

Vocational Teacher Education A Norwegian Context

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The purpose of this paper is to present the development and status of vocational teacher education in Norway, and to discuss its contemporary philosophy, structure and content. As there is no very clear definition of the term vocational education, the concept is elaborated and discuss. For the same purpose a historical overview is included and discuss in relation to other forms of teacher education. Didactic as a curriculum theory of practice and critical reflection was used as a theoretical reference for this study. The analysis are mostly based on historical documents, government policy documents, written laws and the contemporary national curriculum of Norway. Some personal field experience from teacher education since the late 1980's was also taken into consideration. In the end there is a critical discussion on vocational teacher education, its purpose and role in a post modern society compare to other forms of teacher education.

Introduction

Organized vocational education in Norway has a long tradition that originates from the guild system. However, before that there were skilled craftsmen and women in many fields. Their skills and aesthetic sensibility can be observed in works like the Viking ships, the Stave churches, textile works and other old artefacts. However, research and papers on vocational education, and vocational teacher education in particular, is not so often to see. It's a pity, because a modern welfare state will require craftsmen and women with high quality education. This fact indicates we should do more research in this field.

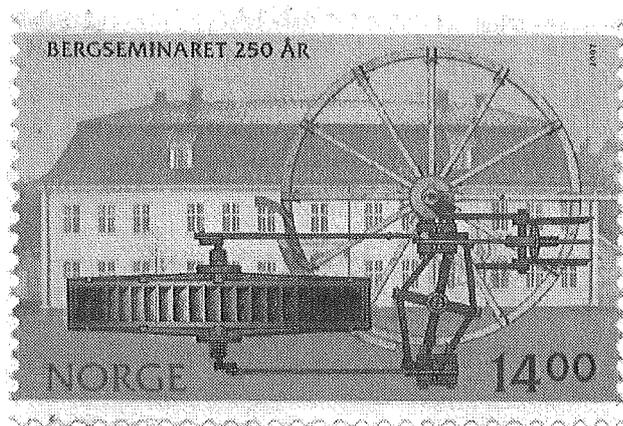


Figure 1 Bergseminaret in Kongsberg, 1757ac

Organized vocational training was introduced in Norway by German guilds about year 1400ac. They gave organized apprentice training in the workshops, but not in regular schools. However, the system has been developed over many years. In Kongsberg a well organized apprentice system was introduced in 1717. The apprentices could also attend lectures at Bergseminaret, the first mining seminar in Europe, which was opened in 1757. Later, lower technical and industrial education was established, and from 1875 theory in technical evening schools became compulsory for all apprentices in both crafts and industrial branches. Today there are nine main branches offering a combination of 2 years of full time vocational education in schools and 2 years of apprentice training in a workshop, (Aakre:2005). All education

is free of charge. The first vocational school on daytime was *Bergen Navigasjonsskole*, a school for seamen. It was probably started in 1639, about the time the first Norwegian, blacksmith Peder Bartholdsen, came to Japan via Nagasaki. The first vocational school of agriculture was *Sem landbruksskole*, opened in 1825. They also gave some training in wood and metalwork for making own tools. In wood and metalwork the first vocational school on daytime was *Holmøy Arbeidsskole*¹,

¹ *Holmøy Arbeidsskole* is now *Eid Videregående skule*, <http://cid.vgs.no/>, a combined school for general and vocational education. *Christinaia Kvindelige Industriskole* is now part of *Oslo University College* as the *Faculty of Aesthetic Education*, <http://www.hio.no/content/view/full/1225>. *Bergen Navigasjonsskole* changed name to *Bergen Sjømannsskole*, now part of *Bergen Yrkersskole*. *Kongsberg Bergseminar* is now the *Norwegian University of Science and Technology (NTNU)* in *Trondheim*, <http://www.ntnu.no>.

established in 1858. A similar school for girls was started in 1875, *Christiania Kvindelige Industriskole*. This school also played a core role in vocational teacher education for women since the 1880's. All schools still exist, but with different names.

Teacher education has become a frequently discussed topic in recent years, both in Norway and many other countries. The main reason seems to be the fact that most research concludes there is a close relation between the performance of the students in school and the competence and qualification of the teachers. Norway spends a lot of money on education compared to many countries, and we like to believe our school system has high quality standards. However, international tests like the PISA indicate that Norwegian students, especially primary school, make low scores on important basic topics like reading and calculation. Though these tests only give a narrow picture of the situation, teacher education has become a main topic discussed both by researchers, in the media and by the public in general, (Fladeberg:2006). Just now there is a tense discussion on whether Norway needs to introduce a master program for all teachers in the future, vocational teachers included.

Some years ago there was a tendency to believe that vocational education had lower quality. However, maybe the situation now is the opposite: There is a time for general teacher education to learn from vocational education and vocational teacher education, especially when it comes to learn from practice and real life situations?

Theory and method

Didactic is a core concept in educational science in the German speaking countries and Northern Europe. It is not only about teaching methods, as many seem to believe, but also how to communicate about education and critically discuss its purpose and role in our society, whether it is general or vocational. Therefore, to support the discussion I chose to use critical-constructive didactic as a theoretical reference for this study. The theory has been developed over a long time since the concept "didactic" was introduced by the Czech educator Comenius about 1630 ac. In *Didactica Magna*² it was called the "art of learning". The idea of work in *Arbeitschule*³ was also integrated into this concept.

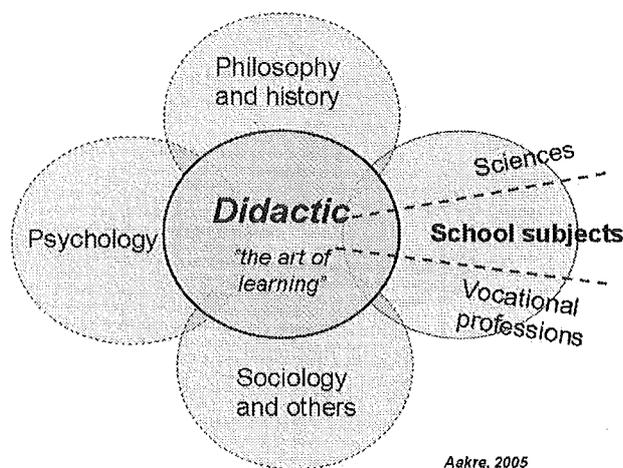


Figure 2 Model of didactic as a science of education

The latest and most modern version of didactic often refers to the German educator Wolfgang Klafki, who introduced a modern concept by integrating *critical reflection* from critical theory⁴, (Klafki:2001). In the Anglo-Saxon countries, like England and USA, the concept didactic is not so often used. However, the same concepts and elements are found in terms like "education", "curriculum" and "instruction".

Klafki differentiates between two main concepts: "general education" and "specific education". The first category raises questions related to general education for all. The second category is related to more specific education for a certain vocation or a certain scientific field. For instance: in vocational education we use the concept "vocational didactic", or "yrkesdidaktikk" in the Norwegian language. Didactic is unique in the way it is both an

² The first version of *Didactica Magna* was probably published when Comenius was living as a refugee in the Bohemian mountains, (Piaget:1993).

³ The most influential educator in this respect was George Kerschensteiner, but also influenced by Pestalozzi, (Myhre:1991:135).

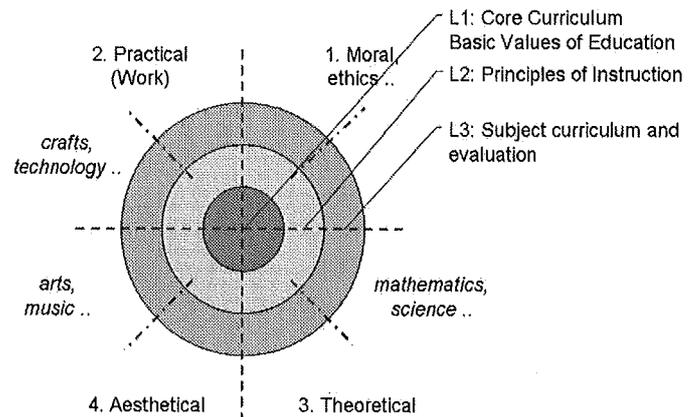
⁴ I prefer the version of critical theory formulated by Jürgen Habermas, (Habermas:1981).

analytical and normative science. The reason for this statement is the fact that education always deals with cultural values and ethics in some way or another. In educational practice we have to make decisions on what is right or wrong to do, not only collect and analyse scientific data about education. We also have to communicate values related to the same data, and evaluate their impact on our society and culture. Therefore didactic includes elements from many sciences, like philosophy and history, psychology, sociology as well as content from the specific subject or the vocation a teacher is going to teach.

Vocational didactic, or "yrkesdidaktikk", is different from general didactic in the way it has its focus on the competences and characteristics of a specific vocation, not on school subjects or general competences for all. In vocational didactic we primarily analyse the requirements of a certain vocation to search for relevant contents and methods to be implemented in the specific field. On the other hand, we can not completely exclude knowledge from other fields. In most vocations some competences related to for instance mathematics are also needed, but the content in this case needs to be adapted to the practice of the specific vocation. Therefore, vocational education today also includes a great deal of general education, and you will find subjects like mathematics, science, language and others.

The discussion between general education and vocational education has already been introduced. Another question is at what age it should start, and whether it should be given in regular schools, in a workshop or a combination of both. The stereotype picture of vocational education might be it is some kind of simple training of skills, and of lower educational quality than education in general. This stereotype image may originate from the ancient Greek philosophers who did not include work, and especially physical work, as part of what educated people should do. Work, especially physical work they argued, was for the slaves to take care of, not the well educated. On the other hand, the Greek also developed the idea of harmony between soul and body. In their old curriculum *paedeia* they integrated many kinds of skills and knowledge, for instance both natural science and poetry, as well as philosophy and martial arts in their academia, or gymnasium, (Myhre:1991).

The idea of harmony was extended to include work by early pioneers of education in Europe, like Comenius, Pestalozzi and Kerschensteiner. Comenius even claimed that everything can be learned in a workshop, from general education to advanced skills in each crafts. Gradually an integrated curriculum was developed that included four main area of education: *moral* and ethics, *practical* work, *aesthetics* and *theoretical* knowledge⁵. All four areas became equally important in education, and they can still be found in most national curriculum documents in Northern Europe, for instance Norway, (KUF:1993). A theoretical model of this is visualized in the figure.



Aakre, 2005

The model includes three more analytical categories: L1, L2 and L3. L1 represents ideals and cores values of a culture. Ideas like freedom, equality, solidarity, truth and beauty are examples of such vales in the Norwegian curriculum. Harmonic integration of many types of skills and knowledges may also be part of this category, though

Figure 3 Model of a holistic integrated curriculum

⁵ An example: When the Parliament of Sweden (Riksdagen) discussed the implementation of *sloyd* in the public schools in Sweden in 1877, some representatives like Grefve Sparre argued that moral, theoretical, practical and aesthetic subjects should all be part of harmonic education. He also mention "teckningskonsten", as "the art through drawing", (Motionen i Andra Kammaren, N:o 134, p31).

it may rather be part of L2 as a theory of instruction. L2 may also include more explicit theories from psychology or sociology about what is good ways of teaching and learning. Some educators may argue that the structure of a certain subject is the most important factor, while other educators may argue that active participation by the students and their personal interests may be the most important in education. L3 represents what is going on in practice. Practice may some times be quite different from the espoused ideas or theories that are used in the curriculum document, by school administrators or the teachers. Educational research should look for lack of consistency between L1 – L2 – L3, analyse them critically and make inconsistency visible so improvements can be made.

Since 1993 the core curriculum in Norway is the same for both primary, upper secondary and adult education. However, the theories of instruction may vary on the different levels, and there always seems to be a discussion weather vocational education should be general or only very specialist. The German educator Wolfgang Klafki argues that there are always some overall topics, or universal problems, all education should deal with. He argues that even vocational education should deal with such overall topics or questions, and lists the following five:

Peace and mutual understanding, Klafki argues, is a fundamental ability that needs to be educated in all societies and cultures. Today we live in a global world and a common market that makes common understanding and cooperation even more important than ever before.

Environmental issues and awareness, how we use our natural resources and care for our common planet are responsibilities we all need to take care of. Environment also includes aesthetic aspect of life, how we plan and make or neighbourhood and our cities. Visual and spatial pollution could do just as much harm to human well being as pollution of the air.

Work is a third area that involves the basic needs, to have a decent income and to make a good life for one self and the family. We should also be critical on this issue: Some people seem to have too much, may be only work, and no leisure time. Others may not have a job at all. How do we provide jobs and educate our kids to have a job and to take care of a job is very basic. It involves both the specific skills as well as social and communicative abilities.

Differences and discrimination created by our society represents a fourth category of topics that should be questioned and dealt with in all education. Is it ok that most of the management in the society, or in companies, are run by men? Or should there be made changes towards more equalities between gender, between social classes and ethnic minorities?

Finally, modern technology is an issue that effect our jobs, society and living in many ways. How do we develop and use modern technology in our work, our leisure life and to improve our society and culture?

Main concept and historical background

The concept “vocation” seems to originate from the Latin word *vocare*, meaning "to call". The original meaning was calling for salvation. However, a more modern usage of the word became “calling for a life task”, probably introduced by Martin Luther, and later used as a core concept in ethic of work in the West. The protestant idea was that each individual was expected to fulfill his God-appointed task in everyday life. The legacy of this religious ethic continued to exert its influence in an increasingly secular world. Today, vocational education as a general term is related to specialist education for some kind of vocation or profession. The term profession is also often used, especially when we refer to higher education and professions like teacher, dentist, doctor, lawyer and similar jobs. Therefore, in most cases vocational education now refers to vocations obtained from upper secondary school, or some post secondary schools. Such vocations could be a skilled mechanics, a caregiver, an electrician, a florist or a

hairdresser. In some countries we also find the term "vocational college". However, in this paper I primarily refer to vocational education as part of upper secondary education, age about 16-20 old.

Historically there is a close relation between this use of the concept vocation, and compulsory education in Norway. The first formal schools though were established in 1153 ac⁶. However, they were academic school to serve the church and government. Organized vocational training can be traced back to the German guilds about year 1400. The historical background of this system I already explained. Finally, compulsory education for all was introduced in 1739, a school reform that influenced even secondary and higher education, (Tveit:1989:27). These reforms had their origin from the Pietist movement, and their school system in Halle Germany, that also emphasised *work* as a main category. From this system Norway and many other countries got the idea of *Realschule* as a non-academic school.

However, the first law of education in Norway had no special requirements about the teacher. For a long time the teachers, and especially the vocational teachers, had their own masters as model for good teaching practice. The first attempt to establish a teacher seminar was in Bergen about 1750, but it was not in permanent operation. After years of planning, the first two private teacher seminars for general teachers were opened in Kviteseid Telemark in 1818, and in Tromsø in 1826, (Dahl:1989). The purpose of the seminar in Tromsø was also to educate teachers for the Sami communities. In 1827 a new school law made teacher training compulsory, and several national teacher seminars were established.

Vocational schools in the field of agriculture were first established in 1825. The teachers of these schools also had training from similar institutions before they became a teacher, and no formal teacher training was required. However, in 1905 teacher seminars to train teachers for the gymnasium and other upper secondary schools were introduced. Today this system of teacher seminars, or PPU, still exist as one year study of educational science and practice, based on an already achieved university degree. Teacher education for women in handicrafts started about 1870, and for home economics in 1909. Finally we have industrial or technical education and technical vocational education that was introduced in 1856 and 1875. However, until the first formal law of crafts and industrial education in 1940, there were no special requirements of teacher training in these schools.

Today there are three types of vocational teacher education available in Norway: The most common way is still the PPU programme which includes one year of teacher training based on a university degree, like engineering, nursing or agronomy to mention a few of them. Then there is a second model based on a minimum three years of integrated program including both the programme study, for instance electric and electronics, and educational science in the same program. A master program in vocational didactic, "yrkesdidaktikk", was included in both programmes in 1978.

Finally there is a third model which are a kind of "mixed" integrated programs related to practical aesthetical subjects in elementary and lower secondary schools, and that are also subjects in upper secondary schools. The most typical one is teacher education in arts, crafts and design. This form of teacher education started about 1880, and was first formalised in 1936 to offer teacher education in handicrafts. A master program in Forming, "arts crafts and design", was included in these programmes also in 1978.

Policy, law and core curriculum

Since the 1950's the Norwegian government has been implementing a policy of equality between academic and vocational education. In 1974 a new school law was passed, and both academic and vocational programmes were integrated in many schools. Until 1995 teacher education was still conducted in special institutions and regulated by a separate law for each programme of study.

⁶ They were five Cathedral schools that still exist in Oslo, Hamar, Stavanger, Bergen and Trondheim

However, since 1995 all forms of teacher educations, vocational teacher education as well, are regulated by the same law of universities and colleges, and basically based on the same criteria. That also means it is up to each university to decide what kind of program they will offer, as long as they can comply with the law and prove the necessary qualifications for the National Bureau of Accreditation, NOKUT.

Though each programme has their own curriculum, there are some common requirements in all of them. Since 2003 these elements have been formulated in 5 core competences required by all teachers:

1. Competence in vocational programme and/or subject
2. Competence in didactic
3. Competence in social relations
4. Competence in change and improvement
5. Competence in vocational ethic

All teacher educations also require 12-24 weeks of guided practice in school

Based on the national core curriculum each university makes their own curriculum with all the details for the specific teacher education programme. Teacher education can be combined with both bachelor and master degree, as well as a PhD. Though there are more or less the same requirements for all forms of teacher education, there are different ways to become a teacher. The two main courses are:

1. Integrated programme, minimum 3 years. (Today, general teacher education is 4 years)
2. PPU, practical pedagogical programme, based on an already obtained bachelor or master degree. In this case the students take a 1 year programme with educational science and practice. Educational science consists of didactics related to the specific subject or a vocation, and general educational science, often called pedagogy.

Teacher education can be combined with almost any university or higher education, as long the candidate choose vocations or subjects that are thought in basic or upper secondary school. The structure of the university system in Norway is shown in the figure below.

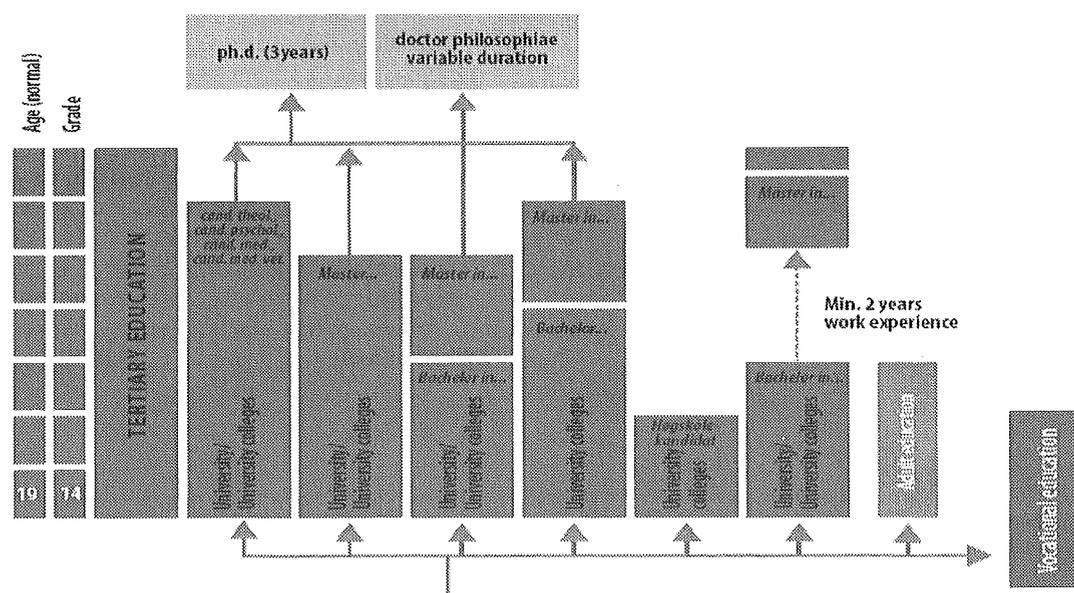


Figure 4 Teacher education as part of higher education in Norway

Examples of vocations are electrician or care giver, and examples of school subjects are arts and crafts or Norwegian language. However, for instance archaeology or art history are not school subjects, and can not be chosen as a main subjects in teacher education.

Higher education in Norway is now adapted to the Bologna process⁷, as one of the first countries in Europe, even though Norway is not a member of EU. The structure of higher education in Norway today is shown in the figure.

The concept “*vocational college*” is not used in Norway, but vocational education and adult education include some post secondary schools of 1-2 years, more related to practice than a university. The most common one is a 2 year post secondary school called “Teknisk fagskole” for industrial skilled training. They are regulated by a separate law. Now also other fields like health and social care has such schools based on the same law, and there is a discussion on implementing a formal system of vocational colleges. These schools can also be integrated as a part of vocational teacher education.

On the other hand, since 1994 it has been easy in Norway to transfer from vocational courses to university. Some universities also offer special programmes for this. The “Y-course” for engineers at Telemark University is one example of this, and has proved very successful. This programme was rewarded the Government price for best innovation in education in 2008.

An overview of the general requirements of teacher education in Norway today is included in the table below.

Table 1 General requirement for teacher education in Norway. (60 credits = 1 year)

Content	Integrated programme	PPU programme
Preconditions: Special entrance criteria for vocational teacher education	Certificate + follow up + 2 years practice	2 years practice
1. General study of vocation or subject	90 (1,5 years)	A relevant bachelor ⁸ 180 (3 years)
2. Specialist study of vocation or subject	60 (1 year)	
3. Educational science	30 (+30) ⁹ (1 year)	60 (1 year)
4. Practice	12-24 ¹⁰	12-24
Sum compulsory program	180 (3 years)	180+60 (4 years)
5. Elective studies:		
a. Extra courses	30-60 ¹¹	30-60
b. Master program	120 (2 years)	120 (2 years)

⁷ The Bologna process refers to a decision in Bologna in 1999 that all countries in Europe would develop a university system that makes it easy to transfer from a university in one country to a university in another country. The system are based on Bachelor, Master and PhD degree, and the credit system ECTS, which means European Credit Transfer System.

⁸ A relevant bachelor or master could be for instance engineer or nurse

⁹ 30 credits of educational science are integrated in the general and specialist study as subject didactic in the integrated programme

¹⁰ Vocational and subject teacher need to have 12-14 weeks of practice. General teachers have to take 21-24 weeks

¹¹ General teacher education is 4 years, or 60 credits extra. There are also offered a variety of extra courses from 10-60 credits. However, minimum 60 are required for higher status and salary, like “adjunct”

In spite of many similarities between general teacher education and vocational teacher education, there are some differences, for instance when it comes to the entrance criteria: In vocational teacher education the students need to have minimum 2 years of practice, and if he or she has a regular vocation course from secondary school, about half a year of follow up in subjects like mathematics and language are needed. General teacher education can be entered directly from upper secondary school. The criteria are visualised in the table.

Content of vocational and subject education

Vocational teacher education in Norway is related to vocational programmes in upper secondary school. Therefore, we need to be familiar with these vocational programmes. The main structure of upper secondary school is shown in the figure below. From first year, age 16, the students have to choose between vocational course or general course. The first two years are a combination of general and vocational education in school, and the last two years are apprentice training in a workshop. However, after second year, the students in vocational course can change direction into a general course.

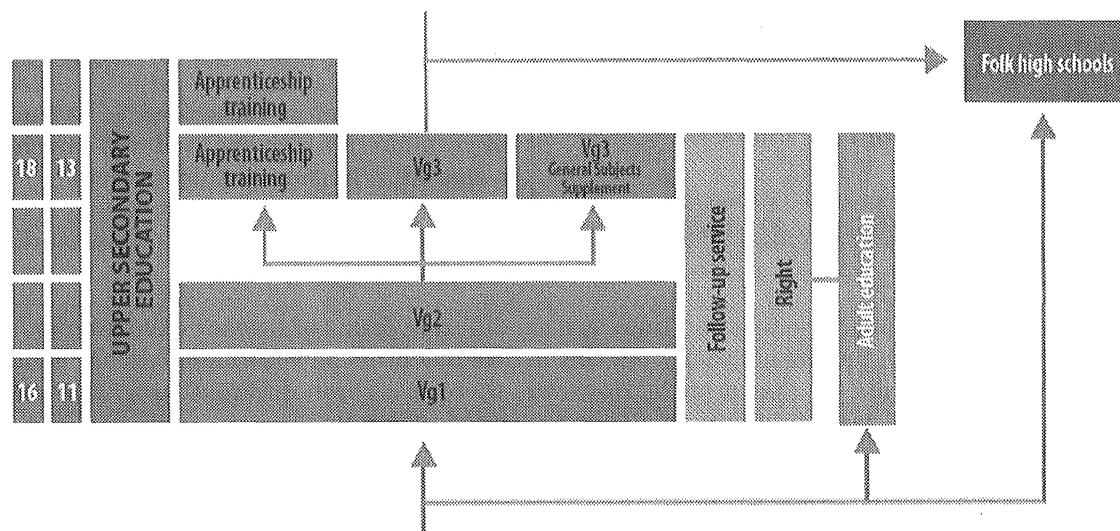


Figure 5 Structure of upper secondary education in Norway, (Age 16-19)

Since the 1970's there have been many improvements of vocational education in Norway. In the 1960's and 1970's there was a trend towards organizing most upper secondary education in the school, very much according to the American high school model. However, gradually there was a shift towards more emphasis on field training in practice. Since 1994 there has been a well organized system based on a 2+2 model: 2 years of combined general and vocational training in school, followed by 1-2 years of specialist training in a workshop or business based on an apprentice contract. The companies are paid by the government to take care of and teach the apprentice. As the students in Norway has a legal right by law to complete their programme, those who can not have a contract with a workshop or company, are offered specialist training in the school, or take a follow up general course¹².

¹² The companies tend to prefer to make contract with the best students, especially students with high attendance. Therefore it is often the students with problems in school that are not able to have a contract. Many of these students also tend to drop out of the programme.

From first year the students have to choose either a vocational course or a general course. Today about 50% of the students in Norway choose to take a vocational program in upper secondary school. The vocational course includes 2 years of education in the school based on a rather broad program, and 1-2 years of apprentice training in business. The first year in school consists of common topics for the branch of study, for instance electric and electronics or design arts and crafts. In second year the students need to choose specialisation. Those in electric and electronics may choose electronics, while those in design, arts and crafts may choose a special course in design and textile from the second year. Today there are 9 vocational programs and 3 mixed practical aesthetic programs. In the table below they are listed together with the main courses in primary and lower secondary school:

Table 2 Vocational programs in upper secondary school (grade 11-13)

Vocational programs (2+2 years)	Practical aesthetic programs (3 years)
1. Programme for Building and Construction 2. Programme for Design and Crafts 3. Programme for Electricity and Electronics 4. Programme for Health and Social Care 5. Programme for Media and Communication 6. Programme for Agriculture, Fishing and Forestry 7. Programme for Restaurant and Food Processing 8. Programme for Service and Transport 9. Programme for Technical and Industrial Prod.	10. General education with speciality in: 10a. Arts, Crafts and Design 10b. Sports 10c. Music, Dance and Drama Note: In addition to these there is a General programme in which the students can choose to specialize in general subject areas.

Based on the structure of higher education there are six different forms of teacher education in Norway. Two of them were already mentioned briefly. As this article has focus on vocational teacher education, I choose to start with details on this branch. However, there are three different programs related to vocational teacher education explain that should be explained in details:

1) Practical pedagogical seminars (PPU) was first introduced in 1905 for those who had a university or college degree, and wanted to become a teacher in Gymnasium or Vocational schools. Schools for agriculture were the first vocational schools to introduce such a program compulsory for their teachers. Today, this is one year of educational science and practice on top of a university or college degree, and also the most common way to become a vocational teacher as well as a subject teacher in upper secondary school. In Vocational teacher education they normally take only one main subject, for instance the programme for electric and electronics or health and social care. Subject teachers for general courses normally have to take two main subjects, for instance mathematics and natural science.

2) An integrated programme for special subject teacher education was first introduced in 1909 for teachers in home economics. A similar program for women to teach handicrafts already existed since the 1870's, but not formalised until 1936 when drawing and handicrafts were made compulsory in all primary schools. Today it is continued as a three year integrated program in arts, crafts and design education and a master program was included in the program in Telemark and Oslo in 1978. This branch of teacher education is aiming at education in arts, crafts and design in lower and upper secondary schools. Today this program is a combination of a teacher education and a vocational education.

Since 1994 this branch of teacher education has been further developed to include other practical aesthetic programs like music, dance, drama and physical education. The timing has to do with implementation of such programs in upper secondary schools.

3) An integrated programme for vocational teacher education for crafts and industrial education was introduced in 1947. However, this system was laid down in the 1960's because very few students chose a career via this program. The majority prefers the PPU programme explained in paragraph 1. However, a new integrated programme was introduced in 2000 for vocational teacher education, covering all the main vocational studies in upper secondary school. The basis is a 3 year integrated study to become a vocational teacher. A master program in "yrkesdidaktikk" was introduced in 1978. Now the students also can take a PhD program, but so far not many students did. On the other hand, this new system seems to suffer from the same problem as that of 1947: very few candidates enter these programs. Therefore the seminar model explained in paragraph 1, based on a university degree, still seems to be the normal way to be a vocational teacher. Personally I, and many other educators, tend to think this is also the best and most flexible model for the future, (Frøyland:2007).

4-6) Category 4 to 6 is not so relevant in this context and should be explained very briefly. Category 4 is subject teacher education based on a university degree and extended with a PPU, but for teachers in regular school subjects like language, mathematics, social science and others. Some few vocational teachers may have this background, but not very many.

Category 5 is general teacher education that covers all subjects and all grades from 1-10, both primary and lower secondary schools. This is a four year integrated programme the majority of teacher students enter. But they seldom become a vocational teacher.

Finally, category 6 is preschool education, which is a three year program that can also be extended to a master program. Some of them become a vocational teacher, for example to teach upper secondary students who are going to be kindergarten assistants.

Content of general and specialist study

In order to explain the content of vocational teacher education in details, I chose to explain the program for integrated teacher education in arts, crafts and design. In this model educational science is integrated into a complete program of 3 years for a bachelor or 5 years for a master. It is also possible first to take a bachelor or a master, and after that one year of science of education which is part of the integrated program. However, this will take one extra year.

The content of the vocational or subject study varies within the different programs described before. In most cases vocational teachers have a bachelor, or master, of science and some years of practice, before they decide to become a teacher. However, normally they need to have minimum 90 credits of basic studies, and 60 credits of specialized studies. After that they have to take 60 credits (one year) of practical pedagogical education (PPU), including the five competence areas mentioned above. In this case they do not take any subject study, but need to take vocational or subject didactics. This area includes how to plan, conduct and evaluate teaching and learning. It also contains the history and background of the specific vocation or subject, its typical structure as well as critical reflection on the purpose and quality of this type of education in a modern society.

The content of an integrated program, category 2 and 4, is easier to describe. It is also more or less the same for both vocational teacher education and special subject teacher education in for instance arts, crafts and design. Normally they first need to take 90 credits of many areas of the vocation or the subject they study. After that they need to take another 60 credits special courses in the field they like to specialize. For the 90 credit study a teacher of Arts, Crafts and Design may need to take credits from drawing and picture arts, visual communication, crafts of textile, wood, metal and ceramics as well as art history. For the final part, the 60 credit study, the student may choose to take for instance design and technology or design and textile.

Table 3 Example: Teacher education, integrated programme in arts, crafts and design¹³

Program	Year	Practice	Pedagogy	Didactic ¹⁴	Main subject	Other
Master	5	-	-	Integrated	Master thesis (60)	-
	4	-	-	(12 int.)	Special study (30)	Science (18)
Bachelor	3	3 weeks	-	(10 int.)	Elective special study (60): Design and Technology, Textile, Metal, Wood, Ceramics, Visual Art and ICT or Folk Art	
	2	6 weeks	15	(10 int.)	Arts, Crafts, Design (35) + subject didactic integrated	Art and Design History (5)
	1	4 weeks	15	(10 int.)	Arts, Crafts, Design (35) + subject didactic integrated	Art and Design History (10)

A teacher student in electric and electronics may need to take basic courses from both fields for the 90 credit study. Then, for the specialized course he or she may choose to take courses like energy production, automation, avionic, electronics etc. There are so many options they can not all be listed here.

Vocational instructors in workshops and companies

There is one more important question to elaborate: What about the two apprentice years the students take in a workshop or company? Do they have any teacher or guidance during their apprentice years? Yes, there is a formalized system based on the national Law of Education, (Lov:1998:§4-3). The workshop or the company do not need to have a vocational teacher with full vocational education, but they have to be approved by the educational ministry in each county, the line of business organisation and their agency for vocational training. Big companies normally have such a unit inside their own organisation. Smaller workshops normally have such a unit for the "guild" that serves many workshops or small companies.

Formally the law requires personnel who are well qualified in the specific vocation they have apprentices, and the law requires a head of the unit and "one or more instructors" to conduct the training and counselling according to law and curriculum. In 1994 modules of 1-3 weeks courses were introduced for this category of instructors. Some of this training are conducted as distance education. In the late 1990's I was myself involved in conducting such courses, and we also designed a one semester university course in Vocational Counselling, (Aakre:1997).

The main content of this training is how to plan, conduct and assess in service training. How to communicate with the apprentice and the staff and how to counsel the apprentice is also important part of this course. . The system is very much based on the idea of "master learning". However, many instructors may take a one semester course in pedagogy or counselling or education with similar content. In many cases the head of the unit may be a full time vocational teacher, and in some cases in collaboration with the local vocational school.

¹³ Numbers refers to credits. 60 credits = 1 year. EETS refer to credits according to the European Credit Transfer System, ECTS. One year of full time study is normally 60 ECTS. That means you need minimum 180 ECTS for a Bachelor and a 300 ECTS for a Master.

¹⁴ In an integrated programme didactic related to the subject or vocation is integrated in the subject, (marked "int." in the text)

Content of educational science

The content of educational science is more or less the same for all teacher education programmes in Norway. However, in vocational teacher education we use the concept of vocational didactic - "yrkesdidaktikk" - in stead of general didactic or subject didactic. That means there are more emphasis on analysing and understanding the qualifications needed in a certain vocation or profession, and not so much focus on regular school subjects. But all forms of teacher educations are guided by five main competence areas mentioned already.

Vocational and subject competences form the bases for being a good teacher. They include both practical and theoretical knowledge in the specific vocation, as well as in some core general subjects related to science and research on which the vocation may be based. Each Vocation also has to be understood in relation to other vocations and professions in our society. Both general and specialist knowledge in these fields also plays an important role as ideals and models for the students, as well as their parents and the society as a whole.

Didactical competence theory and practice

The core of educational science is didactical competence as it is the unique science different from other professions. The central point of didactical competence is to prepare for and help the students to learn to learn in order to develop their personal formation and to contribute to our society and culture in a meaningful way. Therefore didactical competence has to start with the true understanding of personal identity, the purpose of education in general, as well as the practical implementation in schools, both in a historical and contemporary context. This makes curriculum analysis and instruction in a historical and contemporary context a core science for this purpose.

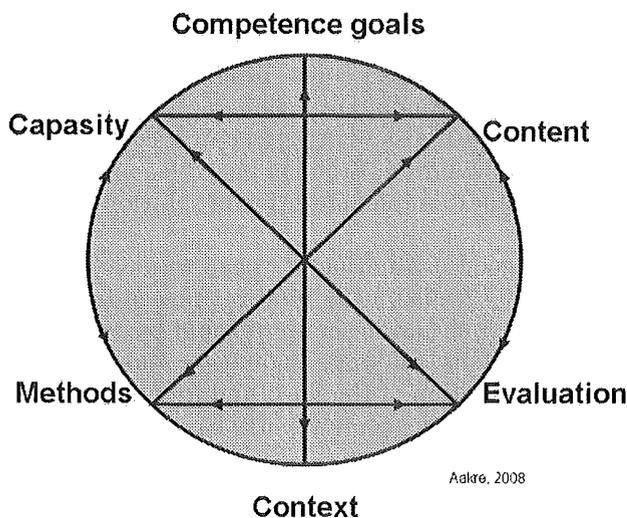


Figure 6 Theoretical model for educational planning and reflection

education in Norway. The model has six categories that interact with each other, and therefore need to be analysed and considered when the teacher makes his or her planning, weather it is for as short session or it is for the overall planning of a semester or a year. The categories are 1) Competence goals, 2) Capacity or ability of each students, 3) Content to be learned 4) Methods to be use by the students as

¹⁵Didactic is also about analysing the conditions and need of students with different skills and abilities, to choose proper content that is educational, and to implement the best methods and strategies for the students to learn. A good teacher should not only be able to follow a pre made plan, but able to develop such plans by him or herself. Planning also involves preparing for students with special needs. Finally, assessment, testing and improvement of both programmes and student learning processes are part of this activity.

Learning and teaching are seldom a linear process with a specific start and a certain end. They are dynamic processes that depend on interaction between many different factors. A classroom is like an ecosystem. Therefore the model, or method, shown in the figure is commonly used as a starting point throughout all years of teacher

¹⁵ This model is commonly used in Norway since the late 1970's. It was probably first introduces by Sigmund Lieberg and Bjarne Bjørndal.

well as the teacher to reach the goals, 5) Criteria that will be used to evaluate whether the students reach the expected competence or not and finally considerations related to the context, both physically when it comes to available classroom and materials as well as the cultural background of the students.

Planning could start in almost any of the six categories, but is often started with a discussion on the *competences and goals* we expect each student to reach. However, often we start to elaborate the competences and the goals and evaluate these goals in relation to the capacity and ability of the students. The reason is that there is no sense to set goals the student can not possibly be able to reach, and it is no good practice either to set goals too low because the student will be bored and not motivated to work. In fact, research on education in Norway often concludes that many students feel bored because they have to wait for other students to do their task.

Content is about what the students should learn of knowledge, skills and behaviour. Often it is related to a specific vocation, skill or school subject. However, we tend to differentiate between three forms of selecting and organising the content: 1) Content can be organised as a very specific topic within a subject. In electric and electronics it could be how to install a lamp or to explain the function of an electric motor. 2) Content can also be organized as a theme. In health and social care it could be about life style related diseases and how to prevent such diseases. 3) Finally the content could be formulated even more open as a problem or project. In arts, crafts and design it could be like "design and make a lamp to be used in an open office environment".

Methods are about the way of learning, or learning strategies, the student are advised to use to reach the competences in a best possible way. In Norway we tend to differentiate between five forms of learning: 1) Play is a natural way of learning familiar to all kids, but not so common in higher grades. But even in secondary and higher education play, and especially role play, could be very successful. An example could be communication with a customer or to solve a conflict in the workplace. 2) Individual studies based on reading or calculation is a second alternative and quite often used in the schools. May be we even use this method too often? In electric and electronics it could be to calculate the capacity of a cable for a heater. In health and social care it could be to calculate and select proper medicine for a certain illness. 3) On the job training is a third alternative. In vocational education it could be to keep watch over a patient and report if something happens, or to install a new processor in a computer. In many cases this is just to follow a certain procedure and act on deviation. Problem based learning, PBL, is a third alternative that involves the whole process from problem to implementation of solution.

Evaluation is another important category. In order to make good evaluation we need to develop good and clear criteria for the evaluation. Evaluation should not only focus on the final results, but also the process of the students work. 1) Process criteria for designing and making a lamp could be to ask the students to provide many ideas and sketches on different solutions, making, evaluation and testing of prototypes, using different kinds of materials and of course evaluation of the form and function of lamp in use. Result criteria could be final test of the lamp in use and may be some reports from customers or users on how they like the form, the colours and the function of the lamp.

Context is a category that could consist of many things. First of all planning and learning and teaching need to adapt to the physical conditions available in the school. It does not make sense to ask the students use tool that are not available in the workshop, or go on an exhibition if there is no time or money to do so. However, context could also include more complex aspects of education as the culture within a certain company or workshop, how to communicate with colleagues from another country or depending on another language. Cultural differences may involve many barriers that need to be evaluated and carefully considered when planning for student learning activities.

Finally: back to the students who are the main part in this. A good teacher should be able to help the students to maintain their motivation and interests and to develop their own good way of learning, to

develop self confidence and delight for further studies. In order to succeed, the teacher needs to include the students, their parents and colleagues in a good climate of collaboration. Didactical competence is also about planning according to national law and curriculum, both in a constructive and critical way.

Social competence

Social competence is a third important part of educational science in teacher education. That means collaboration and communication skills and understanding. This is often based on science like psychology and sociology. A good teacher need to be able to adapt his planning and teaching to different groups of students and environments. He or she also needs to be able to make a good atmosphere among the students, make everybody feel confident and to avoid harassment or bullying of any kind. A good teacher should be able to communicate with each student as an individual, and to stimulate their admiration for school and studies. This part also involves parents and colleagues, as well as the local community. In Norway club activities are not organized by the school, but local clubs may often organize their activities at the school in the evening and some times the teacher may be the local coach in soccer or skiing. The municipality also provides cultural activities like music lesson, theatre or art, often using the school building or facilities. For this purpose the teacher need to collaborate in teams and to acquire knowledge of management and to solve social or cultural conflicts.

Competence of change and development

Competence of change and development were implemented in the core curriculum from 2003, and related to the fact that we live in a global society with almost continuous change. These changes are reflected in the schools through the view of the students, the way they behave as well as the competence the students or their parents ask for from the school. This is a new situation the schools and the teachers need to adapt to improve both the content as well as they way they teach. A good teacher need to be open to change and new ways of thinking when it comes to the content of education, methods of learning as well as the basic view on education and the school as an educational institution. At the same time the teacher need to know the history, to evaluate good and bad and to take care of what is best practice. The teacher need alone and together with others be able to analyse a new situation or request, evaluate curriculum and plans, ways of learning, materials, technology and how to organise teaching and learning in a best possible way. This should also be reflected in the way of learning by the students. Many of them will meet a society with jobs that are not yet available or created. Therefore entrepreneurship education and the ability to make an own career is an important purpose of a modern school.

Competence of vocational ethic

Competence of vocational ethic was also implemented in the core curriculum from 2003, and related to the same fact that we live in a global society with almost continuous change. Norway now has many immigrants and world wide we meet many different cultures. That means it is not longer obvious what is right or wrong, what is good or bad, what is beautiful or ugly. Different people have different opinions and different points of view, but still we need to have some ethical standards accepted by all. A good teacher need to be able to see the relations between general moral and ethics, and the special ethical standards required by a teacher as a profession. He or she also need to be able to communicate ethical standards with different kind of people, to understand other people and to make agreements on what is right or working to do in a school and educational context. To be with and to work with children as well as adults involves both to provide professional information as well as professional secrecy. Often there are cases that represents a dilemma with no clear pre written rules to follow. Sometimes students may be in a crises and need the support and protection from the teacher. Some times it is the opposite: The teacher has to inform, for instance the parents. The teacher also has power and the ability to use it or

not. However, he or she needs to use this power in a balanced and respectful way according to the basic values in our culture, the law and the curriculum.

Learning methods and assessment

Each university has the freedom to apply proper materials and relevant methods of teaching and learning, as long as they follow the core curriculum and the overall competences can be achieved by the students. This freedom also includes the freedom to implement part time studies and distance education. For instance, in many cases, especially when it comes to vocational teacher education, the study is combined with a part time or even full time job in a school. Today also many teacher educational programs use information and communication technology (ICT) and video conference systems as a means of communication between the university and the students. All universities use some kind of e-learning system, in most cases a system called "Fronter".

Until the 1970's science of education in most programmes of teacher education was quite academic and influenced by scientific management and behavioural psychology, and there was little or no relation to educational practice. This was not very successful, and often criticized, especially by students in vocational teacher education. Late 1970's and in the 1980's there was a turn towards influence from gestalt psychology, and gradually also confluent education, that was more holistic in its approach, (Grendstad:1990)¹⁶. Practical experience and critical reflection on the students own practical experience became more important. Gradually this tradition was developed into a more formal system of vocational didactic, or "yrkesdidaktikk" which is the concept in Norway. The implementation of a master program in vocational education, and also research fellowships, helped to develop this field of educational science in a more professional and scientific way.

In the 1990's counselling also became a new trend in vocational education as well as professional development. The influence from sociocultural theory, and the idea of "scaffolding" as a learning strategy in vocational education, proved to be quite successful, (Vygotsky:1986).

For many years the problem of decontextualisation of teacher education has been discussed and criticised, not only in vocational teacher education, but also other forms of teacher education. Lack of practical experience is one of the strongest critic from teacher students even today, in spite of the fact that more and more practice has been implemented in teacher education in recent years. Today there seems to be a trend towards better collaboration between the teacher universities and local schools. For instance, Telemark University started a trial programme in general teacher education with more practical based training in 2007.

Another strategy has been to implement more practical cases and also problem based learning in the university in a way that the student have to go out in practice to makes research and studies for their papers. In stead of writing pure theoretical essays or articles that use to be most common, the students now have to support their papers by some field studies and empirical data from own practice. In this way theoretical studies and critical reflection are combined in the same work. This is very much in accordance with critical- constructive didactic that emphasises method integration. That means a combination of historical hermeneutic method, empirical methods and critical reflection, (Klafki, 2001)

However, there are also theoretical studies based on scientific literature. A one year study is normally about 2-3000 pages, but in some cases the students can choose a certain percentage, may be 10-20% by their own. A scientific project (FoU) is compulsory and it should be based on a thesis and in most cases

¹⁶ I had my teacher education through PPU from the national university of vocational teacher education, SYH, in 1988. The title of my final thesis was "Human Development". Core theory was related to gestalt psychology and confluent education in combination with an empirical study on education in computer technology.

consist of both a theoretical and practical part, usually a field study. The types of methods could be summarized in six main areas:

- Practical based cases
- Problem based learning (PBL)
- Lectures
- Seminars in small groups
- Counselling, individually and in groups
- Scientific projects with field studies

Assessment and evaluation is based on several methods. However, first of all there is a continuous evaluation on whether the student is suited for a teaching profession or not. A student may be able to pass all theoretical test, but still not be regarded as qualified as a teacher, for instance if he or she does not show capability to communicate with students or willing to cooperate with colleagues. The types of assessments could be summarized in five main areas:

- Practice in the schools (12-24 weeks)
- Theoretical studies with regular tests
- Articles, essays and reports
- Scientific work
- Group work and communication

Gender issues and ethnicity

Now it is a long time since Norway had special schools for girls and boys, women and men. However, even though Norway is well known for its policy and practice on gender equality, we still see many differences in education. Most of the teachers in Norway are women, especially in primary school and in vocational education in areas like social and health, food processing, arts and crafts. On the other hand, there are a majority of boys and men in areas like mechanics, electric and electronics and construction. New areas like media, design and computer science the situation seems a little more equal. Since the 1970's Norway had many immigrants with religious and cultural background different from the West. However, there are relatively less students from these groups in all forms of teacher education as well as professions like police and nursing.

For along time there have been special programs to help even out such differences, but such differences seem to take a long time to change.

Sami Education and duodji

The Sami people have by law the status as indigenous people in the Norwegian constitution, and there is a special chapter on Sami education in the national law of law of education, (LOV:1998:Kap.6). Based on this law there is a Sami University College providing teacher education, and there is also a program for vocational teacher education. The profile of this teacher education is typical vocations related to the Sami culture, like duodji¹⁷ and reindeer husbandry¹⁸. Duodji is based on traditional Sami handicrafts that became part of the apprentice system in 1991. In this vocational teacher education there is more emphasis on Sami culture, about 15 credits (ECTS), and less vocational didactic.

¹⁷ Duodjie is the concept used in the Northern Sami language. As there are several language groups among the Sami not very similar to each other, the Southern Sami use the concept duedtie.

¹⁸ Heimeyrkesskolen for samer, the Sami vocational school, was started in 1952. Today it has a Sami name: Sami Joatkkaskuvla.

Conclusion

Over the last thirty years both vocational education and vocational teacher education in Norway has been developed into a well organised system. Today the quality of this system is just as good as other forms of education, and should be valued as such. The content is based on an integrated and holistic curriculum. That means vocational education is not only skilled training, but also includes general education for personal life, take responsibility in society and to act in an authoritative way, not only follow orders made by others. Over the years there is also implemented a well organised system for transfer from vocational education to university.

Vocational teacher education in Norway has a shorter history though than general teacher education. Originally it also used to be shorter, less academic and in some circles regarded as lower status. This fact may explain why there is so little research available in this field. However, today vocational teacher education is based on the same law of universities, and equal to all other forms of teacher education and university studies. Vocational teacher education is even accepted in general education down to the fifth grade in elementary school. In addition to regular vocational teacher education, there is a national system for serving compulsory apprentice training in workshops and companies. This system is based on the national law of elementary, secondary and adult education.

Vocational teacher education used to be more specialist than general teacher education, and often also focused only on skilled training for a certain job or profession. However, today it is based on a national core curriculum similar to other forms of teacher education. That means vocational teachers now are educated to deal with not only technical skills, but the whole personality of the students. A social and cultural perspective is also included in vocational teacher education. That means the vocational teacher also learn to deal critically with overall issues like culture, equality of genders and ethnicity, awareness of environmental problems and the responsibility to support a sustainable development in society and culture.

In some cases vocational teacher education serves as a model for other forms of teacher education. One main reason seems to be a successful combination of providing the students both practical aesthetic experiences as well as theoretical studies. Better integration of theory and practice seems to be a challenge in all forms of education today. For this purpose vocational education made many contributions over the last thirty years. Unfortunately, it has not always been documented in a good way and therefore not so easily available. More research on vocational education would help make this knowledge available to all educators.

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