Aligned Instructional Systems:

Finland

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With contributions from:

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History and background

Finland has been an independent country since 1917, having previously been part of the Russian and Swedish Empires. It is a parliamentary democracy that has been a member of the United Nations since 1955 and the European Union since 1995 and has a population of approximately 5.4 million. Finnish is spoken by 91% of the population; Swedish by 5.4%. Sámi is the native language of approximately 1700 people who are members of the Sámi people of northern Lapland. The primary religion, followed by 80% of the population is Lutheran Christian. (Statistics Finland 2014). As with most European countries, Finland has recently accepted a large number of migrants making it a genuinely multicultural and ethnic society.

Until the 1960s, education was accessible only to those who could afford it or who lived in towns near the Grammar or middle schools or university. Most of the population left school after six or seven years of basic education. Education in general was poor and marked by inequality. Opportunities to attend private grammar schools were limited. In 1950, only 27% of 11-year-old Finns were enrolled in grammar schools (Sahlberg 2011b).

The subsequent transformation of education in Finland has certainly been comprehensive, and is also different from most of the other jurisdictions in this study. The Finnish success story, at first viewing at least, seems at odds with the neoliberal consensus of other successful states, being based on having a high level of trust in high quality teachers rather than on a system of competition, high-stakes external testing, external accountability and sanctions for failure.

The transformation of Finnish education is generally considered to have started with the Comprehensive School Reform (1972-77). This abolished the dual system of dividing children at age 11 into either a general secondary or vocational school, but instead had all students in a common system for Grades 1–9. The objective was to provide a homogenous education, open to all, with mixed ability teaching and no selection. From this starting point equity was an essential objective of the reform (Kuusioehito-Awale & Lahtero 2014). Initially there was a three-band streaming system, but once it was clear that certain groups were doing less well when it came to entering secondary education, it was abolished. However, while the 1980s experienced some equality in the students’ learning outcomes, the achievement gap was still wide due to streaming students into groups according to their ability in mathematics and foreign languages (Sahlberg 2011b).

In the mid-1990s, Finland sank into a deep economic depression, with unemployment rising to 18%. It was clear to the government that the economy had to modernize and that to facilitate this, further educational advancement was needed. A decentralization program was implemented as a means to increase the efficiency of education at a lower cost in straightened financial times (Kuusioehito-Awale & Lahtero 2014).
Since the 1990s, the locus of control over the education system has clearly shifted from the center to the providers of education (municipalities) and the schools themselves. Instead of the former guidance by regulations and orders, the new guidance was by objectives and outcomes. The municipalities and individual schools had unprecedented responsibility for managing education locally. The newly created National Board of Education (NBE) published curriculum guidelines (core curricula), and based on these, municipalities and schools had the responsibility of developing their own local curricula and school programs. However, such freedom was soon seen to have the consequence of widening differences between schools. This led to a revision of the national curriculum in 2004 resulting in a new National Curriculum Framework, which increased the guidance from the center (Kuusioehito-Awale & Lahtero 2014) but at the same time provided support to strengthen the local curriculum development process in municipalities (Halinen & Holappa 2013).

Another important reform was the Polytechnic Education Experiment Act of 1999. Its aim was to raise the level of tertiary education by converting it to non-university higher education. Polytechnic education offered upper-secondary school graduates an opportunity for higher education, and provided an opportunity for many cities to establish new centers of higher education (Aho, Pitkanen, Sahlberg 2006).

As part of its drive for equity, Finland has been heavily investing in building the system of special needs education, early childhood, fair school funding and school meals and health services (doctors, nurses and dentists are available every day in every school). Finnish schools are generally small (fewer than 300 students) with small class sizes (fewer than 30) and are well equipped. All students receive a free school meal daily, free health care, transportation, learning materials and counseling. Early intervention if a student is seen to be falling behind in any way is also a hallmark of the system (Darling-Hammond 2010).

The Finnish system has a core value of inclusiveness and all students, even those with severe learning difficulties, receive a similar basic education. Every student has the opportunity to progress through to university. Streaming and tracking are not a part of the basic education system, and support is available to all, with part time flexible additional support provided for large numbers of students. The aim is to have no educational dead ends so students can always progress to the next level. This is equally a part of the adult education system, which offers multifaceted lifelong opportunities to return to basic studies (Halinen & Jarvinen 2008).

The other major aspect of the Finnish education system is that teachers are regarded as high quality professionals, who receive a very good training and consequently have great status in Finnish society. Being accepted onto a teacher training course is highly competitive with an acceptance rate of around 10%. The courses are of Masters’ level and are run by a small number of universities, lasting three years. Once qualified, teachers have a great deal of autonomy within the Finnish education system (Sahlberg 2011b).

Subsequent to these reforms, Finland now appears in the top group of countries as measured by the comparative testing regimes, particularly PISA, and is also measured as one of the most
equitable systems by the OECD. While other systems increase school hours, Finland has the lowest number of compulsory instruction hours among OECD countries and students do not have as much homework, except in upper secondary (OECD 2010). For instance, Finnish students on average spend 4.4 hours a week on mathematics (including instruction at school, homework and any extra or remedial instruction) compared with an OECD average of nearly 7 hours a week (Halinen & Jarvinen 2008). Teachers also have less contact time than most other developed nations and can use non-contact time building up teaching and learning communities within their schools. As Sahlberg says, “in Finland, less is more” (Sahlberg 2011a, p. 13).

Sahlberg and others see the following major phases in the development of modern Finnish education arrangements:

- Phase 1 – foundations (Independence to 1968)
- Phase 2 – enactment (1968 – 1985)
- Phase 3 – consolidation (late 80s to current date).

It is on phase 3 that most international interest has focused, although this has frequently associated the current form of the system with the period of its transformation and substantial improvement – a period (phase 2) in which arrangements were very different. Phase 2 was characterized by very high levels of centralized prescription and control, and was designed to ensure thorough “re-conditioning” of the system around the principles of fully comprehensive education. This phase is not well-recognized outside of Finland and conflicts with many contemporary non-Finnish accounts of the system (Benton 2014). The Finnish system now has many features associated with relatively high autonomy but the route to high levels of autonomy was paved with interesting movement from central control and regulation to devolved arrangements (Oates 2013).

Finally, it should be noted that many accounts of Finland fail to engage with problems currently manifest in the system – continued disparity of performance between boys and girls, rising tensions in urban areas regarding social mix in schools, issues of choice and quality following large scale closures of small schools, continued complaints of poor mathematics attainment in first year undergraduates and declining performance at age fifteen in some localities (Autti O & Hyry-Beihmmer 2014; Rinne & Tikkanen 2011; Askew et al. 2010; Goldstein 2008).

Current phase of education reform

In June 2012 the Government issued new national goals for pre-primary and basic education, which in turn has led to the preparation of new basic education core curricula and the consequent renewal of local curricula. This latest wave of reform aims to deepen the themes of the 2004 and 2010 reform programs with new core curricula being ready at the end of 2014, and local curricula expected to be ready in 2016.

The new curriculum has specific focus on twenty first century skills and competences, a particular challenge as these are not skills that can be taught or learned in any single subject.
School culture also figures prominently – how to ensure schools are working as learning communities, promoting collaborative learning, promoting health and security. The current curricula are being examined as holistic pedagogical tools in order to construct a full range of routes stemming from both students’ own needs as well as those of the wider society (Halinen and Holappa 2013).

**Structure of education system**

There are four stages to the Finnish education system:

- Pre-primary
- Primary
- Secondary
- Tertiary.

Education is publicly funded from pre-primary through tertiary levels. Compulsory education, called Basic Education, does not start until the year of the student’s 7th birthday and is currently until students are 16, but a proposal has been put forward to increase this to 17 years (Liiten & Teivainen 2014). The nine years of basic education are provided free in comprehensive schools.

There are approximately 2600 comprehensive schools in Finland – which are generally run by municipalities – that provide basic education. There are no single-sex public schools. Children enroll in neighborhood schools or schools within their home municipality. Fewer than 2% of children go to private or charter schools – 75 schools in total for the entire country (Statistics Finland 2014; Sahlberg 2013).

Responsibility for early childhood education and care, for children up to the age of 5, has recently been transferred from the Ministry of Social Affairs and Health to the Ministry of Education and Culture, so ensuring all phases of education come under one remit (Halinen and Holappa 2013). Every child has a right to attend a day care program between birth and the age of five.

At the age of six, parents have the option to send their children to a one year pre-primary program. Although not compulsory, pre-primary is taken up by almost all eligible children. Currently 96% of children attend these programs, where the class size is limited to 20 pupils, with no more than 12 the recommended figure (Salminen 2013). Local and municipal authorities provide pre-primary education free for all six year olds.

The objective of pre-primary education is to improve children’s developmental and learning readiness as well as to strengthen social skills and self-esteem through play and positive learning experiences. Children do not study school subjects in pre-primary, which is seen as a
transition period designed to support children’s physical, psychological, social, cognitive and emotional development (Halinen & Jarvinen 2008).

Finland school structure

When children turn seven, they enter basic education in comprehensive schools. Basic education is comprised of primary and lower secondary education – Grades 1-6 (primary), Grades 7-9 (lower secondary). The school may provide an elective 10th year for students who have not entered upper secondary general education or vocational education and training.

For the first six years, one class teacher teaches all or most of the subjects; during the last three years, certain subjects are taught by specialized teachers. No more than 20 students are taught in each class (Sahlberg 2011b). The school year is 190 days, five days a week. The number of lessons ranges from 19 to 30. Meals are free, as are all instructional materials, health and dental care and travel to and from school, and after school activities are available. At the end of compulsory schooling, a school leaving certificate is awarded that allows students to progress to the next level (OECD 2010).

Students generally apply for either upper secondary general education or upper secondary vocational education and training at the age of 16, both of which lead to further tertiary studies should students want to stay on education. Upper secondary is optional, but approximately 95% of students stay on. This is a selective level, and students are selected on basis of their previous study record. The upper secondary syllabus is designed to last for three years but students may complete it in two to four years. Students learn on modular programs, which gives them the flexibility to choose courses that are not age-bound.
In their last year, students participate in the Matriculation Examination, which is required for graduation. Completion of upper secondary (either general or vocational) gives students eligibility to apply for higher education at universities and polytechnics (Hendrickson 2012).

Universities and polytechnics constitute the fourth stage of education. Universities emphasize scientific research and instruction. Polytechnics, also known as universities of applied sciences, adopt a more practical approach (Ministry of Education and Culture 2013b). About 60% of the students go on to higher education (Sahlberg 2013).

Additionally, adult education is available for general certificate or vocational qualifications. Adults can also study certain modules, recreational studies and take courses that help to develop citizenship and work skills (Ministry of Education and Culture 2014a).

Also, a well-developed system of grants and loans exists, where financial aid can be awarded for a full time study at upper secondary and vocational levels, and higher education.

**Special needs education**

For students with special educational needs there are two main pathways:

- Students are mainstreamed with regular classrooms and are provided with part-time special education in small groups, led by specialist teachers. These students generally have an individual learning plan that helps them reach their learning goals. These students complete their studies by following either the general curriculum or one adjusted to their abilities
- Some students are provided with permanent special education in separate groups or classes.

Special needs education is a part of every classroom, with over a fifth of students receiving some extra support in speech, reading, writing and mathematics. Even successful students will have received some interventions at some stages, so removing most of the stigma associated with special needs provision. (Halinen & Jarvinen 2008)

**Policy aims & vision**

According to the Finnish National Board of Education (NBE) the underlying values of education are “human rights, equality, democracy, national diversity, preservation of environmental viability, and the endorsement of multiculturalism (NBE 2004, 12).” Finns want their education to promote responsibility, community and respect for individual rights and freedoms. In an effort to promote tolerance and intercultural understanding, while the basis for instruction is Finnish culture, the system takes pains to include indigenous, Nordic and European cultures as well as the cultures of other people lately arriving in Finland. Instruction is meant promote gender equality, regional equality, be non-denominational and politically neutral. Everyone should be educated to understand their rights and responsibilities in society, working and family life.
This document is clearly built on the UNESCO Salamanca statement (UNESCO 1994), which sets out high expectations for inclusion of all students in successful education. Every child has a right to study at the nearest mainstream school and receive individual support. There is an emphasis on cooperation among members of multiple professions and the need to build an entire school community rather than focus on the problems of individual students. It stresses the importance of considering every learner’s individual strengths and educational needs (Halinen & Jarvinen 2008).

Finland’s educational mission statement fleshes out the vision. Education’s task is both to offer students a chance to acquire a general education and to give society a “tool for developing educational capital and enhancing equality and a sense of community”. Alongside opportunities for growth and learning an education should develop a healthy sense of self-esteem. Knowledge and skills will allow students to become involved citizens in a democratic society and “awaken a desire” for lifelong learning. Linguistic and cultural identity – through the development of mother tongue – is also critical. “It is also the mission of basic education to create new culture, revitalize ways of thinking and acting, and develop the student’s ability to evaluate critically” (NBE 2004, p.12).

The most recent publication setting out detailed aims and objectives for the Finnish education system as a whole is set out in Education and Research 2011-2016. A Development Plan. (Ministry of Education and Culture 2011). This shows both a continued focus on improving education standards and a determination to drive for further educational equality.

**Twenty First Century Skills**

Most of the 21st century skills are enshrined in the Core National Curriculum for 2004 as Cross Curricular Themes, set out by Finnish National Board of Education (NBE)\(^1\). The themes represent the central emphases of educational and teaching and are expected to be incorporated into numerous subjects, integrating education and instruction. They are:

1. Growth as a Person
2. Cultural Identity and Internationalism
3. Media skills and communication
4. Participatory citizenship and entrepreneurship
5. Responsibility for the environment, well-being and a sustainable future
6. Safety and traffic
7. Technology and the individual.

For each of the cross-curricular themes, the goals, objectives and core contents are set out.

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\(^1\) The Finnish National Core Curriculum from 2004, including its cross curricular themes, can be found here [http://www.oph.fi/english/curricula_and_qualifications/basic_education](http://www.oph.fi/english/curricula_and_qualifications/basic_education)
Growth as a person has the objectives of developing the physical, psychological and social as well as the ethical, aesthetic aspects of the individual. It also emphasizes the students’ self-development as learner as well as to learn to function as members of a group or community. The last two are particularly apt as 21st century skills. Among the core contents for this theme are mentioned various ways of cooperation. Thus there is a focus on skills of self-motivation and learning about learning as well as the interpersonal skill of cooperation. Beginning in first grade, teachers place a major emphasis on students’ metacognitive development. Students set their own educational objectives and evaluate their progress. The goal of this practice is “to increase students’ curiosity and motivation to learn, and to promote their activeness, self-direction, and creativity by offering interesting challenges and problems” (NBE 2004 preamble, p. 8).

The cultural identity and internationalism theme has the goal of helping the student “to understand the essence of Finnish and European cultural identities, discover his or her own cultural identity, and develop capabilities for cross-cultural interaction and internationalism” (NBE 2004, p.37). The focus is on learning the interpersonal skills of global and cross-cultural awareness – key 21st century skills.

Media skills and communication has the following goals: “to improve skills in expression and interaction, to a 21st century advanced understanding of the media’s position and importance, and to improve skills in using the media” (NBE 2004, p.37). For communication skills, in turn, emphasis is given to “participatory, interactive, and community communication” (NBE 2004, p.37). Here there is an emphasis on key inter-personal skills with the emphasis on participation and interaction and improving of technical skills in relation to the media. As well as gaining know-how in this area students will also learn to “take a critical stance towards contents conveyed by the media, and to ponder the related values of ethics and aesthetics in communication” (NBE 2004, p.38).

Participatory citizenship and entrepreneurship has the goals of helping the student to “perceive society from the viewpoints of different players, to develop the capabilities needed for civic involvement, and to create a foundation for entrepreneurial methods” (NBE 2004, p.38). One of the objectives here is to “understand the importance, workings, and needs of the school community, the public sector, the business world and organizations, from the perspective of the functionality of society” (NBE 2004, p.38). Here students’ learning will branch out from their own school community to that of wider society and the economy and its different sectors, public and private. The contents of the course not only provide information about the local community, economy and organizations, it also emphasizes the importance of participating in the local environment, “providing information on entrepreneurship as a vocation” and “providing the opportunity of getting an introduction to working life” (NBE 2004, p.39). This theme emphasizes key 21st century skills of citizenship allied to entrepreneurship and in this way providing a bridge between the school and the economy.

Responsibility for the environment, well-being and a sustainable future has the goal “to augment the student’s abilities and motivation to act for the environment and human well-being. It is the
objective of basic education to raise environmentally conscious citizens who are committed to a sustainable way of life” (NBE 2004, p.39). This theme emphasizes the key issue for 21st century of the environment and a sustainable future and the importance of raising consciousness in the new generation for protecting the environment and enhancing human well-being and the relationship between the two.

Safety and traffic has the goal of helping the students to “understand the physical, psychological and social dimensions of safety, and to guide the students towards responsible behavior” (NBE 2004, p.40). Here there is an emphasis on the key 21st century of taking personal and social responsibility for one’s own and others’ safety.

Technology and the individual has the goal of helping the student “both to understand the individual’s relationship to technology, and to see the importance of technology in our daily lives” (NBE 2004, p.40). Students also learn to use technology and information technology for various purposes. Students also learn to evaluate it in relation to ethics and equality. Here the focus is on the key 21st century skill of ICT literacy and knowledge. It looks not only at the instrumental aspect of ICT but in a critical way and in relation to moral issues of ethics and equality. It is facilitated via an online collaborative process.

Since the Finnish school system is decentralized, and decision making about curriculum development is left in the hands of municipalities and schools, the national core curriculum is not prescriptive in terms of how these cross curricular themes should be addressed by teachers in their classrooms. The national core curriculum describes a number of concepts, skills and standards to guide the development of curricula at local level that encourages students to be active learners who can find, analyze and use information for problem solving in novel situations. However, these objectives have not been implemented evenly across the country, according to Ahonen (2011), who states that teachers read the content part of the curriculum and the 21st century skills are left aside in the everyday school work in most cases. He says that while policymakers ask that teachers change their practice, Finnish teachers want additional guidance as to how to make pedagogical change.

Currently there is discussion around new iteration of the national curriculum and consideration is being given to adopting 21st century skills more explicitly (Adamson & Darling-Hammond 2012). The new version adds to the focus on 21st century skills both in the curriculum documentation and also on adding specific sub points that are codified under new legislation. These include mandating that students have the ability to collaborate and that both students and teachers increase their learning about and use of ICT (Ministry of Education and Culture 2012, in Adamson and Darling-Hammond 2012). Although the system is decentralized these frameworks could provide direction for teacher training, professional development and classroom practice to implement 21st century skills.

Ahonen (2011) sees assessment as critical and believes that if these skills are not assessed, they are unlikely to be taught, although he does not propose that this is accomplished through national testing. Instead there is a project at the University of Jyväskylä focused providing
teachers with tools to assess 21st century skills through tasks for formative assessment and localized to the Finnish environment (Adamson and Darling-Hammond 2012; Ahonen 2011).

**Governance**

At the national level, education is steered by the Ministry of Education and Culture, which is responsible for developing education policy, and the Finnish National Board of Education (NBE), a national development agency that is responsible for implementing education policy. The Ministry of Education and Culture is the principal decision maker for education policy: it oversees the annual state budget for education, prepares legislation, sets the education strategy and licenses and funds education providers. On the other hand, the NBE follows the development educational objectives, content and methods, and assists the Ministry in preparing policy decisions. The NBE has the following main tasks (Aho et al. 2006):

- determining the National Core Curricula for preschool, primary and secondary education, vocational qualifications for upper-secondary vocational education and competence-based qualifications for adults
- implementing education development programs
- evaluating learner outcomes using sample-based assessments involving 5-10% of students
- maintaining national and international databases and information services on education and finance
- monitoring and anticipating vocational and professional education needs, overseeing student selection and the production of textbooks and other learning materials
- recognition and comparison of qualifications
- in-service staff training.

At the local level, administration rests with local authorities, usually municipalities or joint municipal boards. Finland has a long tradition of strong local government. There are approximately 320 municipalities in Finland according to The Association of Finnish Local and Regional Authorities, most of which have an Education Committee. Municipalities vary in size, but average 12,000 inhabitants. Since many are very small, from the 2000s there has been a tendency for municipalities to merge or join together in federations. These local authorities make decisions on the allocation of funding, local curricula and personnel recruitment. They also have the autonomy to delegate decision-making powers to the schools.

Each local authority draws up a local curriculum based on the core curriculum and in response to local needs. Each school develops its own programs of study which it uses to develop annual work plans for the school, for each teacher and individual study plans for students when required. Local curricula are approved separately for education provided in Finnish, Swedish and the Sami language (Halinen 2006).
Local authorities, in their capacity as education providers, are responsible for all practical arrangements, such as teaching arrangements, and are also responsible for the effectiveness and quality of the education they provide. For example, while most class sizes are small (see below) there are no national regulations governing class size. Local authorities decide how much autonomy to give to schools, but most schools have their own administrative arrangements and visions and generally quite a bit of autonomy in terms of hiring staff, for example. Teachers have pedagogical autonomy, deciding for themselves how to meet the expectations of the national core curriculum, teaching methods as well as what textbooks and instructional materials to use (OECD 2010). There are no longer any school inspections – the system relies on the expertise of its teachers and other personnel to reach quality objectives, largely through self-evaluation.

While in many jurisdictions an emphasis on local autonomy might lead to a market between schools and a competition for pupils, this is not the case in Finland. The present government has expressed its concern that parents, particularly in cities, are starting to pick the ‘best’ schools for their children. The government has responded by reasserting the essential emphasis on equality and equity and to prevent segregation between schools (Halinen and Holappa 2013).

Thus, the organizational model for education services in Finland can be described as a two-level system of governance: the Ministry of Education determining policy and the NBE overseeing policy implementation, curricula and qualifications at the national level; and local authorities (municipalities) and schools developing curricula and implementing policy at local level.

In terms of legislation, in addition to national core curricula, basic education is governed by legislation set of statutes. The primary statutes are the Basic Education Act (1998, 2004), the Basic Education Decree (1998) and a 2001 government decree on the national objectives and allocation of classroom hours in basic education. These legislative instruments contain provisions on the general aims, subjects to be taught, languages of instruction, learning outcome assessment and the rights and duties of students (Ministry of Education and Culture 2014b).

As noted above, early childhood and care is now under the Ministry of Education having being under the remit of the Ministry of Social Affairs and Health. Finland is invests three times more than US in early years (0-6 years) programs to reduce the achievement gap between children when they start elementary education. Fewer than 2% of children go to private or charter schools, and the government issues charters and licenses – which are difficult to obtain – to run them (Sahlberg 2013).

Finally, it is worth noting that education is commonly seen as a joint concern of government, parents, employers and society in general. There is a strong trust in a school’s capability to manage education and little concern over their children’s welfare. There is an unwritten
agreement between home and school that parents are responsible for raising their children according to their own values, while school restricts itself to the academic and social education. While this situation has come under some tensions with recent immigration patterns, this open communication between parents and schools remains a fundamental element of the governance of Finnish schools (Aho et al 2006).

A significant side effect of the comprehensive school reform program was the amalgamation of the two existing teachers unions into the Trade Union of Education in Finland (OJA) in 1973. Since then the OJA has become an important partner in subsequent education reform and development (Simola, et. al. 2009).

Public/private

Before the comprehensive reforms many grammar schools were private. The majority were subsequently merged into the municipal education systems and only around 1% of schools are now private. Private schools are semi-public with owners only able to collect minor fees from students, while the schools have to follow the same national acts, decrees and curricular directives as the public schools. Currently permission needs to be granted from both municipal and central government in order to establish a new private school. The same principles apply to the private vocational schools and polytechnics, which are mainly owned by the municipalities and only differ from public institutions in their organizational form (Aho et al. 2006).

Textbooks

Currently, there are no explicit processes of state approval for textbooks, but this follows a period of tight regulation of textbook form and content. Textbooks were approved by the Examining Office of the National Board of Education until the mid-1990’s. This was a significant part of educational reform and it would be a mistake to see Finland as a state in which there is no state influence on textbooks, since this ignores the powerful influence of prior history of state approval processes in Finland (Oates 2014).

Textbook policy in Finland has been analyzed by Ahonen (2008), who notes the way in which textbooks have been viewed as instruments of control and social reproduction – and, indeed, subject to important critique by student organizations. This is an interesting element of Finnish history highlighting both the importance of textbooks and the negotiated or allowed influence of learners within the system (Ahonen 2008).

Overall, the system reforms moved the system from moribund performance in the late 1960s to high performance, as measured in PISA in 2000. These dates are important in respect of the key dates regarding patterns of control in textbooks in Finland. The high levels of control – including control of textbooks – played a part in the initial, coherent transformation of the system to being a comprehensive one, and ensured alignment in the new system arrangements. The subsequent interventions on textbooks enhanced quality.
Looking at time lags in the system, the impact of approved books (and more importantly the common criteria around them) was unlikely to suddenly cease in the early 1990s. Approval may have stopped but use of the approved books (and the impact on the shape and content of the school curriculum) did not cease overnight, on the date that textbook approval ended. The children who did so well in the first PISA survey were 15 years old. They progressed through a system that was continuing to be conditioned by the textbook forms that had been established during the period of approval and intensive research – that is, these children may have been measured in 2000 but they were educated in the mid-90s, and in a system with many quality features established during the late 1980s.

Finland, of course, has continued to do well on subsequent PISA tests (with a slight blip in 2012, see below). It did not, however, feature quite so prominently in the curriculum-based TIMSS and PIRLS assessments. As stated above, Finnish teachers continue to highlight high quality materials as a key feature of the system – even if the mode of production and application of quality criteria has evolved (Kuismanen & Holopainen 2014; Oates 2014).

**Accountability**

As stated above, the accountability system in Finland is different from most other nations’ in that the primary locus of control is within the schools themselves, supported by their local authority, although there is national policy on some aspects of education such as the curriculum frameworks. This section will therefore concentrate on teachers’ responsibilities and backgrounds, since it is they who largely self-evaluate.

There is no inspectorate in Finland. Local authorities are required to evaluate their schools and the education provided, to ensure its effectiveness and quality. The evaluation system relies on the professionalism and expertise of teachers (Galloway 2008). No assessment details are available, so it is impossible to test how demanding these assessments are. However national retention rates and comparative performance figures are high.

According to Sahlberg (2010b), the word accountability is not used in Finland’s education system, it is used more in economics, accounting and business. In an often quoted statement, Sahlberg defined accountability as “something that is left when responsibility is taken away” (Ravitch 2013a, unpaginated) In an article on ‘intelligent accountability’ in Finland, Sahlberg (2007), contrasting the Finnish accountability system with global education reform trends, described it as being based on:

- flexibility and loose standards that builds on good practices and innovations in school-based curriculum development, learning targets and networking (in contrast to centrally prescribed performance standards for schools, teachers and students)
• broad learning with creativity, based on deep learning that gives equal value to an individual’s personality, morals, creativity, knowledge and skills (in contrast to a focus on basic reading, writing, mathematics and natural sciences)
• intelligent accountability, with policies that gradually build a culture of trust within the education system that values teachers’ and principals’ professionalism in judging what is best for students and in reporting their learning progress (in contrast to raising student achievement through processes of promotion, inspection and rewards/punishments for schools and teachers based on outcomes of standardized testing).

Nonetheless, this culture of “trust” is underpinned by a comprehensive evaluation program (Simola et al. 2009). For although all traditional forms of control over teachers’ work, such as school inspections, a detailed national curriculum, officially approved teaching materials and so on had been eliminated by the early 1990s, this does not mean that there is no evaluation of learning, teaching and assessment or the activities that support these. Municipal and national authorities are required by legislation to evaluate their schools and the education provided, and to participate in external evaluation. The evaluation system is predicated on the professionalism and expertise of teachers, and aims for continuous improvement in the quality of education and training (Galloway 2008).

All educational personnel, including teachers, are expected to treat all students as individuals and guide and help them according to their capability. Teachers are required to have a Masters’ degree as well as undergoing initial teacher training that includes teaching practice. There is consistency in the training (see below), which helps to minimize differences in professional standards among teachers. The teaching profession is highly regarded in Finland, which attracts a very high caliber of candidates (Ministry of Education and Culture 2014).

**Setting Standards**

The National Core Curriculum is determined by the National Board of Education. The current core curriculum for basic education was confirmed a decade ago and was introduced in schools in August 2006 (NBE 2014). A review and renewal of the core curriculum is underway by the NBE, it is expected to be completed at the end of 2014 and implemented from 2016-2017 school year.

The national core curriculum is a normative document, which emphasizes national decision-making and narrows down differences in local implementation. Also, for the first time, national criteria for student assessment were introduced in the core curriculum (NBE 2004). Still, decisions about development, delivery and assessment of the core curriculum are made by local authorities in conjunction with schools who develop a local curriculum. The local curriculum is developed within the national framework, while taking into account the local context, however, approval for approach to delivery and assessment from the NBE is not required. Thus, while the national core curriculum provides the guidelines, local authorities and
schools are responsible for drawing up their own curricula, and teachers are given the freedom to flexibly incorporate teaching methods, learning material and assessments (Galloway, 2008). Teachers along with school principals make decisions on what and how to teach (Ravitch 2013b).

The characteristics of curriculum policy for basic education give the national core curriculum a dual role: on one hand it is an administrative steering document, and on the other a tool for teachers to develop their own pedagogical praxis. This dual role makes the development of the curriculum structure challenging (Vitikka et al 2011).

The current standards setting system in Finland therefore is based on three essential ideas:

- management by goals given in legislation and in the national core curriculum
- autonomy of local authorities in providing and organizing local curriculum
- freedom for teachers, as valued experts, to develop the local curriculum in their classrooms.

The national core curriculum sets out different subjects’ core content and objectives as well as the basic principles of student assessment, special needs education, student welfare and educational guidance. The core curriculum contains principles of a good learning environment
and approaches to working. This core curriculum is revised approximately every 10 years. Schools write their own curricula based on the national core curriculum, so there is leeway for local and regional differences. The local curricula must define the values, underlying principles and general educational and teaching objectives (Sahlberg 2013; NBE 2014; Vitikka, et al 2011; OECD 2010).

There are no test-based standards until the end of upper secondary schooling. Instead, teachers’ judgments are relied upon, gathered through continuous, formative, classroom assessment. Decisions on how students will progress through basic education and to upper secondary education are made by the class teacher, or jointly when a pupil is taught by several teachers, with parents and the students (who are encouraged to self-assess) also involved. A great deal of trust permeates the system (Sahlberg 2010a).

Teacher training

Initial teacher education

Finland has only one teacher preparation program, which is taught in eight research universities. All teachers in Finland must obtain research-based Master’s degrees in their subject areas. There is no undergraduate degree in education, as there is in most developed countries.

There are two categories of teacher in Finland, classroom teachers and subject teachers. Classroom teachers are required to obtain a Masters degree in Educational Science. They can teach in pre-primary, primary and comprehensive schools. Subject teachers obtain a Masters degree in their selected subject together with educational studies. Only subject teachers can teach in upper secondary schools. Vocational teachers must have a degree from a university or a Vocational Institute of Higher Education. After graduation teachers usually work for a number of years and then complete their pedagogical studies at Vocational Institute for Higher Education.

Finland is committed to research-based teacher education, which means that educational theories, research methodologies, and practice all play an important role in preparation programs. The teacher education curricula takes students from the foundations of educational thinking through to educational research methodologies and then on to more advanced fields of the educational sciences. Each student thereby builds an understanding of the systemic nature of educational practice.

Another important element is practical training in schools. Over the course of the program candidates advance from basic teaching practice to advanced practice and then to final practice. Students observe lessons by experienced teachers, practice teaching observed by supervisory teachers, and deliver independent lessons to different groups of students. Practical
experiences comprise about 15 to 25 percent of teachers’ overall preparation time. Teachers are also guided to learn reflection as a tool for continuous personal development. In all, teacher preparation takes five or six years of full-time study (Darling-Hammond & Rothman 2011).

Around 6,500 people apply to be class teachers each year, with only 800 being successful, which illustrates how sought after teaching positions are and how the programs attract very highly qualified students in Finland (Toom & Husu 2012). Acceptance is based on multiple measures including an essay, an entrance test, an interview and evidence about motivation to teach (Ravitch 2013b). The entrance procedure is below:

- **1st part of the examination** – applicants read a book of around 200 pages – which consists of six or seven scientific articles that have been published previously in scientific journals. Questions cover all these articles.
- **2nd part of the examination** is a team task, where four or five applicants work together to design an activity for children and then perform it in front of the admissions panel. The panel ascertains how applicants communicate, how they work together and how creative their ideas are.
- **3rd part** is a personal interview where applicants are interviewed before they are accepted for teacher training.

In general, the school principal, together with the school board, typically makes hiring decisions on new teachers. The teaching force in Finland is highly unionized; almost all teachers are members of the Trade Union of Education. There is no formal teacher evaluation once in post with teachers receiving less formal feedback from their principal and other senior staff.

The local way in which the Finnish curriculum is drawn up allows teachers to organize classroom activities quite freely and choose for themselves the teaching methods, materials and assessments they use. While secondary teachers teach the subjects they specialized in, they are free to make use of their personal strengths in choosing their classroom approach. This localism means that there is no overall pedagogic style; any school will have mix of traditional and modern methods, with teachers learning from the existing good practice within their schools. This has led to a ‘pedagogic conservatism’ (Toom and Husu 2012) with a balance between existing and innovative teaching practice.

A key characteristic of Finnish teachers’ work environment is that they are autonomous, trusted, and respected professionals; teaching in Finland is a very sophisticated profession, where teachers feel they can exercise the skills they have learned in the university (Darling-Hammond & Rothman 2011). This is confirmed by the 2013 OECD TALIS survey (OECD 2014b). Nearly 60% of teachers in Finland believe their profession is valued, well above the OECD average response rate of 31%, and 95% of teachers reported that the advantages of being a teacher outweighed the disadvantages, almost 20% higher than the average response. However, over a quarter of teachers reported not being entirely prepared for teaching the content of their subjects and over a third reported being not entirely prepared to teach their subjects’ pedagogy. As there is no national framework for teacher appraisal, it is not surprising that 28% of teachers...
reported not being formally appraised, double the TALIS average response rate of 14%. Most feedback was conducted in informal situations but only 38% of teachers reported a moderate or large positive change in their teaching practice as a result.

**Continuous Professional Development**

All teachers get support for professional development through in-service training organized by NBE and the universities. While Finnish teacher education has been praised for its systematic academic structure and high overall quality, professional development and in-service programs for teachers are more variable. In Finland, induction of new teachers into their first teaching position is less uniform than initial preparation. It is up to each school and municipality to take care of new teachers’ induction to their teaching assignments. Some municipalities and schools, as part of their mission, have adopted advanced procedures and support systems for new staff, whereas other schools simply bid new teachers welcome and show them their classrooms. Nevertheless, there have been discussions and recommendations from the Ministry of Education and Teachers’ Union to provide an induction phase for newly qualified teachers (Hacklin, Kantelin, Sormunen and Väisänen 2009)

Most compulsory, traditional in-service training has disappeared. In its place are school or municipality based longer term programs and professional development opportunities. Continuous upgrading of teachers' pedagogical professionalism has become a right rather than an obligation. This shift in teachers' learning conditions and styles often reflects ways that classroom learning is arranged for students. As a consequence of strengthened professionalism in schools, it has become understood that teachers and schools are responsible for their own work and also solve most problems rather than shift them elsewhere (Sahlberg 2007).

In response to concerns about uneven opportunities for in-service professional learning, the government is planning substantial increases in professional development budgets and considering ways to require that all teachers must have access to adequate professional training financed by municipalities. The Finnish Ministry of Education, in collaboration with municipalities, plans to double the public funding for teacher professional development by 2016 (Darling-Hammond & Rothman 2011).

Some of the above is confirmed in by the 2013 OECD TALIS survey (OECD 2014b). Teachers in Finland report lower participation rates than average for a number of professional development activities, including courses and workshops (60% compared to a TALIS average of 71%), education conferences (35% compared to 44%) and training in outside organizations (9% compared with 14%). Overall teachers in Finland report spending an average of three days on professional development activities over the past 12 months compared to a TALIS average of eight days.
Finland’s Curriculum

The NBE issues curriculum frameworks that schools need to take account of when they create their own, complementary, curricula. The subjects that students must study are listed below.

Pre-Primary Education

- language and interaction
- mathematics
- ethics and philosophy
- nature and the environment
- health
- physical and motor development
- art and culture.

Basic education - Comprehensive schools (to Grade 9)

The following factors must be evident in the basic education curriculum:

- values and underlying principles
- general education and teaching objectives
- language program
- lesson-hour distribution to be observed locally
- depictions of operational culture, learning environment and working approach
- possible instructional emphases, language immersion, or foreign-language instruction
- possible integration of instruction
- implementation of cross-curricular themes
- educational objectives and content in different subjects by year group, or, in instruction of mixed groups, by study modules
- instruction in optional subject subjects
- objectives for student behavior
- cooperation with pre-primary education and other basic education
- cooperation between home and school
- cooperation with other parties
- student welfare plan and organization of related cooperation
- principles of curriculum formulation
- guidance and counseling activities as a support for studies, and arrangements for an introduction to working life
- organization of club activities
- provision of remedial education
- instructions of students requiring special support
• instructions of students belonging to different language and cultural groups
• student assessments based on descriptions of good performance and criteria for final assessment
• principles of academic progress
• certificates and reports
• information strategy
• evaluation of activity and ongoing development (NBE 2004).

Subjects include:

• mother tongue and literature
• the other national language
• foreign languages
• mathematics
• environmental studies
• biology and geography
• physics and chemistry
• health education
• religion/ethics
• history and social studies
• music
• visual arts
• craft
• physical education
• home economics
• optional subjects decided locally by schools

The minimum number of lessons in annual weekly lessons (Kaihari-Salminen 2006; NBE):

<table>
<thead>
<tr>
<th>Subject</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother tongue and literature</td>
<td>14</td>
<td>14</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>14</td>
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<tr>
<td>A-language</td>
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<td>-</td>
<td></td>
<td></td>
<td>8</td>
<td></td>
<td></td>
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<td>8</td>
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<tr>
<td>B-language</td>
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<td>-</td>
<td></td>
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<td>-</td>
<td>-</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mathematics</td>
<td>6</td>
<td>12</td>
<td></td>
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<td></td>
<td>14</td>
</tr>
<tr>
<td>Environmental studies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9</td>
<td></td>
<td>3</td>
<td>7</td>
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<tr>
<td>Environmental and nature studies</td>
<td></td>
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<td></td>
<td></td>
<td>3</td>
<td>7</td>
<td></td>
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<tr>
<td>Biology and Geography</td>
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<td>2</td>
<td>7</td>
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<tr>
<td>Physics and Chemistry</td>
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<td>3</td>
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<tr>
<td>Health education</td>
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<tr>
<td>Religion/ethics</td>
<td>6</td>
<td>5</td>
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<td></td>
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<tr>
<td>History/Social studies</td>
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<td>3</td>
<td>7</td>
<td></td>
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<tr>
<td>Music</td>
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<td></td>
<td>4</td>
<td>30</td>
<td>3</td>
<td></td>
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<tr>
<td>Visual arts</td>
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<td></td>
<td>4</td>
<td>7</td>
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<td></td>
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<tr>
<td>Craft/Technical work/Textiles</td>
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<td>4</td>
<td>7</td>
<td></td>
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<td></td>
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<tr>
<td>Physical education</td>
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<td>10</td>
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<tr>
<td>Home economics</td>
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<td>3</td>
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</tbody>
</table>
The present distribution of lesson hours was confirmed in 2001 and it is currently in use; there is also a new distribution that was confirmed in 2012 and it is expected to be implemented in 2016 together with the new core curriculum (NBE 2014). According to Kaihari-Salminen (2006), the elements of the basic school curriculum are as follows:

- Basic values and goals for teaching and learning
- Shared ideas about teaching and learning
- Organizing teaching and learning
  - Conception of learning, learning environment, principles for the selection of teaching methods
  - Allocation of lesson hours, language program, criteria for student intake, teaching arrangements with other schools and partners
- Goals and structures for learning support and special education
  - Student guidance and counseling, individual study plan
  - Remedial teaching, part-time special education and special education
  - Preparatory education for immigrant children
- Goals and structures for student welfare services
- Welfare services, after-school activities, activities outside lessons, school meals and transport services
- Goals and contents, methods and assessment procedures in different subjects
- Subjects and cross-curricular themes.

**Curriculum reform 2016**

The national core curriculum for pre-primary and basic education is being renewed for implementation in 2016-17. The process involves all stakeholders, particularly education providers and education personnel. The aim is also to encourage parents and students to participate in the process. The curriculum review will aim to move away from subjects toward competences (Ministry of Education and Culture 2010; NBE 2013). The renewed core curriculum should be completed by the end of 2014 (NBE 2014).

The previous subject-based curriculum stressed both the aims and content that are associated with disciplines, whereas the new competence-based curriculum is structured primarily on skills, nevertheless the Government Decree N. 1435 (2012) states that the knowledge to be taught in the new curriculum must be based on scientific knowledge.

**Upper Secondary schools (Years 10–12)**
According to the NBE (2004) upper secondary schools must create program documents that contain the following:

- mission statement and value priorities
- main characteristics of the operational culture, the study environment and working methods
- counseling and guidance plan
- integration and cross-curricular themes
- distribution of lesson hours
- language program
- objectives and core contents by subject and course
- principles of independent study
- information strategy
- co-operation with students’ parents or guardians
- co-operation with vocational institutions and other upper secondary schools
- co-operation with other educational institutions and bodies
- education for students in need of special support
- education for language and cultural groups
- student welfare services
- assessment of students’ learning
- continuous development and evaluation of operations.

The curriculum must include descriptions of all courses. The objectives and core contents of applied courses must also be determined within the curriculum. In cases where the upper secondary school provides foreign-language education, distance learning or an opportunity to complete general upper secondary school diplomas in art and physical education, this must be specified within the curriculum.

Subjects in Upper Secondary Education:

- mother tongue and literature
- the other national language
- foreign languages
- studies in mathematics and natural sciences
- studies in the humanities and social sciences
- religion or ethics
- physical and health education
- arts and practical subjects.

Provision for applied and specialist learning is decided by schools.

Language of instruction
Both Finnish and Swedish are national languages, although more people speak Finnish as a mother tongue. The language of instruction in Finnish schools can either be Finnish or Swedish, but in either case students need to learn both languages. Latest EU figures state that in 90% of comprehensive schools, Finnish is the language of instruction and while almost 550,000 students learn in Finnish, just over 36,000 learn in Swedish (EU undated).

There are special preparatory programs for students whose first language is neither Finnish nor Swedish. They are entitled to 900 hours of special instruction for ages 6 – 10 and at least 1000 hours for older students. During this instruction they are integrated in mainstream classes. The preparatory instruction program’s objective is both to promote Finnish/Swedish language skills as well as to integrate students into Finnish society by getting them ready to move on in education. The program is, if possible, conducted in the student’s native language (NBE 2009).

Assessment processes

The National Core Curriculum for Basic Education (2004) sets out guidance and arrangements for both formative (in course) assessment and final assessment at the end of a phase of education. The National Curriculum also provides overall objectives for assessment associated with each phase. The local curriculum provides local guidance on criteria and practices regarding progression each year from one grade to another.

The importance of formative assessment is highlighted. Approaches advocated are aligned with the curriculum in their emphasis on assessment of work skills alongside assessment of subject matter, and the on use of a variety of approaches in assessment including the importance of self-assessment and feedback to students. The need to provide commentary as well as scores to indicate how the student has met particular objectives is underlined.

Summative assessment at the end of each school year provides feedback to students and their parents about progress and areas for improvement. Particular attention is paid to identifying individual needs for special support. There are no high stakes assessments for Grades 1-4. The final assessment of Basic Education takes place at the end of Grade 7 and is based on teacher assessment of samples of work over the preceding two years. Notable features of the Finnish system are the lack of high stakes assessment and the status given to teacher assessment.

A student may be retained as a 9th Grade student until he or she completes all basic studies, and receives a basic education certificate, or reaches the leaving age and resigns from school. After basic education, the great majority of students (95%) continue in full time education: in additional basic education (2.5%), in upper secondary schools (54.5%) or in initial vocational education and training (38.5%).
However, there is growing concern about the social exclusion of youth. Among 20-29 year-olds around 110 000 only have a basic level of education and 55,000 young people are unemployed job-seekers. Youth unemployment is on the increase. Altogether, it is estimated there are 40,000 untrained young people not working nor in education or training programs. A youth guarantee program began in 2013. This offers everyone under 25, and recent graduates under 30, a job, on-the-job training, a study place or rehabilitation within three months of becoming unemployed. Prevention of drop-out from education and exclusion from society is a government priority.

Assessment at the Basic Education level

There is no cohort-wide testing in Finland until students reach upper secondary education. Instead, students are continuously assessed by their teachers. Schools generally will have data on testing that is developed and implemented by teachers, but those data are not publicly available and the testing is not high-stakes (Sahlberg 2013). Each year students’ progress is reported either in the form of a written description or a grade at the end of the year and on one occasion before that (Galloway 2008). The grading scale is from 4 to 10, where 4 denotes a fail, 5 pass, 6 and 7 satisfactory, 8 good, 9 very good and 10 excellent. The report covers the following:

- conduct
- schoolwork
- knowledge and skills
- progress in different subjects.

Individual subject teachers comment on the student’s progress in the subject and the main classroom teacher provides input on issues such as conduct. Upon successful completion of basic education, students are awarded a school leaving certificate that allows them to progress to upper secondary education. Students who achieve the highest grades and marks are eligible to attend general upper secondary education, while others attend the vocational school (Hendrickson 2012). “Teachers are never evaluated by the rise or fall of their students’ test scores. There is no value-added assessment in Finland” (Ravitch 2013b, unpaginated).

Assessment at Upper Secondary school

In upper secondary students are given assessment feedback on a frequent basis for every course, based on their achievement of course objectives and their overall progress in each subject. Again, the skills and knowledge that a student has obtained is assessed by the teacher for a specific course, or in consultation with colleagues if several teachers are involved in the course. The final assessment is decided by the principal and the subject teacher or teachers together (Galloway 2008).

The grading scale is that same as that for basic education. Students who fail their assessments are given an opportunity to take a separate examination to complete the course. Students are
expected to include compulsory and elective courses in their individual study plans and, according to the Government Decree N 955 (2002) they must complete a minimum of 75 courses for upper secondary. The students are assessed for compulsory and elective studies and once they have obtained acceptable grades for their courses the can complete general upper secondary education. They then receive a general upper secondary school certificate, and typically sit for an external Matriculation Examination that includes the entire secondary school program To complete this phase of their education, although it is possible to complete general upper secondary education without the Matriculation Examination and still be eligible for tertiary education, but this is not very common. Following this, they receive a separate certificate that show details of the examinations passed and levels and grades achieved. Hence, in Finland, there is only one high-stake school leaving examination at the age of 18 or 19 (Sahlberg 2013).

The Matriculation Examination is offered in spring and in autumn to those studying in Grade 12. A Matriculation Examination Board administers the examination and provides guidelines on the contents of, and arrangement for, the examination. Passing the examination makes the students eligible for tertiary education. However, admission to a university and polytechnics could require students to go through an additional entrance examination in some fields of study (Galloway 2008).

The Matriculation Examination tests whether students have achieved the necessary knowledge and skills required by the curriculum for general upper secondary school (students in the vocational upper secondary schools can take it too, but it is not very common), and whether they have reached an adequate level of maturity. Before candidates can sit the Matriculation Examination, their principals are required to confirm that they fulfill the requirements laid down for participating in the examination in terms of having passed the compulsory courses for the subjects they will be examined on. The examination comprises of at least four tests (Galloway 2008):

- a test in the candidate’s mother tongue — compulsory for all candidates
- three tests from the following four categories:
  - second national language
  - foreign language
  - mathematics
  - one test in the general studies battery (sciences and humanities).

Students may opt to take more than these four tests. On completion of either general or vocational secondary education, students have the option of progressing to higher education by attending universities or polytechnics (Hendrickson 2012).

Regarding vocational upper secondary education, students’ learning and the competences acquired as a result of the learning progression, are assessed throughout the period of study. Assessment involves students’ individual self-assessment, as well as teachers in charge of the course and on-the-job instructors or supervisors for work-based activities. Students’ learning
and competencies are assessed against the vocational skills determined by the National Core Curriculum (NBE 2010).

In order to award grades in the different modules of the vocational qualifications, a three-step grading scale – Satisfactory 1, Good 2, and Excellent 3 – is used. Additionally, in vocational qualification modules, vocational skills demonstrations are used to assess students’ competencies, performing work assignments in the most authentic settings possible. Skills demonstrations are part of on-the-job learning periods, at workplaces or at vocational institutions, and are designed, implemented and assessed by teachers at vocational upper secondary schools in co-operation with representatives of employers or instructors (Räisänen and Räkköläinen 2014)

Students are awarded vocational qualifications once they have completed all compulsory, optional and free-choice study modules (a total of 120 credits) to an acceptable standard. These qualifications consist of a vocational upper secondary certificate and a certificate of skills demonstrations; the latter including information on the vocational skills demonstrations taken and the grades awarded for these, and the former includes the qualification modules and their corresponding grades (Eurypedia 2013)

**National assessments**

In addition to the school-based assessment of learning that schools carry out, national assessments of learning outcomes are done regularly. There is a test nearly every year either in mother tongue and literature or mathematics. Other subjects are assessed according to the evaluation plan of the Ministry of Education and Culture. Not only are academic subjects assessed but cross-curricular themes are as well. The assessments are not cohort wide, they are sample-based. The main aim of the national assessments is to follow at a national level how well the core curriculum’s objectives have been reached.

National assessments are most commonly carried out in Grades 6 and 9 and their main aim is to ensure equality and equity across regions and for students from different language groups, social backgrounds and gender. The government stresses that these assessments are meant to develop and steer, not to control. Outcomes are not used to rank schools and are not made available publicly, despite pressure from the media. Approximately 10% of schools and 5-7% of students are part of the sample. Every third Swedish-language school is included. Participating schools receive their own results, which are compared with national outcomes. These data are meant to be used developmentally by the schools. Nationally, the results are used to aid in policy decisions (NBE 2006).

**International Testing**
PISA 2012

<table>
<thead>
<tr>
<th>Mathematical Literacy</th>
<th>Score</th>
<th>Rank</th>
<th>Point difference highest (95%)/lowest (5%) achievers</th>
<th>Below level 2 (basic skills for life and work)</th>
<th>Levels 5 &amp; 6 (top performers)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>519</td>
<td>12th of 65</td>
<td>281 points OECD = 302</td>
<td>12% OECD = 23%</td>
<td>15% OECD = 13%</td>
</tr>
<tr>
<td>Reading</td>
<td>524</td>
<td>7th of 65</td>
<td>309 OECD = 310</td>
<td>11% OECD = 18%</td>
<td>14% OECD = 8%</td>
</tr>
<tr>
<td>Scientific Literacy</td>
<td>545</td>
<td>5th of 65</td>
<td>306 OECD = 304</td>
<td>10% OECD = 18%</td>
<td>23% OECD = 8%</td>
</tr>
<tr>
<td>Problem Solving</td>
<td>523</td>
<td>9th of 44</td>
<td></td>
<td>14%</td>
<td>15%</td>
</tr>
</tbody>
</table>

Finland has historically been a strong performer in PISA literacies, however, between 2003 and 2012, mathematics performance in PISA decreased by 25 points – 32 points between the 2009 and 2012 tests. Reading performance also declined – 22 points between 2000 and 2012. Science performance decreased by 18 points between 2006 and 2012. The point differences between its highest and lowest achievers, which the OECD uses as a measure of educational equity, i.e. the lower the point difference, the closer educational opportunities are for all students, is lower than the OECD average, though. (OECD 2013c; OECD 2014a)

PIRLS and TIMSS 2011

<table>
<thead>
<tr>
<th></th>
<th>Score</th>
<th>Rank</th>
<th>Advanced International Benchmark (625)</th>
<th>Low International Benchmark (400)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIRLS 4th grade</td>
<td>568</td>
<td>4th of 45</td>
<td>18% International Median = 8%</td>
<td>99% International Median = 95%</td>
</tr>
<tr>
<td>TIMSS math 4th grade</td>
<td>545</td>
<td>9th of 57</td>
<td>12% International Median = 4%</td>
<td>98% International Median = 90%</td>
</tr>
<tr>
<td>TIMSS math 8th grade</td>
<td>514</td>
<td>15th of 56</td>
<td>4% International Median = 3%</td>
<td>96% International Median = 75%</td>
</tr>
<tr>
<td>TIMSS science 4th grade</td>
<td>583</td>
<td>3rd of 57</td>
<td>20% International Median = 5%</td>
<td>99% International Median = 92%</td>
</tr>
<tr>
<td>TIMSS science 8th grade</td>
<td>552</td>
<td>7th of 56</td>
<td>13% International Median = 4%</td>
<td>99% International Median = 79%</td>
</tr>
</tbody>
</table>

Finland participated in PIRLS for the first time in 2011. Participants did as well on informational as on literary reading. It also participated in TIMSS for the first time in 2011.

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2 Although PIRLS, TIMSS and PISA all have a mean score of 500 and a standard deviation of 100, because different countries participate in the assessments, the scores cannot be compared across instruments, i.e. a 570 in TIMSS does not equal a 70 in PISA. The same, obviously, is true for rank order – coming in 4th in PIRLS does not equal coming in 4th in PISA.

3 As a rule of thumb, the OECD equates 40 points with one year of schooling.
Detailed analysis of curriculum

In this section, the following key areas of the Finnish curriculum have been analyzed: primary language, mathematics and general science, and secondary language, mathematics, earth science, biology, chemistry, physics, history and geography (social studies) and vocational education. The areas of the analysis are:

- Orientation – the aims, goals and rationale for the subject/content area
- Coherence and Clarity – the extent to which the curricula contain clear and specific goals for each grade and whether the suggested learning activities and pedagogical materials support those goals
- Scope – the scope of material coverage, the number or amount of items or goals in the curriculum versus the depth of mastery proposed of each one
- Levels of Difficulty – to what extent the curricula items can be judged to be at the appropriate levels of difficulty. An appropriate level of difficulty should be defined as one that builds sequentially on prior and existing knowledge and presents an achievable challenge to the average student
- Integration – how the different subjects within each grade of the curriculum is internally aligned
- Progression – how smoothly and coherently the learning goals and proposed content of a given curriculum in a given subject progress from one grade level to the next
- Key competencies – the level of development of a number of key competencies in the current curriculum and textbooks (such as problem solving, teamwork, self-learning, creativity, critical thinking competencies).

Basic education is a compulsory nine-year program for 7 to 16 year-olds in comprehensive schools with no division between primary and lower secondary education. Aged 16, students progress to upper secondary education for three years and then on to higher education. Grades in Finland do not match grades in the USA, since students start school at age 7 in Finland and not at 6 as in the USA. In the Finnish education system there is no clear line between primary and lower secondary. In general primary reports have looked at Grades 1-4 and Secondary Grades 5-9, but in some individual subjects this distinction may vary.

**Primary: Finnish language**

This report concentrates on Grades 1-5.

**Orientation:**
Cross-curriculum themes put emphasis on the whole person (“Growth of the person”, the first cross-curricular theme “encompasses all instruction”), and this is the starting point for describing what the mother tongue and literature curriculum offers. In the early years the aim of the language curriculum is to “continue the language learning that has begun at home”; while “the
fundamental task of instruction in the mother tongue is to spark the students’ interest in language, literature and interaction.” “The objective is that the student becomes an active and ethically responsible communicator and reader who gets involved in culture and participates in and influences society.” There are curriculum specifications for each main language (Finnish, Swedish, Sami, Romany).

**Coherence and Clarity:**
The curriculum specification is set out for Grades 1-2 and 3-5 with objectives for each of the following: students’ interaction skills; reading and writing skills; relationship with literature and language. Core content is set out for each objective by grade-stage for example Grade 1-2, Reading and Writing: “word recognition, progressing from short words towards long, unfamiliar ones; gradual shifting from reading aloud to reading silently, too.”

The number of core content sub-areas listed by grade-stage increases over time and becomes more differentiated. For Grades 3-5 these are: "interaction skills; text comprehension; preparing compositions and oral presentations; information management skills; tasks and structure of language; literature and other cultures.” Objectives and core content specify between three to seven sub-areas. Grades 6-9 increase the range and level of content specification.

**Scope:**
A description of good performance is given for the end of each stage setting out the range of competences in each area that students will have developed for example for Grades 1-2, students “are able to write simple and familiar words almost without error and have begun to use terminal punctuation in sentences, and capital letters to begin sentences.”

Although the specification is not as detailed as in other curricula in use in Australia and Canada, the general level of skill expected is similar. The high recognition given to introducing children to their own and the national culture in Grades 3-5 and 6-9 is marked.

**Levels of Demand:**
The levels of demand are appropriate and build on knowledge acquired in the previous phases. Descriptions of good performance combine definitions of technical skill with the capacity to use that skill for the children’s own purposes, for example, students in Grades 1-2 “are able to express themselves in writing, too, so as to enable them to cope with writing situations in their own daily lives; they will also be able to use imagination in their writing.” Such definitions change over time and become more complex in successive stages, for example, at the end of the fifth grade, students are expected to be able to: “plan and develop ideas for the content of their texts and are able to construct texts based on information, experience and imagination; the writer's own voice and a growing vocabulary will be evident in their compositions.”

**Progression:**
There is clear development between stages, in terms that are familiar from other curricula. The absence of the close itemization of each individual skill that makes up a larger competence
facilitates greater cohesion in the learning goals and allows the larger aim to remain at the center of the planned curriculum.

Assessment: Although formal assessment arrangements are delayed to the end of stage, progression is continuously monitored by teachers with frequent reporting to parents over the year. Students who are not thought to have made sufficient progress to benefit from the curriculum in the next stage can be held back a year. Such decisions are taken in consultation with parents on the basis of what is in the best interest of the child. This is a different model of assessment, in which the teacher’s judgment plays a key part, with the emphasis on devising personal study programs for the student rather than pacing all students through a grade-by-grade syllabus regardless of its relevance for their needs. Pedagogy can adjust continuously, while expectations of attainment are kept high through continuous monitoring of progress towards Grade objectives and definitions of good performance. The emphasis on the personal responsibility of the student, in the curriculum specification and in the monitoring regime, accords well here.

Key competencies: The mother tongue curriculum is defined in such a way to enhance a sense of national identity, including recognition of diverse language groups that make up Finland. Assessment also takes account of work skills – “the student's skills in planning, regulating, implementing and assessing his or her own work”; Behavioral assessment – “how the student takes other people and the environment into consideration and observes rules”; and self-assessment by the student – “to support the growth of the student's self-knowledge and the development of his or her study skills.”

Primary: Mathematics The information that follows is based on the mathematics document (section 7.6) of the ‘National Core Curriculum for Basic Education’ (2004). Primary has been taken to mean Grades 1-5.

Orientation: The mathematics section starts with a discussion of the subject, which starts with statements about offering opportunities for the development of mathematical thinking and for the learning of mathematical concepts and problem solving methods. It is stated that mathematics instruction must progress systematically and create a lasting foundation for the assimilation of mathematical concept and structures.

Coherence and Clarity: Documents list content under groups of grades, rather than individual grades. The content is mostly clear, though in some cases more exemplification would help. It is unclear to what
extent details are left to teachers and to what extent they are specified or suggested in documents such as text books.

**Scope:**
Content is listed in clusters of grades, with Grades 1 and 2 together and Grades 3 to 5 together. This is followed by Grades 6-9 grouped together, which is interpreted to be lower secondary.

The curriculum for Grades 1 and 2 starts with a statement saying that the core tasks of mathematics instruction at this level are:

- development of mathematical thinking
- practice concentrating, listening and communicating
- acquisition of experience as a basis for the formulation of mathematical concepts and structures.

This is followed by a list of objectives that develop these themes, but also include more content based aspects such as “understand the concept of natural number and learn the basic computational skills appropriate to it.” This is followed by core content, which occupies one page then description of good performance at the end of 2nd Grade that also takes one page. The core content is organized in five domains:

- Numbers and calculations
- Algebra
- Geometry
- Measurement
- Data processing and statistics.

Number and calculations is the most extensive of the five, followed by geometry. Work on numbers and calculations includes understanding numbers, including the base ten system and introducing fractions by ‘concrete means’. Work on calculation includes addition and subtraction, including the connections between them, multiplication and multiplication tables and division using concrete tools. The expectation is that students calculate in a range of ways, including with practical aids, mentally and using pencil and paper. The algebra content at this level consists of seeing regularities, ratios and correlations pictorially and working with simple number sequences. Content also includes the phrase “investigating the number of various alternatives”.

Geometry content for Grades 1 and 2 includes observing and describing spatial relationships and geometric shapes. Students recognize, explain and name 2D and 3D shapes, draw 2D shapes and construct 3D shapes. They meet basic geometric concepts such as the point, line segment, horizontal line, ray, straight line and angle. They work with simple reflections and dilations. Measurement at this level includes understanding the principle of measurement and the use of measurement devices. Students use and compare common units of measurement and work with length, mass, surface area, volume, time and price. Data processing and
statistics at this level is about collecting data, reading simple tables and diagrams and presenting data on bar graphs.

The descriptions of good performance at the end of 2nd Grade give slightly more detail (for example, in mentioning odd and even numbers which are not listed specifically in the content and in giving examples of which 'simple fractions' students should work with). However, in many cases what is written here is basically a repeat of the content. There is a difference in headings, however, and the first category includes some detail on what is expected (see later section on key competencies). The four headings for good performance at the end of second Grade are:

- Thinking and working skills
- Numbers, calculations and algebra
- Geometry
- Measurement

The sections for Grades 3-5 start with a statement about the core tasks of mathematics instruction at this level which are to:

- Develop mathematical thinking
- Introduce the learning of mathematical models of thinking
- Strengthen basic calculations and the concept of number
- Provide experiences as a basis for assimilating the concepts and structures of mathematics.

This is followed by objectives, which broadly match the above. Content is then listed in four domains, which change slightly from Grades 1-2, with the measurement content now forming part of the geometry heading and data processing and statistics extended to include probability. The domains for Grades 3-5 are:

- Numbers and calculations
- Algebra
- Geometry
- Data processing, statistics and probability.

Number and calculation continues to be the longest section, followed by the geometry section, which also includes measures.

The number section starts with strengthening the concept of the decimal system and introducing the 60-based system with the help of times on a clock. (If base 60 is done in the abstract this is quite unusual, but less so if it is just related to time – it is not clear from the details given). Number content at this level also includes multiplication and division, including ratio and divisibility. Students use algorithms and calculate mentally. There is work on fractions, decimals and percentages, including the relationships between them, addition and subtraction of fractions.
and decimals and their multiplication and division by natural numbers. Students are introduced to negative whole numbers, they use brackets and they evaluate, check and round the results of calculations. They investigate the number of different alternatives. In algebra, students are introduced to the concept of the algebraic expression, they work with number sequences, regularities, ratios and correlations and solve equations and inequalities by deduction.

Geometry at this level includes dilations, reflections, similarity, scale, reflection symmetry and congruence. Students work with parallel and perpendicular lines, measure and classify angles and work with circumference and area. They study and classify different types of polygon and the properties of 2D and 3D shapes. Measurement work at this level appears to be mostly revision and possibly some extension of earlier work. Under data processing, statistics and probability, students continue to gather and present data and read simple charts and diagrams. They work with co-ordinates and are introduced to mean, mode and median. They have experiences with ‘classical and statistical probability’.

Good performance at Grades 3-5 is described under four headings, which broadly match the content above and occasionally gives more exemplification. The headings for good performance at this level are:

- Thinking and working skills
- Number calculations and algebra
- Geometry
- Data processing, statistics and probability.

Levels of Demand:
It is quite hard to tell this from the outline given, though the amount of content in the first two grades seems quite demanding. Some statements might be demanding, depending on how they are interpreted (for example surface area at Grades 1-2, 60-based system at Grades 3-5). The way content is described is likely to allow for students to work at different levels of attainment.

Progression:
Material does not appear to be listed by individual grade. There are many commonalities but also some clear differences between the content for Grades 1-2 and for Grades 3-5.

Assessment:
Curriculum statements contain some discussion of assessment as part of studies, which should be ‘truthful and based on diversity of evidence’. The good performance descriptions have a role in more formal assessment.

Key competencies:
The heading ‘Thinking and working skills’ appears as the first category under the good performance sections. For Grades 1-2 these are about understanding and communicating, including justification. These are more detailed for Grades 3-5 and include problem solving and end with ‘know how to follow rules’.
**Primary: Science**

This commentary is based on the 2004 National Core Curriculum for *Basic Education* (compulsory education from age 7) for Grades 1–4 (ages 7-11).

**Orientation:**
The underlying values for Basic Education as set out in the National Core Curriculum are ‘human rights, equality, democracy, natural diversity, preservation of environmental viability and the endorsement of multiculturalism’ (p12). This is reflected in an emphasis throughout the science related requirements on the environment and citizenship.

The mission outlined for Basic Education refers to the need to ‘create a new culture, revitalize ways of thinking and acting and develop the student’s ability to evaluate critically’ (p12). Advice on instruction underlines the importance of lifelong learning, the importance of active learning through independent and collective problem solving and the need to promote dispositions such as curiosity, motivation to learn, self-direction and creativity (p16).

Science for Grades 1-4 is set out within the broad subject group called *Environmental and Natural Studies*, combining biology, geography, physics, chemistry and health education. Reflecting the overall mission, investigative, problem centered, experiential approaches to learning are advocated with a concern to promote a ‘positive relationship with nature and the environment’ (p170).

**Coherence and clarity:**
The objectives set for Environmental and Natural Studies in Grades 1-4 make reference in broad terms to the need to develop skills associated with inquiry, such as observing, classifying, representing information in varied ways, to develop and use concepts and to act safely to protect themselves and the environment. Core content is presented as a series of broad topics under the headings:

- Organisms and living environments
- One’s immediate environment and home region, and the world as a human living environment
- Natural phenomena – including light sound, heat, electricity and magnetism
- Substances around us
- The individual and health
- Safety

There are no set requirements for particular grades and teachers can organize the curriculum into modules on the basis of children’s needs and their local environment.

There are also no specific goals for each grade. A description is provided of good performance at the end of the 4<sup>th</sup> Grade under the headings:
• Science activities – this section sets out what children will know how to do, in terms of skills and processes related to scientific inquiry
• Organisms and environments, Natural phenomena and substances around us, the individual and health and safety – in each case the list refers to what children will know and understand.

There is also some reference to skills of investigation in particular in relation to *Natural phenomena and substances* and to the demonstration of positive attitudes to the environment and to others in *Organisms and environments, the individual and health and safety*.

In line with the Basic Education Decree, there is considerable scope to develop local programs in accordance with children’s personal needs and progress in contrast to systems that set out the curriculum on a year-by-year basis. Curriculum objectives and content reflect the curriculum orientation.

**Scope:**
The curriculum has a strong focus on the environment and on developing positive social skills and attitudes as members of a community.

It is difficult to judge the level of mastery expected. In relation to the objectives set down for science activities and the description of good performance at Grade 4, skills and processes such as observing, comparing, describing and communicating are included, but there is limited attention to questioning, predicting, planning, measuring, explaining or evaluating associated with problem solving and inquiry and the development of procedural and conceptual understanding. There is no reference to the nature of science or discussion of work of scientists.

In terms of the core content, this is focused on introducing key features of scientific phenomena related to children's everyday lives. The emphasis is on describing and knowing about features and properties rather than introducing and explaining key concepts, models or big ideas in science. Although the description of good performance at Grade 4 refers to 'know how to use central concepts and perceive concepts in their entirety' these are not spelt out explicitly. For example, children should be able to identify common species in the environment – but there is no specific reference to diversity or adaptation. There are limited references to Earth in Space and Earth Sciences or Forces (these are included in Grades 5-6).

**Level of demand:**
No specific requirements are set out for each grade level. There is limited specification of scientific concepts or terminology to be introduced. The content suggests an experiential emphasis with room for local interpretation of level to meet individual needs. Abstract concepts such as energy, evolution, forces do not feature explicitly. In this respect the expectations are less demanding that those of some other jurisdictions.
Progression:
The curriculum for Grades 1-4 is designed to build on experiences in the pre-primary phase. In Grades 1 and 2 the emphasis is on developing ‘students’ capability for subsequent work and learning’ (p13). There are no explicit details of expected progression across Grades 1 to 4 and beyond into Grades 5 to 9 except those implicit in curriculum content.

Across Grades 5–9 the curriculum is increasingly differentiated. In Grades 5-6 the curriculum is divided into Biology and Geography and Physics and Chemistry and then separate subjects for Grades 7-9. As before, key objectives and core content are set out for each phase (Grades 5-6) and (Grades 7-9) with a description of good performance at the end of the phase. The end of performance descriptions show progression in depth and scope of expectations in terms of students' knowledge and conceptual understanding and include a wider range of inquiry skills and processes. There is a continued emphasis on responsibility for the environment and citizenship. Ideas about the nature of science are introduced explicitly in physics and chemistry in Grades 7-9. Reference is made to the importance of physics and chemistry in everyday life and the application of ideas in decision-making.

Assessment:
Although teachers may make use of classroom tests, this is not required and it is therefore difficult to make detailed judgments about the match between assessments and science curriculum content, particularly at grade level where local advice and guidance is influential. In broad terms there is coherence between curriculum content and objectives for Grades 1-4 and the description of good performance at the end of Grade 4.

Key competencies:
Throughout the general and subject specific dimensions of the National Core Curriculum for Basic Education there is an emphasis on the development social skills and thinking and reasoning skills associated for example with problem solving or critical evaluation. Both teaching and assessment approaches advocated underline the importance of children’s self-direction and awareness of their own learning. The features of good performance in Environmental and Natural Studies include use of literacy and numeracy skills, but no specific references to ICT (although ICT is mentioned in general advice concerning Working Approaches (p17)).

Secondary: Finnish language

Orientation:
The nationally devised program of study stipulates that mother tongue studies are compulsory. It states:

Instruction in mother tongue and literature is guided by the perception of the native language as a concept system used by individuals to structure the world and construct social reality. Along with their mother tongue, people absorb the culture of their
community and build their own identity. This enables social interaction and the continuity and development of culture.

This sets a tone in which the study of the home language is integrated into wider cultural and social values from Grade 1 through to matriculation. The basic values of upper secondary school instruction are built around Finnish cultural history, which is seen as belonging to a Nordic heritage. By upper secondary school, students are expected to treasure their cultural heritage. Students will not only have a command of the range of skills underpinning mother tongue, but also be educated in tolerance and international co-operation.

For the upper secondary curriculum the program states that:

mother tongue and literature is a key practical, theoretical, cultural and art subject, providing components for linguistic and cultural all-round learning. The subject derives its contents from linguistics, literature, communication sciences and cultural studies. Knowledge of language, literature and communication and skills in reading, writing and oral communication will be learned in different communication and interactive situations. Instruction in mother tongue and literature will guide students to appreciate their own culture and language. The subject will guide students towards greater understanding of multiculturalism and multilingualism and towards linguistic and cultural tolerance.

The aim of instruction in literature at upper secondary school is that students will understand literature and analyze and interpret texts from different points of view. Literature provides components for intellectual growth, formation of cultural identity and diversification of students’ own powers of expression. Instruction in mother tongue and literature aims to provide suitable communication and interaction skills to create sufficient conditions for further study, inclusion in working life and active citizenship.

Social interaction and learning are based on diversified communication competence and sound literacy skills as well as on the ability to use language as required in each specific situation. The mother tongue and literature subject will steer students towards active acquisition of information and critical processing and interpretation of such information.

Instruction aims at internal integration of the subject, as different areas of knowledge and skills are interconnected functionally. The common denominator is language and the perception of the human being as a communicator who acts purposefully, expresses oneself and interprets and produces meanings.

Because of the linguistic diversity of Finland there are parallel programs of study also for mother tongue Sami, Romany and Swedish.

*Coherence and Clarity:*
The objectives of instruction in mother tongue and literature are set out in very specific detail in order to provide guidance for the highly decentralized model. For example they stipulate that students should:

- consolidate their knowledge of language, literature and communication and be able to make use of the relevant concepts
- consolidate and diversify their communication and interaction skills, so as to be capable of intentional and appropriate interaction
- learn to use language in an increasingly appropriate manner in both speech and writing
- learn to understand and analyze the relationship between text and context
- consolidate their textual skills, so as to be able to analyze, interpret, assess, utilize and produce different types of texts with greater awareness of their functions and contexts
- learn to assess textual expression, such as rhetorical devices and argumentation, and to apply their knowledge to receiving and producing texts
- consolidate their knowledge of literature, thus developing their thinking, expanding their all-round learning in literature, their imagination and artistic insight and vision and constructing their world view
- command the norms of written language and understand the necessity of a shared, standard written language
- be able to select and critically assess different sources of information and the reliability, usefulness and intentions of information and know how to make use of information and communications technologies to study the subject
- enjoy culture and appreciate its diversity.

The curriculum is supported throughout in highly specific detail, delineating objectives and content. The indications are that schools adhere carefully to this – there is no evidence of great regional fluctuations in progression. There is evidence that reading, for example, is strong irrespective of social or demographic background.

**Scope:**
The scope of the curriculum is thus very comprehensive, and is expressed in closely defined competencies or objectives, for example students are expected to:

- consolidate their conception of text
- learn to examine various types of texts with greater awareness of factors steering their interpretation of the texts
- understand a text as being a semantic unit and be able to examine its features in terms of the function, communication situation and medium
- learn to observe their use of language, reading habits and communication with greater awareness
- become accustomed to revising the linguistic form of texts that they have produced
• consolidate their knowledge of group communication: they will develop and learn to assess their own participation methods in terms of group interaction and atmosphere and teamwork or effectiveness of conversations.

This is underpinned by stipulated core contents:

• basic factors steering the interpretation and production of texts, such as function, recipient, genre and text type
• effects of the communication situation and medium on text
• consolidation of the conception of text, such as written and spoken texts, media texts, electronic and graphic texts, factual and literary texts, public and private texts
• observation of and practice in language and content in different types of texts: intelligibility, clarity and coherence
• summarizing and commenting on texts
• assessment of one’s own communication skills, knowledge, attitudes and motivation from the perspective of upper secondary school studies
• interaction skills in groups. Students will gain practice in analyzing the language, structures and meanings used in texts and will learn to perceive the connection of a text with context and other texts. Students will consolidate their knowledge of genres and develop as producers of different types of texts
• cultural significance
• knowledge relating to this. They will learn to analyze and produce argumentative texts and culture to individuals and society.

At its most sophisticated this represents a challenging, integrated curriculum. The objectives of the course are for students to:

• know different phases of the development of the Finnish language and understand the effects of European linguistic and cultural contacts on the formation of and continuous change in Finnish culture
• appreciate the multiculturalism and multilingualism of Finland today and understand the significance of the mother tongue to everyone
• be familiar with key works and themes from Finnish literature, being able to assess their significance from the perspective of their own culture in terms of construction of cultural and individual identity.

This reflects the close integration of home language studies with social integration and cultural alignment. Indicative content is indicated by source and genre, but the selection of texts is again up to the school itself.

Core contents
• text in oral and written tradition: from folklore to literature, from written culture to modern communication
• formation of and changes in the Finnish language in an international environment
• principles of language steering from the viewpoint of a student’s use of language
• significance of language and literature in the construction of a national identity
• Finnish literature in its temporal and cultural contexts, key literary works and themes
• written and oral contributions on topics related to the themes of the course.

Schools are encouraged to develop key competencies as cross curricular themes. The objectives uniting all cross-curricular themes are stated as:

1. observe and analyze contemporary phenomena and operating environments; express justified ideas of a desirable future; assess their own lifestyle and prevailing trends from a future perspective; and make choices and take action for the future that they consider as being desirable.

The cross-curricular themes common to all upper secondary schools are:

- active citizenship and entrepreneurship; safety and well-being; sustainable development;
- cultural identity and knowledge of cultures; technology and society; communication and media competence.

In addition to these cross-curricular themes, education providers may also accept other cross curricular themes for their own curricula. Schools are asked to ensure:

- there is sufficient development of a number of key competencies in the current curriculum (such as problem solving, teamwork, self-learning, creativity, critical thinking competencies)

And to ensure their integration in to the curriculum, they are asked to assure:

- Are the elements above internally aligned? For a given curriculum in a given grade level, are the coherence, clarity, scope, and difficulty reasonably and appropriately similar among subjects?

Levels of Demand:
The Matriculation Examination tests whether students have achieved the necessary knowledge and skills required by the curriculum for the upper secondary school, and whether they have reached an adequate level of maturity. The examination comprises at least four tests: mother tongue, plus three of four constrained options. Continuing the policy of decentralization the tests are initially marked in the candidates’ schools and then are sent to the Board for centralized marking.

As with the school curriculum, mother tongue skills are closely related to core social and philosophical concepts. For example, sample essay topics include:

“Some politicians, athletes and other celebrities have publicly regretted and apologized for what they have said or done. Discuss the meaning of the apology and accepting it as a social and personal act.”
“Has your body become your hobby?”

“Media is competing for audiences – what are the consequences?”

“Choose three world religions and compare the role and use of a holy image within them.”

Overall performance is graded on a seven point scale, indicated by the quaint use of Latin terms:

- Laudatur (L) 5%
- Eximia Cum Laude Approbatur (E) 15%
- Magna Cum Laude Approbatur (M) 20%
- Cum Laude Approbatur (C) 24%
- Lubenter Approbatur (B) 20%
- Approbatur (A) 11%
- Improbatur (I) 5%

**Progression:**
Progression to university is through the national matriculation examination and Universities’ own entrance examinations.

**Assessment:**
Formative assessment of mother tongue and literature courses focuses on the full range of the subject. Students are informed of the objectives and contents of the courses, which are specified in great detail, and encouraged to monitor their own progress. Course grades are influenced by written and oral contributions and active participation. This involves setting personal objectives and receiving feedback both from other students and from the teacher. The curriculum is intended to develop students’ self-assessment skills in order to enable them to develop a profile of themselves as speakers, readers and writers. For example:

Students will gain a deeper understanding of language, texts and interpretation of these and they will develop their ability to read texts. They will know how to analyze their communication environment and identify their own skills as speakers, listeners, writers, readers and media users, so as to specify their image as communicators.

Students must develop interaction skills, reading and writing, text comprehension, knowledge of language, literature and other culture, information acquisition skills, preparing compositions and oral compositions, tasks and structure of language.

This formative assessment is described in terms of specified competencies, for example:

**Listening and speaking comprehension Grades 1-6**

**Proficiency level**
A1.1 elementary stage 1 - limited communication in the most familiar of situation
- Can understand a limited number of common words and phrases
- Can answer simple questions about personal details.
A1.2 developing elementary proficiency
   Can understand a limited number of words, phrases, questions, requests
   Can use very limited vocabulary, contextual expressions some elements of basic grammar
   A limited communication in the most familiar situations

A1.3 Functional elementary proficiency - can understand simple utterances in routine discussions.

By proficiency level B (Grades 7–9) it has become *basic needs for immediate social action and brief narratives*. And by proficiency level C *managing in a variety of demanding language use situations, escalating to C 2, has extremely good command of grammar, vocabulary and text organization. May make occasional mistakes in idiomatic expressions and stylistic aspects.*

Students are assessed by their teachers against the clearly defined objectives continuously through Grades 1–9, but this is not made public. However, a student’s progress is reported at the end of the school year, and on at least one occasion before that. For Grades 7–9 the report includes a grade, together with written comments. Grade 4 denotes a fail, 5 a pass, 6 and 7 satisfactory, 8 good, 9 very good and 10 excellent. The report includes a comment from each subject teachers. The student’s knowledge and skills in each subject or subject group are assessed by a teacher or a group of teachers, and the final assessment is decided by the principal working with the student’s teachers. These skills are tested at the end of secondary education through the matriculation examination.

**Secondary: Mathematics**

In this report we have considered lower secondary to mean Grades 6-9, and upper secondary Grades 10-12.

**Orientation:**
The importance accorded to mathematics in the Finnish curriculum is related to the individual development of the students: their intellectual growth and their participation in problem solving and social interaction. The development of mathematical thinking is highlighted and seen as a means of developing creativity and precision. The use of mathematics in solving everyday problems is mentioned and, in Grades 6-9, developing capability in modeling everyday problems is identified as a core task of mathematics instruction. However, application of mathematics to real world problems is presented throughout secondary education as a vehicle for developing mathematical thinking and concepts and as a means of motivating and encouraging independent experimentation and investigation rather than as an aim in itself.
In the lower secondary Grades 6-9 there is no mention of the role that mathematics might play in further study of STEM\(^4\) subjects or in employment. At upper secondary level, the curriculum aims to give students a clear understanding of the role that mathematics plays in society, including everyday life, science and technology and to prepare students for further vocational or academic education. While the importance of application of mathematics is recognized, this is all related to the development and future of individual students, with no orientation to national economic health or scientific or technological development.

At upper secondary level there is an emphasis on mathematical communication and information processing. This emphasis is differentiated, reflecting the trajectories of different groups of student at this level. For those studying the advanced syllabus, their development and use of mathematical communication is oriented towards active participation in mathematical and scientific discourse. For those studying the basic syllabus, it is oriented towards understanding and interpreting the use of mathematical forms of communication by others, in particular in the media.

*Coherence and Clarity:*
A single list of content is given for all students at Grades 6-9. A set of objectives is given, identifying affective, cognitive and social objectives, some of which are specific to mathematics, for example:

- come to understand the importance of mathematical concepts and rules, and to see the connections between mathematics and the real world
- learn to perform calculations and solve mathematical problems.

Others are more generic, though open to specifically mathematical interpretation, for example:

- learn to think logically and creatively
- learn to express their thoughts unambiguously and to justify their actions and conclusions.

There are no explicit connections made between this list of objectives and the subsequent list of “core contents.”

The mathematical content is identified in a list divided into six strands:

- Thinking skills and methods
- Numbers and calculations
- Algebra
- Functions
- Geometry
- Probability and statistics.

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\(^4\) Science, technology, engineering and mathematics.
Apart from the strand Thinking skills and methods, these strands provide a standard formal partitioning of the subject area, although separating Functions from Algebra is somewhat unusual and emphasizes the importance of functional thinking. The naming of strands at this level contrasts with that in the earlier years of basic education.

Within each strand there are between six and fourteen topics listed. These topics are not tightly defined. For example, within Geometry, the topic “calculating the volume and surface area of a three-dimensional figure” does not indicate the types of figures to be considered or excluded (for example cuboids, prisms, cones, compound figures, etc.). Similarly, within Probability and statistics, the topic “interpretation of diagrams” does not indicate what types of diagrams should be considered. There is no indication of how the content is to be organized across the grade levels.

At upper secondary (Grades 10-12), the curriculum is divided into “advanced” and “basic” syllabi. The target group for the advanced syllabus is aiming to use their mathematical capabilities in further vocational or higher studies, while the target group for the basic syllabus is being prepared “to use mathematics in different situations in life and in further studies.”

The advanced syllabus is defined by a list of ten compulsory courses:

- Functions and equations
- Polynomial functions
- Geometry
- Analytical Geometry
- Vectors
- Probability and Statistics
- The derivative
- Radical and logarithmic functions
- Trigonometric functions and number sequences
- Integral calculus.

And three optional “specialization” courses:

- Number Theory and Logic
- Numerical and algebraic methods
- Advanced differential and integral calculus.

Closer examination of the content of each of these courses shows that, while in most cases a coherent package of content has been constructed, in a few cases the rationale for the organization of the content is less obvious. For example, *Trigonometric functions and number sequences* are not obviously connected at this level. However, as schools are able to arrange the teaching of the content of these courses to consolidate it into “integrative modules”, it may be that coherence is constructed in practice. Although the order of study is not specified, it is
apparent that, in many cases, later courses in the list draw on topics encountered in earlier courses.

The basic syllabus is defined by a list of six compulsory courses:

- Expressions and equations
- Geometry
- Mathematical models I
- Mathematical analysis
- Statistics and probability
- Mathematical models II

There are also two “specialization” courses:

- Commercial mathematics
- Mathematical models III.

The names of these courses indicate a mixture of abstract mathematics and applications. The contents of the three courses on Mathematical models each specify the study of particular mathematical concepts to be used in modeling real world phenomena. These contents are additional to those studied in other courses rather than merely application of previously learned concepts and methods.

Within each course at both levels, a list of objectives and core contents (including four to ten sub-topics) is given. Each syllabus is given for the phase as a whole, with individual schools responsible for deciding the order and distribution of courses across the three years of study. As in the list of content for Grades 6-9, the sub-topics are not tightly defined and in some cases leave considerable scope for interpretation. For example, in the course “Analytical geometry” (advanced syllabus) the core content includes the sub-topic “solving equation systems”, without any specification of the types or numbers of equations that might be involved in an equation system or the solution methods that students might be expected to be familiar with.

It appears that each of the courses is accorded equal weight with respect to the certification of upper secondary schooling as recommended equivalences are given for students transferring from the advanced to the basic syllabus (for example the advanced course “The derivative” is to be taken as equivalent to the basic course “Mathematical analysis”).

Students in the upper secondary school are expected to choose ten specialization courses across all their subjects. It is possible that individual students may do only the compulsory mathematics courses in their chosen syllabus or may do one or more specialization course in mathematics. Thus, a student completing the advanced syllabus may study approximately twice as much mathematics as one completing the basic syllabus, depending on the number of specialization courses studied.
Scope
As noted, the content at lower secondary level is defined for the whole of Grades 6-9 without identifying what should be taught in each grade. The broad content headings have been indicated above. Some notable features are:

- **Thinking skills and methods** lists a number of specific “functions that demand logical thinking”, including for example classification, comparison, measurement, looking for rules.
- History of mathematics is included within **Thinking skills and methods**.
- Using a calculator is included within the same sub-topic as rounding and estimation. This suggests that rounding and estimation have a role in the use and interpretation of calculator results. It is not clear what the scope of calculator use might be in general.
- The algebra content is divided into Algebra, focusing on manipulation of expressions and solution of equations, and Functions, focusing to a large extent on graphical representations. This separation is unusual and may inhibit conceptualization of connections between different ways of representing relationships between variables.
- Proportionality is listed three times, under the headings of Numbers and calculation, Algebra and Functions. This reflects the significance of proportionality for this stage of mathematics learning, but may not serve to support a coherent conceptualization for students. It is worth noting here that, while proportionality is also evident in the Geometry area (for example similarity and congruence, trigonometry), the possible connections across areas are not signaled explicitly.

The scope of the lower secondary curriculum is less than found in many other jurisdictions. Across all strands of the curriculum, the more advanced and formal aspects seem to be deferred until upper secondary school. In particular, the scope of algebra in the curriculum in Grades 6-9 is limited in comparison to most other jurisdictions. Solution of equations focuses primarily on linear equations. Solving quadratic equations is included, but only “incomplete” quadratics (ax²+bx+c=0 where either b or c is zero). Thus students are not expected to encounter widely generalizable approaches to solution of quadratics (binomial factorization, quadratic formula) until upper secondary level. The Functions strand also does not identify quadratic functions as a focus of study. Moreover, the assessment criteria for a grade of 8 (“good”) at the end of basic education expect students only to be able to solve a first-degree equation. Factorization of quadratic polynomials and solution of quadratic equations is encountered in Grades 10-12 by students studying the basic syllabus in their first course (Expressions and equations) and by those studying the advanced syllabus in their second course (Polynomial Functions) together with more extensive study of polynomials in general and of the nature of the roots of quadratics.

The formal aspects of calculating probability seem very limited in Grades 6-9. The content of the curriculum includes only the concept of probability and the notion of relative frequency. The assessment criteria indicate that a “good” student should determine numbers of possible outcomes, organize a simple empirical investigation of probability and understand the meaning
of probability and randomness in everyday situations. The use of rules for calculating probabilities of combined events is not expected until upper secondary level.

Similarly, formal geometry is limited at lower secondary level with no explicit expectation that a “good” student should engage with proof. The geometry of circles is deferred to the advanced syllabus at upper secondary school. Although “justifying” is included in the objectives for Geometry in the advanced syllabus for Grades 10-12, it is not evident that this includes formal Euclidean proof. The matriculation examination for 2014 includes circle geometry in the context of solving a problem in analytic geometry. For upper secondary students studying the basic syllabus, the approach taken to geometry focuses on procedures and problem solving rather than on formal reasoning.

**Levels of Demand:**
The curriculum at lower secondary level indicates only the end of phase assessment criteria for a student to achieve Grade 8 (defined as “good” on a grading scale from 4 to 10, where 5 denotes a pass and 10 denotes "excellent"). These criteria provide descriptors of what a student at this level will be able to do. As noted above, there is limited expectation of formal reasoning and algebraic work is restricted to linear forms. Where students are expected to formulate or solve problems these are qualified as “simple” cases. For example, in Algebra a student will “formulate a simple equation concerning a problem related to everyday life and solve it either algebraically or by deduction.” We would judge, therefore that this level of achievement is within the reach of the “average” student at age 15/16. The lack of defined criteria for higher or lower achieving students makes it hard to judge what expectations are for these groups. There is some content listed that does not feature in the Grade 8 criteria, so presumably higher achieving students would be expected to engage successfully with this. In the absence of examples of pedagogic materials it is not possible to judge whether sufficient challenge would be offered at the highest levels.

At upper secondary level, the advanced and basic syllabuses offer different levels of demand for students with different trajectories, both building on learning from the lower secondary curriculum. The advanced syllabus both extends the scope of the mathematical concepts and methods to be studied and develops the level of formality and abstraction. The compulsory courses introduce students to fundamental concepts and methods but appear to restrict application to relatively simple cases. Thus the two courses introducing differential and integral calculus deal only with “elementary functions.” This suggests that the compulsory courses are accessible to students who have achieved the level described as “good” at the end of basic education. The optional “specialization” course in advanced differential and integral calculus not only extends the range of functions dealt with but also delves into the notions of continuity, differentiability and limits that provide a theoretical basis for university level study of analysis.

The basic syllabus emphasizes the application of mathematical concepts and methods to real world problems. There is some consolidation of earlier content, but also extension of the abstract nature and complexity of the concepts and methods studied. Although this is more
limited than in the advanced syllabus, the level of demand is such that students who had not achieved “good” at the end of basic education would seem likely to struggle.

**Progression:**
Within each phase of education, objectives and content are given for the whole phase rather than for each grade level. The curriculum appears to facilitate smooth progression between phases. Some of the listed content explicitly indicates consolidation and extension of content from the previous phase and there are no obvious gaps.

**Assessment:**
The only cohort-wide external assessment occurs at the end of upper secondary school in the form of the matriculation examination. Up until that point students are assessed and graded by their teachers. In order to guide teacher assessment at the end of basic education (Grade 9), a set of criteria are provided for a Grade 8 (“good”). However, there are national assessments in mathematics conducted every two years for a 5% sample of students in the final year of basic education (Grade 9) as a means of examining the extent to which the national objectives for basic education have been achieved.

The national assessments consist of: multiple-choice questions, examining “basic mathematics skills”; constructed answer tasks, examining problem-solving skills; and, in the more recent years, mental arithmetic tasks, some of which are administered orally by teachers. Although these assessments are not high-stakes for students or schools it is likely that they have an effect on teachers’ interpretation of the curriculum, especially as the problem-solving tasks and the mental arithmetic tasks are scored by teachers using rubrics provided by the National Board of Education. Moreover, schools and local authorities may also purchase the tests for their own use. Multiple-choice and problem-solving items are drawn from the five content areas of the Grade 6-9 curriculum (excluding Thinking skills and methods as a discrete area of content). However, both example items labeled as “Functions” address proportional relationships. This suggests that other types of function and the interpretation of various forms of representation of function (including graphical, tabular and algebraic forms) may be under-represented.

Example 3 (functions, rate of correct answers 22%, 2000)
According to instructions, concentrated juice is mixed with water at a ratio of 1:4. How much diluted juice can you get from two litres of concentrated juice?

Example 7 (functions, rate of correct answers 59%, 2004)
It takes me 24 minutes to walk home from school at a speed of 5 km/h. How much time does it take me to get home when I ride the same distance on a bicycle at a speed of 15 km/h?

The weighting of the different areas varies somewhat from year to year, though *Numbers and calculation* has consistently been the most represented area in the multiple-choice items. Examination of published example items suggests that most of both multiple-choice and problem-solving tasks are presented as word problems involving some form of everyday
context. The exception is in *Algebra*, where the two example items both require manipulation of symbols without context. The multiple-choice questions seem to require application of a routine procedure. Some of the problem-solving tasks appear to require students to engage in rather more interpretation of the situation presented and/or in identifying and carrying out a multi-step solution, although in all cases the relevant areas of mathematics are straightforward to identify.

At the end of upper secondary education, there is an externally set matriculation examination. In mathematics, separate examinations are set to assess the advanced and the basic syllabi. These examinations address topics taken from across the compulsory courses. The matriculation examination for the advanced syllabus assesses skills, understanding and problem solving. It includes what may be considered routine questions that would be likely to be familiar to students. Most of these are abstract questions dealing only with mathematical objects. There are also a small number of more challenging questions, demanding that students engage with novel situations:

**Question 14**

According to one story, humanity experimented with movement with the help of regular polygons before the wheel was invented.

a) An equilateral triangle rotates rightward, until the vertex A reaches the horizontal surface. Calculate the length of the curve traced by the point A as it moves as described above (2 points).

b) Sketch the curves that would be produced by a square and a hexagon if the polygon is rotated so many times that the point at the lower left again hits the horizontal surface. (2 points)

c) Calculate the length of the curve traced by a corner of the square in question 14(b) if its circumference is $p$. (2 points)

d) Calculate the length of the curve traced by a corner of the hexagon in question 14(b) if its circumference is $p$. (2 points) (3 points).

**Question 15**

On the interval $[-1, 1]$ for two continuous functions $f$ and $g$, the scalar product $f \ast g$ is defined by the formula

$$f \ast g = \int_{-1}^{1} f(x)g(x)dx$$

The functions are orthogonal if $f \ast g = 0$.

a) Define $f_0(x) = 1$, $f_1(x) = x$ and $f_2(x) = x^2$ for $x \in [-1,1]$. This will determine the functions $g_k: [-1,1] \to \mathbb{R}$, $k = 0,1,2$, using the formulas
\[ g_0(x) = f_0(x), \ g_1(x) = f_1(x) - \frac{g_0 * f_1}{g_0 * g_0} g_0(x) \] and

\[ g_2(x) = f_2(x) - \frac{g_0 * f_2}{g_0 * g_0} g_0(x) - \frac{g_1 * f_2}{g_1 * g_1} g_1(x) \]

Evaluate the functions \( g_1 \) and \( g_2 \) (4 points).

b) Show that the functions \( g_j \) and \( g_k \) are orthogonal across all indices \( 0 \leq j < k \leq 2 \) (2 points).

Let \( h(x) = x^3 + ax^2 + bx + c \). Find values for the constants \( a, b \) and \( c \) such that the functions \( h \) and \( g_k \) are orthogonal for each \( k = 0, 1, 2 \) (3 points).

These more challenging questions are signaled on the examination paper and successful answers are awarded more marks. When making their choices about which questions to answer (10 out of a possible 15), students are thus able to decide whether or not to accept the challenge. Overall, the nature of the matriculation examination is well aligned both with the curriculum content and with its objectives, including the affective objectives of persistence, independence and courage.

The matriculation examination for the basic mathematics syllabus contains a mixture of questions which may be characterized as: abstract questions assessing mainly skills; “word problems” in which a simple situation is presented to be solved by applying standard mathematical methods; and “modeling” questions in which a more complex “real-world” situation needs to be described mathematically in order to solve a problem. This is consistent with the curriculum content and objectives.

**Key competencies:**

The stated objectives of the mathematics curriculum at lower secondary level include key competences:

- taking responsibility for students’ own learning
- communication skills
- problem solving
- working in a sustained way
- functioning in a group.

At upper secondary level, individual responsibility and persistence continue to be objectives, while communication skills and problem solving have a prominent role. However, there is no evidence of functioning in a group as an explicit objective.

**Secondary: Earth Science**

**Orientation:**
The curriculum is orientated toward ‘social reconstruction’ – changing the world (or at least Finland) for the better. It can be seen as a fairly ‘radical’ approach to education, and contrasts to some jurisdictions, which tend to have more emphasis on maintaining the status quo and developing their economies. Human rights and environmental protection are prevalent in the statement of underlying values and this is supported by the stated curriculum that follows.

The underlying values of basic education are human rights, equality, democracy, natural diversity, preservation of environmental viability, and the endorsement of multiculturalism. Basic education promotes responsibility, a sense of community, and respect for the rights and freedoms of the individual.

**Coherence and Clarity:**
The curriculum has coherence and clarity. The principle of integration of knowledge and skills is reflected in the learning outcomes which are stated as to “know about”, “know how to” and to “understand.” There is no clear separation of skills and knowledge. The curriculum is conceptual – specifying outcomes as, for example knowing how to analyze the impact of a natural hazard on people. The curriculum does not specify exhaustive detail or ways to teach content. So, there is need for subject teacher expertise in interpreting the curriculum and designing the precise detail.

**Scope:**
Earth science is not referred to as a separate subject, but is contained mainly within a strong geography curriculum, and within the natural sciences (see Geography report). Integration and connection between subjects, such as science and geography, is a strong principle:

Environmental and natural studies is an integrated subject group comprising the fields of biology, geography, physics, chemistry and health education. Instruction in the subject group includes the perspective of sustainable development. The objective of instruction is that the pupils get to know and understand nature and the built environment, themselves and other people, human diversity, and health and disease.

There is emphasis on the people-environment link. Natural hazards and environmental concerns are prominent. The curriculum is noticeably fairly brief, compared to some to some other jurisdictions, but it is carefully expressed using geographical and earth science concepts to guide, rather than attempting to describe in exhaustive detail. Explicit pedagogical guidance is largely absent, although there is emphasis on problem-solving and investigation. There is apparently strong trust in teachers to interpret and choose how to teach the curriculum content.

The curriculum also has a very strong emphasis on the Finnish context. So earth science is learned in the context of the Finnish environment and people.

**Finland in the world**
- Finland’s map view and landscape
• Interaction of nature and human activity in Finland’s different regions; the built environment and traditional landscapes
• Finland’s population and its minority cultures
• Opportunities for influence in the planning and development of one’s environment
• Finland as part of the world
• Small scale research into one’s immediate environment or home municipality.

Levels of Demand
The earth science curriculum is suitably challenging at lower and higher secondary level. However, much is down to the interpretation of the curriculum by subject experts. As mentioned above, the curriculum does not specify a high level of detailed content or ways to teach. The outcomes are clear in the ‘know’ and ‘know how to’ but there is potential for different interpretation of these outcomes. Subject teacher expertise is important if the Finnish curriculum is to be taught.

Assessment:
Finland is distinctive in having external assessment arrangements only at matriculation level. Before this school and teacher assessment takes place, although there is a set of guidelines about how grades should be measured and the use of averages. A principle of fairness and inclusion is apparent. As with teaching of the curriculum, assessment also requires and expects a high level of teacher expertise and places trust in teachers. The principle of assessment to support learning is clear (as is common with most other jurisdictions):

The role of assessment of students’ learning is to provide students with feedback on their progress and learning results both during and upon completion of upper secondary school studies.

Key competencies:
These are not stated as ‘key competencies’, which reflects the integrated nature of the curriculum (skills and knowledge are integrated) but implicitly there is expectation of the following ‘competencies’ through (earth) science:

The students will:
• know how to make observations with the different senses and how to direct their attention toward the essential features of the object of those observations
• know how to describe, compare, and classify objects, organisms and phenomena on the basis of their various properties
• know how, with guidance, to carry out simple investigations of nature, natural phenomena, and the built environment
• know how to use a variety of information sources and how to compare, but different means, the information they have acquired
• know how to express – orally, in writing, and by drawing – the information they have acquired about nature and the built environment.
Secondary: Biology

Orientation:
Science begins in Grades 1-4 with studies of Environmental and Nature Studies. From Grade 5 science is studied as Biology, Chemistry and Physics. Two sets of criteria are provided for Biology, one for Grades 5–6 and the other for Grades 7–9. Both provide background information, objectives, core contents and assessment criteria. For Grades 7–9, the stated objective is to give an introduction to evolution, the fundamentals of ecology, and the structure and vital functions of the human being.

The criteria state that Biology instruction must be inquiry-based learning and develop the students’ thinking in natural science. The stated objective is to give the ability to observe and investigate nature, and to utilize the potential of information technology in searching for information on Biology.

Coherence and Clarity:
The National Core Curriculum for basic education provides clear specific objectives, content and assessment criteria. A set of nine clear objectives is provided, for example.
The students will:

- Learn to use concepts and methods of information acquisition and research that are characteristic of biology
- Learn to depict basic phenomena of life
- Learn to identify species, to appreciate biodiversity and take a positive stance towards its preservation
- Learn to discern the structure and operation of ecosystems.

Grade 7–9 Biology is divided into the following topics:

- Nature and ecosystems
- Life and evolution
- The human being
- The common environment.

Each topic has its core contents described, for example:

Life and evolution:

- Structure and activity of the cell
- Emergence, development and organization of a population
- Biological and cultural evolution of the human being; distinctive features or the human species
- Potential of biotechnology; related ethical questions.
The state provides these foundations to the curriculum, but there are no rules as to how the curriculum should be constructed, or how it should be taught. Schools draw up their own curricula within the framework of the national core curriculum. There is room for local or regional specificities. All local curricula must, however, define the values, underlying principles, as well as general educational and teaching objectives. The teachers have pedagogical autonomy. They can decide themselves the methods of teaching as well as textbooks and materials.

**Scope:**
In the National Core Curriculum for basic education Grade 7–9 Biology is divided into the topics as above. Each topic has its core contents briefly described. These descriptions cover both biological knowledge and environmental awareness.

Final Assessment Criteria for a grade of 8 (good) are provided and these do give an indication of breadth and depth, for example:

**Life and evolution**
- Describe the main features of cell structure in plants and animals.
- Explain photosynthesis and describe its importance from the standpoint of a population.
- Analyze a population in terms of its main groups and how to justify the grouping.

The core provides the most basic framework for biology, but local authorities, schools and teachers have considerable autonomy in how they design their own curricula, and are encouraged to use local and regional opportunities to enhance the curriculum.

It is therefore quite difficult to establish the breadth and depth for Grade 7–9 Biology as the core curriculum is quite literally that – the core. However the range of biological concepts and knowledge appears to be appropriate for the grade range.

**Levels of Demand:**
The level of demand is appropriate for this course in Biology. This is illustrated by the way each topic builds on from previous grades.

Starting in Grades 1-4, with studies of Environmental and Nature Studies, Biology progresses through Grades 5–9. The National Core Curriculum for basic education allows teachers to easily track how the level of demand builds on knowledge from previous grades, through the topic and core content structure.

Bloom-based command words are not used for topic and core content structure, nor for the objectives, but are used for the Final Assessment criteria, for example:

**Life and evolution**
- Describe the main features of cell structure in plants and animals.
• Explain photosynthesis and describe its importance from the standpoint of a population.
• Analyze a population in terms of its main groups and how to justify the grouping.

Teachers have considerable autonomy setting level of demand in their planning, but benchmarks are provided in the final assessment criteria to assist them with these decisions.

**Progression:**
The National Core Curriculum for basic education shows how, starting with Grades 1-4 with studies of Environmental and Nature Studies, Biology progresses through Grades 5–9.

Although there is no explicit progression it is very straightforward to track topics and themes across Grade 1–9, for example:

- Grade 1-4 Most common species of plants, fungi and animals in the students immediate environment
- Grade 5–6 Identification of the main flora and fauna in nearby areas; guided gathering of plants
- Grade 7–9 Identification of the main species of plants, fungi and animals in the students’ home region; guided collection on plants.

The core provides the most basic framework for biology, but local authorities, schools and teachers have considerable autonomy in how they design their own curricula, and are encouraged to use local and regional opportunities to enhance the curriculum.

**Assessment:**
Biology is evaluated numerically, by verbal summaries or a combination of the two. The numeric grade depicts the level of performance. In Grades 5-6 Biology and geography are assessed as one module. In Grades 7–9 Biology is assessed separately as part of the core curriculum.

Final assessment criteria for a grade of 8 are defined and include the topics of:

- Biology study skills
- Nature and ecosystems
- Life and evolution
- The human being
- The common environment.

Each topic contains a set of criteria, for example:

*Life and evolution*
The student will know how to:
- Describe the main features of cell structure in plants and animals
- Explain photosynthesis and describe its importance from the standpoint of a population
- Describe the reproduction of plants, animals, fungi and microbes
• Explain the fundamental features of evolution and the history of human evolution
• Analyze a population in terms of its main groups and how to justify the grouping.

Grades are given on scale from 4 to 10.

National evaluations of learning outcomes are done regularly, so that there is a test every year either in mother tongue and literature or mathematics. Other subjects are evaluated according to the evaluation plan of the Ministry of Education and Culture. Not only are academic subjects like Biology evaluated but also subjects such as arts and crafts and cross-curricular themes. The evaluations are sample-based and education providers receive their own results.

**Key competencies:**
One key element of basic education is to develop the students’ capabilities for self-assessment. The purpose of this is to support the growth of self-knowledge and study skills and to help the students to learn to be aware of their progress and learning process.

The whole culture of education in Finland is geared towards a broad balanced education, with the student increasingly taking responsibility of their own learning as they progress. Key competencies are not explicit within the curriculum, but rather intrinsically part of the whole culture of Finnish education. There is an expectation that students will become self-learners, will work as part of team, will be able to solve problems, will be creative, and will develop critical thinking skills.

**Secondary: Chemistry**

**Orientation:**
The National Core Curriculum for Basic Education and the National Core Curriculum for Upper Secondary Schools is developed by the Finnish National Board of Education. Science in Grades 1-4, which is the first cycle of compulsory education, begins with **Environmental and Nature Studies**. Science in Grades 5-9, which is the second cycle of compulsory education, proceeds with **Physics and Chemistry** for Grades 5-6 and then with separate subjects in Grades 7-9. This review covers Grades 5-9 and upper secondary education.

The objectives and core contents of subjects begin with a short introduction on general approaches and a list of objectives which act as a summary of course content. In **Physics and Chemistry** (Grades 5-6), observations of natural phenomena are emphasized, leading to basic concepts and principles. Student engagement with health and safety is also stressed. Experimental approaches to science are developed in Grades 7-9, as is ‘Instruction (which) guides the student in thinking in a manner characteristic of science’. Personal development is also covered, in particular: ‘forming a modern world view ... capabilities for making everyday choices, especially in matters related to environmental protection and the use of energy resources’. In upper secondary education, these themes are further developed, such as in the relationship between theory and experimentation. There is a notable additional feature that
stresses team work: ‘Plan experiments in groups and discuss information or material acquired through experimentation, its processing and modeling and the assessment of its reliability’.

**Coherence and Clarity:**
The objectives and core contents are set out in a very similar way for each of the three phases, which aids clarity. The objectives and content sections show coherence. The sections on assessment vary: in Grades 5-6 there are descriptions of good performance, in Grades 7-9 there are final assessment criteria, and in Grades 10-12 there is a brief general paragraph. The two curricula both include a detailed section on science activities such as: using measuring equipment, assembling information, working safely, and preparing research reports. This helps to clarify the way in which the subject is to be studied, as well as what is to be studied. In Chemistry at upper secondary level, there is a compulsory course and four specialization courses. Students would need to be supported in selecting their specialization courses with a view to overall coherence within chemistry and across their program.

The chemistry domain is covered in the objectives and core contents sections within five of the 300 pages in the curriculum for basic education and seven of the 250 pages in the curriculum for upper secondary education. This is similar to the other subjects in the curriculum. The chemistry contents for upper secondary education are covered in 23 concise statements such as: ‘stoichiometric calculations and the Ideal Gas Law’. There is clearly scope for teachers to interpret and develop the chemistry content using the guidance in the curricula.

**Scope:**
The core content relating to chemistry in Grade 5-6 comprises just five short statements relating to The substances around us. One such statement is simply composition of air; the atmosphere. The performance descriptors that follow this core content clarify the scope of these statements, such as: know about the composition of air and the chemical symbols of atmospheric gases and understand the importance of the atmosphere in sustaining life. The core content of Chemistry in Grades 7-9 is broader in scope and organized as three to five short statements under each of three headings: Air and water; Raw materials and products; and Living nature and society. Similar to Grades 5-6, assessment criteria accompany the core content in Grades 7-9 and clarify the scope of the statements. Nonetheless, there appears to be considerable scope for teachers to interpret and develop the curriculum in schools.

Upper secondary chemistry objectives and core contents are organized in one compulsory course called The chemistry of man and of the living environment and four specialization courses called: The micro-world of chemistry, Reactions and energy, Metals and materials, and Reactions and equilibrium. The curriculum states that: ‘Specialization courses are elective courses relating to compulsory courses in the same subject and students must include at least ten such courses as part of their study plan’. The number of specialization courses in chemistry that students take may therefore vary between just one and all four. This reflects the breadth of students’ upper secondary programs and the need to prepare students for further specialization. Although the performance descriptors assessment criteria are provided for the two preceding phases, no similar section is included for the upper secondary phase. The scope of the content
is therefore less explicit and more open to interpretation and development. This appears to be a design feature of the document. The curriculum (page 8), states that:

> Education providers may decide how to draw up their curricula on the basis of the National Core Curriculum. Each upper secondary school curriculum will be drawn up in co-operation with interest groups with a view to ensuring the high standard of general upper secondary education, its relevance to society and commitment from the community as a whole to the jointly determined objectives and procedures.

**Demand and Progression:**

As indicated above, demand is clearer in the basic curriculum than in the upper secondary curriculum. In general, the demand appears to be appropriate but it is hard to judge in the absence of information about how much time is available for the subject.

Progression is easier to determine, given the systematic presentation. Indeed the introduction to each of the sections draws attention to prior learning, and so should help to ensure there are neither gaps nor repetitions in coverage, which might otherwise occur with such short and general content statements. For example:

- Grades 5-6: origin, utilization, and recycling of products and materials belonging to the living environment; safe usage of those products and materials
- Grades 7-9: key elements and compounds to be found in the earth’s crust and their properties, and the manufacture, use, sufficiency, and recyclability of products
- Grades 10-12: understand factors influencing the process of chemical reactions and their significance to living environments (industry).

**Assessment:**

Tikkanen and Aksela (2012) provide: ‘an analysis of Finnish chemistry matriculation examination questions according to cognitive complexity. The research data consisted of 257 questions from 28 matriculation examinations between 1996 and 2009. Qualitative approach and theory-driven content analysis method using Bloom’s revised Taxonomy of Cognitive Objectives were employed in the research. The categories of the higher-order (HOCS) and lower-order cognitive skills (LOCS) were formed on the basis of earlier research. This research was guided by the following question: What kinds of cognitive skills and knowledge do Finnish chemistry matriculation examination questions require? The research indicates that the examinations were cognitively demanding. The majority (77%) of the questions required higher-order cognitive skills. The Bloom’s revised Taxonomy of Cognitive Objectives as used in this research give a useful way for designing or analyzing chemistry summative assessment tools. All three higher-order cognitive skills (HOCS) categories should be more evenly presented in chemistry matriculation examinations.’ These findings seem to imply test items with relatively little structure, which would be in contrast with the content of the assessment instruments available for the other education systems included in the present research.

**Key competencies:**
A notable feature of the assessment system is the encouragement of student self-assessment to develop their understanding of their own learning. Other features are the attention to group work in scientific experimentation, including researching information. Throughout the curriculum specifications, there are implicit references to competencies which, given opportunity for development in science, including chemistry, have a more general application. These include enquiry skills, broad knowledge and understanding objectives, and the application of science to personal and social situations.

**Secondary: Physics**

**Orientation:**
This review covers Grades 5-9 ages 12–16. Science begins in Grades 1-4 with studies of Environmental and Nature Studies. The secondary age part of the basic curriculum is divided into two, with curriculum specifications for Physics and Chemistry for Grades 5–6 and Physics for Grades 7–9. In upper secondary there is a compulsory Physics course and seven specialties.

The National Core Curriculum for each of basic education and upper secondary provides considerable detail for the whole curriculum, including values, pedagogy and support for students. Each of the three sections on physics opens with a short introduction on general approaches and a list of objectives that act as a summary of course content. At Grades 5-6 this emphasizes observations of natural phenomena, leading to basic concepts and principles. The students’ engagement and health and safety are also stressed. Experimental approaches are further developed in Grades 7-9, as is:

Instruction (which) guides the student in thinking in a manner characteristic of science.

The personal is also covered, in particular:

Forming a modern world view… capabilities for making everyday choices, especially in matters related to environmental protection and the use of energy resources.

In upper secondary these themes are further developed, for example the relationship between theory and experimentation. There is a notable additional feature which stresses team work:

…plan experiments in groups and discuss information or material acquired through experimentation, its processing and modeling and the assessment of its reliability.

**Coherence and Clarity:**
Each of the three curriculum specifications is set out in a very similar way, which aids clarity. The objectives and content sections show coherence. The sections on assessment vary: at Grades 5-6 there are descriptions of good performance, at Grades 7-9 final assessment criteria and at grades 10-12 a brief general paragraph. The two basic curriculum descriptions include a detailed section on science activities such as using measuring equipment, assembling
information, working safely, preparing research reports – which helps to clarify the way in which the subject is to be studied, as well as what is to be studied.

It is noted that the subject physics is covered in six pages out of 300 in the basic curriculum document, and eight out of 250 in the upper secondary. There is clearly scope for teachers to develop their own interpretations of the physics content in the light of general guidance.

**Scope:**
For Grades 5-6 the content description is very brief. There are four statements of physics content: on electricity, energy, forces and the solar system. The performance descriptors that follow add some scope to these, for example:

- Know how to do experiments in which electricity is used to produce heat, light and motion.
- How to apply scientific knowledge in traffic or moving about.

The Grades 7-9 content has greater scope with 14 statements under the topic headings of: Motion and Force, Vibrations and Waves, Heat, Electricity and Natural Structures. This last is a rather odd combination for a topic, covering radiation, conservation of energy, and proportions of structural parts from elementary particles to galaxies.

As noted above, it is the performance descriptors and assessment criteria that follow the content that provide a clearer picture of the scope. In the Grades 10-12 curriculum, these are absent. The statements though numerous (about six for each of the eight compulsory or specialist sections) are very brief, for example:

- structures of and basic interactions between matter and the universe
- energy resources
- light, mirrors and lenses
- vibration energy
- projectile and planetary motions
- Coulomb’s law, homogeneous electric fields and matter in electric fields
- the energy industry
- radioactivity and radiation safety.

These clearly require additional information about the scope of treatment, and it is not apparent from where this comes, though there is a culture of teachers’ freedom to devise their own courses.

**Demand and Progression:**
As discussed above, the demand is clearer in the basic curriculum than in the upper secondary where no performance criteria are included. In general the demand appears to be appropriate, but it is hard to judge in the absence of information about how much time is available for the subject. Progression is easier to determine, given the systematic presentation. Indeed the
introduction to each of the sections draws attention to prior learning, and so should help to ensure there are neither gaps of repetitions in coverage, which might occur with the short and general content statements, for example:

• Grades 5-6: various ways of producing electricity and heat; energy resources
• Grades 7-9: conservation and degradation of energy; heat as a form of energy
• Grades 10-12: absorption and release of energy, in particular radiation, in natural and artificial processes.

Assessment:
The nature of the examination in physics differs from any of the other jurisdictions reviewed, in a number of ways:

• All of the questions require extended answers, though some have parts and quite short answers
• There is a choice of 8 from 13 questions, with no restrictions
• Some guidance is given about the weighting of the marks and the difficulty of the questions.

The questions cover a broad range of topics including everyday applications (playground equipment, musical instruments, boats), experimental procedures (electrical circuit measurements), technological developments (electrical power generation and transmission) as well as calculations and open-ended theoretical descriptions. No time limit is given for the exam.

Key Competencies:
A notable feature of the assessment system is the encouragement of student self-assessment to develop their understanding of their own learning – surely the key competence of an educational process. Others are the attention paid to group work in scientific experimentation, including researching information. Throughout the curriculum specifications there are implicit references to competencies which, given opportunity for development in physics, have a more general application. These include enquiry skills, broad knowledge and understanding objectives, and the application of science to personal and social situations.

Secondary: Geography
Finland is unusual in that geography does not align with Social Studies or the Humanities, but with the Biological Sciences. Teachers of geography in the secondary schools usually also teach biology and are trained in both subjects together.

Orientation:
The orientation is not put within the context of citizenship and civic competencies. Rather it is aligned with the notion of the Earth as an object of study:
In geography instruction, the world and its various regions come under examination. The instruction must help the student understand phenomena associated with the activity of human beings and the natural world, and the interaction of those phenomena in different regions. The objective of geography instruction is to expand the students’ conception of the world from Finland to the whole of Europe and the rest of the world.

The document adds that instruction in geography and biology should contribute to:

- Personal growth and development
- Understanding of social and environmental relations
- Active citizenship and
- Sustainable development.

**Coherence and Clarity:**
The goals of the curriculum are both brief and specific. For example, ‘perceive a map of the world and know its main nomenclature’. Much is left to local interpretation and the teacher’s judgment. The document specifying biology and geography between Grades 5 and 9 is fewer than 10 pages.

**Scope:**
Again, treatment here is brief and precise, for example, "rainforests, savannas, steppes, deserts, areas of winter precipitations and temperate and cold zones as human living environments" (Grades 5-6). At Grades 7-8, when geography and biology appear separately, there is a little more detail. The document requires quite extensive geographical world knowledge. There is also a strong emphasis on ‘Finland in the world’

**Level of Demand:**
This is difficult to judge from the evidence available.

**Progression:**
It is very interesting how the more extensive geography at Grade 7-8 emerges from a somewhat more integrated notion of the geographical merged with biology.

**Assessment:**
There are detailed ‘assessment criteria’ for Grade 8 under the curriculum headings of:

- Geographical skills
- Analyzing the world
- Analyzing Europe
- Analyzing Finland
- The common Environment.

Criteria are for local teacher assessment and are expressed in terms of either students will know how to … or will be able to …
**Key Competencies:**
The curriculum is embedded in a very strong ‘ethos’ that includes values of social equity and environmental care. These values appear to imbue the curriculum with notions of cooperation, problem solving and team working, occasionally explicitly but more implicitly than in many jurisdictions.

It is important also to add that there is an Ethics and a Social Studies component to the curriculum: geography is not subsumed under social studies. However, the social studies assessment criteria do specify some key competencies:

**Acquisition and use of social information:**
The students will
- Be able to interpret the media’s information, statistics and graphic presentations critically
- Be able to justify their ideas about social issues
- Know how to compare different alternative for social decision making and economic solutions, and the consequences of those alternatives.

**Secondary: History**

**Orientation:**
The rationale for history in the Finnish curriculum is reminiscent of ‘historical consciousness’ approaches to history didactics (Wilshcut 2010). This is a curriculum that asks students to reflect on identity in time rather than fix identity through student interpellation into a tradition/heritage narrative.

The task of history instruction is to guide the students in becoming responsible players who know how to treat the phenomena of their own era and the past critically. The instruction guides the students in understanding that their own culture and other cultures constitute the result of a historical process. The instruction deals with both Finnish and general history.

The task of instruction is to provide the students with materials for building their identities, for familiarizing themselves with the concept of time, and for understanding human activity and the value of mental and material work.

**Coherence and Clarity:**
Conceptual objectives are addressed in this section.

**Grade 5-6 Objectives**
The pupils will:
- come to understand that historical information consists of the interpretations of historians, which may change as new sources or methods of examination emerge
• come to understand various ways of dividing history into eras; they will use the concepts of prehistory, history, antiquity, the Middle Ages and the modern era correctly
• learn to recognize changes in the history of their own families or home religions, and to depict changes, such as the birth of farming, that are seen as having had a fundamental impact on human life
• learn to identify the continuity of history with the aid of examples
• learn to present reasons for historical changes

Grade 7-9 Objectives
The pupils will learn to:
• obtain and use historical information
• use a variety of sources, compare them, and form their own justified opinions based on those sources
• understand that historical information can be interpreted in different ways
• explain the purposes and effects of human activity
• assess future alternatives, using information on historical change as an aid.

Headline objectives for Grades 5-6 aim to develop understandings of the nature of historical knowledge (it is itself changeable in nature and located in time), of chronology, to apply historical understanding to their own personal/family histories and to develop understandings of continuity and change and of the reasons why changes occur.

Headline objectives for Grades 7-9 do not aim to explicitly continue to develop these conceptual understandings but focus, instead, on (1) the acquisition, use and interpretation of historical information (2) the explanation of human activity and its effects and (3) using history to reflect on future possibilities. It is not gradual and cumulative in its approach to progression but assumes that having gained understandings of one kind in Grades 5-6, students would build on this foundation to address tasks of a different nature in Grades 7-9.

The sequencing of objectives relating to understandings of historical knowledge and its construction is a little surprising also – a sophisticated understanding (the transitive nature of historical knowing) is addressed at Grades 5-6 before basic competencies in historical source handling have been addressed (these figure in Grades 7-9).

The detailed statements of content for each grade are not always consistent with the focus of the headline objectives.

Under the header ‘Historical knowledge and one’s own roots’ in Grade 5-6 it is stated that students should interpret ‘the meanings’ of oral and written sources and material culture. This is certainly a grade appropriate activity and likely to be very valuable. It is not consistent with the headline objective, which is historiographic in focus.

Scope:
An analysis of content for Grades 5-6 and 7-9 is provided in the table below.

<table>
<thead>
<tr>
<th>Grades 5-6</th>
<th>Grades 7-9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Historical knowledge and one’s roots</td>
<td>Nationalism in the nineteenth century</td>
</tr>
<tr>
<td>Prehistoric and historic times and the first advanced cultures</td>
<td>The industrial revolution</td>
</tr>
<tr>
<td>Emergence of European civilization</td>
<td>The period of transition in Finland</td>
</tr>
<tr>
<td>The Middle Ages</td>
<td>From Great Power rivalry to World War I and its consequences</td>
</tr>
<tr>
<td>The dawn of the Modern era</td>
<td>The depression and the era of totalitarianism</td>
</tr>
<tr>
<td>Finland as part of the Kingdom of Sweden</td>
<td>The World War II period</td>
</tr>
<tr>
<td>Liberty gains a foothold (French Revolution)</td>
<td>From East West conflicts to North South confrontation</td>
</tr>
<tr>
<td>Additional themes:</td>
<td>Additional themes:</td>
</tr>
<tr>
<td>• One non-European culture</td>
<td>• One non-European culture</td>
</tr>
<tr>
<td>• Evolution of trade, culture, transport, demography</td>
<td>• Evolution of equality, culture, and technology</td>
</tr>
<tr>
<td></td>
<td>• European disintegration and integration</td>
</tr>
</tbody>
</table>

In terms of breadth and depth:
- the curriculum has temporal breadth (ranging from prehistoric times to the present), although most of the content is modern history (four of the seven key content headings for Grades 5-6 and all of the headings for 7-9)
- the curriculum is narrow in content in the sense that it takes the form of a classic modernist and Eurocentric narrative (the exceptions to this are the study of ancient civilizations at the start of Grades 5-6 and the brief reference to the study of a non-European culture in the broader themes identified for each grade).

The ‘distribution of lesson hours in basic education’ states the hours to be devoted to history and social studies (the two are not disaggregated):

- no time is devoted to history and social studies in Grade 5
- three hours a week are to be devoted to history and social studies in Grades 6-8 inclusive
- seven hours a week are to be devoted to history and social studies in Year 9.

As has been noted, it is not clear in what detail topics are to be studied so it is hard to come to a judgment. This is particularly the case where social studies and history hours are not disaggregated.

**Levels of Demand:**
In content terms, it is difficult to assess levels of demand since little detail is provided on curriculum content and since it is not clear how much time is to be devoted to history. The organization of curriculum is sequential and cumulative in content terms (students start at the beginning and move forward) so there is content coherence. Assessment objectives give an insight into levels of demand/progression.

Assessment:
Statements of ‘good performance’ are provided for the ends of the 6th and the 8th Grades. These are summarized and evaluated in the table below.

<table>
<thead>
<tr>
<th>Outcome categories</th>
<th>Good performance at Grade 6</th>
<th>Good performance at Grade 8</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquiring information about the past</td>
<td>Distinguish fact from opinion</td>
<td>Distinguish between factors that explain something and secondary factors</td>
<td>1. Students must first be able to read and interpret a source (Grade 8) before they can distinguish between a source and its interpretation</td>
</tr>
<tr>
<td></td>
<td>Distinguish between a source and an interpretation of a source</td>
<td>Read an interpret various sources</td>
<td></td>
</tr>
<tr>
<td>Understanding historical phenomena</td>
<td>Be able to periodize the past and identify features of periods</td>
<td>Put events in context and in chronological order</td>
<td>2. Grade 8 statements about explanation duplicate those from Grade 6 (albeit with different phrasing);</td>
</tr>
<tr>
<td></td>
<td>Note continuities in history and understand (1) change is not necessarily progress and (2) looks different from different perspectives</td>
<td>Explain why people in the past may have thought / behaved in different ways from those current in the present.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Empathize with people in the past and understand cause and effect relationships</td>
<td>Be able to present causes and consequences of events.</td>
<td>3. It is hard to see how students could achieve the first Grade 6 statement without previously having achieved the first Grade 8 statement (since an account is inherently an answer to a question (Lee 2005)).</td>
</tr>
<tr>
<td>Applying historical knowledge</td>
<td>Know how to present an account of historical phenomena from the perspective of some of the parties involved</td>
<td>Be able to answer questions about the past using information that they have acquired (including by using IT)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Know that accounts can be presented in various ways and explain why this is</td>
<td>Be able to present justified opinions and evaluations about past events and phenomena</td>
<td></td>
</tr>
</tbody>
</table>
Sample Assessments
One assessment was available for scrutiny – History Matriculation examination, translated from Finnish.

Four structured questions (consisting of a stimulus source, a comprehension question and one or two questions that ask for the explanation of related content knowledge) are included and so are six essay style questions. It would seem that students are expected to answer six questions. It is not clear if they have to select a combination of question types.

The question paper covers a range of the topics identified in the Grades 5-9 curriculum with a bias towards the nineteenth and twentieth centuries. If this is a typical paper then the inference should be that the second half of the curriculum (Grades 8-9) is more fully examined that the first half of the curriculum.

The table below summarizes and evaluates the first four questions in the exam paper. Most of the answers are discursive. A good range of concepts appear to be covered. The evidential questions appear to make limited demands on students’ abilities to reason about sources and cannot fully assess some of the more ambitious learning outcomes identified by the syllabus (for example, the empathetic objectives or the objectives that require students to understand history as having historicity and interpretations as being changeable).

<table>
<thead>
<tr>
<th>Questions</th>
<th>Content focus</th>
<th>Conceptual focus</th>
<th>Format</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>The Black Death</td>
<td>Evidence</td>
<td>Stimulus source and discursive answer (2 marks)</td>
<td>Comprehension</td>
</tr>
<tr>
<td>1.2</td>
<td>The Black Death</td>
<td>Cause / Consequence</td>
<td>Discursive answer (4 marks)</td>
<td>It may not be clear to students what kinds of reasoning are called for here (does ‘consider effects’ mean list them or list and evaluate them?)</td>
</tr>
<tr>
<td>2</td>
<td>Religion in ancient Greece and Rome</td>
<td>Significance</td>
<td>Discursive answer (9 marks)</td>
<td>It may not be clear to students what kinds of reasoning are called for here (does ‘consider significance’ mean identify significance or debate significance and relative significance?)</td>
</tr>
<tr>
<td>3</td>
<td>Scientific Revolution (16th century)</td>
<td>Period features</td>
<td>Discursive answer (9 marks)</td>
<td>This question may call for little more than recall.</td>
</tr>
<tr>
<td>4</td>
<td>Marxism, Revolution, Russia, UK</td>
<td>Cause/consequence</td>
<td>Discursive answer (9 marks)</td>
<td>This is a very demanding question that asks students to explain the Marxist theory of revolution and also</td>
</tr>
</tbody>
</table>
Key competencies:
No reference is made to key competencies in the history sections of the curriculum.

Vocational education

Orientation:
Vocational education programs in Finland are specified in great detail, both at 16+ and for adults. The requirements have the status of regulations. While there is an awareness of the need to be flexible, the sheer mass of subject and assessment specification is likely to introduce a certain inertia in to the system. On the other hand there is close engagement with employers, and therefore a clear line of sight to work. In a relatively small system, the will to maintain currency is likely to be able to promote change. There is a relatively high status for vocational qualifications, with a parity of esteem built in to the system and its progression pathways.

Vocational education and training (VET) programs are intended both for young people and for adults already active in working life. They can study for vocational qualifications and further and specialist qualifications, or study in further and continuing education without aiming at a qualification. The aim of VET is to improve the skills of the work force, to respond to skills needs in the world of work and to support lifelong learning.

Vocational qualifications have been designed to be close to the work place and respond to labor market needs. Qualifications are based on working life occupations and the competencies required in these occupations. Prior learning acquired in training, working life or other learning environments can be counted towards a qualification. Qualifications are based on a requirement to achieve 120 credits. A full time course covers 40 credits a year.

Post-compulsory education is divided into general education and initial and further vocational education and training. After basic education, the great majority of students (95%) continue in full time education: in additional basic education (2.5%), in upper secondary schools (54.5%) or in initial vocational education and training (38.5%).

VET specifications are available for upper secondary, further vocational qualifications, specialist qualifications, apprenticeship training at 16+ and adult education. In total 146 000 students attend initial vocational training every year. Of them, 4 500 attend access courses preparing for initial vocational training. The largest fields are Technology and Transport (36%), Business and Administration (19%) and Health and Social Services (17%). The other fields are Tourism, Catering and Home Economics (13%), Culture (7%), Natural Resources (6%) and Leisure and Physical Education (2%).
There is growing concern about the social exclusion of youth, especially among 20-29 year-olds. Around 110 000 only have a basic level of education and 55 000 young people are unemployed job-seekers. Youth unemployment is on the increase. Altogether, it is estimated there are 40 000 untrained young people not working nor in education or training programs. A youth guarantee program began in 2013. This offers everyone under 25, and recent graduates under 30, a job, on-the-job training, a study place or rehabilitation within three months of becoming unemployed. Prevention of drop-out from education and exclusion from society is a government priority.

**Coherence and Clarity:**
The specifications are exact and set out in great detail. There are 119 study programs leading to 53 different vocational qualifications confirmed by the Ministry of Education and Culture. There are 305 further and specialist qualifications, which are taken as competence-based qualifications.

The Government decides on the general goals of vocational education and training, the structure of qualifications, and the core subjects. The Ministry of Education and Culture decides on specific studies and their scope. The curriculum consists of a national core, each education provider’s locally approved curricula and the students’ personal study plans.

The NBE sets requirements for student assessment, student counseling, on-the-job learning, special education and training, educational arrangements for immigrants and apprenticeship training. This is all documented in great detail, though the competencies as such are not supported by the high level of range statements available in some systems. It is possible to read across the requirements for various occupational groups, but the regulatory nature of the specifications is, in all likelihood, not going to be responsive to the differing levels of performance required in different occupational areas.

**Scope:**
Lower secondary education ends at age 16. Vocational and further vocational qualifications are upper secondary level and adult qualifications. All vocational upper secondary programs take three years, including a practical training period of at least six months. Qualifications can be completed in the form of school-based education and training or apprenticeship training. Since the early 1990s, vocational training for both 17-19 year olds and adults has been moving towards a highly specified competence-based qualification system (Cedefop 2014).

Most young learners complete their upper secondary vocational qualifications at vocational institutions. All qualifications include on-the-job learning. Vocational qualifications may also be completed in apprenticeship training, which contains courses arranged at vocational institutions. Most apprentices are adults.

A full vocational qualification requires 120 credits, spread over the three years of full-time study, unless prior learning can be counted towards the qualification. The qualifications are designed
to offer progression from the basic education syllabus. At least 20 credits must come from on-the-job learning. Matriculated students can also study for initial VET. Their prior studies are regarded as the equivalent to 30 credits, which can be counted towards the vocational qualification. Vocational qualifications are acceptable for progression to higher education. There is a range of further, specialist vocational qualifications that are post-secondary. Upper secondary vocational qualifications may also be obtained through competence tests independent of how vocational skills were acquired. Competence-based qualifications are usually completed by adults.

There is well established parity within the system. There are no dead-ends. From the late 1990s the vocational track has given eligibility to access polytechnics and universities. With this reform upper secondary vocational education and training became equal to general upper secondary education as a pathway to higher education. To facilitate this all vocational qualifications have core elements.

Permission to provide VET courses comes from the ministry, which allocates vocational areas of study and student numbers. However, providers themselves are responsible for meeting local labor market needs, and developing localized schemes based on national core curriculum requirements.

The biggest fields are technology, communications and transport and social services, health and sports. Half of all vocational students are female, however, the proportion varies according to vocational area. Technology and natural sciences are male dominated while healthcare and social services and tourism and catering are more female.

**Levels of Demand:**
Vocational qualification requirements are developed through broad-based cooperation with stakeholders, thus having a clear line of sight to the world of work. National qualification requirements are drawn up in co-operation with employers' organizations, trade unions, the Trade Union of Education and student unions. National Education and Training Committees, local tripartite bodies as well as other representatives of working life take part in the curriculum work as advisers and consultants.

Specifications are very detailed competency statements, related to clearly defined employment areas and their subsets. Natural Resources and the Environment, for example, has specifications for agriculture, fishery, forestry, horse care, horticulture, natural and environmental protection, hiking and nature services, and riding instructors. A vocational qualification can be completed both as a curriculum or competence based qualification. The requirements constitute a regulation and cover both the upper secondary and the competence-based qualification.

Competencies are very specifically stated in the manner of UK National Vocational Qualifications. For example:
Customer services for waiters/waitresses

- know how to function in customer service assignments at restaurants or public sector workplaces operating under various business ideas or concepts.
- workplaces include cafes, restaurants, staff restaurants, transport terminals, fast-food, catering or tourist establishments, and institutional foodservice facilities.
- a waiter/waitress maintains customer facilities and displays products available for sale as well as presents, sells and serves the customer products and services. They serve individual customers and customer groups. They work in co-operation with other employees toward promoting customer comfort, safety and well-being. They work in accordance with the requirements for sustainability and hygiene, and observe all applicable license regulations and other sector agreements and statutes.
- serving drinks under supervision, observes serving temperatures, methods and equipment for the drink selection on offer, independently observes serving temperatures, methods and equipment for the drink selection on offer. A skills demonstration must comprise at least:
  - mastering the work process in its entirety
  - mastering the work method, equipment and material in their entirety
  - underpinning knowledge: observing nutritional recommendations and preparing
  - foods for special-needs diets
- cost-effective and profitable performance and acting in accordance with the principles of sustainable development key competences for lifelong learning in their entirety
- planning of work shift assignments, arrives to work dressed in the required manner and takes care of their appearance, arrives to work dressed in the required manner and is particular about their appearance.
- observes working hours and, if necessary, makes arrangements for any deviations from set working hours, observes working hours and, if necessary, makes arrangements for any deviations from set working hours in accordance with establishment policy.

Progression:
Students in compulsory schooling are required to study in the general area of ‘technology’. Courses in home economics, for example, provide students with the capabilities and practical skills required to manage their everyday lives. The course prepares students for further studies and can be adapted according to a specific VET field. Their scope is 20 credits, that is, the equivalent to six months of full-time study.

Prior to starting an upper secondary vocational qualification, students may apply for pre-vocational programs preparing for vocational studies, where necessary. This is directed at young people who have not yet gained a clear idea of their career choice or are without sufficient capabilities to apply for or cope with vocational studies. Each student studies in accordance with an individual study plan. The weighting is between 20–40 credits. Flexible pathways have been developed for the transition point between basic education and upper
secondary level. They are aimed at supporting successful transitions from one level to the next as well as providing continuity.

Drop-out from vocational education and training is far more common than from general upper secondary education, although it is not high in European terms (9% in 2010/11) (Cedefop 2014).

Assessment:
Student assessment is entirely criteria based, a student's learning and competence is always compared to either the skills requirements specified in the vocational qualification modules or the objectives of core subjects as well as the assessment criteria based on them. This includes an element of range statements, defining the context in which the skill is to be demonstrated.

Key competencies:
National qualification requirements have been based on a learning-outcomes approach since the early 1990s. Recently more flexibility has been introduced in order to respond to the changing requirements of the world of work, for example including modules from other vocational qualifications, including specialist vocational qualifications or polytechnic degrees. This has allowed students to create individual learning paths and given providers an opportunity to meet the demands of regional and local labor markets more effectively. VET programs are based on individual study plans, comprising both compulsory and optional study modules. Modularization allows for some individualization of qualifications.
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