

Learning through Praxis and Cooperation

Lev Vygotsky and Vocational Pedagogy

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Abstract

With industrial capitalism vocational education and training of the working class occurred in apprenticeship in workplaces and as students in technical/vocational schools. Vocational education research shows that many students learn in workshops and fail to learn/drop out of traditional classroom settings. Vocational pedagogy, a learner-centered approach to teaching and learning and Vocational didactics, teaching and learning as they pertain to working life are new concepts in the field of education describing how youngsters in vocational school workshops learn through activities and in cooperation with a mentor and each other. I discuss this problematic in light of Cultural-Historical Activity Theory.

Keywords

Epistemology, vocational pedagogy, vocational didactics, activity theory.

Introduction

One of the main findings in my research in the vocational sector over the past decades is that students and apprentices in the vocational trades prospered and learned when they were in activity in the workshops in the vocational schools or in the workplaces, while at the same time they found no meaning or relevance to the many hours spent in classrooms for general education. They showed up for the workshop classes but they failed to show up for the academic classes. Empirical research conducted by myself and students of vocational pedagogy during the past decades, decades marked in Norway's upper secondary schooling by a decrease in workshop instruction and an increase in the more abstract general curriculum, shows that the contradictions between these types of learning have remained fierce and persistent during the present school reforms in vocational and adult education (Bodin, 2004, Bongo 1999, 2001, Grimestad 1993, Frøland 2004, Mjelde 1993, 2006, Velten 2004)¹.

Vocational education in schools and apprenticeship are in focus in Norway right now. The Minister of Knowledge introducing a parliamentary report on education in March 2013 emphasized that more attention will be paid to vocational subjects. The government intends to reduce today's large drop-out problems. This Norwegian Official Report (NOU. No. 20 2012-2013) has reported that 30% of the students did not finish Upper Secondary School (16-19 year cohorts) on time. The highest rate of drop-out happens in the vocational streams. The report points out that if student completion increases from 70 to 80 per cent it will lead to a cost reduction for society of between 5.4 and 8.8 billion Norwegian kroner per cohort (ibid. 174).

We have also seen a greater interest in what is now called evidence-based research in vocational education and new attention is being paid to the fact that 13 years of schooling, remote from working life, has created a new set of problems (Bakken and Elstad 2012).

Drop-out rates have been substantial both from lower secondary and upper secondary schools for decades. What are the reasons that vocational students' and apprentices' experiences of learning and meaning in the workshop setting and working life have contrasted so sharply and so negatively with those of the school where learning is supposed to take place in classrooms? Simultaneously, while one poses such questions one also see the concepts of "cooperative learning," "work-based learning" "master/apprenticeship learning" and "situated learning" have become "hot" concepts in the academic discourse around the social

organization of learning, both in schools and in workplaces (Ainley and Rainbird 1999; Billett 2000; Coy 1989; Grosjean 2001; Nielsen and Kvale 1999, 2003; Lave and Wenger 1991)². But these discussions are seldom connected with the contradictions found within vocational education itself which harbours a tradition historically divided between workshop learning, vocational theory and general theory in the school program, often in combination with learning at actual sites of working life. The contradictions experienced in this mixed learning situation are full of conundrums. (Mjelde 1997)

Little research focussing on working class experiences has been conducted in this field till now³. My aim here is to explore these contradictions in light of how vocational students and apprentices experience their everyday learning life in the light of scientific thinking that might shed light on the complexities in vocational pedagogy. First I outline recent developments and contradictions in the present educational reforms in Norway in light of traditions in vocational education.

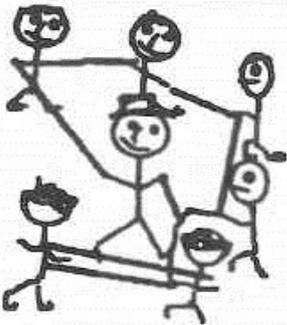
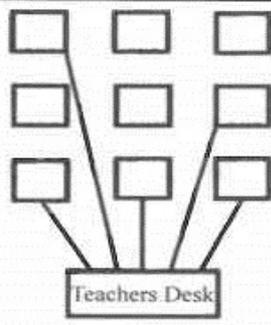
The Organization of Teaching and Learning in Vocational Education

There have been many different roads in Norway into the skilled/semi-skilled manual labour market during the past hundred years. A usual path after the Second World War was for youngster to attend a vocational school for six months to one year and to enter apprenticeship before they went on to get a craft certificate. Some factories had their own workshop schools. Many youngsters also entered directly into apprenticeship and attended the apprenticeship school one day a week or in the evenings to get their training in vocational theory. The only constant in this development has been change (Mjelde 1993. 76-80). A parliamentary law on vocational schools for trade and industry was passed in 1940, but was not enacted till 1945 due to the occupation of Norway by the Germans from April 7th 1940 till May 8th 1945⁴. The Apprenticeship Act was passed in 1950⁵.

Vocational education in the craft and industry branches has followed many different ways of organizing the three different components. hands-on workshop learning, vocational theory connected to the specific craft and general subjects such as language and natural sciences. Cooperation with craft and industry organisations has been the central feature till the 1970s.

As an educational model, apprenticeship originated in the guild system which developed under feudalism. The guilds were organised in three ranks: master, journeymen and apprentices. Hands-on learning and strict discipline were the order of the day. Journeymen and apprentices in each craft were organised to best serve the master's interest. They were tied to the existing order through their wish to become master craftsmen (Marx and Engels 1985.70; Mjelde 1993.54-58). Vocational schooling for crafts and industry took traditions from the guild system as its model until the parliamentary Upper Secondary Schooling Act came into effect in 1976. Forty-two hours a week was common in the training for many trades. In the period between 1945 and 1976 the major model saw two-thirds of the teaching time devoted to workshop and vocational theory instruction and one-third to general subjects in the classroom. I have illustrated the learning sites in the following way:

Figure 1. Arenas of learning in Vocational Education

WORKSHOP	WORKSHOP/ CLASSROOM	LECTURE HALL/ CLASSROOM
		
PRACTICE:	VOCATIONAL THEORY:	GENERAL THEORY:
Kitchen Mechanical Workshop Building site Hospital ward	Technical drawing Knowledge of materials Braking theory Social & Caring fields Human biology etc.	Norwegian Mathematics Natural sciences English

The above figure reflects two different learning traditions - PRACTICE/VOCATIONAL THEORY originated in the master/apprentice learning traditions and GENERAL THEORY/ CLASSROOM TRADITIONS developed from the Cathedral School traditions of the Middle Ages, In the workshop traditions the students are in hands-on activity making bread, repairing a car, building a house, cutting and styling hair or learning to lift patients in a hospital ward. Learning takes place amid the roar of machinery or the blast of hot ovens or equipment in a hospital. The students work together and consult one another while the teacher moves around the room advising the work process. Workshop practice and vocational theory are integrated and vocational theory might be taught in the workshop or in a separate classroom. The vocational teachers have a skilled trade in their background. General theory in vocational education is taught separately, away from the workshop and vocational theory portions of the syllabus. The general theory teachers have an academic background and the teaching takes place in traditional classrooms where students sit in rows. The general subjects are not connected to what is happening in the workshop or in vocational theory.

The School Commission of 1965 proposed that general and vocational education in upper secondary education (16-19 year olds) be administered by the same act and organized under the same roof. All learning should take place within a unitary school where vocational and academic studies should be integrated, in terms of both content and physical organisation. Apprenticeship was to be abolished. In 1974, the traditional gymnasia and the vocational schools came under one comprehensive law. The law was implemented from January 1st. 1976. One of the goals in social democratic Scandinavia in the post war period has been the elimination of class contradictions by means of creating "equality of opportunity regardless of class, gender or geographical origin" in the educational system. Another fundamental aim of the law of 1974 was to give equal status to practical and theoretical education. The former academic (gymnasiums) and vocational schools were now renamed; they became Upper Secondary Schools (KUF 1982.19).

The integration of vocational and general education under one common law during the first decades after 1976 resulted in both vocational training and academic programmes continuing to perpetuate their respective traditions (Mjelde 1994, 1997, 2006). Vocational education in schools and working life has the

specific complexity in being directly connected to the ebb and flow of the manual labour market. Competition over places, both in the vocational schools and over apprenticeships has been fierce. Before the reforms there were various points of entry into the semiskilled and skilled manual labour market. As mentioned before, youngsters entered apprenticeship directly from compulsory basic education and went to the apprenticeship schools in the evenings. The apprenticeship schools were often in the same locations as the vocational schools. The last decades have seen reform after reform in relation to the whole educational system in Norway. Here I concentrate my comments on the reform in upper secondary education called Reform 94, which was instituted in the autumn of 1994⁶.

The main model for vocational education under the 1994 reform was two years spent in school followed by a two-year apprenticeship in working life. Compared to the period prior to 1976, the time in workshops, in the bakery, in the technical engineering class or the car mechanics shop where hands-on learning took place has decreased and general theory-based classroom training has increased. With Reform 94 all theory should be taken during the first two years in schools. The traditional apprenticeship schools were abolished overnight. All the roads were closed to craft-certificates by entering directly into an apprenticeship after compulsory school.

Research from the last decades shows that drop-out problems from a 13-year compulsory school have increased and the problems inside vocational education (16-19 year olds) also increased⁷. Follow-up research of Reform 94 has unveiled the problems. The research institutes FAFO and NIFU released the results of a 2011 study of the work and learning environment faced by apprentices. They interviewed 2,804 apprentices. 95 % were motivated to learn in the workplace, not in school (Bakken and Elstad 2012, see also the Country Report, Norway inVET in Europe 2013, Meld. no. 20. 2012-2013).

Many youngsters have rebelled against 13 years of compulsory school prior to being allowed to enter working life. A characteristic statement about the distance between learning in schools and learning in work life is: "School gives you no insight into the actual reality of work and how things develop. By and large school grinds you down with all its theoretical subjects". Apprentices also commented about difficulties with theoretical subjects and that schools fit neither the craftsman nor the academic (Mjelde 1993).

This in turn has led to new reforms. The reform of 2004 provided the possibility of entering directly from the elementary schools into apprenticeships and attending what is now called. "coordinating school for theoretical training." Håkon Høst's (2013) empirical work among drop-outs from lower secondary school who are given a new chance in a combination between workplace and "coordinating school for theoretical training" show that this combination works. This is a return to the old apprenticeship school traditions.

The vocational school teacher Elisabet Frøland asked in 2004 why the old name "apprenticeship-school" could not be used. She says that the gap between "theory and practice" for vocational students has never been bigger (see also Høst 2013; Olsen 2013). The new name underlines the contradictions between decisions made in an academic bureaucracy and the everyday life of vocational teachers and students. One of the carpenter apprentices (16 years old) Frøland interviewed in 2002 said, "If I had not got an apprenticeship place, I would never have managed to be in the school." My own research among apprentices in the 1980's showed that eighty-nine per cent preferred being apprentices to sitting at a school desk. As one of them put it, "Going to school in to-day's society really takes it out of you." This apprentice, in Bergen, had experienced his everyday school life as a nightmare. "Being tired of school", or "sick of school" were expressions that came up again and again among the 1,617 apprentices in my study. What was the reason for the hostility the students had developed toward what they called "theory"? Citations from my apprenticeship study 1982-1984 (Mjelde 1993) shows the divisions very plainly. A graphics student said, "You learn more by working (in practice) than by sitting at a school desk with all that baloney about theory." The resistance against the hours spent in theory classrooms in Norwegian/Social Science and Chemistry was strong among the apprentices in the school where I did my participant observation. The apprentices were in discussions with the academic teachers over both the curriculum content and time spent in the classroom. They negotiated constantly with the chemistry teacher about leaving an hour earlier on Monday afternoon. All of the 17

apprentices in the mechanical engineering factory where I also did fieldwork expressed their contentment with their positions as apprentices in the factory. One of them said. "It was terrific to get away from sitting at that school desk where you're just supposed to accept stuff. Finally we could produce something ourselves. Working and earning money for three years suits me much better. And also, I was tired of school."

It is not a new phenomenon that students are tired of school learning, but it becomes even more serious as the length of obligatory schooling increases⁸. I present these examples as a background in order to pose questions about meaning and meaninglessness in the pedagogy that is pursued, whether it is in primary school, in vocational training or in higher education. Yet, the question of meaning is the basis for posing questions both about primary school and vocational training for the crafts and industry branches of the economy, particularly when as many as 89 % of the apprentices in my apprenticeship study of 1982-1984 found the learning arenas in school to be meaningless.

Lennart Nilsson (1981, 2004) is one of the few researchers in Scandinavia who has worked with the problems of learning and teaching in vocational education. He maintains that a prerequisite for the education of the future is that the teacher must find out how the students experiences are related to their activities and learning situations. Where are each individual in their learning process? Furthermore, one has to take these experiences seriously by taking up the teaching in such a way that it conveys what, from the perspective of the students, gives meaning to them in the learning activity. To experience education as something meaningful is a starting point for the development of competence and adjustment to the work situation. He points out that there has been little interest in researching how students in the vocational trades experience their learning conditions and possibilities⁹.

Back to the starting point. Why do vocational students thrive and learn in the workshops that are integral to vocational courses of study? What in particular is it about this learning situation that makes it different from the classroom tradition of education? What is it that creates an atmosphere for learning and cooperation? How can this be understood scientifically, from what we now know about learning? Learning is one of the basic social phenomena in the social sciences and the central one in pedagogy. Neurosciences as well as social sciences have been developing by leaps and bounds during the past decades and have opened renewed discussions about learning and teaching. But learning and teaching have been researched for a much longer time. The work of Lev Semenovich Vygotsky, Aleksei Nicolayvich Leontiev and Alexandr Romanovich Luria starting a century ago laid the groundwork for much of the discussions today¹⁰. Another Russian scientist from that period was Ivan Pavlov, a scientist they were inspired by and whom they also challenged. Here I will discuss specifically Vygotsky's scientific work in relation to the conundrums in vocational education today¹¹. But first some words about the Cultural, Historical School of Moscow (CHAT).

The Cultural Historical School of Moscow

The contribution of the Cultural-Historical Activity Theory, initiated by the Russian psychologists, Lev Semenovich Vygotsky, Aleksei Nicolayvich Leontiev and Alexander Romanovich Luria shed innovative light on the development and understanding of learning and teaching following the Russian Revolution. They sought to establish an approach to psychology that would enable them to "discover the way natural processes such as physical maturation and sensory mechanisms become intertwined with culturally determined processes to produce the psychological functions of adults". Vygotsky and his colleagues referred to this new approach variably as "cultural," "historical," and "instrumental" psychology. These three labels all index the centrality of cultural mediation in the constitution of specifically human psychological processes, and the role of the social environment in structuring the processes by which children appropriate the cultural tools of their society in the process of their ontogenetic development.

The three provided an historical and social analysis of the development of the higher mental functions of human beings. Lev Vygotsky was the leading scientist in this group in the 1920's. He is called "The Mozart of Psychology" (Toulmin 1978). A major feature of Lev Vygotsky's thinking is that a human being learns from

the social context to the individual context and that the development of human speech, consciousness and thought must be understood in their concrete social and historical circumstances. People develop their mental and psychological activity inductively, by speaking to and communicating with other human beings. Thinking and language cannot profitably be studied by investigating individuals without their connections to others in society, but rather, they ought to be viewed interactively from a material and developmental perspective as members of a complex and living society. This point of view is of fundamental significance for all pedagogy. A. R. Luria and A. N. Leontiev further illuminated Vygotsky's findings by showing the variation in the development of consciousness in relation to geographical conditions and social background (Enerstvedt 1986).

Class and education have been discussed again and again in educational theory during the past century (Mjelde, 1987, Mjelde 2006, 2016). Language development and forms of education and culture are some of the aspects that divide the middle class and the working class culture. Alexander Luria (1976, 28) expressed it in the following way. "The average middle class child begins her/his schooling with the attitude that problems are something you solve by first talking about them and then doing it, while the average working class child has learned that you solve the problem by acting and then talking about it." This lays the groundwork for an understanding of why many vocational schools students prefer to learn through activities in workshops and working life. The division between vocational and academic education is another class distinction in society. Lev Vygotsky's scientific work brings us further in understanding how the contradictions manifest themselves in the educational system today.

I was introduced to Lev Vygotsky's work through the writings of the US professor Jerome S. Bruner (1970, 1996) and what was referred to as "the Sputnik Shock." Vygotsky's theories gained currency in the West after the aerospace Sputnik developments of the late 1950s. In 1957, in the middle of the cold war between Soviet Union and the USA, a war that had both technological and political features, Sputnik, the first satellite to reach orbit, was launched in the Soviet Union.. The belief in the ultimate success of the American approach to everything was severely shaken by the Russians' success in starting and winning the initial "space race". This shocked the USA whose leaders believed in their country's technological superiority and led them to make a huge investment in education and a search for new approaches to learning and teaching – a new way to win or lose the Cold War (Portes and Salas 2011, 20). One might ask if the "space race" and Sputnik actually led to the translation to English of Lev Vygotsky's work. His book, *Thought and Language* was published by Harvard University Press in 1962. Lev Vygotsky's work *Mind in Society* appeared in USA in 1978.

Lev Vygotsky criticized traditional teaching based on his understanding of the importance of societal interaction and cooperation in the learning processes. He argued that the learner's ongoing performance in interaction with the teacher and fellow students in the immediate social community of learners and the broader connections to society and culture, was a far more precise index of learning than intelligence tests based upon a goal composed of pre-digested knowledge. Therefore the concept Zone of Proximal Development developed from his work can be viewed as directly addressing the workshop learning and master/ apprenticeship tradition, such as we can observe it in vocational education. He provided an historical analysis of the development of the higher mental functions of the socially situated human being in contrast to what has been called the school of "possessive individualism" and which is the focus of much of today's education¹². A major feature of Vygotsky's thinking is that a human being learns in a certain definite direction; namely, from the social to the individual. People develop their mental and psychological activity through speech. Thinking and language are most profitably understood when viewed from a developmental perspective. The psychological development of the individual is dependent upon the historical epoch in which this development occurs. Luria and Leontiev's research have further illuminated this phenomenon by showing the variation in the development of consciousness in relation to geographical conditions and social background (Daly and Mjelde 2000; Mjelde 1987, 1990, 1993). This point of view is of fundamental significance for all pedagogy. It indicates that the child is not to be viewed first and foremost as a biological

being to be socialized through norms and values so as to develop his or her cognition; rather, the child is a social being who develops her/himself through human interaction and language, through the internalization of the norms and the acquisition of whatever knowledge is particular to the time in history and the place on earth where that child is living. By so doing, she or he adds to the continuity and trajectory of the society and its culture.

Consequently, language and communication are fundamental both to human mental activity and to the development of each human generation in society. Human beings have developed language, thought and consciousness through work (activity) and cooperation. Vygotsky uses the concepts of word and meaning as basic tools for investigating the development of language and thought processes. A person does not learn a word's significance without the word being associated with its meaning (its socially created connotations [contextual meanings] and denotations [generalized or abstract meaning]). Individual experience can only be communicated beyond the experience of the individual when it is organized into categories that are confirmed and verified by other participants in society through established conventions and customs. Meaning is comprised of units of these implicitly common categories. The generalizations or denotations that are implicit in the categories simplify the complexities of experience. they enable science to develop and far-reaching plans and goals to be devised and implemented through time and across space.

Without simplifications and symbols to organize them, the higher forms of human interaction and cooperation would not be possible. Society needs systems of mediation for determining and categorizing what is rational and intentional in the actions and thoughts of its members. This system of mediation is language, the basic units of which are words and meanings. Thus, words and meanings are tools developed through verbal and written interactions between members of society. In the course of striving to understand one another and become members of good standing of society and its component parts we create new internal monologues in which our own experiences are measured against and contrasted with the conventions and generalizations of the society and culture. Meaning and real life understanding are core concepts for philosophers of language such as V. N. Voloshinov, M. Bakhtin and L. Wittgenstein. These philosophers of language argue that in normal everyday life, meaning is seldom denotative; it is not abstract or general; nor is it separated from a living social context. In a word, everyday meaning is always special, concrete, inductive and interactive (Mjelde 1993. 35).

To sum up: a major feature of Vygotsky's thinking is that human beings learn in a certain definite direction; from their social milieu to the development of the individual. Human knowledge and understanding are constituted by and arise from social relations and language, the key tools created by human kind for the organization of thinking. Mental activity is the result of social learning, of internalization of social signs, of social relationships and culture. Alexander Luria recalled that Lev Vygotsky referred to his psychology as instrumental, cultural and historical. As an epigraph to one of his works, Vygotsky quoted a citation inspired by Francis Bacon. "Neither the mind nor the hand can do much alone. The deed is brought to fruition through activity and cooperation." Another aspect of this way of thinking about teaching and learning is that by means of participating in practical activity one learns to develop one's mastery. The apprentice moves from one level to the next in the social medium of one's fellow practitioners under the guidance by the master and in cooperation with other learners. No man is an island. This talks to the traditions in workshop learning in vocational education.

Lev Vygotsky and Vocational Pedagogy

Lev Vygotsky, in his thought-provoking thinking now called the zone of proximal development speaks directly to the core of vocational pedagogy. Vygotsky's ideas have been known and utilized in the Western world in the last decades.. But these ideas have not been brought forcefully into the realm of educational management and policies; nor are they well known in vocational education research. Lev Vygotsky's scientific work sheds light on the experiences that vocational students and apprentices have acquired from

the learning arenas of present-day society, and also on their grasp of learning in the social relations of the school as compared to the social relations integral to the tradition of working life. In the school tradition, learning is separated from the real, local, concrete, contextualized understanding of life and of the concrete nature of everyday existence, namely the experience of working with others to make a living. This separation is neither as decisive nor as stark in the traditions of vocational training. On the other hand, one clearly sees how the development of vocational education at school, divided between the vocational trades on one side, and the general subjects on the other, is a development that has led to the impoverishment of broad and far-ranging education in the vocational trades. The hallmark of workshop learning in the field of vocational pedagogy is the relationship between concrete activities, whether they are in a kitchen or a mechanical workshop, beside a sickbed or an operating theatre in a hospital where learning and meaning are natural and concrete. Actions, words and meanings are integrated and stand together in the learning process. The learner has a distinct experience of meaningfulness and usefulness as she/he learns and expands hers/his zone of proximal development. A profound understanding of this interactive learning in the context of work is lacking among most policy makers¹³.

Vygotsky speaks to another aspect of vocational pedagogy, namely that learning occurs in the course of interacting and cooperating with others¹⁴. Vygotsky maintained that the thinking processes of any individual must be understood as a form of internal speech that has been transferred and internalized from its starting point in social interaction. His point of departure is that the learner moves dialectically between spontaneous self-reflective learning and a more scientific and logically-oriented form of learning. Concepts that children learn on their own, spontaneously by participating in physical and spoken interactions with other human beings, are what he refers to as everyday concepts. On the other hand, those ideas and concepts that the child acquires through an explicit and systematic assimilation of the material to be learned, into what s/he already knows, are called intellectual or scientific concepts, and are frequently defined theoretically with the help of other words. For example, an everyday term like “dog” can be put through a hierarchy of scientific concepts such as animal, vertebrate, mammal and canine. The learner’s appropriation of a word’s general and comparative meaning is extremely dependent upon being put into a special context. If the learner has not experienced a certain life situation, the learner’s comprehension of the words that generalize experience remain incomplete until everyday life introduces experiences that give a greater depth of understanding to that particular generalizing word. This process takes place in the most immediate zone of development, in the necessary interplay between the learner’s inductive experience (which gives rise to word sense) and the deductive, generalizing, teacher-directed instruction (which helps expand understanding of generalized word meanings). If one is lacking in rich experience with the multi-faceted nature of words and their significance, one does not learn to evaluate a word’s full meaning in one’s society, culture and historical moment (Daly and Mjelde 2000; Mjelde 2009). Lennart Nilsson’s (2004) work in vocational pedagogy stresses the aspect of time in the learning processes and emphasizes how important it is for the learners themselves to have control of how much time they need for solving the task. When the task is formed in relation to the learners’ own time perspective and the learner succeeds in finishing the task, this experience will lead to the mastering of new activities.

Vygotsky’s scientific work and the concept the zone of proximal development address the workshop learning and master-apprenticeship tradition, such as we can observe in vocational training within the crafts and industry sector. A definition of this concept is found in Vygotsky’s words.(1978.86) “It is the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers”. The concept of scaffolding is used to describe the supports and guidance involved in zones of proximal development (Wood, Bruner and Ross 1976). The concept is taken from the scaffolding in the construction site in the building trades. The scaffolding is the support that apprentices, be they children or adults, get when they are in the process of solving a task with which they can potentially cope. In the

same sense that scaffolding at a building site is a temporary structure, a scaffolding of assistance for the learning student is equally provisional. It is there to help the student carry out the assigned task, and then to be taken away. The scaffolding can also be interpreted from the perspective, or the mentoring of the teacher who is involved in the learning process together with the students; that is, the teacher here sets definite goals for the students' learning activity. Stieg Mellin-Olsen and Reidar Solvang (1978) have developed this concept in relation to, among other things, mathematical instruction. They use the concept of scaffold-building for the process that a teacher sets into motion when he or she gives guidance in mathematics. The goal is to get the learning process underway so as to hand over the accomplishment to the learner and thereby tear down the scaffolding. Tony Irizar and Adita Chiappy's work (in Mjelde and Daly 2004) on applying these ideas in the teaching of English as a secondary language in Cuba is also an inspiration to further development.

Moll (1990. 3-15) argues that it is the following aspects of Vygotsky's theory that have significance for understanding the zone of proximal development. holistic teaching and the mediating and bringing about of learning and change¹⁵. By mediated learning he means that words and language are the tools that act as intermediaries and bring about internal human activity. Vygotsky criticized traditional teaching for having an atomistic view of learning. Among other things, he felt that both the splitting up of school subjects and the parcelling out of teaching content into individual subjects contributed to the elimination of the meaningfulness of the individual subjects. Knowledge, he argued, cannot be taken out of its natural context and passed on in isolation; it can only yield meaning and create motivation if it is taken up as a part of a whole. Another of his major principles is that learning occurs through the internalization of processes that, in the first place, the individual carries out together with others in her/his surroundings or habitat. As an alternative to traditional mediatory pedagogy, Vygotsky proposed a form of teaching that involved the development of higher psychological processes through an active cooperation between the teacher and the student collective, and which stimulates each individual to attain a new level of personal development, in relation to each other and to the teacher. Vygotsky (1962.104) wrote "the only good kind of instruction is that which marches ahead of development and leads it; it must be aimed not so much at the ripe [functioning of ripeness] as at the ripening function".

I have described this process graphically in the following way:

Figure 2. The spiraling process of learning and teaching in apprenticeship traditions

Learning site workshop	The Adaptation of the Learning Processes	The Student/Apprentice Zone of Development
<p>Learning as an integrated, cumulative process. The integration of hand, mind and heart. Learning and meaning created through goal oriented activity.</p> <p>Lev Vygotsky. Neither hand nor mind can do much alone. The deed is brought to fruition with tools and cooperation.</p>	<p>The goal is reached. The apprentices are mastering the task and have reached the next zone of proximal development.</p> <p>The new level is now the actual zone of development which creates the bases for further learning.</p> <p>The master has developed his/her skills interaction with the learners and created a better basis for teaching the activity of building a boat or writing a thesis.</p>	<p><i>The next zone of development</i></p>
<p>Development through interaction and crisis.</p> <p>Mikhail Bakhtin. It is in the tensions and confrontations between different voices that new insight and understanding come into being.</p>	<p>The master + the apprentices decide on the next level of development.</p> <p>The apprentices interact and negotiate. Their understanding of the details and significance of the task.</p> <p>The master demonstrates, instructs and explains.</p> <p>The apprentices train and repeat, assisting each other with the assistance of the master.</p> <p>The apprentices perform the tasks without assistance.</p>	<p><i>The nearest zone of proximal development</i></p>
<p>Learning by Doing Luria . to move from the simple and concrete to the complex and general.</p>	<p>The master and the apprentices map and determine through tools and meditation what the learners are mastering in a field. This makes the basis for the adaptation of the teaching processes towards the nearest zone of proximal development.</p>	<p><i>The actual zone of development</i></p>

■ Liv Mjelde (1987,1990, 2004, 2006, 2009, 2011, 2012, 2013).

I have described the learning processes as an escalation process. The learning site is the workshop and the master and the apprentices map and determine together through tools, cooperation and mediation what the learners are mastering in a field. This makes the basis for the adaptation of the teaching and learning processes towards the nearest zone of proximal development. The master and the apprentice decide on the

next level of development. The apprentices interact with the master and each other about the details and significance of the task. The master demonstrates, instructs and explains. The apprentices train and repeat, assisting each other with the help of the master till they perform the tasks without assistance. They have then reached the nearest zone of proximal development. This is a process with learning through praxis and cooperation. The apprentice reaches a new level in the spiral which now becomes the actual zone of development; this in turn creates the basis for further learning. The novice moves through these stages: from apprentice to journeyman to master. The goal is being reached. The apprentice has become a master. These are similar processes whether you train to be a carpenter, a plumber, a medical doctor, a teacher, a nurse or a scientist. The activity itself is the rotation point for learning.

Conclusion

The development in vocational education is full of paradoxes and dilemmas, but many of today's concepts stem from the findings of Vygotsky and his followers. "Activity theory" is a concept coming out of this tradition (see Portes and Salas 2011). "The master-apprentice learning model", "learning through activity", "situated learning", "social learning" and "learning by doing" are now important conceptions in the academic debate about learning. The master apprenticeship model has been rehabilitated. (Kvale 1993; Nielsen and Kvale 1999) The anthology (Coy et al 1989) entitled *Apprenticeship. From Theory to Method and Back Again* is the result a group of social anthropologists taking up the theme of learning by doing and through social relations, as the contributors observed in many different learning situations around the globe. A common feature of these works is their rootedness in the Cultural-Historical School of Moscow and Lev Vygotsky's work. These ideas are seldom brought into the general debate concerning the problems of vocational education today.

Given the way the educational system has developed to the present, we have a hegemonic situation where both general academic and vocational education separate knowledge from experience, theory from practice, thought from action. A course of studies that takes into account all these factors and incorporates hands, heart and brain, conceptualization processes and their practical exercise is necessary for a better education for all. Similarly, a working life wherein one can advance with experience and maturity, where the mechanic can become an engineer, and the caregiver with a craft certificate can, stone by stone, build her/himself into a nurse, radiographer, or doctor, is essential if we are to achieve a better life for all (see also Freire 1997,1998). Contradictions in the present-day school show the limitations created by sectional interests in society. This is strikingly evident when one tries to use one generalized school and education system as an instrument for bringing about social change across society. In other words, one comes up against the interests of the powerful and the conventional social boundaries, between conceptual and practical knowledge, between individual-based conceptual learning and social learning and activities. This is particularly evident when one tries to create both a common school and conformity through education – especially in a society that is not nearly as equal and united as the politicians assure us it is.

But to clarify the contradictions as they appear in the curricula of the vocational trades in the upper secondary school is not to deny that some are better than others. Flexibility and response to local conditions are needed. But it is important to put forward an understanding of both sides of this human activity, both the practical workshop tradition and the scholarly general education route. They should both be taken up, but in such a manner that they are encouraged to enrich one another. Contradictions can also be made fruitful when they are analyzed openly and plainly, made conscious and comprehensible, and thus capable of contributing to wider democratization of the school and education in general through development of pedagogy for all. As Tor Halvorsen wrote in 1994:123). "Perhaps future research work in vocational education and working life will establish knowledge that shows the ideal paradigm of the unified schools is atypical when seen in a historical light, despite the hegemony that this cultural inheritance has today."

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- ¹ Masters and doctoral theses are important for new empirical knowledge in the field. I have been teaching vocational school teachers in writing their Masters Theses at Akershus University College in Oslo for the past decades. I have also developed a Masters Program in Vocational Pedagogy in Kampala, Uganda for vocational teachers from Uganda and South Sudan. Students at the Institute of Sociology, University of Bergen have also made important contributions in later years (see Flaten 1999; Vogt 2013; Olsen et al. 1998; Olsen, 2013).
 - ² The concept "pedagogy of professions" has developed in relation to these contradictions in higher education.
 - ³ Boel Berner said in 1989 (p.19) that school problematic in Sweden is being discussed as if there were no difference between general education and vocational education and as if vocational education does not exist. We have found the same situation in Norway during the past 30 years. Erling Kokkersvold and I called it in 1982. "The Vocational school that disappeared". Research interest has increased during the past decade. But the history of vocational education in Norway is not written yet. Claude Grignon (1971) has written an excellent book on the topic in France. "L'Ordre des Choses".
 - ⁴ Vocational education in schools expanded during the war years. In 1939 28 craft and industrial workshop schools existed in Norway. In 1945 the number had risen to 42 (Mjelde1993.72).
 - ⁵ Laws and policies governing the educational system in Norway are created by parliamentary decisions. The schools system is public and free of charge. Few private schools exist.
 - ⁶ Reform 94 was a reform specifically directed toward upper secondary education, vocational and general education for the age group 16-19. It is called Reform 94 because it was implemented in 1994. Kunnskapsløftet "The Knowledge Promotion Reform" was a reform introduced in all primary and secondary schools in Norway from 2006. The overall goal of that school reform was to increase the level of knowledge and of basic skills of all pupils. The reform of 2012-2013 was also directed to all levels of the educational system .
 - ⁷ Drop-out problems have existed in Norway since the 1960's as elsewhere in the Western industrialised world. OECD point out in their report from 2016 the growing risk of social exclusion among early school leavers. Only lately has Norwegian authorities turned its attention to these problems. A reason for this attention might be that Norway is performing poorly in the Pisa-evaluations.
 - ⁸ Paul Willis (1977) and Henry Giroux (1983) showed in their empirical work how the working class had a collective resistance against a system that had no relevance to their lives. Paulo Freire (1970) attacked the traditional school for having a "banking concept of education", in which the student was viewed as an empty account to be filled by the teacher. This is the pedagogy working class students rebel against. (See also Jarbas Novelino Barato 2011, 2016, Rose 2014).
 - ⁹ Tove Lien (1984, 1995) has carried out empirical investigations concerning these questions in the context of adult education. Adult education and vocational education in crafts and industry trades are two sides of the same coin.
 - ¹⁰ The Chicago School with John Dewey and his laboratory schools as a central figure, Georg Kerschensteiner with his activity schools in Munich, Celestin Freinet with his print schools in Vence worked in the same time period as Lev Vygotsky. I have discussed their work in other parts of my writings (Mjelde 2006, 2015 a, 2016.)
 - ¹¹ For a more general discussion see Mjelde 1993.33-47.
 - ¹² C.B. Macpherson (1962) provides an excellent analysis of "egocentric individualism" that has permeated modern western and political thinking in the last centuries and has come to be regarded as the "natural order of things".
 - ¹³ I am not saying that the relationship between meaning, meaninglessness and learning is solved in vocational education. Far from it, the deep split between workshop learning, vocational theory and general classroom teaching is just as destructive of vocational education now as it has been earlier in history. And the lack of real practice-based activities in classroom traditions are as destructive as in academic education. What I am stressing is that we now understand these contradictions to a greater

degree than ever before. The content in the curriculum is another serious question far from solved. Technological change in the trades is another important problematic demanding new solutions.

¹⁴ We have been practising this in a Master course in vocational pedagogy at Kyambogo University, Kampala, Uganda with students from South Sudan and Uganda. 54 of 61 students finished their Masters theses on time (See Mjelde and Daly 2012, Mjelde 2015 b).

¹⁵ I am not content with the concept *holistic*. Perhaps *integrated teaching and learning* is better.