River, NJ: Merrill Publishing.

[17] Knowles, M. S. (1980). The modern practice of adult education: From pedagogy to andragogy. Englewood Cliffs: Prentice Hall/Cambridge.

[18] Knowles, M.S. (1975). Self-directed Learning: A Guide for Learners and Teachers. Prentice Hall, New Jersey.

[19] Kristiansen, I. (1999). Effective Learning Strategies, Using Language Learning as an Example (in Finnish). Opetushallitus.

[20] Lawler, P. A. (1991). The Keys to Adult Learning: Theory and Practical Strategies. Research for Better Schools, Inc. Philadelphia, PA.

[21] Leppisaari, I., Ihanainen, P., Nevgi, A., Taskila, V.-M., Tuominen, T.,  & Saari, S. (2008). In Good Growth – Developing Together Towards High Quality E-Learning in Polytechnic Universities (In Finnish), http://www.kka.fi/files/384/KKA_408.pdf.

[22] Mannisenmäki, E.: The Learner in the Net – Together and Alone (In Finnish). In Matikainen, J. & Manninen, J. (eds.), (2000). Adult Education in the Net. The Theory and Practice of Web-Based Learning Environments. University of Helsinki, The Lahti Research and Education Center. Tampere. Tammerpaino.

[23] McLoughlin, C., Luca, J. (2001). Quality in online delivery: what does it mean for assessment in e-learning environments? The 18th Annual Conference of the Australasian for Computers in Learning in Tertiary Education December 9-12. http://www.ascilite.org.au/conferences/melbourne01/pdf/papers /mcloughlinc2.pdf

[24] Mead, H. (1934). Mind, Self and Society. Chicago: University of Chicago Press.

[25] Nevgi, A., Tirri, K. (2003). Seeking Quality Online Learning (in Finnish), Suomen kasvatustieteellinen seura.

[26] Phillips, J. J., Broad, M. L. (1997). Transferring Learning to the Workplace, Alexandria, VA, Association for Training and Development.

[27] Salmon, G. (2002). E-tivities. The Key to Active Online Learning, Kogan Page, London.

[28] Salomon, G., Perkins, D. (1988). Teaching for Transfer, Educational Leadership, 46, 1, 22-32.

[29] Sisu-Projekti (in Finnish) (2005). http://www.vte.fi/sisu/.

[30] Tannenbaum, S. I., Yulk, G. (1992). Training and Development in Work Organization, Annual Review of Psychology, 43, 1, 399-441.

[31] Thompson, D. E., Brooks, K., Liza´rraga, E. S. (2003). Perceived Transfer of Learning: From the Distance Education Classroom to the Workplace, Assessment & Education in Higher Education, 28, 5, 539-547.

[32] Íhlberg, M., Kaasinen, A. Kaivola, T., Houtsonen, L. (2001). Collaborative Knowledge Building to Promote In-service Teacher Training in Environmental Education, Journal of Information Technology for Teacher Education, 10, 3.