

Teacher Education Curriculum of Secondary School Teachers

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Abstract

The Finnish education system has received attention from all over the world because it came out on top in the PISA surveys. Finnish 15-year-olds have been number one in terms of skills in science, mathematics, the reading of literature and problem solving, and only a very few students fall within the lowest PISA categories. Likewise, the differences between schools are small. A major reason for high level learning outcomes can be seen as a result of a purposeful educational policy and a high competence of teachers. The educational policy has purposefully aimed at equity in education and has promoted the common comprehensive school model. In the process, many important decisions have been made. One of those has been the decision that all teacher education was raised to the MA level (5 years programs and teachers are seen as professionals who have a right and obligation to develop their work in schools. The structure and contents of all teacher education, including secondary school teachers, aim at research and evidence-based orientation. This means that teachers learn to take an analytical and open-minded approach to their work, that they draw conclusions based on their observations, and experiences and that they develop their teaching and learning environments in a systematic way.

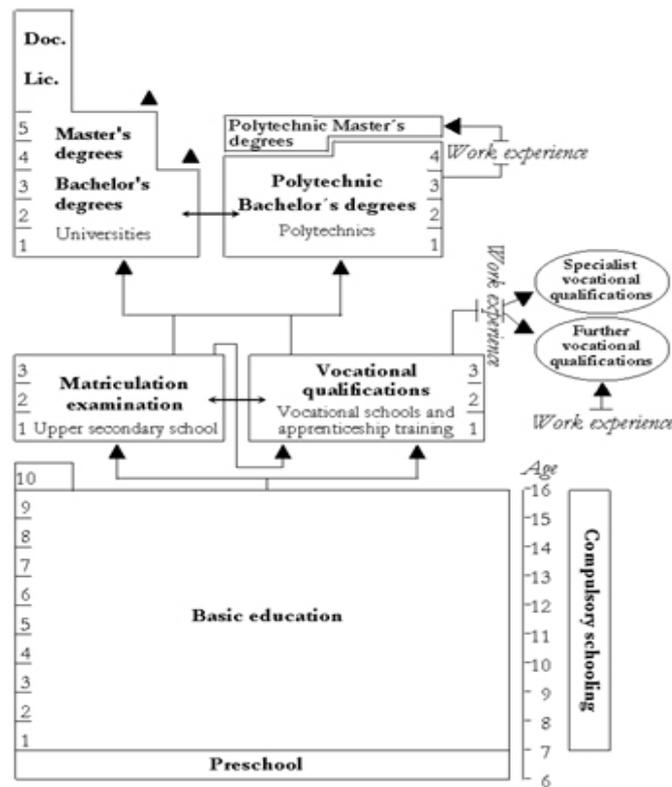
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The Finnish education system in a nut shell

Education is a public service. General education, vocational education and higher education are free of charge. Basic education, upper secondary education and vocational education are financed by the state and local authorities. General education and vocational education are provided by local authorities. Universities are autonomous and financed by the government. Furthermore, there are also liberal studies for adult people that are economically supported by the government.

Municipalities (local authorities) are the providers of education. Providers of education and schools set up their own curricula on the basis of the national core curriculum. In curricula local needs can be taken into consideration. Schools can have their own profiles such as e.g. science or music education (Jakku-Sihvonen & Niemi 2006, p. 7-12).

FIGURE I. Finnish Education System (National Board of Education). Education System Chart



- *Preschool*, is a right for families since August 2001. Preschool education, mainly provided by social authorities in day-care centres, is offered for 6-year-olds. About 96 % of the age group participate in preschool education.
- *Basic education* lasts nine years. The age group is about 60 000 pupils. Children start this compulsory schooling usually at the age of 7 years. At the comprehensive schools, class teachers are mainly responsible for classes 1-6, and most of the subjects are taught by subject teachers in grades 7 to 9 (called also a lower secondary school). In basic education, students get also all study material and one meal from the school. Transportation is arranged by the education provider for distances of 5 km and over. For the Swedish speaking population(about 6%) there are separate schools as well as administrative services. The aim of immigrant education is equality, working bilingualism and multiculturalism. The goals of immigrant education is to prepare immigrants for integration to the Finnish education system and society, to support their cultural identity and provide them with a functioning bilingualism so that in addition to Finnish or Swedish , they have a command of their own native language.(Jakku-Sihvonen&Niemi, 2007, p.11)
- *Upper secondary schools* gather their students usually from many comprehensive schools. After compulsory education, half of the age group chooses the upper secondary schools, which prepare students for higher education. At the end of upper secondary education, passed exam in four subjects gives matriculation certificate, which provides eligibility for universities and vocational higher education. Another half of the age group chooses a vocational school. Also they have access to universities and vocational higher education. All teachers at the lower and upper secondary schools are called subject teachers because they have specified to teach one or two academic subjects.

There is no inspection system to control educational arrangements at schools or institutions. Instead of the inspection, there is an evaluation system. For basic education, the follow up of reaching the national goals set up by in national basic curriculum are evaluated by national sample based assessments. Upper secondary school have there own statute based end examination system.

National evaluations are organized by special councils. The Educational Evaluation Council is a leading independent specialist organisation for educational evaluation and development. It is responsible for

evaluating general education, vocational education and adult education. The Finnish Higher Education Evaluation Council (FINHEEC) is an independent expert body assisting universities, polytechnics and the Ministry of Education in matters relating to evaluation and quality assurance systems. (Jakku-Sihvonen & Niemi, 2007, p. 14).

Finnish education policy promoting equity and quality

The PISA comparisons show that Finland has succeeded in its policy to enhance the equity and quality of learning. It has been a long process, and long-term development objectives were set almost 40 years ago. At that time the main goal was to develop basic education to meet the criteria of the comprehensive education system. Finland is now on top, only a very few students fall within the lowest PISA categories and differences between schools are small.

According to education researchers (Väljjarvi, 2004; Simola, 2005; Laukkanen, 2006; Niemi & Jakku-Sihvonen 2006), the educational policy has purposefully aimed at equity in education, which is the main reason for good learning outcomes. The most important period in the near history was in 1967 to 1974, when the importance of the educational system in building the welfare society was launched and accepted. At the time, there was a wide consensus between politicians that a small country has to promote equality in education by implementing a system, that opens as long educational carrier as possible to all who are motivated in spite of ones socioeconomic status, gender or residence. Laukkanen (2006) emphasises that Finland has built up an education system with characteristics made up of uniformity - free education, free school meals and special needs education. The principle of inclusion has been an important guideline. In 1968, it was decided that the parallel school system should be replaced by a national nine-year basic education that would represent the ideology of comprehensive education. As the Government delivered its bill to Parliament in 1967, one of the arguments for the common nine-year education for all was that it was too early to judge individual capacities at the age of eleven or twelve. Finnish basic education has been logically developed towards the comprehensive model, which guarantees everybody equal opportunities in education irrespective of sex, social status, ethnic group, etc., as outlined in the constitution. Laukkanen (2006) summarises that the most important decisions have been 1) the discontinuation of streaming, 2) the strong allocation of affordable educational resources to lower secondary education and 3) the decentralisation of decision-making powers. 4) primary school teacher education was also raised to the MA level. 5) support for weak students was taken care of. 6) different stakeholders were invited to express their opinions.

Finland has also balanced between a centralised and decentralised administration. The comprehensive school was very centralised in the beginning, but in 1985 municipalities had more freedom and responsibility. The status of the then new national curricular guidelines was to create a framework for curriculum design in the municipalities (Laukkanen 2006). Ten years later, in 1994, The National Board of Education only gave very broad aims and content guidelines for teaching different subjects. The municipalities and, ultimately, the schools set up their own curricula on the basis of the national core curriculum. Since 1999 new legislation has provided to mainstream decentralizing. Providers of education - meaning municipalities, coalitions between municipalities and private foundations - have got large freedom in writing the local curricula. Still, the local curricula have to be drawn in accordance with the National Core Curriculum both for Comprehensive Schools and Upper Secondary schools.

The local curricula have to determine the teaching and educational work of the schools concerned. The curriculum must be drawn up in such a way that it takes into account the school's operating environment, local value choices and special resources. Education providers may decide how to implement their curricula in co-operation with interest groups with a view to ensuring the high standard of general education, its relevance to society and commitment from the community as a whole to the jointly determined objectives and procedures. As it concerns pupil welfare and home-school cooperation, the curriculum must be drafted in collaboration with authorities charged with tasks that are part of the implementation of the local authority's social and health services (National core curriculum for upper secondary schools, 2003, p.8; National core curriculum for basic education, 2004, p. 8)

At the local level, municipalities are encouraged to produce intern and extern evaluations to develop education. Policy-makers are informed about the status of education by assessments and special up-to-date

reports made the Ministry of education. Evaluations are implemented to find evidence to support the continuous development of education and learning. The Parliamentary Committee underlines that evaluation also has an important social and political function in enhancing the realisation of equality among people within the Finnish education system (The Parliamentary Committee on Education, 1998).

The aim of the national evaluation system is to support the local/municipal education administration and the development of schools as goal-oriented and open units, and to produce and provide up-to-date and reliable information on the context, functioning, results and effects of the education system. The Ministry of Education is responsible for general policy making and financing educational evaluations. National educational evaluations are carried out by the Educational Evaluation Council (<http://www.edev.fi/portal/english>). School achievements in basic education are carried out by the Finnish National Board of Education (<http://www.oph.fi/english/>). Beside the national evaluations, the international evaluations are important in developing Finnish education. Since 2000, PISA has provided important information for the development of Finnish basic education.

A brief history of the teacher education in Finland

Since 1970's, teacher education for all teachers in basic education has been arranged at universities. Before that primary school teachers were educated at teacher-training colleges and they had about 3 years education. Secondary school teachers had academic discipline education (about 5 years) in universities and thereafter practical teacher training in normal schools connected with universities or teacher-training colleges. In 1979, the basic qualification for secondary and primary school teachers was defined as a Master's degree in the form of programmes requiring about 5 years to complete. The purpose of this modification was to unify the core aspects of elementary and secondary school education and to develop an academically high standard of education for prospective teachers. Teacher education for the secondary school level was also reformed by expanding the scope of pedagogical studies. (Niemi & Jakku-Sihvonen, 2006,32.)

Since 1970, the basic principles of teacher education have emphasized teachers' work in a broad pedagogical and societal framework (Committee report, 1975):

- All teacher education for comprehensive and upper secondary schools should be academic and carried out in universities.
- Teacher education should be unified for different teacher categories.
- The initial education of future teachers must give a common and broad qualification to all teachers and this common background can then be flexibly complemented by in-service education.
- Pedagogical studies should be developed in such a way that teachers are prepared to be educators in the broad sense of this concept and can attend to their pupils' socio-emotional growth. Teachers should have a pedagogical, optimistic attitude to their work that is grounded in the latest research. Theoretical and practical studies as well as subject academic matter and pedagogical studies should be more successfully integrated.
- Teacher education should consist of societal and educational policy studies.

According to decrees issued in 1979 and 1995, all prospective teachers have to complete Master degree. In terms of the new Bologna process, this degree is equivalent of the second cycle degree in the European higher education area. Primary teachers, called also class teachers, have had science of education as their major, and this degree requires completion of a Master's thesis. The topics of the thesis may be highly school-related, and very often they are action research projects. The secondary school teachers, called also subject teachers, completed a major in their academic teaching subjects and a minor in pedagogy. The educational studies of subject teachers have been completed either as a one-year block or concurrently with their academic studies in their major field.

Teacher education in Finland moved to a two-tier Bologna degree system on 1 August 2005. The combination of a three-year Bachelor's degree and a two-year Master's degree in appropriate subjects will

qualify teachers to teach in primary and secondary schools. Since moving to the Bologna process degrees all teachers must reach Master's degree (180 BA+120 MA = 300 ECTS; 1 ECTS is about 27 hours work).

Universities have had a high degree of autonomy in designing their curricula. Therefore, no detailed «curriculum of subject teacher education» covering all universities in Finland can be presented. However, there are some principles and general outlines followed by all institutions of teacher education. These are partly due to recommendations by the Ministry of Education and partly to an agreement of the Deans of the Faculties of Education and the Directors of the Departments of Teacher Education who are supposed to have regular contact with each other and with the Ministry. The Ministry of Education has full confidence in the departments and faculties involved in teacher education. (Meisalo, 2007, p. 163)

When Finnish universities prepared new curricula for Bologna process degrees they had much national cooperation. All universities responsible for teacher education established a national network for Educational Sciences and Teacher Education (Vokke project 2005). Its main task was to coordinate the implementation of the two-tier degree programmes and to activate interaction and knowledge sharing between teacher education units. It organized seminars and sub-networks where representatives of the universities had opportunities to discuss, argue and reach a consensus concerning the common national components and structures of teacher education. It created a joint forum to analyse and develop the teacher education curriculum taking new challenges in the Finnish society and global world into account. The teacher education network had also active contacts with to the mathematics and science group as well as with the humanities group. As a consequence of the co-operation, all universities will share a common structure of teacher education. A rather good consensus has also been reached concerning the core contents of the curriculum, although each university will have the autonomy to develop its own curriculum based on its current research profile. The project has its own websites at <http://www.helsinki.fi/vokke/english.htm> (in English).

A structure and contents of curriculum for secondary school teachers

The teacher education degree programme of secondary school teachers (subject teachers) includes one major subject (at least 120 ECTS) plus a Master's thesis in their own academic discipline. In addition, they must complete one or two minor subjects comprising at least 60 ECTS in one subject. Subject teachers receive instruction in research methodology and research in their subjects as a part of subject studies. They also become familiar with education and research in education in pedagogical studies (60 ECTS)

The main elements of teacher education curriculum for secondary school teachers consist of studies in:

- *Academic disciplines.* These can be whatever disciplines are taught in schools or educational institutions or in science of education. Academic studies can be a major or minors depending on the qualification being sought.

The typical academic disciplines of secondary school teacher education are:

- foreign language,
- mathematical sciences including mathematics, physics and chemistry, computer science/computer technology,
- mother tongue (Finnish or Swedish),
- biology (botany, zoology and genetics) and geography,
- social sciences including history and economics,
- religion and philosophy,
- home economics,
- textile handicrafts,
- technical handicrafts/technology,
- arts and music y
- sports

- *Research studies*, consist of methodological studies, a BA thesis and a MA thesis.
- *Pedagogical studies*, (min. 60 ECTS) are obligatory for all teachers. They also include teaching practice and orientation to research in education.
- *Communication*, language and ICT studies are also obligatory.
- The preparation of a **personal study** plan is a new element in university studies since 2005 in Finland. Its main function is to guide students to develop their own effective programmes and career plans, and to tutor them in achieving their goals.
- Optional studies may cover a variety of different courses through which students seek to profile their studies and qualifications.

Table II. Main components of the teacher education programs for secondary school teachers.

Secondary school teacher education programme	Bachelor's Degree 180 ECTS	Master's Degree 120 ECTS	TOTAL 300 ECTS
Subject teachers' pedagogical studies (minor) <ul style="list-style-type: none"> - basics of teaching methods and evaluation - support of different kind of learners - latest research results and research methods of teaching and learning - cooperation with different partners and stakeholders 	25-30 (Including supervised teaching practice)	30-35 (Including a minimum of 15 ECTS supervised teaching practice)	60
Academic studies in different disciplines <ul style="list-style-type: none"> - a major 	60 (including BA thesis, 6-10)	60-90 (including MA thesis, 20-40)	120 – 150
Academic studies in different disciplines <ul style="list-style-type: none"> - 1-2 minors 	25-60	0-30	25-90
Language and communication studies, including ICT Practice in working life Preparation and updating a personal study plan Optional studies	35 - 40	0-30	35-70

Pedagogical studies

The distinction between class teachers (primary school) and subject teachers (secondary school) is retained, but the structures of the respective degree programmes will allow them to take very flexible routes to include both in the same programme or to permit a later qualification in either direction. The pedagogical studies (60 ECTS) are obligatory for qualification as a teacher and are approximately the same for both primary and secondary teachers. According to legislation, pedagogical studies must be studies in the science of education with an emphasis on didactics. Pedagogical studies can be part of the degree studies, or they can be taken separately after completion of the Master's degree.

The goal of pedagogical studies is to create opportunities to learn pedagogical interaction, how to develop one's own teaching skills and how to learn to plan, teach and evaluate teaching in terms of the curriculum, the school community and the age and learning capacity of the pupils. Students should also learn how to cooperate with other teachers, parents and other stakeholders and representatives of the welfare society (www.helsinki.fi/vokke).

As a part of the Bologna process teachers' pedagogical studies were reformed in all Finnish universities. The module of pedagogical studies is a Minor in secondary school teacher education and consists of 60 ECTS. Jakku-Sihvonen et al., (2009) have analysed the core elements of the pedagogical studies in 12 teacher education departments of Finnish universities. The following main elements were found: (1) theoretical substance in education, (2) supervised teaching practice, (3) studies for research competence, and (4) optional studies. The results by credits were as follows:

- The main element of the curricula is theoretical substance in education. Credits vary from 25 to 40 ECTS.
- The amount of supervised teaching practice varies from 12 to 25 ECTS.
- The amount of the studies in research readiness varies 3 to 12 ECTS.
- The optional studies are included only in four curricula. The amount of the optional studies is in all cases less than 10 ECTS.

The research group (Jakku-Sihvonen et al., 2009) also analysed how the amount of the theoretical substance in education in those 12 curricula was divided into following the traditional definition of sub-disciplines of the Science of Education: didactics, educational psychology, sociology of education, the philosophy of education, history of education and comparative education (see Jakku-Sihvonen, 2007, p. 218), didactics forms the largest content area of studies in most of the curricula. The amount of studies in didactics varies from 9 to 20 ECTS. The number of credits in educational psychology varies from 3 to 11 ECTS. The number of credits in sociology of education varies from 1 to 12 ECTS. In eight curricula, there are obligatory studies in the philosophy of education. (Jakku-Sihvonen et al., 2009, p. 10-13)

In secondary school teacher education the component of didactics is focused on issues how to teach school subjects to different learners. In American educational literature a corresponding element is very often called as pedagogical content knowledge. In the Finnish case these studies can have very close relationship with learning research, academic discipline studies and teaching methods. A typical feature is a research orientation. Teachers are seen as active professionals who have a right and obligation to develop their work. The aim of teacher education is that teachers internalise an attitude of pedagogical thinking.

An important task of pedagogically oriented studies is to educate teachers who are able to study and develop their own research-based practices. For this reason, the modules on behavioural research methods are also obligatory for subject teachers. The critical scientific literacy of teachers and their ability to use research methods are considered to be crucial. Accordingly, Finland's teacher education programmes require studies of both qualitative and quantitative research traditions. The aim of these studies is to train students to find and analyse problems they may expect to face in their future work.

Professors and supervisors of Finnish teacher education have the responsibility to guide students in the research-oriented aspects of their education. The main object of this guidance is not the completion of research studies itself, but actually to further the process by which students come to see themselves as actively studying and working subjects. In this aspect of the degree programme, the processes of active working and thinking are integrated in various complex and sometimes unexpected ways. The aim of the guiding process is to help students discover and tap their own intellectual resources and to make them better able to work in changing contexts (Niemi and Jakku-Sihvonen, 2006, p. 37).

Research studies in major

The crucial role of subject faculties or departments is in ascertaining the high level of content area knowledge for subject teachers. This is highlighted by the writing of the Master's thesis at the subject department. The thesis facilitates the future teacher's access to research-oriented work, and emphasises the creation of how new knowledge in their field of teaching and learning. Most important is the goal of preparing future teachers to understand new achievements of scientific research autonomously (Meisalo, 2007, p. 166).

Traditionally, in the subject departments at various faculties the focus has been on educating future researchers and little on the future needs of those students who had chosen teaching careers. However, this situation is changing as many faculties and universities have recognised the importance of teacher education. There are also chairs at a number of subject departments where the chairholder's responsibility is to

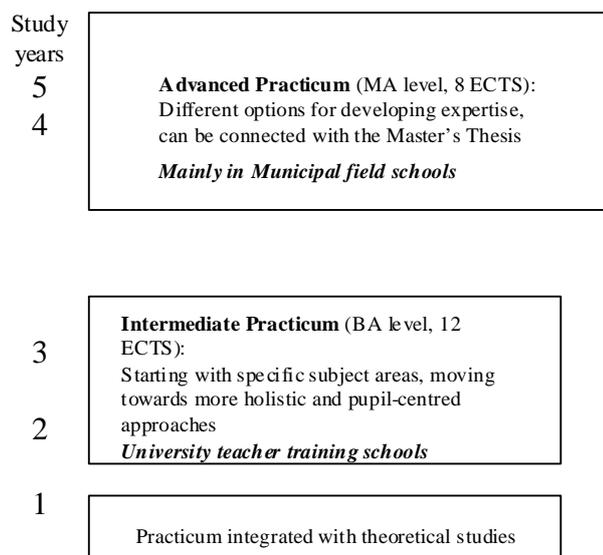
supervise teacher education at the department (Meisalo, 2007, p. 166). There are also more and more examples of joint research supervision in secondary teacher education. One supervisor can be from the academic discipline faculty and another from the education faculty. Topics of student teachers' Master thesis can be closely related with teaching and learning of school subjects.

Teaching practice

Teachers' pedagogical studies also include supervised teaching practice (approx. 20 ECTS). The aim of guided practical studies is to support students in their efforts to acquire professional skills in researching, developing and evaluating teaching and learning processes. In addition, students should be able to reflect critically on their own practices and social skills in teaching and learning situations. During supervised practical studies, students should meet pupils and students from various social backgrounds and psychological orientations and have opportunities to teach them according to the curriculum.

Teaching practice is integrated with all levels of teacher education time. It is supervised by university teachers, university training school teachers or local school teachers depending on the phase of practice (Jyrhämä, 2006) (Figure I).

Figure II. Teaching practice in Finnish teacher education curricula



The main principle is that practice should start as early as possible and support student teachers' growth towards expertise. In the beginning it guides student teachers to observe school life and the pupils from an educational perspective, then it focuses on specific subject areas and pupils' learning processes. Finally it supports student teachers as they take holistic responsibility in their teaching and schools. This period can be tightly connected with their research studies and Master's thesis.

Universities' teacher training schools called also Normal schools play a crucial role in the Finnish teacher education. The Normal Schools are state schools and their teachers have a different status than teachers in other schools. The teachers have a dual role: on one hand teach their pupils and on the other, they supervise and mentor student teachers. Many teachers are active in research and development work and are members of teams that produce learning materials for schools. (Meisalo 2007, p.167)

The above features are described as goals of teacher training schools, but there is frequent critique based on the demand of having at least a substantial part of the teaching practice in more typical schools. Actually, parallel to the Normal Schools there have been so-called field schools with an important contribution to the capacity and volume of teacher education in the times of high demand of qualified teachers. (Meisalo, 2007, p. 167)

Admission to secondary school teacher education

In Finland all universities have Numerus Clausus system. It means that the universities accept only a certain number of applicants and it is related to the amount of degrees negotiated with the Ministry of Education. The universities are accountable for their results and funded according to it. Usually only one forth from applicants can be accepted. Teacher education, especially class teacher education, is one of the most desired study programs. Because of a big amount of applicants, only 15% can be accepted. Also secondary teacher education has become more and more popular in most subjects. In general, admission to the university is difficult for young people wishing to pursue a career as a subject teacher as only a small percentage of the applicants is granted admission to studies in the relevant faculties. This is true particularly for biological subjects, but there have been recently problems in recruiting talented students in mathematics, physics and chemistry and in some foreign languages. There have been many efforts to attract new students and this has resulted in a change from the «elimination approach» to a «recruitment approach» in the organisation of student admission programmes of the faculties. These efforts include utmost flexibility in timing of studies and arranging entrance tests in some faculties occasionally as often as three times a year. (Meisalo 2007, p. 172)

Pedagogical studies are normally put in the individual study plans of teacher students between the middle of subject studies e.g., during the third and fourth study year. However, it is possible to take first a Master's degree studying at the subject faculty only and apply for entrance to pedagogical studies afterwards. All students applying for teacher education programmes are tested and interviewed personally. (Meisalo 2007, p. 172)

A long way to understand professional development of secondary school teachers

Teacher education for secondary school teachers has not proceeded without tensions. There have been contradictory missions, in some cases even strong conflicts between faculties of academic disciplines and education. A major reason of tensions has focus on a questions how much teachers need pure academic content knowledge and how much pedagogical studies. From a viewpoint of academic disciplines content knowledge has been the most important in teachers' work and from educational faculties have stressed teachers' capacity to be interaction with students and to take care of learners. This polarity has decreased during last twenty years little by little. Some reasons of this change can be seen at least from the following trends:

Focus on research

Representatives of the various faculties of education have become more and more into consensus about the principle that teacher education must equip teachers with research-based knowledge. In secondary school teacher education pedagogical content knowledge has been a connective element. There has been growing interest in research on subject pedagogy/didactics. Meisalo writes: «One indication of this is the organising of research symposia and conferences. There has been a long tradition of more than 100 years of meetings

and conferences for practicing teachers including aspects of in-service training. However, research-oriented conferences and the foundation of associations of researchers started only in the eighties. Some of the first meetings of this type were the meeting of researchers on mathematics education in Jyväskylä and of researchers on physics and chemistry education in Helsinki in 1982. At the same time, departments of teacher education started publishing a report series for applied educational research. They offered a forum for publication of research papers even by subject teacher educators» (Meisalo, 2007, p. 174).

The Finnish Association of Mathematics and Science Education Research was founded the next year when the Institute of Educational Research in Jyväskylä also launched publication of a series of yearbooks of subject-area oriented research. Similar activities arose even in other subject areas and in 1987 the first symposium covering all subjects was held in Helsinki with the theme Subject Didactical Research and the Future. It was a joint initiative of the experts of mother tongue didactics and didactics of mathematical subjects at the Helsinki Department of Teacher Education. These symposia became an annual tradition, organised mostly in Helsinki. These forums provided researchers interested in subject didactics an opportunity to discuss and interact with other researchers and active teachers. (Meisalo, 2007, p. 174)

National doctorate schools for teachers

The Finnish higher education policy has invested in national doctoral schools since 1995. They provide some full time research posts to young researchers and a high quality network for a larger group of doctoral students who are reviewed by expert panels and have other kind of funding arrangements. There has been a national doctoral school of education including teacher education. In addition more subject specific schools have been established, e.g., a programme called Doctoral School of Mathematics, Physics and Chemistry Teachers which started in September 1995 and was active to the end of 2001. In according to Meisalo (2007, p. 169) similar activities started again in the beginning of 2003 and it seems that there are necessary funds available at least to the end of 2011. The doctoral schools have as their goals to educate experts in education in specific subject areas. Doctoral schools have created networks of experts in research on teaching and learning in the subject areas concerned. They have promoted international contacts and assisted in publishing in international research journals. Implementation of modern technologies both in the daily work of subject teachers and in the research projects has been among the goals of doctoral schools following the official goals of the information society. The type of research is supposed to be oriented to the development of the practice of teaching, new learning materials, etc. Postgraduate studies are assigned to the partner universities; the school organises seminars mainly on methods of educational research. There can also be interaction over the Internet on the problems of research projects in the meantime. Many teachers studying in postgraduate schools have a substantial teaching experience. On one hand, it is positive as they have had high competence in applying their research outcomes in school practice both themselves and through in-service training. On the other hand, it means that doctoral students are not young and there are demands that the median age of doctorants should be lower in the future (Meisalo, 2007, p. 170).

Teachers are learners

During recent years much effort has been expended to promote the interaction and co-operation of different departments and faculties involved in teacher education. It may be said that the emphasis on goal setting has gradually changed from teaching different content areas to educating top-quality teachers. Professional growth is a long process and it is important that student teachers receive orientation to their future work already during their first years of studies at the subject departments (Meisalo, 2007).

The knowledge about teachers' professional growth has change also the attitude to secondary school teacher education. To become a teacher is a long learning process (e.g. Niemi 1988; Hargreaves 1994; Niemi & Kohonen, 1995; Niemi, 2008). Teachers need the confidence to work with learners in real situations, and student teachers often ask for very practical advice for their teaching practice. The Finnish teacher education aims to integrate teaching practice to different levels of theoretical studies.

The recent research of expertise has revealed that there are different phases in the development into expertise (Dreyfys & Dreyfus 1986). Student teachers also need different kinds of support in different phases of their development. Many researchers have also stressed that expertise is the integration of different kinds

of knowledge. Davenport and Prusak (1998) have found that an expert needs codified knowledge and organised official and literally transferable knowledge. In addition, the development of expertise needs role models, observing experts, tacit knowledge, a social network and even good stories of successful practice. Davenport and Prusak (1998) point out that experts' knowledge is deep personal knowledge which has been tested in practical situations

According to Schön (1991), experts always face problems in situations that are unique and consist of uncertainties, value conflicts and other tensions because of complexity. They work in complex situations and therefore need various kinds of evidence. This sets special requirements on their knowledge base. Experts' knowledge is rational knowledge, but this is not sufficient. They also need principles, rules and models, and to know how to apply scientific theories and techniques to complex problems.

Working as an expert means that the expert has the knowledge and practical abilities to work in complex situations. In addition, they need confidence in two complementary ways (Isopahkala-Brunet, 2004). They need the self-confidence to carry out their expertise in demanding unique situations. They also need to implement their expertise in such a way that their customers, stakeholders and colleagues trust them. In the teaching profession this means that students and parents and even society can trust teachers' expertise.

Even though teachers need many specific skills, they also need a comprehensive idea or vision of what their work as an educational expert means. Teachers need to understand the complexity of educational processes and face evidence that is coming from different sources. They need research-based and research-informed knowledge, but they also need to be open to acquiring and assessing local evidence. Scardamalia and Bereiter (2003) have examined the behaviour of experts. The feature that really distinguishes experts from others is their approach to new problems. The pattern recognition and learned procedures that lead to intuitive problem solving are only the beginning. The expert invests in what Bereiter and Scardamalia call progressive problem solving, that is, tackling problems. That increases expertise rather than reducing problems to previously learned routines.

In the Finnish teacher education teachers' competence must include a readiness to analyse the situation like a researcher and to make conclusions and decisions to act or to change something in a given situation. The pre-service teacher education curriculum provides a foundation, but without research-oriented in-service training, teachers' potentiality to renew and develop their own profession will stagnate. There are good examples of how in-service training has supported teachers' work in local schools, and these activities are tightly connected with research projects (Husso & Korpinen & Asunta 2006). The LUMA Centre (<http://www.helsinki.fi/luma/>) is also an example of cross-boundary activities connecting research and teachers' work in schools. It is serving science teachers, students and researchers. The centre is coordinated by the Faculty of Science in the University of Helsinki promoting the teaching of biology, chemistry, geography, mathematics, physics and technology and enhancing interaction between schools, universities and business and industry. The aim is cross-disciplinary co-operation. The LUMA Centre also seeks to encourage children and young people to become involved in scientific activities. The name LUMA comes from the words referring to science and mathematics (LU= Luonnontieteet in Finnish, science in English, MA= Matematiikka in Finnish, mathematics in English).

Research has been integrated into the activities of the LUMA Centre. Disseminating new research findings is a key in supporting teachers' lifelong learning. This is done with the help of LUMA Science Fairs and summer courses, and by offering the opportunity to take part in research and to follow new developments through the newsletter, the webzine *Luova (Creative)* and Master's theses published by the resource centres.

The LUMA Centre encourages teachers to play an active role in developing their own teaching using the latest research and being also an action researcher in their own schools. Teachers are provided with news of the latest new research knowledge, they become with familiar «this month's researcher», they have information of science and education conferences and events. The Centre organises also annual conferences, workshops and summer courses for teachers. The main principle is that researchers and teachers are working together.

The main principles of curriculum construction

Each society has identified certain important task areas that require special competence. A society gives these tasks to a qualified group of individuals, i.e. to professionals. The members of this profession are responsible for the duties of the task area and the further development of the profession. The main criteria of the profession are that its representatives have a high level, usually a tertiary level, of education, and it has a moral code that they must meet in exercising their profession. Because of their high responsibilities and special competences, the representatives of the profession also have the right and obligation to develop their task area in society.

In Finland teachers are expected to be able to take an active role in evaluating and improving schools and their learning environments. They are also expected to refresh their professional skills, to cooperate with parents and other stakeholders, and to be active citizens (Teacher Development Education Programme, 2001).

This chapter summarizes the main principles that are important also in future Finnish teacher education in connection with the Bologna process. The framework of Finnish teacher education has been designed for national contexts while, at the same time, taking the global perspective into account (Niemi, 1999; Niemi 2000; Räsänen, 1999).

A research-based approach as a main guideline

The main principle of teacher education focuses on research-based education. Teacher education must equip teachers with research-based knowledge and with skills and methods for developing teaching, cooperating at school and communicating with parents and other stakeholders.

- Teachers need a profound knowledge of the most recent advances of research in the subjects they teach. In addition, they need to be familiar with the latest research on how something can be taught and learnt. Interdisciplinary research on subject content knowledge and pedagogical content knowledge provides the foundation for developing teaching methods that can be adapted to suit different learners.
- Teacher education in itself should also be an object of study and research. This research should provide knowledge about the effectiveness and quality of teacher education implemented by various means and in different cultural contexts.
- The aim is that teachers internalise a research-orientated attitude towards their work. This means that teachers learn to take an analytical and open-minded approach to their work, that they draw conclusions based on their observations, and experiences and that they develop their teaching and learning environments in a systematic way.

High quality academic subject matter knowledge and pedagogical knowledge

One of the most important roles of teachers is to open pathways to cultural richness and understanding. Teachers have to be familiar with the most recent knowledge and research about the subject matters. They also have to know how subject matters can be transformed in relevant ways to benefit different learners and how it can help learners create foundations on which they can build their lifelong learning. This means that teachers need the latest research results and knowledge in pedagogy. They should have a thorough understanding of human growth and development and they need knowledge of the methods and strategies that can be used to teach different learners. In addition, teachers have to be familiar with the curricula and learning environments on educational institutions. They also have to know about learning in non-formal educational settings, such as in open learning and labour market contexts. Teachers should have the latest knowledge of educational technology and they need to be able to apply ICT in their work.

In updating the core contents of the Finnish teacher education, consideration was given to the reforms in national educational governance and the new orientation toward transferable skills and the educational demands of a multicultural knowledge society. In all educational systems at all levels, today's teachers and teacher educators are being required to act as responsible educators in a multicultural society. The need to understand different subcultures, religions and values is causing new and difficult demands to teachers and teacher education. Intercultural learning is important for every individual in every culture in a world that

we now call 'global' (Kaikkonen, 1996; Watts & Smolicz, 1977; Räsänen, 1999). Teachers also must have a good knowledge of history and cultural roots for promoting intercultural understanding. Teacher education curricula and programmes should give students opportunities to learn how to take responsibility for ethical choices (e.g. Aloni, 2002, pp. 176-182; Atjonen, 2004,139; Oser, 1994). This is a topic that is worth studying for its own sake for the purpose of developing a scientifically sound foundation for a course or module in applied intercultural ethics in teacher education.

In general, working with different types of learners has been a dominant issue in Finland because of efforts to make Finnish society more inclusive. Developing the ability to cooperate with multi-professional networks, especially in terms of inclusive education, should be an important objective in teacher training (Lappalainen & Mäkihohko 2004; Teacher Education Development Programme, 2001).

Metaknowledge – promoting active and collaborative learning

Teacher education is a very intensive educational process. Within five years, students should understand the main functions of the teaching profession and be able to set individual goals for their own personal and academic development with a positive orientation toward the application of theoretical knowledge. Learning to learn and helping other people to learn are both demanding tasks in themselves (e.g. Niemi, 2002).

The concept of knowledge is now different from earlier static, transmitted contents. We now understand knowledge to be ever renewable and to be construed jointly together with other learners. Teachers need metaknowledge of learning processes: they have to know what learning is from different theoretical viewpoints and how learners can be supported to find strategies to handle their own learning and to become active learners. They also need metaknowledge of collaborative learning processes. This involves knowing how knowledge can be construed in co-operation with others and knowing what the social components of learning processes are.

The social and moral code of the teaching profession

Teachers' work is always very context-bound, depending on learner age level, cultural conditions, available resources and the contents that they are mediating to learners. Teachers and teacher education are also clearly related to national goals and purposes. The welfare and economy of the society definitely depend on the quality of educational outcomes, and these are associated with teachers' competences.

Besides being guided by of national and local community-based goals, teachers' work also has more generic aims. They open doors and windows to cultural enrichment and help people to understand other human beings and their cultural contexts. Teachers are key actors in promoting human rights, justice and democracy in a global world (e.g. Aloni, 2002). In Europe, teachers have in important role in advancing intercultural understanding and mobility.

Representatives of an ethical profession

Teachers also have a key role in preparing a young generation as well as adult people to meet changing conditions (Niemi, 2000). The global world is very interdependent, and changes in technology, economy, politics, and security have immediate profound consequences on people's lives. All citizens should be given tools to analyse and manage these changes.

As teachers are key actors in enabling their student to reach their full human potential, they exercise a strong influence on communities and societies (e.g. Aloni, 2002, p. 176-183). Teachers are representatives of an ethical profession and they have an important role fulfilling the promise democracy, social justice and human rights. Therefore, according to Carr and Hartnett (1996) teacher development should be based on the following premises:

- Teacher development must be connected with more general social and political theories about such issues as democracy, social justice, equality and legitimacy. It has to demonstrate the implications of

a principled view of democracy not just for educational systems but also for the way in which educational institutions should be run. It also has to relate these ideas to curricula, pedagogy and assessment.

- Teacher development must be located within a particular historical, political and educational tradition and context. Teachers do not work and reflect in a social vacuum. They act within institutions, structures and processes which have a past and a social momentum.
- A theory of teacher education has to re-establish a democratic political agenda and to develop constituencies in the wider society for this work, so as to bring about changes as required.

Teachers need in their profession a concept of culture which includes cultural knowledge and intercultural understanding. They also need to understand the factors that create social cohesion and exclusion in a society and how the teaching profession plays an integral part in these processes. They have to be aware of opportunities and ways to work together with other partners and stakeholders in formal and non-formal educational contexts in order to provide learning opportunities to learners at various age levels. They also need to be aware of value contradictions in society and educational institutions and they should be prepared to deal with moral and value-based issues.

High quality pedagogical skills and reflection as a bridge between academic and professional development

As professionals, teachers need a lot practical skills that will enable them to mediate something to individuals or groups and to construct knowledge jointly. The academic contents and practical skills must not be seen as separate or exclusive; they are always complementary in the teaching profession.

Teachers are working today in conditions where continuous change, cultural dispersion, and increasing diversity in all areas of life are commonplace. The structures of families and working life have undergone substantial change. Teachers are witnessing rapid and unforeseen changes in economic life, societal structures, production, and information technologies. Security issues are very real. These phenomena reflect on students' lives and on the educational systems in all Western countries. Teachers' competence must include a readiness to analyse these circumstances, to draw conclusions and to make decisions to adjust or to change something in the situation. This means that the teacher needs a critical mind and the ability to reflect. Reflection can be in action or on action. The fact that many decisions have to be taken very rapidly, in action, requires that teachers have internalised the professional knowledge and moral code that are needed in acting in changing situations.

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