

Understanding the PISA results:

A Comparative Study of Load, Pace and Complexity in Finnish and Norwegian Primary Schools

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Master of Philosophy in
Comparative and International Education

UNIVERSITETET I OSLO

14/07/2017

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Trykk: Representeren, Universitetet i Oslo

Abstract

The Programme for International Student Assessment (PISA) stands today at the forefront of tests that measure pupil achievement. As Finland's successes have turned it into a PISA model, results discrepancies with neighboring Norway, a welfare state sharing similar values, make them appropriate comparative subjects. To understand their differences, this study draws upon functionalism, Bourdieu's field theory, organizational and learning theories to explore teaching *load*, *pace* and *complexity* (LPC) in their primary classes.

This qualitative study uses data from policy documents and class books, as well as, teacher interviews and classroom observations, gathered mainly in the nations' capitals Oslo and Helsinki.

Findings reveal the impact of economic contexts on policies affecting teacher status and education. Finland's need for knowledge production increased the value of learning outcomes, empowering teachers to decide freely about assessment and differentiation. In Norway, a reliance on oil production limited industries, leading to different cultural aims that kept teachers under managerial control.

The study recommends empowering Norwegian teachers to independently assess and differentiate LPC according to pupil's needs. Further, modifying the math books to include reviews and more exercises to facilitate task automatization. Finally, giving more outdoor free play-time to improve learning.

Adjusting LPC, as indicated, will improve Norway's PISA scores and overall academic performance.

Acknowledgements

I would like to thank the faculty and personnel of the CIE program at UiO for their great dedication to the field and its students. Starting with our CIE Programme Coordinator, Prof. Lene Buchert, for the effort she puts to transmit her passion, not only for the field, but also and mostly to social justice and equity in education. To Prof. Teklu Bekele whose enriching lectures were always a pleasure to watch. To Prof. Fengshu Liu, especially for the thoughtful, enlightening methods she employs to clarify complex concepts. To Ms. Camilla Bakke, who was always available and patient, mainly for her guidance during the ups and downs of the thesis.

I am also greatly indebted to my advisor Claire Poppy for her invaluable guidance and expertise that taught me a lot. Without her assistance, this work would not have been completed.

Finally, I wish to thank my family; mainly my son Jonathan, who is the most important reason I chose to make this study, and my mother who was an exceptional human being and the reason for my interest in the field of education.

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Abbreviations

BT	-	Break Time
BTO	-	Break Time Outdoors
CL	-	Cognitive Load
CLT	-	Cognitive Load Theory
LBTI	-	Learning and Break Time Indoors
LPC	-	Load, pace and complexity
LT	-	Learning Time
MKO	-	More Knowledgeable Other
ME	-	Mental Effort
ML	-	Mental Load
OECD	-	Organization for Economic Co-operation and development.
PE	-	Performance
PIRLS	-	International Mathematics and Science Study.
PISA	-	Programme for International Student Assessment.
TIMSS	-	Progress in International Reading Literacy Study.
UDIR	-	Utdanningsdirektoratet (The Norwegian Directorate for Education and Training)
WM	-	Working Memory
ZAD	-	Zone of Actual Development
ZPD	-	Zone of Proximal Development

1 Introduction

Working smarter instead of working harder at school and in real life is the key to success in a modern and everchanging world. The schools of Finland have succeeded in achieving more results with fewer hours and less homework as they have attained higher scores on international academic tests as compared to many nations that focus on hard work (Biggman, 2017; Day, 2015; Lehtniemi, 2016). Neighboring Norway has also given “less” school hours and homework but hasn’t fared as well on international tests (OECD, 2015). As those tests are declared to measure the skills needed to face the challenges of the new century (Davie, 2016), Norway’s schools are pressured to improve their performance. Working smarter means to adapt to a future world marked by constant change and innovation. The end of the 20th century and the beginning of the 21st have witnessed the fall of the Soviet Union, Chinese reforms, the development of democracy in South Korea, and economic liberalization in India. These social and political developments have led to free trade treaties, greater openness, and economic advancements (Stewart, 2012). As trade barriers have fallen, technologies connecting the world have taken over. On the other hand, global warming, environmental worries, recessions, terrorist threats, wars, and massive migrations (Jacobsen & Mather, 2016) have raised concerns about finding solutions for the challenges ahead. Globalization, technological advancements, and interconnectedness have raised the economies’ reliance on knowledge, and increased competition for higher skills. All these changes have made it imperative for nations to adjust smartly their educational systems for the requirements of the job markets and concerns of the future.

Cooperation among the nations is essential to find out how education can be adapted to meet those new global demands. In this spirit, the Organization for Economic Co-operation and Development (OECD) has stirred the international education scene by introducing in the year 2000, a new type of test called the Programme for International Student Assessment (PISA). This test which has similarities with older and more classical tests, such as TIMSS and PIRLS, attempts additionally to evaluate creativity by assessing the pupils’ capacities to find solutions to real life situations using skills learned at school (Hutchinson & Schagen, 2006). While the older tests are classical in their focus on formal knowledge and skills used within the limited environments of classrooms, PISA aims at evaluating real world use of that knowledge (Schmidt, 2014). The importance of PISA is therefore based on the claim that it evaluates skills needed to find solutions throughout life.

Their wide publication made PISA results impactful on the decisions of policy makers worldwide; this has attracted attention to high performing nations. Among PISA's highest achievers, Finland's approach has been influential on some educational researchers who have aspired to understand what has had the greatest impact on the nation's performance (Breakspear, 2012). Several factors have already been pointed out to justify Finland's performance such as: prestigious teacher training and status, less school hours, less homework and more recess time. Several studies have compared Finland to the US, a nation that gives far more school hours and less recess time to its pupils yet one that has often had much lower scores on PISA tests. The difference in a lower school load in Finland is clear also when compared to other high performing nations such as South Korea, China and Singapore. These facts have led lower and higher performing nations to question the necessity of a heavy work load on pupils (Ripley, 2011; Espinoza, 2015). The characteristics that have brought Finland into the limelight have, therefore, also brought forward the positive impact of lower school pressure on the ability of pupils to learn.

In a Scandinavian context, however, this difference in load is not as striking because a philosophy of child friendly schools is common to all Nordic nations. Norway, for example, has also had a gentle approach toward its pupils, yet it has always achieved lower scores on PISA tests. The causes for such performance discrepancies have not yet been understood as studies comparing the two nations are lacking. This makes an investigation that compares Finland and Norway's educational systems pertinent. Such study could help clarify some of the differences and similarities between the two nations and might reveal methods that work best in each context.

It is common knowledge that lower stress helps people become more receptive to learning; this fact applies also to school children during class hours. As the particularities of Finland's performance have led some educational researchers to reconsider break time and school work load, this study aims to find the extent of influence of *load*, *pace* and *complexity* on the performance of pupils in a Nordic context by comparing Norway and Finland in this respect.

1.1 Rationale

The next section presents the rationales used in the study and starts by presenting the rationale for using PISA as an analytical guide (section 1.1.1). It further explains the rationale for comparing Finland and Norway (section 1.1.2), then clarifies the rationale for selecting

primary classes (section 1.1.3), and finally it gives the rationale for looking specifically at load, pace and complexity (section 1.1.4).

1.1.1 PISA

The three main rationales for using PISA are: 1) the information that it yields is valuable and can be useful for the improvement of schools and the educational system as a whole, 2) its results have an important influence on the decisions of government officials, 3) it has propelled the particularities of Finland's educational system into the limelight and has highlighted Norway's performance gap.

To start, PISA and other international assessment tests make use of comparison in order to allow for a greater comprehension of the impact of context, space, and time on education. The value of such a comparative approach in education was described by Kandel as one that discovers "the differences in the forces and causes that produce differences in educational systems" (1936, p. 406, as cited in Manzon, 2011, p. 173). This suggests that international comparative studies contribute to further our understanding of educational systems around the world, and provide valuable knowledge about education. As such, PISA becomes important because it shares similarities with other international comparative studies and contributes to widen a general understanding of several issues in the education field (Bray, 2014; Manzon, 2011).

Secondly, the vast scale of the PISA tests and their results have had from an average to a very high impact on the decisions of policy makers of several OECD nations (Breakspear, 2012); PISA has been relied upon and used to evaluate and improve the performance of schools as well as to reform their policies. The systems of high performing nations such as Singapore, Korea, Shanghai-China, Canada, Australia, and Finland have often been mentioned by policy makers as influencing their decisions (Breakspear, 2012). As an example of its influence, an analysis of policy documents and interviews of German officials have shown that Germany has reacted to its weak PISA results by undertaking important reforms in its educational system (Niemann, 2010). Such considerable influence on national education policies makes PISA worthy of particular attention.

The final rationale for using PISA is that its results have surprised many with Finland's unexpected high performance (Tucker, 2014), and this has propelled the nation's educational system into the limelight (Korpela, 2012). Finland, which throughout most of its history had kept a low profile, became overnight a center of global interest (Chung, 2015). This attention

opened the way for a new market in the nation labeled as “educational tourism.” It has attracted educators and researchers from around the world who visited the country in a quest to uncover its formula for academic success (Crace, 2003). In a survey, a policy maker from Sweden was quoted as saying that Finland’s system has often been mentioned as influential by educational policy makers from Sweden, Denmark, and Norway “given the many common elements of [their] educational systems” (Breakspear, 2012, p.18).

With Finland’s success on PISA came other surprising revelations such as a puzzling discrepancy in performance between the pupils of Finland and those of neighboring Norway (Ladegaard, 2012). As the two nations share similarities in their highlight of equity and equal opportunity in schools, they have differed with Norway’s greater expenditure on education and lower PISA scores. Many, including Norway’s Education Minister Torbjørn Roe Isakson, have expressed worry in what was described as a ‘PISA shock.’ Some have called the situation “alarming” and have pondered on the reasons for such a difference as well as what it meant (Berglund, 2013; Hatch, 2010; Ladegaard, 2012).

1.1.2 Comparing Finland and Norway

The rationale for comparing Norway and Finland is in part based on the similarities of the nations: Both are modern industrialized Nordic European countries, close in geographic proximity that also share similarities in their histories as both have suffered from poverty and have been dominated by foreign neighboring powers. Furthermore, in both nations important events for self-determination, took place during close historical periods: Norway’s constitution was written in 1814 and the nation became independent from Sweden in 1905, while Finland became first autonomous within Russia in 1809 and took its independence in 1917. Throughout those periods, the two nations have had important historic ties with Sweden. Even though they don’t share the same language or complete cultural/historical background, Norway and Finland are today welfare states with healthy economies, and are members of the OECD. In their educational systems, they share also similarity as both attach great importance to the comprehensive school and are known to highlight equality, equity, and an important attention to weaker pupils. Finally, both take special care to create a gentle, child friendly environment where students are safe and not overloaded with school work.

In spite of these similarities, international academic tests have revealed important discrepancies in the performances of their pupils; this raises clear questions about the causes for such achievement gaps and makes them interesting subjects for investigation.

While in Finland “light” student work has been called “the Finnish paradox,” because with fewer school hours and less homework than many other lower and higher performing nations, Finland has been able to obtain top results on PISA tests (Lloyd, 2010), Norway by contrast with its “gentle” school environment has not fared as well on international tests. It is worth noting that even though PISA has launched the debate that highlighted Finland’s success, Norway’s weaker academic performance on international tests was already known through older tests such as TIMSS and PIRLS. These tests began in 1995 and have been conducted every 4 years evaluating math, science, and reading skills of 4th and 8th graders (10 and 14-year-old pupils). Finland and Norway have not always participated in TIMSS, and the first time they did so together was in 2011. The achievement of both nations on such older tests has been consistent with PISA results placing Finland among the top performers and Norway lagging behind (TIMSS, 2011: 40 & 42).

The results have shown that Norway has often performed below the international average and even sometimes ranked last among the OECD nations (TIMSS, 2007). The tests have also revealed that Norway is consistent in its low performance from 4th to 8th grade, which might suggest that its pupils start lagging behind early and don’t catch up in the later years. This could, therefore, mean that what happens by 4th grade is important and, in this context, might provide enlightening revelations that could even determine what happens in later years.

In addition to international tests, some differences between the two nations have already been pointed out by researchers, such as the selection of teachers, their training, and their subsequent status and autonomy (Ladegaard, 2012). Studies, however, comparing the systems of Finland and Norway remain very few and limited, which implies that other differences might exist and have not yet been identified or investigated. Furthermore, since the ideas of light work and shorter school hours have been highlighted in Finland, and some educators and policy makers have advised reducing load and following the Finnish example (Biggam, 2015), the present paper will investigate to what extent this can be appropriate in a Norwegian context. Some important sociocultural differences specific to each nation might make the borrowing of educational approaches difficult to adapt and transfer.

The existing literature which compares the two nations’ educational systems is often general, and addresses issues of education in a broader Nordic context that often includes Sweden and Denmark. Some of the subjects which have been dealt with are: Scandinavian adult education, news and public opinion on PISA, left-wing political influence on education which favors

focus on social skills rather than academic skills, education about organic food and sustainability, a sourcebook on Nordic research in mathematics education, a book providing insights into early childhood discourses and practices in Nordic nations, the Nordic model of education, aspects of early school leaving, effect of school on interest in Natural sciences based on PISA, the Nordic education model, education decentralization and student achievement based on PISA, policies for immigrant students, an analysis of policy texts regarding Nordic teachers, the introduction of algebra, a search for a Nordic model of values and practices, religious education, and inclusion in special education.

As to the literature that deals specifically with Norway and Finland, the subjects covered are: views on the use of individual education plans in primary schools, comparison of teacher education, curricula content and novice teachers' knowledge, policy making processes with respect to teacher education, a study of curriculum, the curriculum as a governing instrument, analysis of policy making, how teachers experience the opinion climate on education which deals with comparing teacher selection and training, the difference between special education systems, attitudes toward special education, religious instruction, freedom of belief, and music education.

Not only is there limited research to help explain the why and how for the differences between the nations' educational systems, there is also a lack of a deep understanding of their similarities. Because of this literature gap, the paper will look at the influential PISA results to analyze the reasons that can create a performance gap between Finland and Norway.

1.1.3 Primary classes

In deciding about the investigative process, questions arose about where to start searching for clues. Logic has led the research to select the primary classes as they are the earliest years and mark, therefore, the start of the scholastic process. As they are the formative years, whatever happens in that period can have a significant impact on the future of pupils at school. Another reason for choosing the primary classes is the lack of studies that compare Finland and Norway in those years.

Both Norway and Finland begin compulsory education of children at age six; while that first year is still called kindergarten in Finland, and is often in a separate building and institution, it is called First grade in Norway and takes place at school. Since kindergarten is not compulsory in Norway, there is a reliance on the primary school to introduce children to all

the knowledge and skills they will need in later years. As it will include all children, data to compare the two nations will be more reliable if collected during the period of compulsory education which starts in First Grade. Before this period, a few children will be excluded as some parents choose to keep their young ones at home.

Furthermore, evidence suggests that academic performance in the primary classes indicates performance in later school years. As mentioned previously, TIMSS tests have revealed that Norway's results have been low throughout from 4th to 8th grade. This means that in Norway pupils start lagging behind early and don't catch up in later years when they participate in PISA tests. For this reason, to understand the PISA results, it is primordial to investigate what is happening by 4th grade. This justifies the rationale of using the period from first to fourth grade as the main focus of this study.

Since the primary classes mark the founding school years, they constitute an important base where the pupils' academic structures are formed. During this period, children are provided with the basic skills that will directly affect their overall development including their social behavior, cognition, and academic attainment (Sylva, 1994). Primary school also marks a period of transition where children are first introduced to the academic and formal world. Here they will have to follow guidance and instruction as well as learn to take responsibility and do things on their own (Orford, 2014). It is a sensible period that can leave its mark on children with a feeling of like or dislike of school that can often be long lasting.

To summarize it, the rationale for choosing the primary school are therefore: 1) a literature gap comparing Finland and Norway in those years, 2) the importance of the early formative years, and finally 3) indications that academic performance during those years reveals pupils' future performance on PISA tests.

1.1.4 Load, pace, complexity

The rationale behind the focus on *load*, *pace* and *complexity* (LPC) is that the special characteristic that has distinguished Finland from other high achieving nations and originated international attention to its educational system, was the lighter load of school work that Finnish schools give to their pupils. Such lighter load combined with high PISA scores was called the Finnish paradox as with "less" work they have achieved "more" learning. Since Norway and Finland are known to have similarities in child friendly schools that do not to overload their pupils with academic work, this study has focused on comparing the two

nations in this respect to verify in more detail the positive or negative impact of diverse measures of *load*, *pace* and *complexity* on academic achievement.

The research has looked at the primary classes of the two nations to investigate different aspects of work load. It has verified which schools move faster with the curriculum, how complexity evolves, when the load becomes heavier, how much work time and break time are given, how all of this is adapted to the student's capacities or interests as verified through assessments and differentiation, finally how much attention is dedicated to academic work as opposed to time spent on arts, music and different child-centered activities. It has also investigated what skills, priorities and values are focused on in school and by the teachers in the classroom. This research has explored these issues and analyzed how the differences found could have an impact on the academic performances of pupils in later years.

It is worth noting that *load*, *pace* and *complexity* are not always distinct and are sometimes overlapping; they are all aspects of differentiation. The following gives a definition of the terms as understood in this research:

Load is measured as the "quantity" of given academic work; it is equivalent to the total number of hours spent sitting in class, or the time spent doing homework. It is also the quantity of material that is covered within a specific time period or during homework.

Pace is the speed at which instruction moves, how "fast" it advances to more complex material, how much there is repetition, "where" instruction remains at the same level before moving ahead or changing subject. *Pace* is also connected to break time or time given to do creative or re-creative activities, because as these offer a time to relax, or time to change focus to a different thinking mode, they slow down the pace of teaching and offer a relief from it.

Complexity is in part connected to pace but also connected to the age of the pupils and investigates how complex is the work that is given in each grade level and each age group. The pupils' age is important because the maturity of the child can play a role in his or her understanding of a subject matter and capacity to learn.

1.2 Aims

The aim of this research is to look for similarities and differences in terms of *pace*, *load* and *complexity* of academic work between the primary schools of Norway and Finland. The study will identify issues of load, pace and complexity (LPC) as adapted to the classroom as a whole and to each individual pupil. The purpose is to identify what could be causing

Finland's pupils to perform better than Norway on international tests such as PISA. The knowledge produced by this study will not only provide researchers, policy makers and teachers with information on the differences that exist between the two nations' systems as applied in primary classrooms, but it will also clarify the positive or negative consequences of those differences on students' performance.

1.2.1 Research Questions

Here are the questions guiding this study:

1. What are the differences in *load*, *pace* and *complexity* of school work in primary levels between Norway and Finland?
2. How could differences in *load*, *pace* and *complexity* and methods of differentiation between Norway and Finland impact on pupil performance in PISA tests?

1.3 Methodology

To compare work *load*, *pace*, and *complexity*, the research looked at the national curriculums, textbooks, work books, and notebooks as well as assignments given to the students. The study also used classroom observations noting activities done during a full school day in several primary classes from first to fifth grade in the capital cities of the two nations. To complete the picture, qualitative semi-structured interviews of the teachers were conducted. Such interviews gave teachers room to provide richer and more enlightening answers than ones provided by structured interviews. The purpose of the interviews was to clarify the teaching/learning processes used by teachers throughout the school year. All such approaches justify the rationale behind the selection of a qualitative research method.

The study has also relied on several theories to frame the study and to analyze its data such as structural functionalist theory, Bourdieu's field theory, organizational theory, cognitive constructivist theory, theory of cognitivism and cognitive load theory.

1.4 Assumptions

The main assumption comes from the influence of PISA's results which indicate a better performance of Finland's pupils over the pupils of Norway; this creates a bias in favor of Finnish approaches regardless of their actual quality. There is, therefore, a tendency to believe that what is observed in the Norwegian schools is not as efficient or as good as what is observed in the Finnish schools. Another assumption comes from the heralded so-called

Finnish “paradox” where it is claimed that a light academic load leads to a higher performance; this also creates a prejudice in favor of: play-time, recess, fewer school days and less homework, assuming these will lead to an improved performance. Finally, the researcher’s background which is from societies that favor challenging pupils at an early age that can lead to a bias against Norwegian schools and assume that their weakness comes from too little load and challenge, and, therefore, is behind the nation’s poor PISA performances. It is important to be conscious of such implicit assumptions and to be aware of them when conducting the study.

1.5 Outline of Thesis

The following outline summarizes the content of each chapter.

Chapter 1 – Introduction

The first chapter introduces progressively the subject of study, putting it in context and explaining its relevance. Thereafter, it presents the four rationales to explain the use of PISA, the selection of Norway and Finland as comparative sites, the choice of primary classes, and the focus on load pace and complexity in teaching. In the end, the chapter explains the aims, methods, motivation, and assumptions, as well as presents an outline of the thesis.

Chapter 2 –Theoretical Framework

This chapter presents the theories that were used to analyse the data and starts from general social theories to more specific theories related to education, and theories for efficient teaching that take into consideration load and complexity of teaching material.

Chapter 3 – Literature review

The literature review covers subjects that are relevant to the present inquiry and that have been dealt with in previous research. It starts with relating Norway’s and Finland’s historic and cultural paths to social equality, and Finland's path to educational success, then it presents the differences between the nations as revealed by PISA results. Finally, it shows the results of meta-analytical studies that evaluate the factors that impact on student performance.

Chapter 4 – Methodology

This chapter explains decisions for conducting the study such as the choice of a qualitative inquiry as research method, the choice of Finland and Norway and their capital cities Helsinki and Oslo as sites of research. It presents also the rationale for school selection, clarifies how

the investigation was conducted and the tools used to gather information on the sites. Further, it explains the questions addressed to the teachers in the semi-structured interviews, and goes over procedures such as taking permission from stakeholders and authorities, travel dates and expenditures. It presents the approach taken to analyse the collected information, and finally, discusses validity, reliability and ethical issues such as anonymity of participants.

Chapter 5 – Presentation of findings and Results

This chapter presents the data gathered on the sites of the two nations, through classroom observations, interviews of teachers, and online survey. The findings are laid out in a clear comprehensible manner with diagrams and charts highlighting the results by pinpointing the basic differences between the two nations.

Chapter 6 – Discussion and Conclusions

This chapter discusses the findings from chapter five, using the lenses of the theories presented in chapter 3 and reaches conclusions to answer the research questions.

2 Theoretical Framework

This section presents the theories chosen to create a lens or perspective through which to analyze the collected data and understand the findings. The study needed theories that could provide a multi-level understanding - from the culture as a whole, to the individual agency of its members, to the function of schools as institutions, to the process of learning in those institutions, finally, to the individual constructs of load, pace and complexity. Each theory is relevant and has its own function in the thesis

The theories used address the issues of structure and society, as well as, the role of the individual within that whole. From structural functionalism (2.1.1) which gives a general presentation of society and its institutions, such as schools and the way they function, to Bourdieu's field theory (2.1.2) which gives a closer look at the individual within the institutions, the theories help to understand the impact of historic development on cultural and social values that affect decisions and transform society, which in its turn determines the role and values of individuals within it. The chapter then presents organizational theory (2.2) as it deals with the way institutions such as schools best function. Finally, theories related to learning, the impact of the environment, personal capacities, load, and complexity on the acquisition of knowledge are explained with cognitive constructivist theory (2.3.1), the theory

of cognitivism (2.3.2), and cognitive load theory (2.3.3) as they all complement each other and will help to thoroughly analyze the purposes of this inquiry.

2.1 Assumptions about society

Social theories are affected by different assumptions. As the assumptions change, the theory also changes. Assumptions which can be regarded as mindsets are termed 'paradigms'. Four paradigms of organizational theory were developed by Burrell and Morgan, based on two assumptions: The first assumption concerns *the nature of social science*; it evaluates how reality is interpreted, or ontology; it looks at how knowledge is reached and its validity, or epistemology; it also investigates the path to knowledge, or methodology; and finally, it explores people's behavior and reactions, or human nature. The second assumption concerns *society* and is divided into two other categories, one is 'regulation' which highlights society's coherence and its unity, another is 'radical change' which sees society as one that has at its heart deep contradictions and structural conflicts. This study draws upon structural functionalism.

2.1.1 Structural functionalism

The first theory that this thesis is concerned with is *structural functionalism* which fits the category of 'regulation' mentioned by Burrell and Morgan. Structural functionalist theory will be used in this thesis to analyze how different socio-cultural paths, in the contexts of the two nations, have an impact and generate differences in educational policies, that in the end have different effects on pupil learning. The theory was originally developed by Emile Durkheim and looks at society from a distance, perceiving it as a rather stable entity, composed of several interconnected parts that hold it together. Another theorist, Herbert Spencer, viewed society as an organism with different parts that grew and developed like the organs of a body (Crossman, 2017). In his perception, just like a body, society has a regulative system which is the government, a sustaining system, which is the industry and economy, and a distribution system, which are transportation and communication routes. When there is a problem with one of those systems or organs, other organs will have to compensate for their shortcoming and this will affect the whole body. Spencer is the one who first used the term 'survival of the fittest' in reference to this adjustment to needs. For structural functionalism, society always leans towards equilibrium to stabilize itself. For this reason, fast change is viewed as bad because, as the entire social body normally moves slowly, it will not adapt in time, which might lead to dysfunctions or even destruction. Society, therefore, should not be submitted to

too much or rapid change, and the parts that compose it must work in harmony to contribute to the proper functioning of the whole.

For structural functionalists, institutions are important components of society, they provide for its needs, and are main structures that it relies on to function (Crossman, 2017). Institutions are viewed as stable like society; they change very slowly, following the changes that happen in society to adapt to its new needs, to find balance and stabilize it again. The government, the military, hospitals and schools are all examples of social institutions, and they are interconnected as they serve each other (Crossman, 2017). For example, schools train people to be productive and be positive contributors to the job market. Jobs, in their turn, provide services that other institutions need. This dynamic works within the rule of the law which is another institution that helps maintain an overall social order. For the theory, institutions have two types of functions, some are manifest, others are latent. The manifest functions are the main purpose of these institutions, while the latent functions serve secondary purposes that are often unintentional. To take schools as an example, their manifest function is to provide education and training, but their latent function is to also to pass on to pupils the values of the wider society.

While European functional theorists have mainly been concerned with interpreting society, American functionalists, such as Robert K. Merton, have looked at people within society. For him, people in a society are also perceived as interdependent. Individuals have a role to contribute, and as they fill the gaps created by each other's needs, they generate a social dynamic (Crossman, 2017). Individuals are, therefore, guided by society's rules and they follow them usually unaware. Within society, the rules and norms are set by such things as culture, laws, religions, and values that have power over people and influence their lives. Schools are the institutions that mostly serve to pass on these rules.

Keeping social order, for structural functionalists, is not bad for society even with social inequalities as these can serve the needs of the group (Bessant & Watts, 2002). For them, society adjusts by itself and changes naturally when there are problems that need to be fixed, therefore, the individual does not need to be very active in such change. Several theorists disagree with this view, such as Antonio Gramsci who considers that functionalist perspective reinforces the status quo (Crossman, 2017). Conflict theorists also disagree and believe that social reproduction is the result of an educational system that is dominated by the dominant's group ideology which gives pupils from higher socio-cultural backgrounds an advantage at

school (Sargent, 1994). Other theorists such as interpretivists, interactionists, and social action theorists, believe that individuals make their own personal decisions about their actions and thoughts, and they influence society in doing so. Bourdieu has developed a theory that looks closer at people inside the institutions and discusses the power relations between them. For him individuals are the product of their environment and heritage, but they can also play a role in making change as they are involved in a power struggle. His theory, which is explained in the following section, addresses both structuralism and the agency of individuals.

2.1.2 Bourdieu and field theory

Bourdieu's *field theory* is a branch of functional structuralism. For him people's existence depends on their relationship to society. Reality for Bourdieu is a social concept as one exists only in relation to others. Like structural functionalism which sees society as an interconnection of parts working together, reality for Bourdieu is perceived by people in relation to their surroundings. Peoples' own definition of self is based on a perceived interconnected relationship with what is around them. Like the *parts* found in structural functionalism, Bourdieu considers that society is made of several multidimensional spaces constituted of smaller spaces or *fields*. Each field is a space which has inner functioning; these can be social groups, workplaces, and institutions, etc. (Bourdieu, 1986).

People entering the *field* are called *agents*; they bring with them what Bourdieu calls their *habitus*. *Habitus* consists of a person's resources or *capital*, which is made of the individual's cultural baggage such as a person's history, social class, education, economic situation, connections, a knowledge of useful cultural codes, dress code, the right behavior, body language, as well as personal choices and inclinations, etc. These forms of *capital* automatically become the *symbolic capital* when one enters a *field*. *Habitus* is often unconsciously acquired from a persons' environment and his/her interactions with it. People are shaped by items from their surroundings combined with the unique characteristics each one has as an individual (Bourdieu, 1986).

Every field has its rules or *doxa*, which is another principle of structure that defines the rules of the game. Bourdieu defines *doxa* as a "Universe of tacit presuppositions that organize action within the *field*". These rules are specific social codes agreed upon by the agents or players involved, and are often related to power relations that limit their actions. It is important for anyone entering the *fields* to learn what the rules or *doxa* are. Some rules are written and evident, others aren't as clear and learned through experience. Agents within

fields should play by the *field's* rules, otherwise they will be removed. Individuals entering the *field* will be evaluated based on the local *doxa*. They will be judged based on where their *habitus* places them within that *doxa*. Depending on where the *doxa* places them, people tend to aim either at preserving the existing power setup or at transforming it. The ones who want change, usually want it to their own advantage. A confrontation can arise between the group that wants change and the group that wants to keep the *doxa*. Each group uses its *capital* during the confrontation to win. The structure of human behavior, therefore, is defined by power relations between and within the *fields*, and behavior depends on where people stand in relation to those *fields* (Bourdieu, 1986).

If a school is taken as an example of a *field*, it is composed of several smaller *fields* such as a playground, administration areas, and classrooms. This thesis is mostly interested in what happens in the classroom and looks at its inner dynamics. It looks, therefore, at the teaching that takes place there, and observes how adaptation to pupils' needs can relate to social reproduction. The study reflects on the teaching methods, considering local Finnish and Norwegian cultures as well as their philosophical views on equity and equality. Using Bourdieu's theory, the paper reflects on the tensions that might exist and the desire for equity and equality as applied through differentiation of teaching in the classrooms of both nations.

2.1.3 Use of functionalism and Bourdieu's theory in this study

In structural functionalism, schools are institutions and are therefore *parts* that work with other parts of society, completing them and providing for their needs. Schools, being an integral part of society, are stirred by other institutions such as the culture that drives the government, which in turn guides the schools' aims. Bourdieu's theory of *fields* has a closer view and looks at the people who form the institutions and the dynamic that drives them, as they are affected by society and by the fields that they are part of. Within the schools, administrators, teachers, and students are the people concerned. They work interconnected, as parts that serve each other, filling each other's' needs. This research is concerned with the functioning of the schools, and the functioning of the people inside them, specifically considering the practical implementation of the curriculum in terms of pace, load and complexity and its impact on both teachers and pupils in the context of two national cultures.

The approach of structural functionalists that look at society from a distance has been criticized, because they can produce flawed results similar to conclusions reached by positivist researchers. To avoid such problems, the use of qualitative techniques to support a

research is recommended. For this reason, this thesis will combine an overall look with qualitative inquiries to produce a holistic picture, and will therefore work with two assumptions:

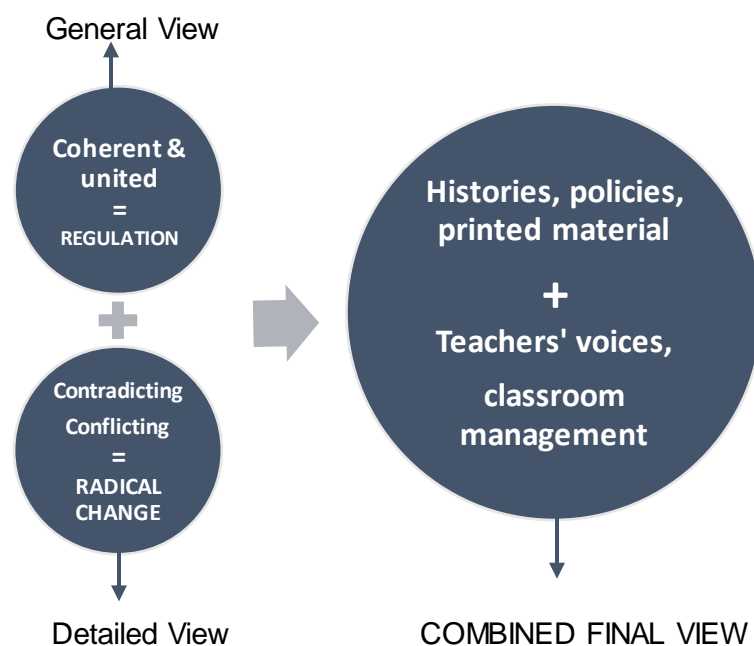
First, with structural functionalism, which will be used to review the regulation aspect of society by presenting a historic and cultural overview of Finland and Norway. It will show how these have influenced the main principles that their educational systems are based upon, and determined the status and role of individuals within them.

Second, with the assumption about the nature of social science, as the approach has been to interpret reality (ontology) to reach knowledge (epistemology). The path adopted to reach knowledge (methodology) explores in part human behavior through classroom observations and human interpretations (human nature) through interviews of teachers.

This second assumption can highlight contradictions mentioned in the “radical change” view of society, as a closer look can show distinct conceptions and reveal differences in the detail. The data gathered from a close-up look in the classrooms, analyzed through Bourdieu’s theory, will verify how the status of stakeholders within society and the schools affects decision making, as well as, educational choices and outcomes.

The approach to data gathering is illustrated in the following diagram:

Figure 1. Plan of approach to data gathering: Combining the general with the specific gives a most accurate final view.



2.2 Organizational theory and psychology

In addition to the theories of structural functionalism and the theory of fields, this thesis will use organizational theory to analyze its data. The theory has similarities with structural functionalism because it views organizations as formed of interconnected structures.

Organizational theory presents the ideas that explain the principles of organizations; it studies people in the workplace and is concerned with productivity. It relies on organizational psychology which is concerned with recruiting, training, and rewarding the people in an organization with the aim to increase their motivation and productivity (Truxillo, Bauer, Erdogan, 2016). The Cambridge dictionary (Cambridge University Press, 2016) defines an organization as a grouping of people and elements that work together to achieve an aim. It is a social, cultural and sometimes a technological structure that functions with a coordinated and goal oriented system. Schools are organizations with educational purposes: they produce the “cognitive development and moral socialization” of children (Bidwell 1999, p.101).

Classrooms form the main structure of schools, and with their teachers and pupils, act as small organizations within the bigger ones. Classrooms in this thesis are therefore treated as organizations.

There are several theories of organizations as they have evolved over time. In this thesis, the theory that is mainly focused on is based on Neoclassical theory which was initially developed in the 1930s by the psychologist and industrial researcher Elton Mayo. His theory emphasizes the connection between productivity and human relations and was derived from the Hawthorne research. That research consisted of a group of experiments in a factory looking for ways to improve productivity. Mayo concluded from his experiment that informal social patterns of interaction had a great impact on productivity. Productivity is dependent on the quality of those interactions as socio-psychological factors influence people’s motivation. His ideas have shaped Neoclassical theory where the organization is a social system composed of interacting human parts (Witzel, Morgen; Warner, Malcolm; Bruce, Kyle, 2013). This idea is reminiscent of structural functionalism with its interconnecting parts, and the theory of Bourdieu that addresses issues of people interactions within the fields.

The theory supports the idea that a scientific comprehension of human behavior, combined with an understanding of the working world, help to achieve the best performance for the organizations and the individuals within them (Truxillo, Bauer, Erdogan, 2016). In this thesis, data is gathered from PISA about the performance, wellbeing and motivation of students and

sometimes of teachers. The teaching processes of the nations and their schools are compared as two organizational cultures. Before focusing on the classrooms, the organization of the educational system, from the national level to the pupils are looked at, as to verify how the educational aims are generated from societies' cultures to influence their policy makers, before being implemented through the curriculums and the teachers in the classrooms.

2.2.1 Teams and group work:

In dealing with the classroom as an organization, the issue of creating *teams* and *work groups* is discussed. Effectiveness of teams depends on how well the people who compose them can work together, this is in accord with functionalist theory. The idea that supports group work is that each person in a team can contribute with his/her strength to reinforce others; they can achieve more working together than an individual would working on his/her own. Well-functioning teams generate good interaction and feedback and are therefore dynamic and can accomplish more work and better quality in less time. The composition of the team has a direct impact on its effectiveness. The skills and knowledge of team members, as well as, their personalities have positive or negative influences on the team's output (Jex & Britt, 2014). Research shows that the performance of teams is improved with a group of people that have a diversity of skills (Guzzo & Shea, 1992). It is therefore recommended to have a mixed group of people in a team. An ideally balanced team would include individuals who can contribute with their knowledge, their skills, and/or their abilities (Knowledge, Skills, Abilities: KSA) (Jex & Britt, 2014). Since teams and group work were used in the classrooms of both nations, they will be analyzed using structural functionalism, Bourdieu, and organizational theories.

2.2.2 Well-being, stress, and motivation:

The well-being of individuals in an organization has an impact on its performance. Discrepancies in PISA results between the two nations can be the result of such differences in pupil well-being based in part on the intensity of school work. The issues of the intensity that pupils put into a goal-oriented work performance can impact their *motivation* which in turn can affect learning. Intensity is connected to *organizational stress*, as work that is too intense can be intimidating and tiring, and work that is too light can slow down learning, leaving pupils behind, and keeping them weak in face of new challenges, which can also result in demotivation. Motivation is a psychological process which has several purposes; it serves to stimulate pupils and direct their attention, encouraging them to make an-effort, and helping

them persevere in it. These characteristics of motivation are important in the school organization as they are “patterns of behavior produced to reach a particular goal” (Mitchell & Daniels, 2003).

2.2.3 Objective/quantitative measurement:

In this research, *objective measure of work* performance is used by observing the classrooms and measuring the time spent on different activities. Even though classroom observations are frequently used as qualitative measures, in this study they were used also quantitatively by developing different frequency counts of pace of activities observed in the classrooms and during the school days.

One of the Hawthorn experiments led was to change the length of rest and lunch periods to see if this had an influence on productivity (Witzel, Warner, & Bruce, 2013). A similar approach was used in this research during classroom observations as it has measured the time spent in the classroom on learning, and the time given for breaks and recess.

2.2.4 Human judgment, qualitative approach:

A concern with people in an organization leads to an interest in their views. In a school context, *human judgment* is based on the judgment of teachers, parent, students, and the school administration. The role of the judgment of those stake holders will be studied especially in relation to pupil evaluation and differentiation. This study will gather feedback from primary class teachers, as well as from the pupils through data found in PISA where their views about the quality of school life in their nations is presented (OECD, 2009).

2.2.5 Human training:

In addition to human judgment, *human training* is important in an organization. Verifying the organization’s aims, environment, and resources serves to understand the needs and quality of its training. The training of teachers and pupils are issues addressed in this study. In pupil training, different types of teaching modes will be identified in the classrooms ranging them from formal to informal teaching modes. Load, pace, and complexity will vary depending on which mode is used. The time spent on each mode will therefore be measured to compare the two nations. Training also involves home assignments and differentiation; these issues will be investigated as well. The results of PISA tests that gave the outcome of pupil training have been the starting point of this research to compare the schools as organizations.

2.2.6 Performance testing:

Beyond training, *testing of performance* and *evaluation* are also important issues in the organization. Assessing the *needs* of people is one of the methods used in an organization to identify weaknesses; it is conducted using performance appraisals to identify where the problems are and help directing the aims and objectives of training (Schultz & Schultz, 2010). In the organization of the school, teachers act as managers of performance in their own classrooms. They manage the teaching process and evaluate the result of their teaching by verifying its outcome on their pupils. To understand how they do it, finding when in the school year assessment are conducted and the extent of teacher control over the choice of tests is important. The research will also check if those tests are *formative*, that serve to identify problems while the teaching is proceeding, or if they are *summative*, that mainly serve to evaluate a final mastery of the studies. The use of formative tests would help adjust the teaching to the needs of the pupils during instruction, and would indicate a greater adjustment of challenges to the pupil level.

In addition to Organizational theory which is interested in people's interactions and productivity, the thesis is also concerned with the learning process. Several theories about teaching and learning are presented in the following section.

2.3 Learning theories

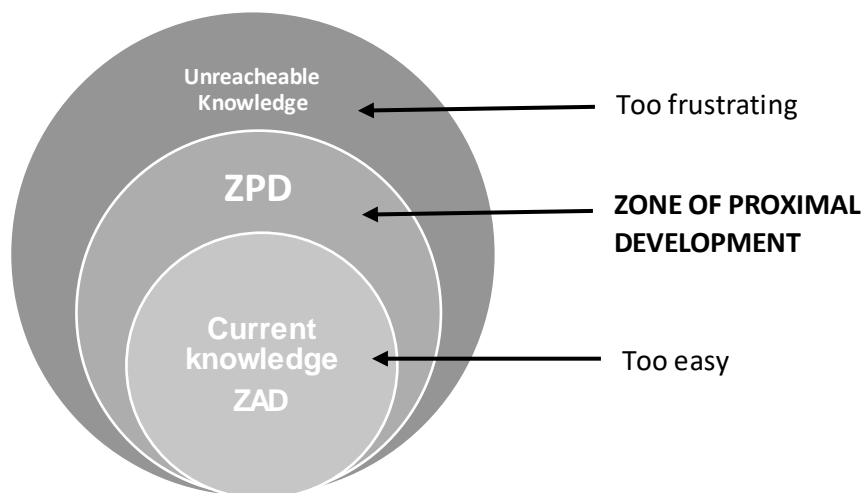
Since improving the understanding of learning is the final aim of this thesis, after theories about society and organizations, this section moves into the classroom to present theories about learning. To help understand the impact of load, pace and complexity on the capacity to learn, this section presents general to specific theories about the learning process. They are important to look at as they will guide the analysis to better understand the data.

2.3.1 Cognitive, Constructivist theory

The quality of teaching and learning in the two nations, as observed in the classrooms, will be analyzed using cognitive constructivist theory. Three main educational theorists Vygotsky, Dewey and Piaget's have developed constructivist learning theory which explains the learning process and reveals the nature of knowledge. The theory views individual understanding as constructed based on what a person already believes and has already experienced (Jennings, Surgenor & McMahon, 2013). Knowledge in this theory, therefore, shares similarities with Bourdieu's view about the subjectivity of personal perceptions.

For Vygotsky, knowledge is built through social interaction and communication, especially with the use of language. As knowledge is an outcome of the environment, learning is an individual process resulting from collaboration. Vygotsky identified the process where learning occurs as a Zone of Proximal Development (ZPD), and the area where knowledge already exists as a Zone of Actual Development (ZAD). For him learning is a mental progression from the ZPD to the ZAD (McLeod 2012) (see figure 2). New information is internalized through a process of inner dialogue which allows it to be stored and used as a base to understand new input. This paper uses Vygotsky's zone of proximal development to analyze how it is applied to different capacities of pupil in the observed classrooms, and check if all pupils get equal support to progress from ZAD to the ZPD (Jennings, Surgenor & McMahon, 2013).

Figure 2. Vygotsky's zone of proximal development (ZPD). Learning happens with the more knowledgeable other (MKO). MOK is key to cognitive development. ZPD is also where 'scaffolding' occurs which consists in a period where the MKO demonstrates what is to be learned, then gradually backs up until the learner can accomplish the task independently.



For Dewey, knowledge does not accurately represent reality but is a perception shaped by personal and social experiences. He argued that pupils should be active and engaged in education because learning happened through personal action and through being. Personal experiences and thoughts were more important than the specific content of the curriculum (Jennings, Surgenor & McMahon, 2013).

The theory explains learning as:

- Constructed: built by using old knowledge.
- Active: everyone creates his/her own understanding.
- Reflective: As one discusses and thinks about what they have learned.

- Collaborative: learning by interaction with others.
- Inquiry-based: by investigating and asking questions.
- Evolving: Knowledge is temporary and transforms with time (Ertmer& Newby, 1993).

These points are connected to more learning theories such as the theory of Cognitivism explained in the following section.

2.3.2 Theory of Cognitivism

This theory is concerned with the mental processing, storage and retrieval of information. It suggests organizing information and presenting it in a manner that is meaningful to the learner, and emphasizes retention and recall. Classes start by activating prior knowledge which is presented before the actual lesson. Such reviews provide structures for the new material and show relationships and connections that help students build on what they already know (Sincero, 2011).

The theory additionally perceives the learning process as a meaning that is derived from experience. For this reason, it advocates interactive teaching strategies to help pupils construct knowledge based on their own experiences. Taking a role in the learning process by actively dealing with a problem or concept will make learning more meaningful, and will increase learner motivation (Sincero, 2011). The application in the classroom of such hands-on and engaged approaches are likely to improve PISA test results.

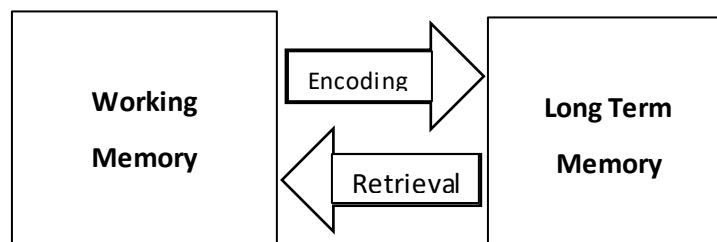
In this study, teaching methods using techniques in accordance with Cognitivism will be evaluated and discussed in the analysis of classroom observations and the methods used in classroom books, especially the math books.

2.3.3 Cognitive load theory

In the same line of thought as Cognitivism that deals with processes of the mind, for cognitive load theorists, learners retain information best when their mental capacity is not overloaded. “Cognitive load theory (CLT) can provide guidelines to assist in the presentation of information in a manner that encourages learner activities for optimal intellectual performance” (Kirschner, Kirschner & Paas, 2009). For them, there are two types of memories: a working memory (WM) which is used during the processing of new information and has limited capacity, and Long-term memory which is information acquired from the past and is stored to be easily retrieved when needed; it has almost unlimited capacity (Sweller,

1999). The process of learning something new creates a cognitive load (CL) on the learner. Teachers ought to make sure that the load they apply while teaching is just enough as not to exceed the limited working memory of their pupils. Since working memory is limited, teaching should be appropriately paced as to allow enough time to process the new information. For cognitive load theory, the best way to optimize learning is by relying on long-term memory, reducing cognitive load, and creating more space in working memory.

Figure 3. Shows the learning process when information is encoded and stored in long term memory, then retrieved later to help process new information in working memory (WM).



The theory identifies three types of load:

- 1- *Intrinsic cognitive load* comes from the complexity of the material itself to the learner. This can be reduced by splitting the task and using informal previous knowledge.
- 2- *Extraneous cognitive load* comes from the presentation of the teaching material and how it is designed. It can be reduced by using worked-out examples and diagrams.
- 3- *Germane cognitive load*, it's the one during which pupils create new schemas as they are learning and later automate them. Intrinsic and extraneous cognitive loads should be reduced to allow more room for Germane cognitive load (Sweller, 1994).

“Intrinsic, extraneous, and germane CL are additive in that, if learning is to occur, the total load of the three together should not exceed the WM capacity” (Paas & Van Merriënboer, 1994b). “Extraneous and germane CL, however, are determined by the instructional design”.

Germane cognitive load is the actual learning process which consists in automating the new knowledge by creating the mental structure or schema which organizes that knowledge. This process often occurs as the new information is assimilated by connecting it to previous knowledge, and soliciting old schema. Older automated schemas are easy to recall and use, and the more schemas one develops in a field, the more efficient one becomes in it. The more a new knowledge is worked on and processed, the more “scaffolding” a learner has which supports that knowledge, and the less guidance he/she needs. Cognitive load could be avoided if the new material is presented correctly, therefore, applying the right measure of load, pace

and complexity to pupils. Teaching material and methods rightly adapted to pupils' capacities should increase Germane CL and decrease unnecessary CL, thus respecting the limits of the working memory (Sweller, 1994).

To assess Cognitive Load (CL), three items are measured: mental load (ML), mental effort (ME), and performance (PE). *Mental load* is the part of CL that the task and environment uses: It is the processes that handles complexity. *Mental effort* indicates the cognitive capacity a person is using when working on a task. *Performance* indicates the outcome of mental load and effort ((Krell, 2014; Kirschner & Kirschner & Paas, 2009).

Cognitive load theory has developed several teaching principles to prevent overload. It is important, for example, to avoid extraneous cognitive load, split attention, and redundant information as follows:

- Courses should be *designed to be learner focused* and clear, avoiding too much information at once, using proper layout with examples, and summary at the end.
- *Goal free* problems should be used with step by step solutions and direct examples to make students easily see how to go from one point to the next. Showing the last aim should be avoided because it requires students to work backward which creates too much cognitive load
- *Avoiding redundancy*: Sources such as text, images, etc, should be combined or presented together to support each other instead of being presented separately.

More detail on how to present new information is also as follows:

- Presenting *supportive information* before pupils start working on a new task will contribute to construct a cognitive schema in long term memory that can later be used in WM during task performance. It is better to avoid presenting this information while a task is being studied because this can cause cognitive overload.
- Presenting *Procedural information*, such as step-by-step instruction, can be presented during task performance, because studying them beforehand has no added value.
- Practicing *part-task* to automate recurrent aspects of a complex skill can facilitate the performance of a new task, as it will decrease risks of errors due to cognitive overload.

This paper discusses how learning material is presented in the Finnish and Norwegian classrooms and verifies if information is introduced in a way that optimizes learner processing of knowledge and intellectual performance with the right load, pace and complexity.

2.4 Summary

This chapter has presented the theories selected to analyze the data and explained why and how they will be used. The theories have been introduced from the most general to the most specific as follows:

- Structural functionalism
- Bourdieu's theory
- Organizational theory and psychology
- Cognitive, constructivist theory
- Theory of cognitivism
- Cognitive load theory

The theory of structural functionalism presented an overall view of how society works. Bourdieu's field theory has given a closer look of the interaction of individuals within the fields of society and its institutions. Organizational theory and psychology have presented how organizations such as schools function and the interactions and roles of individuals within them. Cognitive, constructivist theory has presented a general view of learning and its processes. Finally, the theory of cognitivism and cognitive load theories have provided a more detailed description of teaching processes and ways to promote learning without the overload of the learner.

After the presentation of theories that will be used to analyze the data gathered in the field, the following section presents the existing data that is already found in the literature.

3 Literature review

This chapter reviews literature that contains background information for the subjects under study. It starts with presenting the historic and cultural evolution of the two nations to put them in context, find connections between them, and help compare them (3.1). It then focuses on the development of Finland's educational systems (3.2). This is followed with a brief presentation of the evolution of teaching content in Norway and Finland and the authorities that control it (3.3). It then shows the differences between the two nations based on PISA (3.4). Finally, it presents the factors that influence academic outcomes based on research gathered by scholar John Hattie in his book *Visible Learning* (3.5). Two more sections could have been included in this chapter but were moved instead to later chapters for the sake of

coherence; the first one compares in detail the two nations' curriculums; the second one retraces the two nations' economic developments and influence on their educational systems.

The first part of the literature review compares the cultures of the two nations in the following section:

3.1 Norway and Finland's historic and cultural paths

Even though the two nations have applied welfare policies, they have shown differences in their interpretation of the ideas of solidarity, equality and the way their states prioritize and manage resolutions (Esping-Andersen 1990, 1999). To understand why they have differed, a closer look at the influence of culture is pertinent. Since policies applied in the schools are influenced by local cultures, a cross-national comparative research such as this must take into consideration cultural differences during data gathering and before reaching final conclusions. This section looks at the cultural paths of Norway and Finland, verifying how historic and cultural contexts have influenced policies, and manifested themselves in the nations' educational systems and schools.

Understanding local cultures begins with an understanding of the concept of culture. Li & Karakowsky (2001) define culture as a "cumulative deposit of knowledge, experience, beliefs, values, way of life, attitudes, behavior, meanings, hierarchies, religion, and possessions acquired by a group of people during generations, through individual and group striving." In other words, culture is shaped by habits repeated over a long stretch of time, and is reflected in the behavior or tradition of a group of people that is transmitted through the generations. Culture shapes and defines the identity of human beings, helping to distinguish one group of people from another. Local schools often repeat the local culture as: "meanings of symbols learned are deliberately perpetuated in a society through its institutions" (Li & Karakowsky, 2001).

No scientific standards have been set to determine how to evaluate cultures or to decide which one is superior or inferior to another. Anthropologists, usually, depict each society as having its ways because there is no universal "right way," and all societies differ in their interpretation of "right" and "wrong". As differences between cultures can exist on different levels, finding the sources of those differences and evaluating their consequences can help in making judgments about them (Li & Karakowsky, 2001).

When studying a society, it is important to note that culture is usually not homogenous; variations often exist as within an existing culture, old meanings can develop and change, and new meanings can take their place. Additionally, individuals within each culture have also their own and personal baggage of cultural variations influenced by geographic location, ethnicity, social class, gender, education, generation, job, etc. Furthermore, cultural values can migrate from one culture to another through interaction and copying, or through forms of domination (Li & Karakowsky, 2001). As there are variations within cultures, it is imperative when evaluating them to look at diverse perspectives as not put forward stereotypes, or make general assessments based on subgroups or unrepresentative segments of a population. It helps also to verify that the subject investigated didn't undergo important changes during the period of investigation (Li & Karakowsky, 2001).

Cultural similarities between the two nations, based on comparatively measuring several factors their societies, are highlighted by the following composite-measurement technique of inquiry designed by Hofstede (1997):

1- Existing degrees of inequality: As Finland and Norway are welfare states they have encouraged equity, equality, and provided free education to their population. The two nations display high equality degrees and strive with their policies and educational systems to reinforce and sustain social equality. The Gini coefficient, that measures inequality, gives Norway 25,0 and Finland 26,8 (with 0 expressing total equality and 100 maximal inequality), which shows that both nations have high levels of equality (Lincoln K., 2011). PISA has additionally revealed that social reproduction is minimal in the schools of the two nations, as tests have shown very close results for pupils of diverse socio-cultural backgrounds.

2- Safety or uncertainty factors: The two nations are also among the safest and most stable in the world, as according to the World Economic Forum (2015) Finland was ranked top safest and Norway eighteenth (Oliver, 2016).

3- Tendencies toward collectivism or individualism: As Finland and Norway are welfare states, they both aim toward collectivism.

4- Tendencies toward power/domination or cooperation/support & quality of life: Both nations have strong tendencies for cooperation among their citizens and they begin to train children early-on with specific equitable educational approaches at school. The two nations also support the quality of life of their citizens as they provide health care coverage, free education, and many similar services of the welfare state to their populations.

As they share many similarities in their basic, macro philosophical setup, the factors that lead to their differences are generated by other factors found in their micro variations. When certain policies are adopted in a nation, they start to reflect the ideals that the society is built upon. However, variations in the backgrounds of their populations, can cause policies to have different types of impacts on different societies (Lepsius, 1990). Regardless of general policies, individual actions remain more influenced by ingrained cultural values than on general economic and moral indicators (Duncan and Edwards, 1998). For this reason, societies will tolerate the implementation of decisions by policy makers only if their populations are culturally ready to adopt them. In other words, policies of welfare states, such as those of Norway and Finland, don't necessarily dictate the actions of their people because individual backgrounds and mental readiness might deviate from the initial intentions of the policies. The slowness of change in the fabric of societies and their institutions slows down change, cultures are, therefore, not immediately modified by policies. This means that policies and cultures can sometimes have discrepancies, and institutions, such as schools, can continue working based on older established socio-cultural norms, even if policies have been modified to dictate a different path (Pierson, 1996, 2001).

When it comes to the development of welfare states such as those of Norway and Finland, researchers consider that the development of their systems was influenced by local philosophies, social actors and sociological ideas. Christianity and Christian parties, for example, have had an influence on the development of the idea of the welfare state in both nations (Daly, 1999; Opielka, 2002). As the nations' histories and development have, however varied, their ideas about the basic meaning and role of the welfare state have also varied. And as Finland and Norway have, additionally, different languages, locations and economies, their experiences have further been different and, therefore, shaped their values differently. For this reason, as the implementation of policies of the welfare system is dictated by local culture, each nation, despite geographic closeness, has its distinct cultural identity.

More differences between the two nations and their impact on educational policies are presented in the discussion about the nations' economic paths and analysis in chapter 6.

To better understand Finland's school culture, the next section presents some of the ideas that are prevalent in the nation's educational system.

3.2 Finland's path to educational success

This section is based on the work of Finnish educator and scholar Pasi Sahlberg, who is an expert in the field as he has written some of the most popular books and articles on the subject, and is considered an insider having been an educator and a director at the Ministry of Education and Culture in Helsinki.

For Sahlberg, much of the Finnish success in education comes from a heritage that has borrowed from its neighbors, mainly Sweden and other Scandinavian and Western nations (Sahlberg, 2011). Just like its Nordic neighbors, Finland has chosen the welfare system and has adopted an ideology of equality which is reflected in the culture of its schools. When it comes to borrowing or transferability, even though Sahlberg believes that it cannot be applied to all Finnish educational practices, some, however, present universal benefits. One example of beneficial practices he recommends is to create a positive, safe and relaxed environment for kids at school, one that is also supportive of the teachers' strengths. Another example is derived from the welfare ideology which promotes a system that focuses on cooperation between institutions, schools, teachers and pupils, instead of one that is based on competition.

Historically, 1956 marks the year when the Finnish educational system was unified and made coherent after the establishment of the *School Program Committee*. The decisions of that committee were based on an analysis of international politics of education. As they conceded that Nordic countries share common policies, they decided to focus on increasing educational access and opportunity for equality in education. In those years, toward the beginning of the 1960s, less than 10% of Finns had reached secondary education. Soon later, in the mid of the 1960s a new legislation was developed, followed in 1970 by a comprehensive school reform. In 1985 a decision was made to abolish ability grouping, and today the same curriculum is applied to all pupils. A philosophy of learning in a diverse group was adopted applying the ideas of Dewey and schools that function as small societies. Differentiated learning was to be applied mostly in a diverse classroom to the different existing capacities of pupils (Sahlberg, 2011).

Another event, which has marked the Finnish educational system, occurred in 1994 with the reform of the *national curriculum*. Throughout these years, welfare values of social justice and equity presided over Finnish society, and reinforced the concept of public schools that provide the same opportunity and basic nine-year education to children of all social classes. The *national curriculum* explained the requirement to differentiate teaching based on the

different abilities of pupils. Early on, math teaching provided the option to choose from three different difficulty levels from grade seven to nine.

Since the 1970s the Finns have tried to rely on international studies about education as to improve and develop their educational system. In the late 1980s, a visit by the educational researcher Bruce Joyce has had an important impact on the development of Finnish schools especially for applying a diversity of efficient approaches to teaching. Joyce was one of the first in Finland who highlighted the concept of faculty development, especially the idea that better teaching skills can accelerate student learning, and generate a more efficient classroom. Another influential researcher was the educational psychologist David Berliner, who also put forth the importance of attracting highly qualified candidates, and promoted the value of well-trained and certified teachers. He is the one who recommended mentoring and field experience for teachers to qualify them for their job. For Berliner, teachers' experiencing the complexity of the classroom is necessary for them to develop and acquire the skills required in the classroom (Scherer, 2001).

Stanford professor Linda Darling-Hammond was also another influence. She has developed an evaluation of performance test that helps instructors understand the quality of their teaching during practice. These tests, additionally, support the assessment of teaching plans and estimate student learning in the classroom (Darling-Hammond, 2016).

More ideas about teacher development were brought forth by scholar Andy Hargreaves who has written about teaching reform and growth. For him, it is achieved through teacher cooperation and the exchange of knowledge among professionals. This led to an initiative called the Aquarium Project which encouraged the creation of a network of schools, parents, businesses and other institutions to support collaboration and transform them into active learning communities. This undertaking was shown by research to have had a positive influence on school development in Finland, as it has increased innovation and collaborative effort leading to progress (Sahlberg, 2011). Finally, the last influential educational researcher that Sahlberg mentions is author Michael Fullan who has also emphasized teacher quality, and highlighted the need to empower teachers and improve the leadership of school principals.

Equity: Following the ideology of the welfare state, a great attention was paid to equity and to provide the same quality education to all pupils. Therefore, special educational support is widely used in Finland to give equal opportunity for all to complete school. Almost half of the students enrolled in basic education receive it (Sahlberg, 2011). Such policies that emphasize

social equality faced opposition in the 1980s due to concerns for the suppression of individuality. The Finnish prime minister at the time expressed concern by stating: “When believing that anyone can learn everything, the goals of comprehensive school are set too high...The resources would be...needed to educate those who have proven to be talented” (Sahlberg, 2011, p.120).

When it comes to assessment of pupils, Finnish schools don't have standardized or mandatory assessments except for one at the end of secondary school when students take the National Matriculation Examination. The exam marks high-school graduation and its results are used to enter university. Throughout the other years, Finnish teachers manage, on their own, the assessment of their pupils as they are trained to do so. They apply different types of classroom assessments as they deem fit, for example, diagnostic, formative or summative assessments (Sahlberg, 2011).

Sahlberg has criticized standardized international tests because they force the curricula to become standardized and divert the aims of teaching to focus on obtaining high scores on specific tests instead of meaningful learning. He named this trend the Global Educational Reform Movement or GERM, because similar to an epidemic, it spreads like a virus around the educational systems of the world. For him, GERM harms teaching also because it leads to more competition instead of cooperation, which creates an unhealthy atmosphere that can supersede collaborative effort and friendly rivalry (Strauss, 2012).

Since the 1990s, the Finnish school system lost its hierarchical structure, as decisions inside the classroom became the teachers' responsibility. Teachers are trained to have the right skills and best knowledge of what is happening in the classroom. They are also aware of the needs of each pupil, which speeds up decisions, making them more flexible.

As they are empowered by their training and have more freedom with lesser teaching hours and choice in pupil assessment, Finnish teachers can be flexible and creative, and can experiment in their classroom with diverse methods, taking risk to innovate and make progress. They can also put in application the pedagogic theories they have learned, tailoring them to meet the needs of their students. The teachers' role in the classroom reflects the type of citizen that the nation needs, one who is resilient and solution oriented. Other high-performing nations have now followed Finland's “less is more” approach such as Japan and Singapore to allow for more creativity in the classroom (see Chap. 11 in OECD, 2010).

This greater ‘flexibility’ in the classroom is also the result of a paradigm shift in education influenced by cognitive and constructivist approaches to learning. This led to a new focus on more conceptual understanding, and increased interest in developing different types of intelligences such as social skills and problem-solving skills, instead of just memorization. Such shifts reflect the needs of the new economies for people who can think differently and create original ideas, and ones who are not afraid to make mistakes (Sahlberg, 2011).

Another point that is highlighted in Finland’s educational success is the trust that all the school stakeholders share. This trust is attributed to a society built on the cooperative values of the welfare state, that together contribute to a well-functioning society. Honesty is part of a high social-capital that constitutes an essential building block for a well-functioning Finnish society. According to an OECD report, trust that exists between people in Nordic countries also leads to better cooperation among people inside the school system (OECD, 2008). An additional factor to which external observer attribute to the Finnish success is ethnic homogeneity.

Time spent at school or in learning in Finland is less than many other nations that rely on more of school hours, homework, or private tutoring. Yet the nation has been able to achieve results equivalent to nations with heavier loads of work (OECD, 2010b, Sahlberg, 2010a).

In summary, the factors that have contributed to the Finnish success are historic and cultural, leading to the welfare state. Such a state focuses on an equitable, comprehensive school that provides quality education for all. The welfare state promotes a culture of cooperation, mutual support and exchange, which impacts on the attitudes of teachers and schools, leading to trust and contentiousness. These attributes, combined with a research based educational governance, quality teacher training, and comparatively lower teaching hours, give teachers more control and capacity to manage their classrooms, with flexibility in pupil assessment.

The next section presents the evolution of decision making policies related to teaching methods and content in the Norwegian and Finnish classrooms.

3.3 Development of education policies in Norway and Finland

In 1959, the Norwegian parliament embraced the seven-year compulsory school, which was then extended to nine years in 1969. During this period, the teaching methods at school had been traditionally the teacher’s choice (Elde & Hansen, 2013). In 1974, the issuance of the Mønsterplan 74 gave teachers further authority as they were also allowed to decide about the

content of their teaching using the curriculum as a guide. Soon after, the Mønstreplan 87 gave local-level educators responsibility for the teaching content. Teachers were then required to work together to develop the local curriculum and decide its specific content (Elde & Hansen, 2013). Later, from 1990 to 1995, there was another power shift from the institutional level to the governmental and political level. This was a return to centralized power which placed decisions back in the hands of policy makers. The reason for such a move was to strengthen the state and rely on its management, highlighting the social democratic governance of Norway. The Mønstreplan 87 was later replaced by Reforms 97 and L97 which increased parental authority in making decisions about their children's education in collaboration with the school (Elde & Hansen, 2013).

From the 1990s to the 2000s, the Norwegian education system witnessed many new transformations. In 2006, the curriculum was revised and mostly replaced by several curricular papers, which were later followed by additional documents, including circular letters (Elde & Hansen, 2013). More amendments from that year, such as the Knowledge Promotion Reform, addressed the organization of local teaching in the classroom. It returned some power back from the government to the level of school authority in a move to decentralize. Decisions about assessments and their format, however, remained under the control of the Norwegian Ministry of Education (Elde & Hansen, 2013).

Comparatively, it was much earlier, in 1994, that Finland had made moves to decentralize. At that time, concretization of the curriculum became entirely the responsibility of the local Finnish schools and communities. Teachers were then also allowed to develop and decide the content of their teaching based on the general curriculum's guidelines. In 2004, a holistic national curriculum was established, followed in 2011 by curricular supplement/amendment. The curriculum presented a framework to be converted into a school-based or municipality-based curriculum (Elde & Hansen, 2013).

This means that the curriculums of both nations are today meant to be interpreted locally by the teachers, the schools, and the local municipalities.

Further details comparing the curriculums of Norway and Finland are laid out in chapter 5, section 5.2 in a comprehensive discussion.

Beyond the policies, the next section presents the PISA results of the two nations to see how they have fared academically on the international test.

3.4 Differences between Norway and Finland based on PISA

Comparing the PISA test results of the two nations will clarify some of the weaknesses and strengths that the tests have highlighted. The information introduced here gives a general idea of the test results as they have been to a certain extent consistent throughout the years.

Finland’s performance results on PISA have always been above average, and often among the top performers. As to Norway, its overall academic performance has generally been rather above average in reading, average in mathematics, and below average in science. This means that Norway’s main academic strength has been reading, and its main weakness has been science.

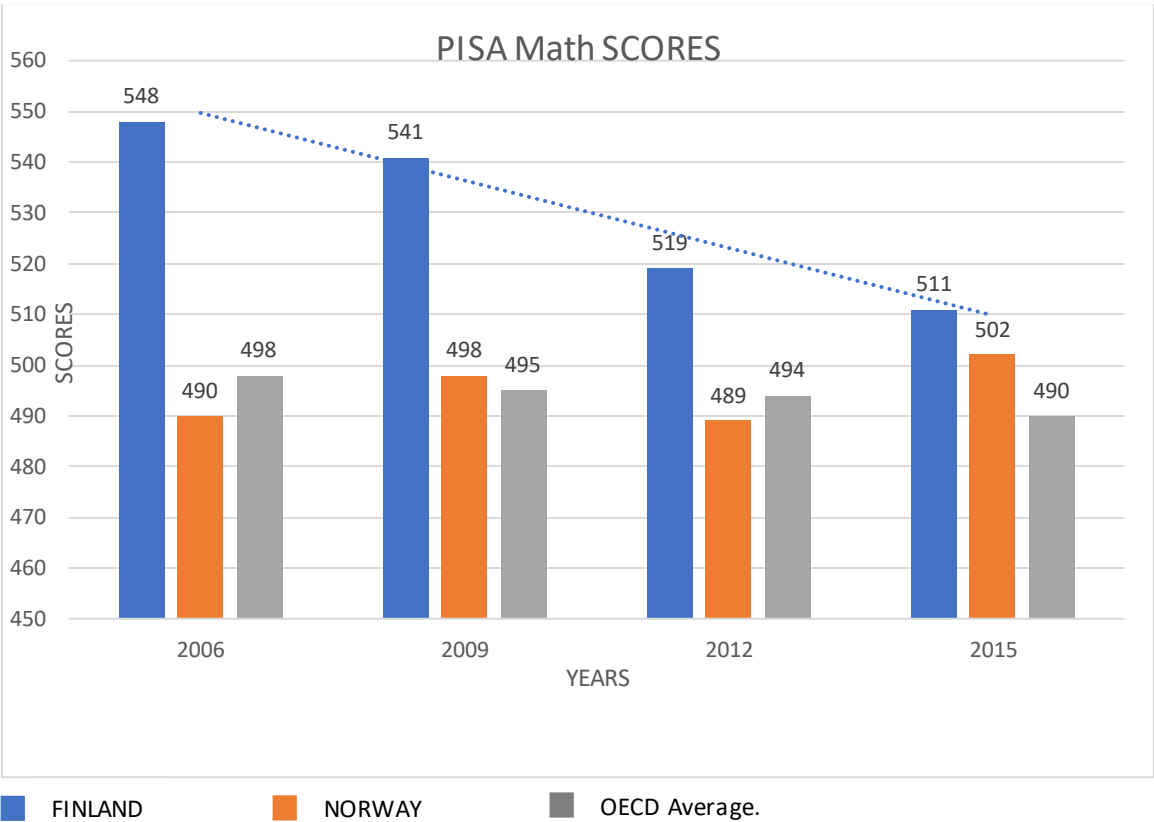


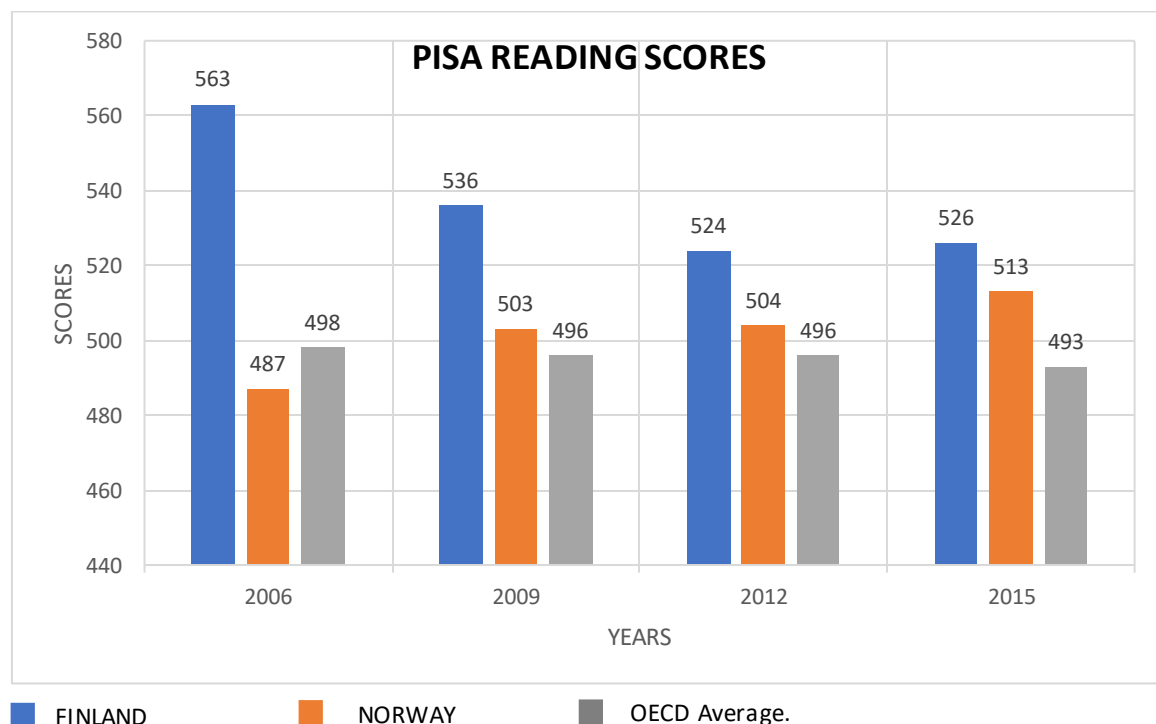
Figure 4. PISA mathematics scores from 2006 to 2015, showing the results of Finland, Norway and the OECD average.

3.4.1 Math: While the math scores of Finland have been high, Norway has had average scores among the OECD nations (see figure 4). Throughout the tests, Norway’s results have been somewhat stable in the midrange category and have been close to those of the US, the UK, France, Germany, Switzerland and the Netherlands. Among Nordic countries, Norway has performed below Finland, above Iceland and Sweden and has had equivalent results to those of Denmark. While in mathematics, boys have outperformed girls by 11 points on

average across the OECD countries, they have had equivalent levels of achievement in Norway and Finland, except in 2015 where girls have outperformed boys in Finland (OECD, 2015). This close performance was also observed in Sweden among other Nordic countries, whereas girls in Iceland have outperformed boys. Norway seems to be doing relatively well in its math teaching as the scores of its tested pupils have been among the highest in problem interpretation. These students have been good not only at interpreting variables but also at figuring out and summarizing different sets of data. Their weaknesses, however, have been in knowledge and methods, as well as using mathematical concepts, and ways of thinking and interpreting a situation mathematically. Overall, Norway's performance in mathematics, despite slight fluctuations, has remained relatively stable, showing a slight increase in the last test in 2015. Finland on the other hand has seen a steady decrease in performance, and its last results have been just few points above those of Norway (see figure 4).

In 2012, Finland has had about 33% poor performers in math, which is less than the OECD average of 45%. The nation has also had 15% top performers, which is almost double the OECD average of 8%. While in Norway, the number of low performers was not far from the OECD average, the number of top performers was below average at around 9.4% (in 2009). This indicates that Norway has been producing few top performers in math and far less than Finland (see figure 4) (OECD, 2012).

Figure 5. PISA reading scores from 2006 to 2015, showing the results of Finland, Norway and the OECD average.



3.4.2 Reading: Overall, in terms of reading, Norway has had average scores on PISA, yet ones below those of Finland. Finland which was at the very top of the performers in 2006 has seen a steady decrease in performance since. Norway on the other hand has seen a slight, yet constant increase in performance. The nation has also managed to achieve a smaller gender gap in performance, yet one that remains above the OECD average. Throughout the OECD, girls have outperformed boys in reading skills by an average of 36 points. The widest gap that has consistently been observed was in Finland with 62 average points of difference. In Norway, scores have also shown a persistent gender gap in performance, as girls have had an average of 46 points above those of boys. Here again, the diagram in *figure 5* shows how Finland’s performance has decreased, getting closer to Norway which in turn, has slightly improved, however, has remained lagging Finland.

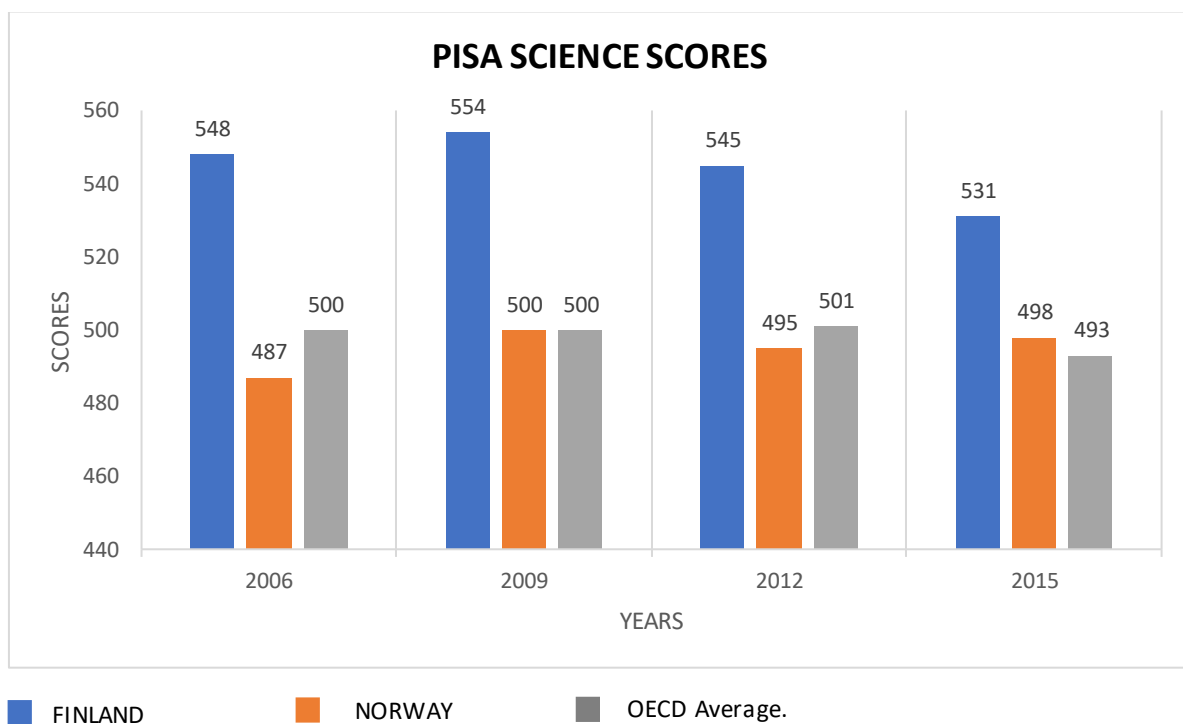


Figure 6. PISA science results of Finland, Norway and the OECD average from 2006 to 2015.

3.4.3 Science: Finland’s high scores in science have seen less decrease in performance than other subjects. Norway which has also shown slight fluctuations, has not seen clear improvements or decrease in performance, and has remained within the same performance range. Science has been Norway’s weakest subject as it has often had results below the OECD average (see figure 6). Its performance has also been below other Nordic nations except that of Denmark which has had an equivalent performance. A good point about Norway’s scores is that, similarly to its math scores, it has shown close results for boys and girls; such equality

between the genders was also found in Iceland. Girls, however, do better than boys in Finland and Sweden, while they are weaker in Denmark. Approximately 15 to 20 % of Norway's participants have had low performances in science. By contrast, the nation has had around 7,5% top performers which is close to less than half the number of its poor performers. This means that Norway has been producing far more poor performers in science than strong ones. On the positive side, the relatively small group of top performers has shown to have a clear understanding of scientific knowledge as they could use their knowledge in diverse and complex real-life situations. In 2009, while the OECD average of low performers was 40%, it was just 20% in Finland, and while the average of top performers was 10%, it was more in Finland with 18%.

Other measurements, beyond the strictly academic are presented here such as equity, teacher/student relations, school satisfaction and hours spent on instruction.

3.4.4 Equity: Finland has consistently had high equity levels, which have been a characteristic shared with most of the Nordic countries, excluding Denmark where the level of equity has been close to the OECD average. In Norway, equity in education has been higher than many other nations, as students of disadvantaged backgrounds have been performing almost as well as students coming from a more advantaged background. Socioeconomic status has not been shown to greatly impact on the performance of most students. In Norway, not only has equity been high, it has additionally been improving according to the PISA tests. Now, only a 7% variation in performance is related to socio-economic background compared to 12% in earlier years. This is much lower than the 15% average in other OECD nations. While Norway's high equity has come with an average overall performance, Finland has had not only high equity but also a high overall performance. A closer look at the Norwegian results, however, reveals that this socioeconomic equity gets lost when one compares pupils from immigrant versus non-immigrant backgrounds. In the nation, the number of students with immigrant background has increased from 5.6% in 2003 to 9.4% in 2012; they have also performed constantly 46 average points less than the other students.

When it comes to low performers in Norway, their percentage has ranged from around 18% to a bit over 22% which is close to the OECD average. On the other hand, the percentage of high performers has fluctuated around 9% which is lower than the OECD average. Here once again it is worth noting the recurrence of a lower percentage of high achievers.

3.4.5 Teacher/student relations and school satisfaction: The quality of relationship between teachers and students in Norway has not been as good as the average of OECD nations. Therefore, teacher-student relationships still need to be improved.

In spite of poor teacher/pupil relations, PISA's evaluation of pupils' happiness at school has shown Norway to rank above the average of OECD nations with 87% reporting positive feelings compared to 80% for the other nations. Denmark and Sweden has had similar happiness levels while in Finland they have been considerably lower with only 67%. On the other hand, Iceland has ranked among the happiest among the OECD countries with 90% of students reporting being happy at school. Beyond happiness, 71% of 15-year-old Norwegian pupils have reported that things were ideal at school compared to the OECD average of 61%. However, only 74% have reported being satisfied with their school compared to a 78% OECD average. Enjoyment of mathematics in Norway has been 50% which is close to the OECD average of 53%.

Disciplinary problems have been reported lower in 2013 than in 2003 and principals have reported also a decrease of hindrance by students. Norway has had higher than the OECD average number of principals who reported a problem due to a lack of qualified teachers. This trend did not improve since 2003.

As the PISA tests give results measured when the pupils are 15-year-old, it is wise to also have a long-term look and see what happens to the pupils who are tested later in life, when they are enrolled in higher education, for example. The statistics show that for Norway until the mid-1980s, just 10% of the population between ages 19 and 24 went into tertiary education. Since that time, this percentage has steadily increased as in year 2000, around 35% of women and 24% of men attended tertiary education. In 2013, this percentage went up to 40% of women and only 25% of men of this age group. By the age of 39 and out of the total population of Norway today, about 55% of the population has a higher education (SSB, 2015).

3.4.6 School Hours: PISA results show that the number of instruction hours don't correlate with pupils' successes or failures on the tests. Too many teaching hours don't seem to necessarily lead to better results as high-performing nations have not shown to rely on many teaching hours for success (Sahlberg, 2011). Finland and Norway, both have lesser school days and teaching hours than many other nations that have had lower or equivalent performances. Even though Norway has a few more days than Finland, their number is not

enough to make a statistic difference. In fact, it seems that when teachers are spending less time in class, they are using the extra time to prepare and plan better classes or engage in other constructive activities beneficial for the school.

3.4.7 Summary of Norway's PISA data: Norway's results should be taken into special consideration because, its expenditure on education has been the third highest across all the OECD countries (PISA, 2012). Overall, in the PISA test of 2015, Norway has had slightly above average performances in math and science, nevertheless, it has had better results in reading, being close to the top performers. The number of top performers in science as well as in math have been clearly lower than average, however, it has had a slightly above average number of high performers in reading. While the number of top performers have clearly increased in science and reading, it has fluctuated, without improvements in math. Norway has had clearly lower than average number of low performers in all fields, especially in reading. Performance gaps between the genders has been extremely low, except in reading where girls have done better than boys. Tests have also shown that the impact of social background on performance was below average (PISA 2015). Beyond the academic scores, PISA has registered more satisfaction and happiness of Norwegian pupils than Finnish ones. Finally, in both nations, the fewer school days and teaching hours compared to most other nations seem to indicate that performance and school satisfaction is not necessarily connected to time spent at school but about its quality.

The factors that impact on the performance of pupils can be evaluated by other measurements than the ones presented in PISA; The following section reveals some of these factors based on research.

3.5 Influences on academic outcomes as revealed by research

This section presents the findings of a large number of studies, that evaluate, from a research-informed perspective, the diverse factors that influence academic achievement. These factors will help interpret the findings of this paper as well as those of the PISA tests. Most of the information in this section is based on the meta-analysis of John Hattie presented in his book *Visible Learning: A synthesis of over 800 meta-analyses relating to achievement*. Hattie uses a "d" value to evaluate and compare the degree of influence of each attribute on learning. The higher the "d" value, the greater the influence, they range from $d=-0,96$ (being the lowest) to $d=1,28$ (being the factor with the most influence).

3.5.1 Student personal capacities and family socio-cultural background

Self: Based on the research of Duncan et al., 2007, La Paro & Pianta, 2000; Schuler, Funke & Barn-Bolt, 1990, the “d” value, or degree of influence of a student’s present academic performance on his/her future academic achievements is **d=0,67**. This means that it is important and is a predictor of the quality of his/her future performance independently of other factors such quality of education, or teacher training, etc.

Parents: The importance of parents’ expectations on a student performance varied from **d=0,58** to **d=0,88** (Hong & Ho, 2005; Jeynes, 2005). Parental support and participation had also influences, from **d=0,43** (Rozenzweig, 2000) to **d=0,56**. This implies that it is important for parents to be engaged in their children’s learning, and parents, as well as, schools should be partners in the undertaking of the education of children. This also means that parents should not be kept away, but instead encouraged to participate in an appropriate way in the academic development of their children. Expectations of parents have an even higher influence on students’ achievement than socio-cultural background which is **d=0,57**.

3.5.2 Informed differentiation

a- Understanding of pupil:

The extent of the teacher’s understanding of pupils and their right stage of development was also important, especially on performance in math, with a **d** value of **0,73** (Brownlee,1981).

b- The right differentiation:

Studies by Naglieri & Das (1997), and Sweller (2008), Show an extremely important correlation between adapting the right level of challenge to a pupil’s developmental stage, and academic performance. Their study shows the highest “d” value measured by Hattie, which is **d=1,28**.

c- Same ability grouping:

Tracking, which consists of separating pupils into different classes based on their abilities has a very low advantage with a **d= 0,11**. Additionally, it presents great disadvantages as it encourages racial bias. In the US, for example, pupils with African and Hispanic backgrounds tended to be placed in lower achievement groups, while Asians kids, as well as, kids with higher socio-cultural backgrounds tended to be placed in more advanced groups (Hattie, 2009).

Creating groups of pupils with same abilities revealed most positive effects for groups of pupils with strongest abilities with $d= 0,30$. This was followed by average ability groups with $d= 0,18$. Finally the group with the least advantages was the weakest group with $d=0,16$ (Kulik and Kulik, 1992). Large classes with over thirty-five students profited more from such grouping than average sized or small classes with a range from $d= 0,35$ to $d= 0,15$ (Lou et al., 1996).

d- Mixed ability groups:

Small-group learning is another type of grouping created of mixed ability pupils. This kind of grouping showed high learning benefits and improvements in pupil self-esteem. The d value for such group is considerably higher than tracking presented in the previous paragraph, as it has a value of $d= 0,5$ (Springer, Stanne, and Donovan, 1999). Studies have shown that adapting challenges to the different capacities of pupils in the mixed group gives the best results (Hattie, 2009).

Mainstreaming pupils with disabilities: Which consists in placing them in regular classes with special support had a small positive effect on their achievement with $d= 0,15$ (Carlberg and Kavale, 1980). The positive effects are greater in mathematics with a $d= 0,22$ and the mentally retarded having the most improvement with a $d= 0,45$ (Baker, 1994).

e- Retention vs. acceleration and enrichment:

Retention: Many studies show that making weak students repeat a grade has among the most negative effects on their academic achievement (Byrnes, 1982; Cosde, Zimmer & Tuss, 1993; Dauber, Alexander & Entwiste, 1993; Foster, 1993; Grissom & Shepard, 1989; House, 1989; Kaaczala, 1991; Mantzipoulos & Morrison, 1992; Meisels & Liaw, 1993; Morris, 1993; Peterson, Degracie & Ayabe, 1987; Shepard, 1989; Shepard & Smith, 1989; Tomchin & Impara, 1992). This negative effect was additionally shown to grow over time indicating an increase in the weakening of their performance as they move from a grade to another. The worsening of the performance of those pupils often resulted from a lack of differentiation adapted to their specific problems (Jimerson, 2001; Holmes, 1983; 1989). Students from disadvantaged ethnic or socio-economic backgrounds tended to be retained more often than others, revealing a discriminatory bias against them (Cosden et al., 1993). Another drawback of retaining pupils was that they tended to have the double number of drop-outs than other pupils (Foster, 1993). Additionally, retention adds cost to the educational system as more school years should be paid for those who repeat a grade.

Acceleration: On the other hand, students who were accelerated showed positive results, not only in academic performance but also in other aspects, such as emotional, behavioral and feelings about school (Jimerson, 2001). High ability pupils who are accelerated learn the same curriculum as other pupils but at a faster pace. A study focusing on social consequences of acceleration found no negative effects, just positive ones on pupils (Feldhusen, and Asher, 1991). Acceleration has a very strong effect on improving academic achievement with a $d= 0,84$. A study found that accelerated pupils can be a full year ahead academically from pupils of the same intelligence who aren't accelerated; their improvement rate is $d= 0,88$ (Kulik, 2004). Even though many studies show that acceleration of gifted pupils is beneficial for them on many levels, prejudice and misconceptions dominate the educational system on this subject, as it is one of the procedures the least often used. Unfortunately, there is even evidence that holding back gifted pupils impacts negatively on their performance (Kent, 1992).

Enrichment: Another method used for gifted pupils is called enrichment which consists in giving extra material to widen the perspective and knowledge or skills of those pupils. When pupils were exposed to higher thinking, the improvement was greater than when they were just exposed to more knowledge, in other word when they were given more complex tasks, it was more beneficial for them than just an increase in load. Such programs had the most positive impact on science with a $d= 1,23$, followed by math with a $d= 1,10$, and finally reading with $d= 0,59$ (Wallace, 1989).

3.5.3 Teacher effect

The role of the teacher in contributing to academic achievement seems rather low according to meta-analysis research; Hattie has estimated it at $d= 0,32$. Teacher training does not greatly improve this score with a very low d value at $d= 0,11$ (Walsh, 2006). However, poorly trained teachers have a negative impact on performance with a $d= - 0,01$ (Qu and Becker, 2003).

When teachers evaluated their own skills, they gave far more credit to their teaching experience in the classroom rather than their academic training (Hattie, 2009). Accordingly, if teacher education is combined with several years of on-site experience their impact on academic achievement increased to $d= 0,39$ (Qu and Becker, 2003). Teacher professional development had a considerably more important impact on pupil performance with $d= 0,66$. Out of such professional development, science saw the greatest benefit with $d= 0,94$, followed by writing $d= 0,88$, then mathematics at $d= 0,50$, and finally reading with $d= 0,34$

(Timplerley, Wilson, Barrar, and Fung, 2007). The type of teacher training that had the most positive impact on teaching skills was reached through demonstration with $d= 1.65$, followed by information with $d=0,63$, then finally the least impact came from theory with $d=0,15$ (Bennett, 1987). Gifted children who are taught by teachers without appropriate training or experience in teaching such pupils can have a negative effect on their achievement with $d= - 0,96$, while teachers with appropriate experience had a far more positive effect with $d= 0,88$ (Wallace, 1989).

Lastly, pupils viewed teachers who gave them challenge to have the most positive impact on their academic improvement, followed by teachers who expected the most from them (Irving, 2004).

A larger overview of influences on performance are presented in appendix A, page 153.

Summary:

This chapter has reviewed the literature that puts the present research in its historic and cultural contexts. It has also clarified previous results, such as the ones obtained from PISA tests and other research based findings to help inform the direction of the study and its results. The following section describes the methods that were adopted to undertake the investigation. It clarifies the questions under study and details the approach taken to gather data and find answers.

4 Methodology

This chapter will start by going over the research questions to present their relevance, then it will explain the choice of research methods and design to clarify why they are suited for this study. It will subsequently describe the approach taken to select samples and inform how the nations and cities under investigation are appropriate comparative choices. In the sampling section, the selection of schools and participants will be described. The chapter will, in addition, cover the materials that were used during the investigation, and will talk about the design instruments, clarifying the types of interviews used and the choice of questions. The end of the chapter will describe the method of analysis adopted, and will discuss the validity and reliability of the study. Questions about ethical issues will be dealt with, including confidentiality and the use of pseudonyms to protect participant anonymity. Finally, the

chapter will address issues related to language understanding and translation and the way they were dealt with.

4.1 Research Questions

1. What are the differences and similarities in *load*, *pace* and *complexity* of school work in primary levels between Norway and Finland?

The goal of this question is to guide the investigation during the study by reviewing policies and school documents, conducting classroom observations and interviewing teachers. The question highlights the three main foci of the research, it will therefore guide the methods and design of instruments.

2. How could differences in *load*, *pace* and *complexity* and methods of differentiation between Norway and Finland impact on pupil performance in PISA tests?

The goal of this question is to guide the analysis of the findings. It helps point out the differences found between the two research sites and uses theory and previous research to evaluate the impact of such differences on student performance as measured by PISA.

4.2 Methods

There are three research approaches in the social sciences namely quantitative, qualitative, and one that combines the two called mixed methods. The quantitative approach tends to be viewed as one that uses measurements and closed ended questions, while the qualitative method tends to be viewed as one that uses open ended questions (Cresswell 2014).

International tests that measure students' capacities such as TIMSS, PIRLS and PISA emphasize quantification in their data collection and analysis; they are, therefore, quantitative and considered deductive in their research approach as they take a view that social reality can be measured and observed objectively (Bryman 2008).

As mentioned previously, the PISA tests, due to their scale, have been influential on policy makers worldwide. However, since they are quantitative in their approach, they give only a general view of what might be happening on site; it is therefore important to have a closer look and verify on the ground the factors that are affecting the test results. The inquiry aims for this reason to create a deeper understanding of the nations' pedagogical approaches by studying them on site and comparing the tools and methods they use. It focuses on discerning specific cultural trends and concerns each group displays, and ones that influence their

approaches to education. As qualitative researchers submerge themselves in the lives of those researched and are concerned with the way people experience and view their lives, the distance between the researchers and their subject of investigation is reduced to a minimum and the researchers becomes a tool for data collection (Creswell, 1994). For this reason, a qualitative inquiry was selected for this research to contribute in clarifying, as well as, completing the general understanding that international tests have generated. Consequently, this study answers the research questions by using qualitative approaches such as the analysis of classroom books and textbooks, the use of observation of primary classrooms in Helsinki and Oslo, and the use of semi structured interviews of primary school teachers.

The use of qualitative research is appropriate for this study, as it will answer questions regarding differences in load, pace and complexity between Norway and Finland in their primary classes, and it will do so through interactions with the participants in their environment.

The selection of the research design and instruments used to collect the data is discussed in the next section.

4.3 Sampling

4.3.1 Countries

The reason for choosing Norway and Finland is in part based on their overall similarities: Norway and Finland are neighboring Scandinavian nations that share a common open border 736 kilometers long. Both nations are in the Schengen Area and both also share borders with Sweden and Russia (The World Factbook, 2016). Their geographic proximity leads them to share natural cultural influences and exchanges. In spite of differences in their earlier histories, similarities between them arise from the 13th to the 19th century as both went under foreign domination by neighboring nations: Finland went under Swedish control and Norway went under the control of Denmark. While Russia took over the control of Finland in 1809, Norway went under Swedish control soon after in 1814. Both nations remained under foreign powers until Norway took its independence in 1905 and Finland soon after in 1917 (New in Norway, 2016, Lambert, 2015). The nations share not only historic parallels but also common present characteristics: Today both are highly industrialized and striving economies; they are modern welfare states that promote equality, and are deeply concerned with providing high quality, free education to all their pupils.

Beyond their historic similarities and their geographic proximity, the two nations are also comparable in terms of population and land size: Norway covers an area of 323,802 square kilometers, and Finland is slightly larger with 338,145 square kilometers. Their population sizes are also comparable with 5,2 million inhabitants in Norway and a slightly larger number in Finland with 5,4 million inhabitants (2015).

Additionally, both nations share a rather ethnically homogenous population: 94.4% in Norway are of Norwegian descent, with 3.6% from other European backgrounds, and 93.4% in Finland are of Finnish descent, with 5.6% from Sweden, and only 1% from other backgrounds. In recent years, migrant rates have increased, as in 2015 the net migration rate was 7.25 migrant/1000 population in Norway which was close to double that of Finland of only 3.1/1000 population (The World Factbook, 2016).

In 2015, the urban population in Finland was 84.2%, which was slightly larger than 80.5% in Norway (The World Factbook, 2016). It is important to mention ethnic diversity and urban population sizes because these have shown to have an influence on academic performance. International tests indicate that a greater percentage of children from urban settings tend to perform better than children from rural areas, and a greater percentage of children from foreign backgrounds tend to have lower performances.

During the 1960s, the discovery of oil and gas in Norway has greatly boosted the nation's economy, which led to a higher overall GDP and a higher per capita income than Finland. Norway's yearly income in 2015 was \$68,800 per capita, while it was less in Finland with \$41,200 per capita (2015) (The World Bank Factbook, 2016). When it comes to expenditure on education, the total spent in primary classes in Norway was at about \$12,255 per student in 2010 (OECD, 2013). It was much less in Finland with \$8,159 per student (2011) (OECD, 2014). As they have been richer, the Norwegians have also been greater spenders on education. Despite this, they haven't been able to achieve better scores on international education tests.

These international tests have indicated a negative relationship between Norway and Finland as more expenditure did not lead to a better performance; they have also, however, revealed a positive relationship between the two nations, as differences in performance between pupils of higher and lower socio-economic backgrounds have been low. The tests have also revealed that achievement in those nations have been rather school independent, and differences in achievement between urban and rural schools, as well as, schools from diverse socio-

economic localities has been relatively small (Kjærnsli & Lie, 2002). Both nations' concerns with social equity and equality, considerations that they also have applied to their education policies, are probably the reason for this equality of results. Equality of results have made geographic diversification unnecessary; focusing, therefore, on the capital cities of the two nations: Oslo and Helsinki becomes a valid option. The selection of these two cities as sampling frames, furthermore, eases practical issues of feasibility and comparability.

Even though important geographic diversification is not necessary, an additional online survey was sent, covering a wider geographic area to reach a greater number of schools all over Norway and Finland. This was done to support the findings. The results of the online survey are meant to be used to complete, confirm, or disprove the findings.

4.3.2 Cities

Norway's capital Oslo and Finland's capital Helsinki are also comparable for their geography and location. Helsinki is the most northern placed capital with geographic coordinates: 6010N,2456E, and Oslo not far, but more to the West with geographic coordinates: 5955N,1045E. In terms of size and density, Oslo covers 454km² and had a population of almost a million inhabitants in 2015 (986,000), while Helsinki is larger, covering 715km² and less densely populated with 620.000 inhabitants in 2014 (The World Factbook, 2016). Nearly 30% of Oslo's inhabitants are born to immigrants and are not ethnic Norwegians. This is more than double the national average of 14%. The largest immigrant group living in Oslo is from Pakistan followed by Sweden, Somalia, then Poland. The western part of Oslo has just 5% immigrants, a far lower average than the eastern part. An average of 40% of primary school children in Oslo have a foreign first language (World Population Review, 2016). On the other hand, in Helsinki, 90.4% are Finnish speakers and 5.4% Swedish speakers. Other language speakers form 4.2% of the city's population. Foreign nationals constitute 3.1% of Helsinki's inhabitants (City of Helsinki, 2016).

4.3.3 Schools

As this is a qualitative research, the aim in selecting participants, was not to deduct generalizations about the educational systems of the two nations as a whole, it was rather to find the participants that will provide the investigation with valuable information specific to the research questions. To achieve this, the units of analysis have been schools and their teachers in the capitals under study. Within this frame, a simple random sampling technique was used which allowed equal probability for each school unit to be included (Bryman,

2008). As this research uses a comparative design, it was important to make sure that samples were equivalent. Hence, and to keep sampling error to a minimum, probability sampling was selected, as it uses a random selection of schools in those cities. Since the differences in performance between the schools is low, the participating schools were randomly selected. Finally, as the great majority of schools in the two nations are public, and international tests are usually based on the results of public schools, it was deemed unnecessary to include any private school, therefore all schools included in the study are public.

Since the research is conducted in the primary classes of Finnish and Norwegian schools, some problems of equivalence need to be highlighted; the main one is that Norwegian children start school one year earlier than Finnish children. This means that first graders in Norway are six years old while first graders in Finland are seven years old. Sample selection, for this reason, cannot be rigid and cannot look specifically at the same grades for comparison. Comparing specific age groups and looking at several class groups in primary school is deemed for this reason more appropriate.

The maturity of the child makes concerns with what is learned at each age more important than what is learned in each grade. For this reason, the selection of samples from the same age group rather than same grade was adopted for comparison. Therefore, the first main samples for comparison have been First-grade in Finland and Second grade in Norway as they both teach seven-year old pupils. The second main samples for comparison have been Third-grade in Finland and Fourth-grade in Norway as they both teach nine-year old pupils. In the research, however, there has been an overall consideration of different classes from first to fifth-grade to have a better general understanding of the whole, basic primary system. In the end, a total of six schools were visited: two in Oslo and four in Helsinki. One of the schools in Oslo was in the Western section of the city, while the second school was in its Northern section. In Helsinki, two of the six schools were located on the East side: one towards the upper East and the other towards the lower East. The third school was in the Northwestern section of the city, and the last school in the downtown center of Helsinki. Eleven classes were observed and their eleven teachers interviewed. The classes were: one first-grade, one second grade, and two fourth-grades in Norway, and three first-grades, one second-grade, two third-grades and one fourth-grade in Finland.

All the schools visited were average in size, with 400 to 800 pupils. The two Oslo schools were in middle to upper-middle-class areas, while the Helsinki schools were from more diverse lower-middle to upper-middle class areas.

- 2 primary schools in Oslo:
 - One 1st grade
 - One 2nd grade
 - Two 4th grades

- 4 primary schools in Helsinki:
 - Three 1st grades
 - One 2nd grade
 - Two 3rd grades
 - One 4th grade

The classes visited had fewer pupils in the Finnish schools than in Norway, reflecting the overall average number of students in the classrooms of each nation. The number of students have ranged from 18 to 22 in Finland, and 26 to 29 in Norway.

The schools and classes have been coded as follows: O for Oslo, H for Helsinki. O1 indicating the first school visited in Oslo, and O2, the second school. The grade is indicated by G, and the numbers 1, 2, 3 or 4, indicate the grade levels. H3G3, for example, indicates the Third grade in the third school visited in Helsinki. The codes used are: O1G2, O1G4, O2G1, O2G4, H1G1, H2G2, H2G3, H3G1, H3G3, H3G4, H4G1.

Additionally, up to nine Norwegian and Finnish primary schools have participated in the online survey (see appendix).

4.3.4 Participants

All the participating teachers were female except for one male, a fourth-grade teacher in Finland. They also have been relatively young with ages ranging from their early to mid-thirties, except for two older teachers: one fourth grade female teacher in Norway who was in her mid-forties, and another first-grade female teacher in Finland who was in her late forties. Since there was only one teacher in each classroom, the same codes used for the classrooms

and schools were also used for the teachers' pseudonyms. They are as follows: O1G2, O1G4, O2G1, O2G4, H1G1, H2G2, H2G3, H3G1, H3G3, H3G4, H4G1.

Nine anonymous additional teachers: six from Norway and three from Finland have participated in the online survey. They were as follows: two first-grade and one fourth-grade teachers in Finland, as well as, two first-grade, one second-grade, one third-grade and two fourth-grade teachers in Norway.

4.4 Materials

During the study, notebooks were used while observing the classrooms to write down all the information about the activities that were taking place during class time. The observations started with the date and exact time of the day. For each classroom observed, information was written down about what was being taught, the number of students in the class, and the number of boys and girls. Other observations were noted as well, such as a description of the classroom, its pedagogic equipment and student work on display. Recess time was also clearly marked. The notes were divided into 15 minute sections in order to pace the work. In Finland, the Finnish translator was writing down in English the teachers' instructions and any verbal reaction or responses from the pupils. His notes were divided into 15 minute sections following the same format as the primary observer. Class observations lasted the whole school day and took place in the same classroom each day. Interviews were usually conducted after the classroom observation, except for one interview which happened before class visit, due to lack of time.

Teacher interviews were recorded on an Olympus digital voice recorder with 2 GB internal memory, long battery life, and several hours of recording time. A backup was also used by simultaneously recording on a Lydoptaker (sound recorder) integrated in a Samsung Galaxy Note cell phone. The recordings were later downloaded on a personal laptop computer and then typed into separate document files ready for comparison and analysis.

The additional online survey was created on OneDrive, a Microsoft Office tool hosted online. A list of questions was created on Excel type sheets in OneDrive and the link to the survey was included in e-mails. These e-mails were sent to a large number of randomly selected school rectors in Norway and Finland. The participating teachers could fill out the survey by opening the link provided in the e-mails. The researcher could also consult the questionnaire and survey online where all the responses were automatically compiled in a spreadsheet.

4.5 Design of instruments

Since a qualitative design was selected, the interviews were semi structured and to some extent open ended. The questions were also presented in a conversational manner and didn't always follow the scheduled order. Some questions were used as a warm up to start the interview, and were meant to understand the teachers' background in terms of training and experience. Such as the number of years they have been teaching, what grade(s) they are teaching now, and what grades they have taught previously.

Other questions were meant to understand the overall pedagogical approach of the teacher; Their perception of their role as a teacher, their daily routine, the non-academic skills they mostly focus on, and the most important trait that they focus on with their pupils such as: Conscientiousness, resiliency, kindness, politeness, creativity, hard work, social skills, etc.

Finally, the questions that were mainly concerned with the subject of study, were meant to understand how each classroom and each pupil was handled in terms of work load, pace and complexity, and if there was some tailoring to adjust challenges to the needs and levels of each classroom or pupil. The questions started with ones that were meant to find out if planning of lessons was global or if it was tailored:

- 1- In your school, do same grade teachers work together to prepare the teaching plans?
- 2- Do same grade classes usually move together at the same pace and in the same teaching order?
- 3- Do you rely on the teaching plans that were developed for the same grade in previous years?
- 4- Are the teaching plans for each class saved to be used as guides for the following years?

Then questions came to find out how the evaluation of pupils was handled:

- 5- How do you usually test the understanding and levels of the students?
 - You take each student alone to test the capacity of each separately.
 - You give tests in the classroom to all students together.
 - You look at student work in the classroom during class assignments.
 - You check student homework
- 6- When do you conduct evaluation tests?
 - At the beginning of the school year.
 - During the school year.

- At the end of the school year.

7- How often do you test students during the year?

- Almost every week.
- Almost every month.
- One or two times during the year.

8- Do you check, early in the school year, the full potential or maximum capacity of each student? (Do you try to find out what is the most difficult work that a student can do?)

9- What skills do you usually check? (Reading___, Mathematics___, Both___)

10- Do you believe that the school system usually helps weaker students get assignments adjusted to their level?

11- Do you believe that the school system usually helps stronger students get assignments adjusted to their level?

12- Do you believe that stronger students could often get more challenge than what they now receive?

During the interviews, there were also questions focusing on the printed materials, such as class book and work books. These were mainly aimed at understanding how easy it was to adapt the materials to the needs of the students, the teachers, and the classroom. They were also meant to find out how the teachers used the material and how satisfied they were with them.

13- Which of the class books are easier to adjust to different student levels? (Math/ reading)

14- Do you use other material than class text books to better adjust to the levels of some students?

15- Which subjects are easier to adjust to? (language/ math)

Questions attempted also to reveal how the management of work load, pace, and complexity was carried out inside the classroom and at home:

16- When do you mostly differentiate/adjust to student levels?

(Classroom, Homework, both)

17- What do you do if the students in your class have different levels and capacities?

a) You give the same assignments to everyone for the sake of equality.

b) You give the same assignments to everyone, but the assignments have increasing complexity and stronger students can finish and be challenged on the more difficult questions.

c) You give different assignments with different difficulty levels depending on the student.

18- Do you sometimes divide the class into stronger and weaker groups?

19- Do you keep all students together in the classroom with different student levels?

- Always
- Stronger students have sometimes separate classes
- Weaker students have sometimes separate classes
- What do you do if the students in your class have different levels and capacities?

20- How much time do you believe students should spend on homework each day?

(10 minutes or less, 10 to 25 minutes, 25 minutes to 1 hour)

21- Do you adjust quantity and difficulty of homework depending on how much time students spend on it?

- Always
- Mostly if parents request it___
- Mostly if they are spending too much time on it___
- Mostly if they are spending too little time on it___

22- What do you believe is the main role of homework?

- To review and reinforce what was learned in class___
- To prepare for the class lessons___
- To expand on what is learned in class___
- Homework is important in primary classes___
- Homework doesn't improve much learning in primary classes___

23- Choose the one you believe most:

- To slightly over-challenge the students in order to help them move forward.
- To slightly under-challenge the students to help them remain confident in their capacities.

24- Which method do you use more often to teach a subject?

Repetition, presenting the subject under several angles and in different ways.

4.6 Delimitations

This section defines the delimitations of the study to help maintain its objectivity. Since the classes visited and teachers interviewed were from first to fourth-grade only, the study is limited to those grades and the results will not cover all the primary classes. The research will include only a general overview of the national curriculums, as well as, a general overview of the books and other materials used in the classrooms. It will, therefore, not analyze the printed material thoroughly, as the aims are not to thoroughly analyse the teaching documents but to provide a general understanding of some teaching processes. Furthermore, the inquiry will use the teachers' answers to find a better understanding of differentiation of LPC; this will be done by understanding how and when pupil levels are evaluated, how differentiation is handled in the classroom, and how it is handled during homework assignments. As this thesis is concerned with a general understanding of differentiation and its adaptation to weaker and stronger pupils, it does not focus on pupils with special needs but gives only a quick glimpse on how they are given support as well.

4.7 Procedure

Before beginning the fieldwork, the project had to be notified to the Data Protection Official for Research, and obtain the approval of the Norwegian Social Science Data Services (NSD). After contacting some schools in Helsinki, I was informed that I needed also a permit from the Education department of the city of Helsinki, which I obtained within a week.

As I live in Norway, the costly trips were the ones made to Finland; for this reason, the time spent there had to be planned and limited.

Initially, I was hoping to start my study by visiting the Norwegian schools since they are more conveniently located. However, a lack of cooperation on the Norwegian side made this impossible. The fieldwork started, therefore, in Finland and consisted of two visits to Helsinki with a stay in the city for one week each time. The first visit was from October 5th to October 10th 2014, during which two schools were visited: one on the east side of Helsinki, in a middle-class neighborhood, the other in the north-west, in an upper middle class neighborhood. During this trip, I could observe three classrooms and interview three teachers: a first-grade teacher in the first school, and a second grade, as well as, a third-grade teacher in the second school. The second trip was from November 2nd to November 7th, during which I could visit a school in a lower middle-class neighborhood on the south-east side, and a school in downtown Helsinki, close to the city center. In the first school, I could observe a first-

grade, a third grade and a fifth-grade, and interview their teachers. In the second school, I could observe a first grade.

The visits in Norway occurred on five different days. The first class visited October 28th 2014 was a 2nd grade, the interview took place the same day. The class was observed again the next week on November 5th, 2014 to complete the observations. The next class, a fourth-grade in the same school was visited on November 10th and interview taken the same day. The second Norwegian school was first visited the same week on November 14th, 2014. On that day, a first-grade was observed and its teacher interviewed. The last visit occurred on the 24th of November with the observation of a fourth-grade and the interview of its teacher.

The interviews have ranged from 30 minutes to 1 hour and a half. During that time, teachers also showed classroom books and documents and explained how they used them.

In the end, an online survey was sent to over fifty schools in both nations, outside the capital cities of Helsinki and Oslo. This was done to verify and test the findings which were limited in geography and participants. The survey was designed to be completed in 10 minutes and included 30 questions, with mostly yes/no, or multiple-choice answers. The questions covered the same subjects as the ones in the semi structured interviews. The questions were addressed to teachers from first to fifth-grade.

Randomly selected schools located on the internet were contacted by searching in google maps and using search engines to find ones located in different parts of the nations. Later, emails were sent to the rectors, who were subsequently contacted to inquire about the possibility of their teachers participating. The emails included a link to the survey that allowed teachers the choice to participate or not.

4.8 Analysis

4.8.1 Interviews

To analyze the collected material, the method used was to sort out the answers of the interviews and lay them side by side, putting together the answers that corresponded to the same subjects or issues of investigation. Subsequently, a search for similarities and differences between the answers of the diverse participants was undertaken. The purpose was also to identify tendencies from respondents in each country, and ones that clearly highlighted divergent cultural dispositions or pedagogical approaches and priorities.

4.8.2 Classroom observations

Analysis of the classroom observations consisted of comparing the notes, mainly calculating the time spent on academic work and time spent on other types of activities. The rhythm of work time and break time was also measured for the sake of evaluation and to understand the concepts of load and pace (LPC) under study.

Teaching modes: Tables were used to show the type of teaching that was taking place in the classrooms. Three different modes of teaching were identified: a formal, semi-formal and an informal mode. These modes were used to indicate the load of teaching and were defined as follows: The first *Formal* mode, is counted as the one with the greatest load, where students are sitting and listening to the teachers or answering their questions; it is also one where pupils are working quietly. The second is the *semi-formal* mode, and includes some movement, music, songs and/or art; it is also one where pupils can be working in a group or talking with others. The third is the *informal* mode, where games are used or freedom of movement and communication are allowed.

Teaching time vs break time: Time spent on teaching and time spent on breaks were also measured as they help indicate load and pace of teaching. The longer the lesson time indicates a greater load and faster pace, while break time alleviates load and reduces pace.

4.8.3 Teaching material, books, and national curriculums

Books, text books, and teaching material were looked at and photographed, or collected during classroom observations. Several older editions of the teachers' math books were given away in Finland which made studying them easier. All documents were compared in terms of pace and complexity in each grade and age group. Additionally, the national curriculums were downloaded from government sites found on the internet belonging to the ministries of education of Finland and Norway.

4.9 Validity and reliability

Internal validity of the findings is mainly concerned with the selection of appropriate theories to analyze the data in relation to the research questions. This was guaranteed by choosing several theories that looked at the data from different perspectives and cover all aspects of interpretation. External validity which is the possibility of generalizing the findings was insured by looking at a wide range of data (history and culture, official policies, curriculums,

class books, class observation, interviews and survey) and by using data from other research such as the results of meta-analysis to support the findings. It has, therefore, relied on triangulation of data. Reliability, is the possibility of repeating the same procedure and obtaining similar results, this was insured by making the procedures clear, and by presenting official documents, data supported by other research, and by adding an online survey to include a wider number of participants covering the entire two nations.

4.10 Ethical issues

As mentioned earlier, pseudonyms were given to the participating schools, classes and the teachers, totally preserving the anonymity of all. The codes used for the pseudonyms are: O1G2, O1G4, O2G1, O2G4, H1G1, H2G2, H2G3, H3G1, H3G3, H3G4, H4G1. Additionally, no personal questions were asked about the teachers or the pupils. The online survey was totally anonymous, as it only revealed the nation that the answers were coming from.

4.11 Language issues

Language issues were mainly a problem during class observation in Finland. For this reason, a translator was hired to sit in the classroom together with the primary researcher to write down the teachers' instructions and student responses. The Finnish translator was a Master's of education student who had taken courses at the CIE program at UIO. This ensured that he understood fully the subject and what was happening in the classrooms, and secured an accurate conceptual understanding of the material.

4.12 Summary

A qualitative design was chosen for this research as it is an exploratory method that seeks to reveal underlying causes, reasons, and motivations behind the phenomenon of achievement discrepancies between Norway and Finland on the PISA tests. Semi-structured interviews of teachers were one of the data gathering methods selected. They combine a pre-determined set of open-ended questions that give the additional opportunity to expand further on the teachers' responses. Random sampling of schools in the two capital cities Oslo and Helsinki was used as it allowed for the equal inclusion of a diversity of schools without bias. Teachers of those schools are the ones interviewed, and books and learning material from their classrooms studied. Additional data was gathered from the classrooms through observations to measure teaching modes, teaching time and break time as to evaluate load, pace and complexity.

5 Results

To find the differences and similarities in *load*, *pace* and *complexity* (LPC) between Norway and Finland, the data was collected from several sources. This chapter displays the data found in each source, presenting what they reveal as follows:

(4.1) Books and curriculum: to compare and help understand the overall class levels as found in the printed materials and identify main differences. (4.2) Class observation: to understand and measure *pace* and *load* of teaching. In this section, *Pace* (4.2.1) is evaluated through the measurement of *break* or *recess* time versus *teaching* time. *Load* (4.2.2) is evaluated through the identification of three types of teaching modes: a) *formal*, b) *semi-formal*, and c) *informal*. The measurement of the length and frequency of these modes was used as comparative units. (4.3) Interviews, to understand the teachers' approaches to differentiation and adjustment: (4.3.1) Testing students to know their level to adjust LPC, (4.3.2) homework differentiation, (4.3.3) in-class differentiation: a) division of class, and b) group work. Lastly (4.4) presenting data from an online survey to verify the answers and support the findings.

5.1 Books

This section verifies *LPC* with the differences observed between the two nations' class books. Two subsections are presented, one for math books and another for mother tongue books. Comparison is based on the books' content as well as on the teachers' inputs, starting with mathematics books.

5.1.1 Mathematics books:

The main focus is on math books as differences between them are clearer and more measurable in terms of quantity of exercises, complexity, and pace compared to other books.

When comparing the math books, it is worth clarifying again that first graders in Norway are one year younger than first graders in Finland. This is a constant discrepancy throughout the school years. As Finnish pupils start later, it was claimed that they don't move faster in the curriculum to catch up with other nations (Sahlberg, 2011); this inquiry has looked at the content of the math books to verify this claim, and see how the nations compare in this respect.

The interviews with teachers have revealed that in Norway two main mathematics books were used: *Multi* and *Mattemagisk*. *Multi* is the older publication, which came on the market few

years earlier than *Mattemagisk* and was already used in the schools for several years. The *Multi* editions referred to in this study were published in 2010. *Mattemagisk* books, on the other hand, are newer publications that came out in 2013. The editions studied in this inquiry are from that same year. In terms of how they are organized, the Norwegian books are divided into home workbooks and class workbooks.

In Finland, on the other hand, there is a great reliance on one math book called *Tuhattaituri*. Unlike the Norwegian books, the Finnish math books employ just one workbook used continuously in class and at home. Finnish pupils are, therefore, continuously working on it in the printed order in class and at home, in other words, they are working on it one page at a time without hopping over pages and without jumping back and forth. Finnish teachers' have expressed great satisfaction with their math books and confirmed their reliance on the books' printed order (see underlined text in interviews):

H3G4:

The books are actually really good. There are books for the weaker ones, books for the stronger ones...In mathematics, for the kids, it's easier to go with the book. It's easier for them, that they know which page they are going...there's too much information in this book, there's more than in the curriculum. So basically, you don't have to do everything that's in these books.

One teacher expressed following the book, however, she also wished it contained more challenging material for the stronger pupils because she had to spend extra time photocopying from outside sources to differentiate correctly, especially for the stronger pupils:

H2G3:

Well in Math, I just follow the structure. Normally we do two pages and after that there are those extra pages...If I could add something, I would add some pages for those who are very good ...like at the end of the book or something... Now we have these special books that we can copy...I would like to have some really challenging pages.

Another teacher also said to follow the book's order, but mentioned using extra material as well:

H1G1: In mathematics, I go by the book but I use a lot of extra materials, and these exercises ... are everything that a teacher can wish for to use.

Finnish *Tuhattaituri* books are organized using a different approach in each semester. The first semester is always a review of the previous year, while the second semester always involves the introduction of new concepts. As it is a review, the first semester uses concepts

that were introduced the previous year, reinforcing previous knowledge and working on more complex numbers. Exercises evolve from simple to more complex arithmetics. The second semester introduces new concepts using the same increasing arithmetic complexity presented the previous semester. New concepts are introduced one at a time, involving repetitive exercises to reinforcing the understanding of each concept. Concepts are also presented under different angles and with different computational difficulties. The arithmetic used is one that has almost been automatized the previous semester. Therefore, focus in the second semester is mainly on understanding the concept rather than processing or calculating numbers.

In comparison, the Norwegian mathematics books are mostly divided by themes, where each chapter presents new concepts. Unlike the Finnish books, the difficulty of concepts and of arithmetic increases from year to year rather than within the same school year. In this respect, Norwegian math books could be described as more playful and multifaceted than the Finnish books, as they give the pupils an opportunity to widen their perspective earlier. On the other hand, the common thread found throughout the Finnish math books might give greater focus, and an opportunity for more repetition of same level exercises, therefore, helping to acquire a deeper assimilation of concepts and automatization of tasks. Additionally, Norway's teachers expressed less satisfaction with their math books.

The following Norwegian teacher did not follow the printed order and used external material to cover the books' shortcomings, especially for more challenging exercises:

O2G1:

It's not following [the book] ... We just added a little bit more.... added some plus.... to figure out how much money you have...because they needed some sort of challenge.

The following fourth grade teacher was satisfied with the teachers' books but not with the students' work-books because they lacked exercises:

O1G4:

I of course, use the books, the pupils have the books but we use other stuff as well. We use clocks, we use what's on the Internet, there are a lot of things that we can use.

I'm one of the teachers maybe using the books the least ... I use the teacher's book very much because it has a lot of good ideas and the ways to practice...we have a book following that we can copy and I took the task from there. ... I like the mathematics teacher book ...Not for the students, it's really boring for the student...It's okay, but it's not enough practicing, not enough tasks, so then we have to copy from other books.

One teacher was rather satisfied with some differentiated exercises that the books contained, as a couple of exercises per week were color coded with three difficulty levels and teachers kept the most complex ones as optional for pupils who wanted to do them:

O2G4: “In the books, there are color codes and you can choose between three levels...I think that’s good in math ... none of the other books have that.”

a) Load:

Load is evaluated through how much work is given, therefore, by finding the number of exercises the students work on during the year, this is estimated here with the number of pages that are included in the workbooks. The Finnish first-grade math book *Tuhattaituri 1a* has 190 pages, and *Tuhattaituri 1b* has 200, which makes a total of 390 pages in Finland. On the other hand, the Norwegian first-grade *Multi* workbooks *Multi 1a* and *Multi 1b* have around 70 pages each, and the home workbook has additional 90 pages, making a total of 230 pages. In other words: $N = 230p < F = 390 p$. Therefore, in the first year, based on their workbooks, Finnish math books have 160 extra pages of exercise. However, as previously revealed in the interviews, Norwegian teachers often made extra photocopies from diverse sources outside the class books to fill in gaps they found. If, as evaluated, Norwegian pupils are given an average of three additional photocopy pages per week, they will have 111 pages of exercise per year added to their work-books. This reduces the difference between the two nations to approximately 50 extra pages to the Finns. Therefore, according to the most conservative figures, Finnish pupils work on approximately 150 extra exercises per year, since there are two to three groups of exercises per page. This difference remains constant in later grades which means Finnish pupils continue to get more exercises throughout their primary years and their *load of work* is therefore greater than Norway. The level of difficulty, however, might not be greater because many of the Finnish exercises repeat the same complexity level. Book complexity and pace are further addressed in the next section.

b) Pace and complexity:

This section compares the books to reveal how fast the nations are progressing in terms of complexity of mathematical concepts and exercises. Norway’s first semester’s, first-grade book *Multi 1a*, which is one of the main mathematics books used in that nation, has exercises focusing on teaching to count to six and writing the numbers from one to six. *Multi 1b*, which is used in the second semester of first-grade, focuses on teaching to count to 20. It also introduces basic additions and subtractions using up to two digits added and subtracted from

one digit (ex. $15 - 2$). For second-grade, in Multi 2A, pupils are taught to count to 100 and learn to add and subtract using two digits added or subtracted by one digit (ex. $65 - 4$). They also use these numbers in adding and subtracting coins, basic reading of time, and measuring simple linear elements, as well as, understanding the concepts of double and half.

In comparison, the mathematics book used in Finland's first grades (*Tahattaituri* 1a) teach to count to twelve, then to add and subtract up to three numbers in a row using numbers from one to 12 (ex. $4 - 2 + 11$). Then *Tahattaituri* 1b, in the second semester teaches to count up to 100. It also has additions and subtractions using two decimals, and additions and subtractions of two digits but rounded off to the nearest 10 (ex. $60 - 40$). Other exercises are: learning greater and smaller than, adding coins of different units, some geometry exercises, such as drawing the mirror image of a diagram or continuing a pattern, and finally simple exercises of measurement of straight lines and linear elements.

While in the Norwegian first-grade, pupils are taught to learn to count to 20, and do simple additions and subtractions, in the Finnish first-grade, they are taught to count to 100, and include simple additions and subtractions, as well as, simple geometry and measurements. Therefore, in the case of first-grade, even though Norwegians start earlier, the Finns are going faster and almost catch up with Norway. A look at these few books reveals that Finnish first-grade catches up with Norway's first semester of the second-grade. This means they are going faster in the curriculum compared to Norway in the earlier grade. The reason for going at a faster *pace* in Finland's first-grade is likely because the Finns already learn numbers in preschool. Finnish teachers mentioned in the interviews that children are already taught to count to 10 in preschool, therefore, when they start school they can move fast in teaching basic counting. However, as teachers need to make sure that all pupils have mastered these numbers, they go over them and work on them again in first-grade.

Findings:

The differences between the two nations as observed in the primary mathematics books are several; while Finnish teachers were all using the same math books and have all expressed satisfaction and reliance on them, Norwegian teachers were using different books and have expressed less satisfaction with them. Finnish teachers were teaching, using their books in the printed order, while Norwegian teachers did not always adhere to the printed order of their books. When it comes to size, the Finnish workbooks have 50 to 150 more pages than their Norwegian counterparts, therefore, 200 to 400 more exercises for pupils to work on each year.

This indicates a greater load of work in Finland. In both nations, teachers have mentioned adding few exercises for the main purpose to add challenge, but in Norway it was also to fill in gaps found in the books.

When it comes to organization, the Finnish books remained within the same theme throughout with a progression based on an increasing arithmetic *complexity*, while the Norwegian math books were divided by subject and concepts. In the Finnish books, new concepts were introduced little by little within an increasing *complexity* of numbers while the Norwegian books presented new concepts with every new chapter. This makes Norwegian books less continuous as they don't have a clear common thread throughout and pupils have to start anew (in terms of processing information) with every new chapter. This implies greater *cognitive load* on the pupils of Norway because of greater complexity. Since the progression of difficulty of concepts is lighter in Finland, as Finnish pupils are not processing new information with new chapters, the complexity of concept processing can be considered simpler. Pupils are instead doing more exercises, therefore spending more time reinforcing old knowledge. The simplicity of the progression of Finnish books gives room to work on more exercises. This means that *load of work* is greater in Finland and *cognitive load* is greater in Norway. Further explanation of this issue will be addressed in the next chapter.

Additionally, when it comes to *pace*, Finnish books are moving faster in first-grade compared to Norway's first-grade, and are catching up by the end of the year with the first semester of Norway's second-grade. Therefore, even though Norwegian pupils start one year earlier than their Finnish counterparts, by second-grade, the discrepancy in level and complexity between the two nations is reduced to just half a semester.

5.1.2 Mother tongue and other books

The books that teach language and other subjects are a bit harder to compare and measure. Comparing them in this study is mainly based on the teacher's opinion as collected in the interviews. Some of the Finnish teachers have expressed satisfaction and a reliance on their language books:

H1G1: "In Finnish, I go by the book in first-grade because it's all about learning to read and write."

H2G2:

When I was in university, it was a big issue –Don't just follow the books! You have to decide yourself if this book is what has to be taught. But actually...it's quite good to

use the book. We don't have to invent the bicycle again... good researchers have done the books, so they also know much about teaching.

Some teachers have expressed satisfaction and an additional reliance on the internet to reinforce their teaching:

H3G4: “The books are actually really good. There are books for the weaker ones, books for the stronger ones... In some subjects, I don't even have the books. I use material in the internet.”

H4G1: “I think we have enough material...I search for my own material. There are so many things on the internet.”

One teacher explained that preferences for different editions depended on teacher's choice, but has additionally mentioned using sources outside the textbooks, especially the internet:

H2G3:

Now I have mixed [order] a little bit because... I was in another school, the last three years, and I had different books and I found the order in previous books better, and now in some books I don't like the order so I'm just like taking some things earlier.

Maybe some books might have better exercises...more challenging, so that it's not possible to answer by writing one sentence and they have to do more, but of course it's only my opinion. Some teachers like really simple exercises

And then maybe the source of information so that they can use other books as well and the internet as well....so that the process is wider and not just only the book.

The teachers in Norway have also expressed relying on outside sources or changing the books' order of teaching. The following teacher expressed satisfaction with the teachers' books but also relied on outside sources:

O1G4:

I like English teachers' books... I use a lot of things from the book as well. But if you only use the books – I know some teachers who are still –I don't think that's good enough, so you have to add and use the books as a kind of practice... I use the books when it's something good But I'm not looking at books first, I look at the goal from the curriculum and we are talking about how we can fix it.

Norwegian teachers expressed the need to use outside sources, and showed some dissatisfaction with their books:

O2G1: “I’ve gone to the second-grade teachers and said, I need some books from you, because the books I have, are not good enough, or they’re not challenging enough. So, I’ve ... gotten their books from Ellemelle or something.”

O2G4:

I often change [the order when using the books] ... One of the goals in English is to know the difference between the English and Norwegian school system, for example, then I can’t use this book because it says nothing about it. But in the teaching plan it is a goal. So, then I have to look in other books... maybe I have to look in fifth grade or sixth grade books ... [I need to adjust] English and Norwegian books... it would be perfect if we can only use one [book].

In Finland, all the visited schools used the same books *Pikkumetsän* for first and second grades. These books contained exercises and texts with different levels of difficulty, easy to adjust to pupils with different capacities, and to readers and non-readers. The texts that were designed for weekly reading were accompanied by comprehension questions and questions that required pupils to use their imagination. Teachers have pointed out during interviews that writing assignments in the books always included one question that demanded imagination skills. In fact, engaging the children’s imagination and creativity are requirements in the Finnish National Curriculum, and is a rule formally set in the language books throughout:

H1G1:

[The first question is] about what is happening, and the second question is usually where they must use their imagination. For example, here they will have to think what could happen next...On these last questions, they are going to use their imagination. They must draw something about the text. And here, you must make questions that you could ask your friends tomorrow at school, so, what is happening—?

H3G4: “During the fourth year, we have this curriculum that says that they have to write a lot of stories...I might give a subject to them or they might invent it themselves, it depends.”

When Finnish teachers asked their pupils to use their imagination, these were allowed to write as much as they could:

H1G1: “When they are doing these exercises at home, I won’t correct the answers. They have been using their imagination and they have been writing longer sentences... I just say, “That’s very good.”

H4G1: [Every Monday they must write] they can use their imagination and write what they want ...I tell them to write as much as they can.

H2G3:

They need to construct knowledge if they are searching by themselves...So it's not that I'm only pouring the information out and they are just like copying it but they have to produce it by themselves. ...So, I'm just giving the starting points and then they are

leading it somewhere else because that's the way ... they get more motivated, because they might find something more interesting that is not in the book.

A second-grade teacher mentioned how much they write when the text is creative:

H2G2: “Three or four pages in these small notebooks... We have these sizes of notebooks to write stories.”

On the other hand, in Norway, it was observed that many of the language assignments did not come from the text books but from diverse outer sources that were photocopied just like teachers did for math homework. Norwegian assignments always used questions of comprehension, but questions engaging the children's imagination were not a set rule and were not consistent. As opposed to Finland, they occurred only from time to time, just randomly. Some of the Norwegian teachers' answers about using creativity and imagination were vague; a fourth-grade teacher had the following to say about the subject:

O1G4: “I hope so, I think so...Yes, I really would like to have it like that...I'm not sure it's in the books, I don't like the books all the time, so I try to add it.”

A fourth-grade teacher said that pupils were assigned a creative writing assignment about four times a semester:

O2G4: “Two weeks ago, they got three or four headlines they could choose between. For example: ‘My good neighbor is getting crazy,’ or ‘It's getting dark’... they can choose between the different headlines and write their own story.”

A first-grade teacher had answers similar to some Finnish teachers in terms of avoiding overcorrection and giving pupils freedom to write:

O2G1:

I think now, it's more important for them to feel comfortable writing, and start writing and be creative and trying to figure out the works. I think that is more important than having to put the “e” in the correct place.

[the types of creative writing exercises are] trying to write words that we haven't worked on, write each other's names and... finding new words that work with “n” or something. ...I don't know if you noticed our panda bear? Sometimes we write letters to her, do a little drawing to her.

Findings:

Here, the main difference noticed between Finnish and Norwegian language books is again that the Finns trusted their books more than the Norwegians. However, both have expressed using external sources, especially the internet, to add to their material. On the other hand, it was noticed that the task to imagine is a skill solicited every week in the writing assignments

of Finnish books while it was lacking in Norwegian writing assignments. Such assignments had often a minimum and maximum limit of one page in Norway, while a maximum limit was not given in Finland. As imagination demands an extra effort from Finnish pupils, it adds *complexity* to their assignments and adds a skill that is not as often worked on in Norwegian language books. It can therefore be considered that, in this respect, this additional skill as well as the allowance to write as much as one wants makes Finnish writing assignments more *complex* than Norwegian ones. Additionally, just as there is a common thread throughout the Finnish math books, there is also a clear and thorough routine in the weekly assignments of the mother-tongue books due to the imagination questions. This indicates that the Finns rely on thought-out rational systems that they apply in their books, which, as revealed in the interviews, seems to offer satisfaction to their teachers. Norwegian books, on the other hand, have less continuity and have shown to offer less satisfaction to the teachers using them, which is prompting the latter not only to juggle with the books' printed orders, but also to look for outside sources to make-up for the books' shortcomings.

5.2 Comparing the national curriculums

The national curriculums provide each nation with a guideline framing the skills that are officially set to be learned during the different periods of schooling. This section compares the curriculums of Norway and Finland from a general view point, then focuses on aspects that could have an impact on *load*, *pace* and *complexity* in both nations.

The Finnish national curriculum provides broad guidelines relating the educational principles that the school system is based upon and setting the different stages for when and how goals should be reached. The curriculum studied in this research was published in 2004 (...).

Compared to the Norwegian curriculum, it is a unified and pragmatic whole divided into nine chapters where objectives and methods are stated. It starts from the concepts and mission, followed by the procedures and aims and finally details good performance. The simplification of the Finnish curriculum occurred in the mid-eighties, reducing its content and liberating it from top-down regulations (Hancock, 2011). The Norwegian curriculum, on the other hand, is divided into four parts; the first part is a *core curriculum* presented as a long dissertation that relates an overall philosophical vision of education and uses an idealistic language; it is divided into several chapters and was last updated in 1997. The second part is a *framework for basic skills* which is a much shorter document that uses a pragmatic language, similar to the Finnish curriculum, to depict what is to be achieved in each grade level; it was last updated in

2012. The third part is the *Quality Framework* which clarifies regulations and responsibilities of school owners. And the fourth part is a long *appendix* detailing the regulations, rights, and requirements related to the number of hours allocated to each subject for each school year and for diverse groups of pupils; it was last updated in 2013.

5.2.1 Cultural differences

The first noticeable difference between the two curriculums can be classified as a cultural one. While the curriculum in Finland is entirely the responsibility of the Finnish National Board of Education and no other authority is mentioned in its pages, the first authority mentioned in Norway's curriculum is The Royal Ministry of Education Research and Church Affairs (Norwegian Core Curriculum, 1997). The mentioning of royalty and the church are on the cover of the curriculum while the last page of the curriculum (p. 44) mentions the Norwegian National Board of Education. This Norwegian Directorate for Education and Training are the main authorities responsible for the Framework for Basic Skills and the appendix. To reinforce differences even more, while the language used in the Norwegian Core Curriculum is philosophical and idealistic, the language of the Finnish curriculum is pragmatic and concrete. The titles of the chapters can illustrate this point as in Norway, titles such as: "The spiritual human being", "The creative human being", etc. are used, in Finland, the titles are: "Values and underlying principles", "General educational teaching objectives" (Finnish National core curriculum for basic education, 2014), etc. Furthermore, the text, in the Norwegian curriculum, uses expressions that convey idealism and grandeur such as: "Education shall be based on fundamental Christian and humanistic values... Veneration for human equality and the dignity of man... Education should view individuals as moral beings... with the ability to seek what is true and do what is right" (p.6-8). More pragmatic and modern expressions are used in the Finnish curriculum such as: "The underlying values of basic education are human rights, democracy.... Basic education promotes responsibility, a sense of community, and respect for the rights and freedoms of the individual" (p.12).

Another noticeable cultural issue is also a different attitude toward getting the pupils to be more involved in their studies. The Norwegian Core Curriculum mentions the need to instil "grit" in their pupils: "Education must encourage making *effort* and *taking pains*. It must nourish *perseverance* by having the young see and sense that *exertion* and experience, knowledge and skills enhance their proficiency... Good teaching will give pupils... the heart to take responsibility for their own learning and their own lives" (p.18). Additionally, teachers must highlight the importance of sustaining challenges: "A good teacher amplifies their

ability to persevere – to *withstand strain*, to *overcome obstacles*, and *not to give up and back out* if they do not succeed at once” (p.22). In comparison, the Finnish curriculum mentions a focus on motivation rather than on effort and exertion: “The objective is to increase pupil’s curiosity and motivation to learn, and to promote their activeness, self-direction, and creativity by offering interesting challenges and problems” (p.16). Here again, the Norwegian curriculum relies on an ideology that captures more traditional values rather than modern ones, as they seem to focus on perseverance, whilst the Finns focus on motivation. Therefore, comparatively, the Finnish curriculum uses more modern expressions focusing on inner drive such as ‘motivation’ and on making the tasks interesting to stimulate the child’s curiosity.

Findings:

While the Finnish curriculum is a straight forward, unified and updated whole that uses a clear pragmatic language focusing on concrete action, the Norwegian curriculum is divided into several sections that seem disconnected with aims that are not followed through. Additionally, while the Finnish curriculum uses a modern pedagogic language and calls for motivating the pupils, the *Norwegian core curriculum* uses an abstract idealistic language that mentions the royalty and the church as guiding authorities, and talks about teaching pupils to persevere beyond pain, while ignoring motivation issues or inner drive.

5.2.2 Differentiation in the curriculums

After main cultural differences, the first issue presented here which is related to LPC is how differentiation and customization of school-work are addressed in the curriculums. Differentiation is explicitly encouraged in the Finnish curriculum and parents or guardians, as well as, pupils are “able to influence the definition of the curriculum’s educational objectives” (p.8). Furthermore, section 11(3) of the Basic Education Decree allows pupils to advance according to their own study program instead of one that is pre-defined by a yearly group (p.13). Modules and subjects of study can be recombined to suit the learner’s needs, as long as, compulsory studies and optional ones are clearly defined and the pupil’s progress is monitored. In a class that has a diverse level of pupils, modules and number of lessons can vary from pupil to pupil, as “the syllabus for a combined class can also be defined in terms of study modules without dividing the syllabus into grades” (p.13). Therefore, teachers can apply differentiation and give complexity and pace adapted to the pupil rather than ones that are tied to an overall grade-year curriculum: “Although the general principles of learning are the same for everyone, learning depends on the learner’s previous constructed knowledge” (p.16).

Differentiation is more important than following the grade's aims: "It has been decided that the pupil may progress academically according to his or her own study programme rather than a grade-by-grade syllabus" (p.21).

Varied teaching modes are to be used: "In instruction, methods characteristic of the subject are to be used, as are versatile working approaches" (p.17). Differentiation in teaching modes is actually a requirement: "The pupils' various learning styles and backgrounds, as well as the developmental differences between boys and girls and among individuals generally, must receive consideration. In implementing instruction...attention must also be given to that objectives and distinctiveness of the different groups making up the class" (p.18).

Furthermore, home and school cooperation and interaction with the teacher are also encouraged. From this cooperation is created the "learning plan" which is specific to each pupil and makes him/her responsible for his/her own studies. "The learning plan also makes it possible to differentiate the instruction and help the school and teachers ensure that the pupil enjoys the best chance of learning and progressing academically" (p.20-21).

Another form of differentiation mentioned is called remedial teaching which "is a form of differentiation characterized by individualized tasks" (p.21). This type of differentiation pays special attention to weaker pupils and the ones that fall behind: "Remedial teaching is to be commenced as soon as learning difficulties are observed" (p.21).

In the Norwegian Core Curriculum differentiation is also a requirement with diverse methods of teaching and a special attention to the weaker pupil. In the chapter on *The Working Human Being*, under the title "Adapted teaching," two paragraphs mention differentiation:

The mode of teaching must not only be adapted to subject and content, but also to age and maturity, the individual learner and the mixed abilities of the entire class. The pedagogical design must be pliable enough to permit the teacher to meet the pupil's differences in ability and rhythm of development (...). The teacher must make use of the variations in pupils' aptitudes, the diversity in the classroom, as resources for all-round development as well as the development of all. A good school and a good class should provide enough space and enough challenge for everyone to sharpen their wits and grow. But it must show particular concern for those who get stuck (...) and can lose courage. Solidarity must embrace those who face individual difficulties and those who can slip and slide when changing class or school (p.19).

Under the section on *The Role of the Teacher and Educator*, just like the Finnish curriculum, the Norwegian Core Curriculum requires taking into consideration the pupil's former knowledge, socio-cultural backgrounds and gender differences: "To explain something new

implies mooring it to something familiar (...). New perceptions must build on what is already well-founded- that which the pupil already knows(...). Even in common culture there are wide variations between individuals, due to social background, sex, and local origin” (p.20).

When it comes to teacher/parent cooperation, it is stated that: “teachers (...) must also work with parents (...). Good teachers are favorable (...) to involve parents” (p.24).

Unlike the Finnish system, however, choice of teaching hours has more limitations and is not just based on the sole decisions of the teacher/student and parents but requires the involvement of the school management. In Norway, differentiation is not purely a pedagogic strategy but includes administrative formalities. The Norwegian appendix states that for primary and secondary classes “school owners may redistribute up to 25% of teaching hours in a subject for individual pupils (...). Such redistribution is not a right. It requires an administrative decision rather than an individual decision under the Public Administration Act. The school owner should agree to the redistribution of teaching hours with the pupil or parents in writing.” For primary and lower secondary schools, this flexibility is lowered to just 5% and the decision is entirely up to the school owner. More limits are additionally placed on this differentiation such as limits on duration, it is stated: “The arrangement should normally not last longer than one academic year at a time and should be based on the number of teaching hours in all subjects in each year of study” (p.2).

Findings:

Even though the core curriculums of both nations require differentiation, Finland allows more freedom in its application. In Finland, decisions about differentiation are made at the student/teacher/parent level independently from additional bureaucratic or administrative consent, limitation, or formality. On the other hand, in Norway, despite terms such as “must” and “should” used in the nation’s core curriculum when referring to differentiation, additional, subsequent texts in the other parts of the curriculum clarify that it is “not a right” and limit its application. Differentiation in Norwegian schools requires the written approval of the school owner who is further regulated by a one-year limit in its application. This implies that Norwegian stakeholders are less autonomous than Finnish ones, as application of differentiation should abide to administrative rules and top-down regulations.

5.2.3 Imagination, creativity and the arts in the curriculums

After *differentiation*, this section verifies load, pace, and complexity as presented through *imaginative and creative skills* in the curriculums. In this respect, as the main clear difference

observed has been in the approaches of the two nations to teach the mother tongue, the focus here has been on them.

A fundamental task expressed in the Finnish curriculum in teaching the mother tongue is to allow pupils the possibility to use their imagination, as they will: “Acquire not simply means of analyzing reality but also possibilities to break loose from reality, to construct new worlds and connect things to new contexts” (p.44) ... “Their imagination, vocabularies, and ranges of expression will be enriched (...). Reworking of things heard, seen, experienced, and read, with the help of improvisation, narration, play and drama, integrating these skills into other artistic subjects” (p.45). The description of a good performance highlights creativity: “Production of text based on the pupil’s own observations, everyday experiences, opinions, and imagination, with emphasis on content and the joy of creating” (p.46).

On the other hand, in the Norwegian Framework for Basic Skills, the mother tongue writing skills that should be mastered remain technical such as the capacity to plan what to write, to construct clear texts and communicate ones’ own opinion and arguments. The requirements stated in fourth-grade represent and summarize the requirements of other primary grades as follows:

Can choose varied strategies as basis for writing, and integrate, refer and quote relevant sources, can revise texts and assess their qualities...Can construct complex subject-related text using relevant terminology and means of expression adapted to subject and purpose...Can argue for or against points of views and make a decision. Can explore subject-related topics and write in different styles, using different structures...Can reflect and assess one’s own learning when working with subject-related texts (p.11).

A main difference between the two curriculums is that even though the Norwegian Core Curriculum dedicates an entire chapter to creativity (The Creative Human Being), this aim is not clearly translated in the subsequent Norwegian Framework for Basic Skills. The objectives of the Norwegian Framework are pragmatic and do not mention any clear aims related to imagination, or creativity.

Furthermore, even though the curriculum mentions that books are to be designed to comply to the core curriculum’s requirements, assignments in Norwegian books do not clearly reflect aims about creativity stated in the core curriculum: “Textbooks and other teaching aids are essential to the quality of education. They must therefore be designed and used in accordance with the principles of this national core curriculum” (p.23). However, as the Norwegian Framework for Basic Skills does not pick up on the creativity and imagination skills stated;

the books that follow also miss the focus on such skills. And, on the other hand, since the Finnish curriculum is unified, it allows ideas to be followed through, and those objectives are clearly identifiable in the mother tongue class books. The development of imaginative skills is clearly solicited in those books, and teachers have pointed out that assignments always had questions requiring the use of one's imagination, along with questions about comprehension.

Other differences in Creativity and arts programs:

All the classrooms visited in Finland, from first to fourth-grade, had two hours of arts and two hours of handwork per week, they additionally had two hour of music that usually involved the use of some instrument with a specialized teacher. In Norway, first-grade pupils were given two hours of music and two hours of art classes per week but had no specific handwork classes; instead they took two hours of English. When it comes to music, Norwegian classes involved learning songs but never involved the use of instruments, unlike Finland. As Finnish pupils had two more hours of handcraft per week, and their music lessons involved the use of instruments, this means they are more involved in artistic activities than Norwegian pupils.

Differences in learning foreign languages have also been observed. The curriculum indicates that in Finland, pupils are sometimes learning Swedish along with Finnish from the first school year at age seven. Later, at age nine, they start learning a third language, usually English. In Norway, learning English always begins in first-grade and is taught from age six along with Norwegian. Norwegian pupils are, therefore, three years younger than their Finnish counterparts when they start learning English. On the other hand, instead of the language courses that the Norwegians are taking in first and second grade, the Finns are taking more crafts classes. This highlights the greater focus on artistic skills that is found in Finland's primary classes. It is also an indication of a lesser load on Finnish pupils as these don't have to memorize words and sentences while doing crafts, which is what Norwegian pupils must do when they are learning a foreign language.

Findings:

Imagination and creativity are important to both; however, the Finnish curriculum gives clear guidelines on their application in the language books, and subsequently in the classroom. The Norwegian curriculum remains abstract and does not mention them in the Framework for Basic Skills. Finnish books and teachers have clearly picked up and integrated the skills, especially in the weekly writing assignment, while it remains random in the Norwegian books

and classroom. In the early primary classes, there is greater focus on arts in the Finnish schools as more hours are dedicated to them while in Norway the focus is on learning English.

5.3 Presentation of data based on classroom observations

This section presents and details the findings based on classroom observations. During these observations, time was paced and divided into 15-minute intervals, writing down what was happening in the classroom every 15 minutes. Notes were taken about the teachers' instructions and the activities that were taking place as well as the responses from the students. To illustrate different aspects of the inquiry and clarify the findings, several tables have been used that facilitate the identification of similarities and differences between the classrooms of Helsinki and Oslo. These tables present the diversity of collected data, focusing on the ideas of work and play to verify differences in LPC.

5.3.1 Pacing lessons and breaks

To go into more detail about the pace of teaching and recess time, the following tables show how many minutes were spent on each lesson before pupils were given a recess. They also show how many minutes were given for recess before lessons started again. By doing so, the tables clarify, not only the pace, but also the load of teaching time, before pupils are given a break. The following table shows the pace as observed in Helsinki's primary schools:

Table 1. Pace of lesson time and break time in Helsinki schools.

<i>HELSINKI</i>							
<i>GRADES</i>	<i>LESSON</i>	<i>BREAK</i>	<i>LESSON</i>	<i>BREAK</i>	<i>LESSON</i>	<i>BREAK</i>	<i>LESSON</i>
<i>H1G1</i>	<i>45 min.</i>	<i>30 min.</i>	<i>40 min.</i>	<i>35 min.</i>	<i>45 min.</i>	<i>15 min.</i>	<i>45 min.</i>
<i>H3G1</i>	<i>25</i>	<i>20</i>	<i>40</i>	<i>15</i>	<i>30</i>	<i>50</i>	<i>45</i>
<i>H4G1</i>	<i>45</i>	<i>15</i>	<i>30</i>	<i>15</i>	<i>45</i>	<i>30</i>	<i>45</i>
<i>H2G2</i>	<i>45</i>	<i>60</i>	<i>45</i>	<i>60</i>	<i>45</i>		
<i>H2G3</i>	<i>45</i>	<i>45</i>	<i>15</i>				
<i>H3G3</i>	<i>45</i>	<i>15</i>	<i>45</i>	<i>15</i>	<i>45</i>	<i>30</i>	<i>45</i>
<i>H3G4</i>	<i>45</i>	<i>15</i>	<i>45</i>	<i>15</i>	<i>45</i>	<i>30</i>	<i>45</i>

Table-1 shows that in Helsinki, lesson time (LT) has varied from 15 to 45 minutes. Break time (BT), which always took place outdoors, has varied from 15 minutes to one hour. The table also shows an overall consistency when it comes to lesson time, with a clear majority of

lessons being 45 minutes long. Out of 25 lessons observed only four were less than 45 minutes and none went over this time limit. This gives the following equation for learning time in Helsinki: $15 \leq LT \leq 45$. On the other hand, most of the break time was 15 minutes long, followed closely by 30-minute breaks. The maximum observed break time was one-hour, which gives the following equation for break time in Helsinki: $15 \leq BT \leq 60$.

The Oslo table (Table 2) shows that lesson time (LT) has varied from 10 minutes to 115 minutes, in other words $10 \leq LT \leq 115$. Out of the 13 lessons observed, the majority varied from 40 to 50 minutes. Three went over without recess, from 65 to 115 minutes, and three were shorter from 10 to 30 minutes. On the other hand, break time (BT), which was sometimes indoors and other times outdoors has varied from 5 to 60 minutes, giving the following equation: $5 \leq BT \leq 60$.

The next table shows the pace, as observed in Oslo's primary schools:

Table 2. Pace of lesson time and break time in Oslo schools.

OSLO							
GRADES	LESSON	BREAK	LESSON	BREAK	LESSON	BREAK	LESSON
O2G1	115 min.	30 min.	40 min.	15 min.			
O1G2	45	15	85	15 + 35	45		
O1G4	65	10	10	15	40	5	30
O2G4	50	5	50	20	45	30 + 30	15

Findings:

Clear differences were highlighted between Finnish and Norwegian schools when it comes to the time spent on lessons and how often pupils get a recess. The results show important inconsistencies in the length of lesson and break time in Oslo schools, far more than what was observed in Helsinki. Lesson time in Norwegian schools has varied from 10 to 115 minutes, and break time from 5 to 60 minutes (Table 2). Finnish schools have shown less irregularities as lessons were usually 45 minutes long (this was also a maximum time for lessons), and break time ranged from 15 minutes to 1 hour (Table 1). Extreme results were therefore found in Oslo as one lesson in a first-grade was close to two hours (115 minutes class - see grade O2G1 in Table 2), which is more than could be expected for a primary class. And one break was only 5 minutes, which is less than a minimum time that could be expected for any type of break. In Finland, on the other hand, the minimum break time observed was 15 minutes,

which gives 10 more free minutes to pupils in that nation. Both nations have had a similar maximum observed break time of 1 hour.

Table 3. Range of time spent on learning and time spent on breaks in Oslo and Helsinki schools.

Compared results of learning time (LT) and break time (BT):		
Range of time for class periods and break periods (measured in minutes):		
Learning time:	Helsinki = 15 ≤ LT ≤ 45	Oslo = 10 ≤ LT ≤ 115
Break time:	Helsinki = 15 ≤ BT ≤ 60	Oslo = 5 ≤ BT ≤ 60

Additionally, while lunch time in Norwegian schools is spent in the classroom, in Finland it takes place in the cafeteria outside the classroom. Lunch time is counted as break time in the tables. This means that in Finland, as pupils leave the classroom for lunch, not only do they move their bodies, but they also get to choose who to sit and socialize with during meals. This is not the case in Norway as during lunch, pupils remain sitting on their own desks and are often required to remain quiet to listen to a story that the teacher reads, or watch an educational or entertaining video on the screen.

Table 4. Daily learning time indoors (LT-I) and break time outdoors (BT-O) for the classrooms observed in Helsinki.

HELSINKI					
	GRADES	HOURS OBSERVED	LT-I	BT-O	
1	H1G1	4.25	68.62%	31.38%	
2	H3G1	3.83	62.22%	37.78%	
3	H4G1	3.75	53.33%	46.67%	
4	H2G2	4.25	52.94%	47%	
5	H2G3	1.75	57.14%	42.86%	
6	H3G3	4	75%	25%	
7	H3G4	4	75%	25%	
TOTAL		25.83 hours	63.46%	36.54%	
<i>TOTAL HOURS OBSERVED</i>			<i>% of time per school day</i>		

5.3.2 Overall teaching time versus recess time:

The previous tables showed the pace during the day using minute as units of measurement, the next tables are focused on measuring the percentage of load per total school day. To do

such measurement, the tables start by showing the total number of hours observed in each classroom per day, then they show the total percentage spent on learning/teaching or learning time (LT), and the total percentage of time spent on recess or break time (BT) per school day. At the bottom of each table, a total gives the number of hours observed in all the schools of each city, and an overall average of the percentage of time spent learning, time spent on recess, the total average time spent indoors, and time spent outdoors.

For the sake of clarity, each nation has its own table. The first table presents the Helsinki findings. The Helsinki table (Table 4) shows that out of a total of 25.83 hours observed, 63.5% of the time was spent indoors on learning/ teaching (LT-I). The table also shows that pupils were outdoors for recess 36.5% of the time each school day:

Learning time indoors: LT-I = 63.46%	Break time outdoors: BT-O = 36.54%
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The second table presents the Oslo findings as follows:

OSLO						
#	GRADE	HOURS	LT	BT	IN (LBTI)	OUT (BTO)
1	O2G1	3	77.5%	22.5%	85%	15%
2	O1G2	4	72.9%	27.1%	79.2%	20.8%
3	O1G4	3	82.8%	17.2%	91.4%	8.6%
4	O2G4	4.1	65.3%	34.7%	77.55%	22.45%
TOTAL:		14.1 hours	74.62%	25.37%	83.29%	16.7%
Conserv. G2&G4:		8.1 hours	69.1%	30.9%	78.4%	21.6%
TOTAL HOURS OBSERVED			% of time spent per school day		% of time spent per school day	

Table 5. Daily learning time (LT) and break time(BT) for classrooms observed in Oslo. IN(LBTI) measures time spent indoors for learning and breaks, OUT (BTO) measures time spent outside for breaks only.

Oslo table (Table 5) shows that out of a total of 14.1 hours observed, 74.62% of the time was spent indoors on learning/teaching. The pupils also spent overall 83.29% of the time indoors for lessons and breaks (including lunch breaks). Since, in the Norwegian primary schools, a lot of the recess and break time was spent inside the classroom, it was deemed necessary to create two additional categories in the Oslo table: one that shows the total time spent indoors for lessons and breaks LBTI = 78,4%, and one that shows the total time spent outdoors, which is a time used for breaks only BTO = 21,6%.

5.3.3 Indoors versus outdoors and conservative measurements:

In this research, it is important to differentiate break time spent indoors (BTI) from break time spent outdoors (BTO), because the quality of recess varies depending on how it is spent, as an outdoors recess offers greater release of tension than one spent indoors, and therefore presents a different load on the pupils. This will be explained further in the next chapter. Table 5 shows that the pupils had a total average recess time of $BT = 25.37\%$ of the total school day. That average represents indoors and outdoors recess time. The total outdoor recess time alone averaged only $BTO = 16.7\%$ of the school day, and the total recess time spent indoors was $BTI = 9\%$. Which means Oslo results are: $BT = BTI + BTO = 9\% + 16.7\%$.

Estimating conservative figures:

More conservative figures can be estimated by eliminating the extreme or special cases. For example, excluding days where classroom observations in Oslo schools were for only 3 hours instead of 4 (see Table 5), gives $LT = 69.1\%$ of learning/teaching time, and $BT = 30.9\%$ spent on breaks (instead of the previous estimate of 74.6% and 25.37%). This prolongs recess time by approximately 5% and reduces learning time by the same percentage. With such conservative figures, the total indoor/outdoor recess time in Oslo compared to Helsinki becomes: $O = 30.9\%$ to $H = 36.5\%$ of the school day (Table 4 & Table 5). This means that out of a 4-hour school day, an average of 12 extra recess minutes are given to Helsinki pupils. This remains considerable since it amounts to approximately 60 extra minutes per week and over 30 hours per school year.

For even more conservative figures, removing the extreme case of classroom H2G2 in Helsinki (as it has an excessive recess time - see Table 4), gives 5 additional recess minutes per day. This means that with the most conservative estimations, Helsinki's pupils still get 25 extra minutes of recess time per week, amounting to about 10 extra hours per school year. This remains a relatively important difference related to load of work.

As it is important to differentiate between outdoor and indoor time, the conservative results in Oslo give an average of 78.4% of the school day spent indoors (instead of 83.29% in the previous calculation - see Table 4), and the average time spent outdoors becomes 21.6% of the school day. Comparing these conservative figures (Table 5) to 36.5% of time spent outdoors in Helsinki (Table 4), gives a result of 40.5% more time spent outdoors by Helsinki pupils each school day. Even using the most conservative measurements, the difference is still important, with 9 extra outdoors minutes each day. This cumulates to 45 more outdoor

minutes per week in Finland, or over 25 hours per school year, which indicates a lesser load for Finnish pupils.

Table 6. Percentage spent per day on break time(BT) and teaching time(LT) as well as indoors and out in Oslo and Helsinki primary classes.

	Teaching (LT)	Break (BT)	In + Out	<i>BT conservative</i>
Oslo	74,6%	25,37%	9% + 16,37%	
Oslo (conservative)	69,1%	30,9%	9,3 % + 21,6%	<i>30 more outdoor hours per year in Helsinki</i>
Helsinki	63,5%	36,5%	0% + 36,5%	

5.3.4 Teaching modes:

The next tables show the type of teaching that took place in the classroom. Three different modes of teaching were identified: formal (F), semi-formal (SF), and informal (inf). These modes give additional indications about the load of teaching. The *formal* mode of teaching can be considered as the one with the greatest load since it is the least playful compared to the other two. The second category is the semi-formal and is one which allows more freedom and might include movement and/or art, and can be one where pupils are working in a group or discussing with other pupils.

Table 7. Time spent on formal (F), semi-formal (SF) or informal (inf.) teaching modes in Helsinki.

HELSINKI					
	Lesson 1	Lesson 2	Lesson 3	Lesson 4	RESULTS
H1G1	30 SF + 15 F	40 SF	45 F	30 SF + 15 F	42% F + 58% SF
H3G1	25 SF	40 F	15 F + 15 SF	30 SF + 15 F	50% F + 50% SF
H4G1		30 inf (Music)	10 inf + 10 SF + 25F	45 SF	21% F + 46% SF + 33% inf
H2G2	20 SF + 25 F	45 F	45 SF		52% F + 48% SF
H2G3	15F+ 15 SF+15 inf	15 SF			25% F + 50% SF + 25% inf
H3G3	45 SF	45 F	45 F	45 F	75% F + 25% SF
H3G4	45 SF	45 SF	45 F	30 F + 15 SF	41% F + 59% SF
TOTAL					43.7% F + 48% SF + 8.3% inf
<i>Minutes spent on each mode of teaching</i>					<i>Total Percentage</i>

The last category is *informal* teaching, which is the freest as it can use games or leave to the pupils the choice to sit where they choose and communicate freely with others.

In the following tables, the numbers indicate the minutes spent on each mode of teaching.

Table 8. Time spent on formal (F), semi-formal (SF) or informal (inf.) teaching modes in Oslo.

OSLO					
GRADES	Lesson 1	Lesson 2	Lesson 3	Lesson 4	RESULTS
O2G1	45inf + 20 F+ 25 SF + 15 F + 10 SF	40 SF			22.6% F +48.4% SF + 29% inf
O1G2	45 SF	40 F	15 SF + 30 inf.	45 SF	22.85% F +60% SF +17% inf
O1G4	15 SF + 30 F +20 SF	10 SF	40 F	30 F	69% F + 31% SF
O2G4	35 SF + 15 F	50 F	45 SF	15 SF	40.6% F + 59.4% SF
TOTAL					38,8% F+49.7% SF+11.5% inf
<i>Minutes spent on each mode of teaching</i>					<i>Total Percentage</i>

The next table summarizes the results of Table 7 and 8 and combines them for both nations:

Table 9. Total for Helsinki and Oslo showing time spent on formal, semi-formal or informal teaching modes each school day.

Teaching Mode	HELSINKI		OSLO
FORMAL	43.7%	>	38.8%
SEMI-FORMAL	48%	<	49.7%
INFORMAL	8.3%	<	11.5%

The results indicated in Table 9 show that the observed classrooms in Helsinki provided 5% more formal teaching, but 2% less semi-formal teaching, and 3% less informal teaching than the classrooms observed in Oslo. While the Oslo classrooms seemed to compensate for less outdoor recess with informal activities indoors, the classrooms in Helsinki dedicate this time to formal teaching. In the extreme case where pupils remained indoors for the longest time in Oslo classroom O2G1 (Table 6 and Table 8), pupils remained indoors without recess for 115 continuous minutes (Table 6), the teacher, however, spent 45 minutes on informal teaching or 39% of the lesson time. The rest of the time was divided between semi-formal and formal teaching. For the entire school-day the modes of teaching for classroom O2G1 have been: 48.4% semi-formal, 29% informal, and 22.6% formal (Table 8). While most of the teaching time used was semi-formal, the least time was spent on the formal mode. Only one classroom in Helsinki (H4G1 in Table 6) scored higher with 33% of the school day spent on informal teaching. However, that lesson was a music class, therefore, not a regular class, and pupils

could move around and use several instruments relatively freely and with only little guidance from the instructors.

5.4 Presentation of data from the interviews

Different points were raised during the semi-structured interviews that have sometimes revealed issues beyond the initial areas of inquiry, such as weekend assignments. The main concerns for emerging issues that were focused on relating to LPC are presented here.

5.4.1 Student assessment and testing

During the interviews, the inquiry has investigated the issue of student testing to find when and how tests were administered. Understanding student evaluation can reveal how teaching is differentiated and how the *LPC* of lessons are personalized and differentiated to the needs of each individual pupil and to the whole classroom.

One of the important issues to look for was when student evaluations took place during the school year. This information could clarify the extent of the teachers' and the schools' concerns were about adapting the lessons to the students' capacities. In general, most tests were meant to be formative rather than summative because as the two nations are welfare states, they are focused on equality and their main concern is to identify and assist the weaker pupil. The national curriculums and teachers' answers have highlighted this concern, but some have also mentioned adapting challenges to the stronger pupils as well.

The teachers' answers have revealed that some started testing early and others later in the school year.

a- Pupil assessment in Finland:

The answers have varied greatly as to when Finnish teachers evaluate their pupils. First-grade teachers have had different approaches as to how they handled their main challenge of differentiating between readers and non-readers. One main similarity was, however, that all have mentioned the involvement of a specialized teacher (or special aid, or special education teacher) who prepared, conducted the tests, or followed up with all pupils. In fact, the special teacher's specific job is to evaluate the students to make sure that no one is left behind, and to work promptly with those who need extra help. They also cooperate with the class teacher to adjust the level of studies to the pupils, which sometimes involves dividing the classroom to give more complex work to pupils who are ahead.

Two first-grade Finnish teachers were eager to evaluate, as early as possible, their pupils and divided their classes subsequently based on readers and non-readers:

H1G1: “A specialized teacher is testing each and every student...We start the first week and do as quickly as possible... a teacher is in the classroom and everyone is doing their own paper at the same time...then she has tests where one student goes to her classroom. And if he or she knows every letter, then she is going to ask them to read to her.

After the specialized teacher has done all the tests, we have a meeting and we think where this or that student goes. if I notice that this one is in the wrong group, I will move them.”

H4G1: “Of course. In the beginning of the year, we did some tests...One week after school started. [A special teacher prepared the tests] And then she told me, they can read, they cannot read. She divided them into categories ... About four [categories]. And then I did groups... Now I have two groups.”

The following third-grade teacher said that during first-grade she tested her pupils early, in the Fall Semester and gathered beforehand information about them from preschool. She, however, kept readers and non-readers together and didn't divide her class:

H3G3:

I got the papers from preschool ... so it was easy to know then who might have some problems... so in first-grade ... the first tests are in the fall ...and there's this specialized teacher who helps with that...That's quite early and it helps to know what was happening in the preschool. We have a meeting before they start school ... about the kids.

The following third-grade teacher also tested early:

H2G3: I always give for a new group an exercise where they write a letter ... it's not a test but ... I see what they are writing and how good are their language skills The special teacher made tests ... two or three weeks after the school had begun and then I gave that letter exercise on the second day...

Other teachers preferred to be more patient with their students in first-grade. The following fourth-grade teacher, for example, didn't test his pupils in the first semester of first-grade but waited for spring time to do the tests. In the subsequent grades, however, with the same students, he was testing first thing in the school year:

H3G4:

It's usually in March. That's good because the first graders, in the fall, they're managing school, how to even eat, how to communicate After Christmas, it's more exact school. I usually do it like that.

... And in the fifth grade ...when I start in August, the first thing is, I exam so I can see what they remember from last year.

... Our special aide teacher...makes these exams ... every spring...they are in Finnish and in mathematics. And I can see where they are good at, and what they need to learn more ... it's the same exam for everybody... The first are easy and then it becomes more complicated...so it becomes hard for them to solve.

Other first-grade teachers tested even later at the end of the year, just like many Norwegian teachers do in first-grade:

H3G1: “The special education teacher has this end of the year test for everybody where they see the level of each student more individually.”

In mentioning first-grade testing, the following second-grade teacher gave an even more extreme response because she had a philosophy of allowing kids to play:

H2G2:

I haven't tested ... They need to know something when they are going into the 3rd grade. It is a big challenge, but at the same time for me it is like “Let's play...and not learn all the time. Let's be human beings, let's be children.

This year...I knew that they are a lot lower... Some of them were like, “I can't do this...” Panic, panic, panic. I wanted to see the national level. So, we did the national test... It went quite good. There are a few of them that have the extra care now.

...they have groups already, I just marked on my notebooks that this one needs more ...because this age is much about those working skills, how you can do work; it's not just tests.

b- Pupil assessment in Norway:

In the visited Norwegian schools, testing in first-grade didn't occur as early as some of the Finnish schools that tested early. Norway's first-grade probably tested later due to younger school enrollment of pupils. They start school one year earlier than Finland when pupils are one-year younger, therefore, not as many of them can already read. Differentiating between readers and non-readers has been the main issue in Finland's first-grade. In Norway, however, pupils who have attended pre-school (as it is not mandatory) can be evaluated there, and those who might need extra help or who are ahead are usually pointed out. The file of children moves from pre-school to the school which will then track their further development. As preschool is not obligatory in Norway, not all pupils benefit from this type of evaluation.

Unlike Finland which has only optional tests throughout primary school, Norway has obligatory tests that are regulated by the Norwegian Directorate for Education and Training

(UDIR). As mentioned earlier, those tests, according to UDIR, have a formative purpose and help identify weaker pupils to give them the assistance they need. UDIR is responsible to ensure that the tests are prepared within a specific framework and by educational professionals working in universities or in national institutions. Furthermore, UDIR requires the tests to be conducted in the spring. The first test in Norway's first-grade is, therefore, usually conducted toward the end of the school year. During the inquiry, some of the teachers that have taught first-grade have indicated that they often became aware early on about their pupils' capacities and knowledge of letters and numbers because kids usually like to demonstrate what they know. No specific formal tests have, however, been mentioned. When it comes to the years after first-grade, some teachers interviewed have mentioned testing early; the following fourth-grade teacher, for example, mentioned needing the test results to create groups and used formative assessments to ensure groups were properly mixed. Unlike the separate groups of readers and non-readers created in Finland, the groups created in these Norwegian schools were mixed, therefore composed of pupils that had different capacities which allowed them to help each other:

O2G4: "We work early maybe the beginning of September and test... we have different types of tests... in TA (student grouping) it is important to know early which level they are in math and Norwegian because you're going to group them."

The following teacher gathered also information from previous teachers and used official and school tests to evaluate her pupils:

O1G4:

I knew from the start because I talked to the first-grade teacher, so we have a kind of a meeting every year to get information... If they change teachers, of course. [In the beginning of second grade tests are given] during the autumn.
The school has something they call "Årshjule," a calendar where they put in the tests and everything, so we can see when it's coming.

A second-grade teacher explained taking each pupil at a time for a personal informal evaluation few months after school had started:

O1G2: "We had, about this time, a conversation with each student outside ... So after about three months (of the beginning of the school year)."

Findings:

Finnish teachers are not required to test their pupils, they can choose any test they want and use it any time during the school year. Many of the teachers interviewed tested early and

followed up on testing throughout the year. Several teachers tested first thing in first-grade and divided readers from non-readers into two separate classes for few hours during the week. On the other hand, in Norway, the main tests were not usually scheduled by the teachers but required and scheduled by the school management following official guidelines. In first-grade, tests usually happened toward the end of the school year per official guidelines. In later grades, some teachers tested early because they needed to know student levels to create mixed groups for a few hours during the week.

5.4.2 Homework

In the interviews, the questions relating to homework sought to find answers to the following issues: How long did students spend on it? Did teachers differentiate or adjust *complexity* and *load* to the capacity of the pupils? What value did teachers attach to homework? Different other issues were also occasionally brought up during the interviews as some were deemed important to include, such as weekend and writing assignments.

a) Time spent on homework

Investigating the time spent on homework helps to understand the *load* of work that is given to the pupils.

In Finland, the main answers have ranged from thirty minutes to one hour:

H2G2: “I’ve asked and it differs. When they actually do it, it’s half an hour to an hour. But their parents say it can take three hours, three or four hours, the whole day just discussing about homework.”

H2G3: “It’s approximately from 30 minutes to 1 hour... In Finland, it’s the normal amount of time. So, if it goes over an hour, then it’s too much.”

H3G4:

Usually, it depends, but the quicker one might be fifteen minutes to thirty minutes. But I say to the parents that if it’s more than one hour a day, then you can stop. One hour is usually the maximum time I recommend... Yes [the minimum is 15]. If it’s done in less time, it’s not done properly.

While, most teachers in Finland have estimated the average time spent on homework to be about 30 minutes, most teachers in Norway have estimated their pupils using half that time, at a 15 minutes average per day. Also, while the maximum time mentioned in Finland was one hour, it was forty-five minutes in Norway. Additionally, even though the estimated time in

Norway has ranged between 15 and 45 minutes, some have expressed worried concern about students spending more time on homework. The answers have been as follows:

O2G1: They probably spend half an hour... Well, maybe [the average is] 15 minutes a day.”

A fourth-grade teacher clarified that she hopes it was not more than thirty minutes:

O2G4: “Between twenty and thirty minutes (per day). I think, I hope not more than that.”

And when asked if in first-grade her pupils also spent up to 30 minutes on their homework, she answered: “No, I hope not! Then they got...something to read, 15 minutes, I think.”

Another fourth-grade teacher said not more than 45 minutes, but was corrected by yet another one who believed that 45 minutes was about the right amount of time for a fourth grader.

Findings:

The teachers’ estimate of daily time spent on homework was 15 minutes longer in Finland than it was in Norway and ranged from 30minutes to one hour. An attitude or value difference was also noticed; while a Finnish teacher’s estimated that homework done in less than 15 minutes would be done improperly, Norwegian teachers expressed fear about homework taking more than 30 minutes in 4th grade, or more than 15 minutes in first-grade. One hour was a normal amount of time spent on homework in Finland according to the teachers, while it was 15 to 30 minutes in Norway. There was therefore a tendency for greater appreciation of homework in Finland than in Norway in the interviews.

b) Homework differentiation

The inquiry went on to find out if *load* and *complexity* of homework were differentiated and adjusted to the capacities of the pupils. Several approaches to differentiate were found; In Finland, some teachers mentioned that the material was designed in a way that adjusted itself, therefore they didn’t need to give different assignments. The answers were as follows:

H3G1: [Different levels of homework?] “Yes, sometimes but not every day. For example, this is the same homework but they do it differently. They are designed in a way, where advanced students can do more while weaker students can do less.”

H4G1:

Usually they have the same homework... usually they are reading different pages... some are reading easier words, some are reading stories, and every week they need to write a small story. And it’s good because some can only write words and some can write two pages...everyone can write something.

Others answered that they gave more quantity or more difficult work. The following teacher had many research type assignments and focused on increasing the difficulty of the task:

H2G3:

[If they spend less than ten minutes] then I try to make the student do more complex work], making it a wider search for example or then writing more, longer text and more complex language, not more [quantity].

The following fourth-grade teacher didn't mind giving more quantity as well as increasing complexity to his pupils. He mentioned starting to use that method since first-grade.

H3G4: "I might give different homework to some ... I'll give more, I'll make more difficult exercises."

A first-grade teacher H1G1 explained that pupils who could already read when they started school were taught a couple of times per week in a separate class, and were given different home assignments in reading as well as in writing.

Some differentiation was also observed in Norway; a second-grade teacher O1G2 said that she adapted the level by usually giving her pupils a different page to read from the Norwegian class textbook. She also gave a totally different assignment sheet to pupils of different levels.

A fourth-grade teacher O2G4 explained adjusting to the weakest, such as the ones with learning difficulties, and to the strongest, such as in English:

Most of them are having the same homework but the very weak ones and the very strong ones have their own. I have two students that have English in sixth grade; they have their English homework. And I have another student that has another English homework than the others because he is also very good. And the one with dyslexia has his own homework in all subjects... The same in math, those who are very good. These math books... there are color codes ... you can choose between three levels.

She also mentioned enquiring about the load of work with parents: "We are talking about that ... the parents tell us if they think it's too much or too little."

The same teacher, however, answered "No, I don't" to the question if she gave more difficult homework to someone who said it was too easy.

The math textbooks have assignments that adjust themselves as they often have three exercises per page with three color codes: yellow, red and blue, from the easiest to the most difficult. The pupils are required to complete the yellow and red exercises. The difficult blue exercises are left as an option for those who could or wanted to complete them.

When another teacher from first-grade was asked if more work was given to pupils who finished their homework too fast, she answered she didn't, instead she gave them an optional drawing to do:

O2G1:

No... I have an extra page that they can do [per week], it's optional... But they sometimes like to do more homework than they're supposed to... this boy especially. He asked for more homework... I said you know what? You can... I gave him a little assignment to draw something somewhere...

Findings:

Answers from Finland and Norway have shared some similarities, such as assignments that adjust themselves and differentiation of reading assignments. While three teachers in Finland seemed quite actively engaged in adjusting quantity and difficulty, only one teacher in Norway O1G2 has expressed clear engagement in adjusting difficulty as she gave a separate assignment sheet for pupils of different levels. In general, however, home reading assignments were differentiated in Norway, as pupils were given books of different levels to read or are reading different pages from the class-book.

c) Weekend activities:

In Helsinki, on the first day of visit and while observing class H1G1, the teacher asked her pupils if during the weekend, they had played the 'numbers' game with their parents, as she recommended. The mention of a weekend assignment was unexpected, which prompted the inquiry to look further into tasks that might be given beyond the regular school days, as this issue can affect the subject of *load*.

Two third-grade teachers in Finland mentioned giving weekend activities in science:

H2G3: Yeah, maybe, it depends, but usually, every day they get something, well they can do it on Friday after school. Sometimes they don't get anything, it can also be an experiment for example for science.

H3G3: Yeah, normally in science. It's more like writing about that thing that we have discussed or tried here in class. And then at home they remember it again, and then they can write about it.

A fourth-grade teacher mentioned giving assignment occasionally:

H3G4: Not first, second or third-grade, but I will give fourth, fifth and sixth-grade from time to time, not always.

For earlier grades, a first-grade teacher (H3G1) said that she gave recommendations on how to be on the weekend rather than what to do. Her recommendations weren't directly linked to academic work, but on Mondays she usually asked them if they followed her what she said, and the pupils who had were usually better prepared for the week, as she claimed.

A similar response came from a first-grade teacher in Oslo. While she recommended a math game to play with their parents, she mostly encouraged them to play outdoors:

O2G1:

“I give the parents hints of what they can do with their children... There's a hand math game where you have to try to subtract until... I think it's important that the parents take them out and enjoy the day outside or go to something fun or just enjoy their time together on the weekends. I think that holds a lot of value and I think that's also in the Norwegian culture, it's important that they connect... children are always learning and so there are many things parents can do with their children. But it's also just to spend some quality time together.”

A fourth-grade teacher (O2G4) indicated that she might give an optional homework on Friday, but also that some pupils choose to do their weekly homework during the weekend because they were too busy with after-school activities during the week: “We have a weekend homework we could plan on Friday and those who want can – I have two students that bring their books with them on the weekend, they are doing all their homework on the weekend... Because they are going to so many activities, and I don't want them to do that, but it's their parents who decide.”

Findings:

Similarities: First grade teachers of the two nations have shown similarities in terms of recommending optional non-academic activities for the weekend.

Differences: Greater differences were observed in higher grades; it seemed routine and acceptable in Finland to recommend some activities such as a scientific experiment, while in Norway, the weekend is considered a free time, unless working then is a necessity, such as the case of one fourth grade O2G4.

d) Value teachers attach to homework and other issues:

Teachers' opinion is likely to have an impact on the *load* and *complexity* of the work they give. The value they attach to homework is revealed by the way they talk about it, as is highlighted in the following:

The first interview in Finland was of a first-grade teacher (H1G1) who stressed how often she gave homework and used the word *always* frequently to support her statements: “There is *always* homework”, “there is *always* a story...” “There is *always* a new letter on Monday... there is *always* a picture...” Her repetitive use of the word conveyed a positive disposition toward homework, underlining its importance.

Several Finnish teachers expressed also enthusiasm about writing exercises, and one mentioned the subject nine times during the interview:

Writing two times per week...reading and *writing* about the text...then we are going to *write* more...you’ll have to *write* something about the picture...*write* some words or sentences about the picture...

Other teachers in Finland also highlighted writing assignments, and the importance of homework in general, such as a third-grade teacher (H2G3) who stated: “Every day they should be writing and reading something.”

About how much her pupils get to write, she answered: “It depends on the exercise but from half a page to one page. One page is kind of maximum, but then I always give an option to write more of course.”

She, therefore, clarified that she gave her students a minimum quantity but not a maximum limit to write.

A fourth-grade teacher H3G4 also gave a minimum limit: “I give homework every day. Usually Finnish language. I give lots of assignments where they have to write a story, a minimum of one page.”

He also stated the need to give more homework to first-graders if they finished too fast:

So, they know how to work because for the sixth graders, seventh, eighth, and ninth, there will be a lot of homework. So, if they don’t know how to do it in the first-grade, it’s hard for them to understand later that they have to sit down and work.

Even though the research didn’t focus essentially on writing assignments, several Finnish teachers brought up the subject automatically demonstrating a special interest in developing writing skills. This same interest wasn’t brought up by Norwegian teachers.

In Norway, on the other hand, a first-grade teacher O2G1 expressed a rather negative attitude toward giving more homework to pupils who finished too fast:

“Because I also don’t want them to... I want to give them the chance to be children as well and not sit and do homework all day. It’s a difficult thing, but honestly, for first

grade, I think it's better that they find things to do at home...that they can play outside, with just a stick and a little rock. And they love it. So, I try to teach them things like that...They sometimes like to do more homework than they are supposed to... But there's always that love-hate thing with homework because you want them to enjoy their time at home. When I was a kid, I went outside and played... Here, now, the kids don't go outside very much."

This teacher O2G1 mentioned earlier *giving a drawing* as an extra assignment to pupils who asked for more homework (see Homework Differentiation). In comparison, a Finnish first-grade teacher said giving pupils the choice if they wanted more homework:

H3G1: "Some of them ask for more, they are allowed to choose."

While the Finnish teacher had a flexible attitude in giving more homework, the Norwegian teacher gave only a non-academic task to pupils who asked for more.

Another fourth-grade Norwegian teacher O2G4 also expressed reserves about giving too much homework. When asked about how long they spent on it, she expressed hope they didn't spend too much time: "Twenty and thirty minutes, I think, I hope not more than that."

When asked if her first-grade pupils could have spent up to thirty minutes on homework per day (as Finnish pupils do), she also expressed reserves and hoped it was much less: "No, I hope not...15 minutes, I think."

Findings:

Finnish teachers had a more positive attitude toward homework than their Norwegian counterparts. While they highlighted the value that they place on writing assignments and their concern to instill early on in pupils the habit to work, Norwegian teachers, on the other hand, were concerned about impeding on the pupils' free time with too much homework.

5.4.3 Methods of differentiation or adjustment to student levels

The methods used to adapt the classroom material, greatly influence issues of *LPC*. For this reason, the interviews have inquired about the approaches teachers choose to differentiate tasks to the overall capacity of the classroom and to the individual capacities of each pupil.

a) Methods used in the classrooms of Helsinki

In Helsinki, teachers were independent in managing their classrooms and took initiative in planning their lessons. Out of the seven teachers interviewed, two from first-grade stated that they divided the classroom a few hours per week, totally separating the readers from the non-readers. The first teacher divided the class with other teachers based on capacity:

H1G1

The situation here is that ten of the students already know how to read...I have three groups ... normally on Mondays and on Thursdays, we have three teachers; myself, the other first grade teacher, and our specialized teacher. We divide the students into three different classrooms...and I will give them ... sometimes different exercises at school... [We differentiate also with the writing] once a week...

The second teacher took care of the separated classes all by herself by planning her own class schedule and giving her pupils different teaching times:

H4G1

I did groups... Now I have two groups. I have six lessons when I have half and half class. [One class is for] those who can't read and the other is for the students who can read. I think it's good because you can do other things... I have a star group and a flower group... On Mondays, the flower group starts the day at nine o'clock and their school day ends at twelve o'clock. And then, the star group comes at ten and they end at one o'clock... Only for six hours, they are in these different groups... because there is reading, there is writing. There are so many things. It's easier.

Both teachers separated pupils few hours during specific mother tongue classes but kept the pupils together during other courses. In math, for example, they used in-class differentiation by giving on occasions extra material to pupils who could handle more challenge.

H1G1:

In math... For example, him he's very good, I give him extra assignments...that are a little bit harder. But I think that it's important to make those easy exercises and rehearsals, too...now in first grade, I don't stress about it.

H4G1: "In math, I see who can do better and who needs more practice, and I give them Sudokus (...)."

The other five Helsinki teachers interviewed kept the student together all the time in the same classroom. They applied in-class differentiation methods and sometimes used extra material to adjust the level to different pupil capacities.

H2G2:

[I follow students] in the classroom mostly... I have these different books for those who are behind, these e-books...I give my own extra teaching to them and there are nine who need it...three or four [need support] in language and two in mathematics. And then I have three to whom I have to do those papers, because the working skills are not so good.

H2G3:

I gave extra material to the better ones ... I tried to help the weaker ones...I didn't have the extra teacher to help me, I was all alone... There are different series of those books ... [I] can take copies ... I might have some other material as well.

Several teachers mentioned differentiated material in the class-book assignments, as well as, using differentiation for readers in first-grade:

H3G1:

I have exercises which adapt.

Translator: Exercises in themselves are differentiated in the book... Everybody has their own pace. All start with the same exercise which is required from everybody and after that they take different tasks.... They have the same structure in every lesson... [There are three levels in the book... it becomes more difficult]. When you have more skills, you adjust to the next level.

Teacher: I try to remember also the better pupils. I'm trying to but I have to say that I am a Finnish teacher and if I have pupils who don't have so much skills... I have to pick them up... I have many books which I copy... pupils who can already read have a notebook ... where they get this sort of picture and they write about it...

H3G3:

In the books, you can choose ... if you're very quick, there are some extra things you can do... I have some extra papers that I give those who are very clever and want to do more.

In the first grade ... I had readers and non-readers but ... I didn't have any assistant, nothing. So, they were all [together] ... those who could read could do more things in the book So, they heard what we did with those who couldn't read.

One fourth-grade teacher, additionally to challenging the readers in first-grade also mentioned giving more work to pupils who were good in math:

H3G4:

The first grade, I think is the most difficult because some of them can already read and you have to find exercises that are challenging them... I have to [adjust to their strength] ... Math, also. Some of them already know how to divide... But usually, it goes like, the strong ones will say, they always want more...I do give them more.

In addition to doing in-class differentiation and giving adapted material to some pupils, four out of seven teachers in Helsinki mentioned giving extra tutoring to weaker students, often with the help of a *special teacher*:

H1G1: I will give extra tutoring to some students after schooldays.

H2G2: [The *special teacher*] takes [pupils who need] ...mathematics, and language [support]... every week it's a different case.

H3G1: I have also a *special teacher*... She's my team partner [helping stronger and weaker students].

H3G4:

I have one extra lesson a week so I can help the weaker ones... During the day [the *special teacher* takes care of them also] but after the day, I have one hour extra...I try to see the weak ...and try to get them better.

This last fourth-grade teacher had one extra method of differentiating which consisted in creating in-class mixed groups made of pupils of different capacities who can work together. He explained it as follows:

H3G4:

I don't want to divide them too much... it's not against the law, but...I think it's for the students because... if I would be in the weak ones, it would be difficult for me to understand; I don't want to do that...

I usually [assign] the weaker...to write everything... so he/she is part of the group...I might change it, of course. Sometimes I could give it to the stronger one and see how they manage, and then sometimes the weaker one is the chairman of the group.

b) Methods to differentiate used in the classrooms of Oslo

As to the teachers in Oslo, they had slightly different methods of adjusting teaching to the capacities of their pupils. Two teachers out of the four interviewed, mentioned using an in-class mixed groups method called the TA system. That system consisted of creating several groups of four to six pupils where each group is given a different task. Pupils in a group work on their assigned task for 15 minutes, then they move together to a different task. In one of the assignments, the group sits with the teacher and works with him/her on a task; this allows for a one on one teacher/student interaction which helps the instructor to better evaluate the capacity of each individual pupil and give him/her direct feedback:

O2G1:

I have five different groups ... You don't want to have a whole table of only children who don't really understand what's going on, because then they don't get the support and the help from their peers, which is how the TA system works, they help each other. So, I have - a sort of mix – where there are children that are on the verge of being a little higher so I try to mix them in a good way.

The second teacher interviewed from the same school also mentioned the TA system:

O2G4:

New Zealand and Australia started with this TA, we call it in Norwegian. ...When I have only four to six pupils I can listen, I have more time together with each... to be near them in another way than if you have 21 or 25 because they are small, you see them.... It's just 15 minutes on each... [During the TA. they are not grouped according to their levels] because I think that they can learn from each other. A good student in math can teach when he's working here...

When asked if more challenge was given to stronger pupils, a second-grade teacher mentioned using a different approach to empower her pupils:

O1G2:

The students that were good in numbers, I made them read their own exercises before they started ... Also, I was teaching them a bit more strategy... They went around and helped other students so they also had to explain... They kind of became small teachers helping me around.

A fourth-grade teacher mentioned creating an in-class same level group in English to adjust to the stronger pupil as well:

O1G4: “Of course [the strong ones] need more challenge...Not always but I try to do that... I have three, four, five maybe [that are very good in English], so they can read together in a group.”

The fourth-grade teacher of the other school O2G4 mentioned creating sometimes separate same level groups for advanced mathematics students:

Last year we had [grouping] for the very good ones in math. Eight all together, they got extra challenges... [This year] we didn't have enough money because they now need another teacher...So, then we have to do it in class.

Another method she also mentioned was grouping same grade pupils with similar capacities: “If we see some of them need to read more, we can have courses where we put students from different classes together so that we can mix... and then work on different things.” This teacher O2G4 mentioned also creating groups in first-grade for readers, similarly to Finland:

When they are starting reading, in first-grade I think it's good that they are in a separate group... In first-grade this year... [the strong ones are together and the weak ones together] because if you can read you can work on different tests than if you can't...And in math you can have mixed groups.

However, the first-grade teacher O2G1 of that school had explained practicing in-class same level grouping only for weaker pupils and did not mention differentiating for readers:

O2G1: “I sometimes take some of the children who have a little bit of difficulty learning the alphabet...and I sit them in the middle and we work with the alphabet and letters, just with them...”

At the time of the interview none of the methods mentioned by the fourth-grade teacher O2G4 were being used. For this reason, she come across as wanting to present a better image of what was being practiced in her school. Many answers have clearly focused on the weaker

pupils; the fourth-grade teacher of the other school mentioned creating separate same level groups with a focus on weak pupils as well:

O1G4:

We are three teachers, and we divided them into three groups. But not the whole day and not all the time ... We can't put children in a group for more than three months, we are not allowed to... This week we have courses in mathematics and in Norwegian reading, so we try to help the pupils that are struggling a bit.

Three out of four Oslo teachers mentioned that they also get help from a specialized teacher to adjust the level and give support to the weakest pupils:

O1G4: We have one extra teacher ... she's also the third *resource teacher* who can help us making groups ... we plan it together... If one of the teachers is ill it's not easy to do.

O2G1: I already have a *special pedagogue* who takes children out of the classroom. So, the last period, she took four children out and worked with them individually.

O2G4: We have something we call *New Start* and that's for the weak ones... it is a teacher... so he's working three times a week with the weakest... Especially those with the dyslexia.

Findings:

An important differentiation that was practiced at school in Helsinki consisted of separating readers from non-readers in first-grade. Such separation did not occur in Oslo schools at the time of the visits but was mentioned to have occurred in previous years, especially for English classes. Some Norwegian teachers mentioned the support of a specialized teacher for their weaker pupils, as well as putting the latter in a group for a limited time to focus on their needs. For the weaker pupils, Finnish teachers mentioned giving extra classes at the end of the school day, or relied also on specialized teachers who took the students for a few hours to give them extra focus during regular school hours. Other forms of differentiation mentioned by teachers of both nations was creating mixed groups with mixed abilities to allow pupils to support each other during in-class assignments.

For math, other than mixed groups, Finnish teachers mentioned using in-class differentiation as well and relied on exercises from the books that had increasing difficulty levels. They also mentioned giving extra material to challenge more advanced pupils.

5.5 Online survey

A survey questionnaire to support the findings was electronically sent to over a hundred school in each nation. The participation has, however, been very low with just three participants from Finland and six from Norway. The low participation rate made the findings statistically

insignificant. Analyzing the meaning of the answers has been complicated not only because of the difficulty of reaching general conclusions with such a small sample, but also because some answers did not support the answers of the face to face interviews, and it was impossible to further verify the background of the answers. Answers collected during interviews, therefore, should be considered more reliable in this study because it was easier to verify what the teachers exactly meant and see what was happening in the classroom. An additional factor which makes the answers hard to interpret is the imbalance in number of participants between the two nations. For example, if 100% of the answers indicate a specific choice in Finland and only 50% pick that same choice in Norway, the actual number would be three teachers in both nations giving them, therefore, equal value. As low participation rates have prevented the thesis from establishing meaningful results based on the survey, it was deemed better to put it as a reference in the appendix. Check appendix B for a brief discussion of findings based on the survey, and appendix C for the full list of questions with all their answers.

5.6 Summary

Interviews have revealed that in both nations, the main focus in the classroom is on the weaker pupils; in Finland, however, since first-grade starts with pupils one year older than Norwegian pupils, Finnish teachers are faced with the extra challenge of a large number of students who can already read when they begin school. Two of the teachers interviewed resorted to dividing their readers from their non-readers, and putting them in different classes for a few hours during the week to give them adapted material.

In addition to those who made use of ability grouping, Finnish teachers have often expressed actively giving more material, and sometimes more complex content to their stronger pupils. Some of them mentioned that the books they used contained material designed to adapt to different levels. Norwegian teachers, on the other hand, have explained that in the classroom, they relied, most often, on giving stronger pupils more responsibility towards other pupils. One of the Norwegian teachers mentioned several methods that can be used to adapt material to stronger pupils, including ability grouping, however, she wasn't using any of them at the time of the interview. Another teacher had explained that they were allowed to resort to ability grouping for a limited time period, however that it took too much time to plan it and they were too busy to be able to do that.

6 Discussion of findings and conclusion

This chapter examines the findings using several lenses. It starts by presenting the educational systems of Norway and Finland from the perspective of structural functionalist theory (6.1). Then, it looks at the school systems from the perspective of organizational theory (6.2), using also Bourdieu, constructivism, cognitivism, and research to discuss different categories of findings such as: training of people in a school organization (6.2.1), differentiation (6.2.2), team and group work (6.2.3), well-being, stress and motivation (6.2.4), break time vs teaching/learning time (6.3), pace (6.4), the math books (6.5), and also total learning time (6.6). Finally, the chapter presents the conclusion (6.7)

To understand and explain the subject under study, the research starts with traditional theory and structural functionalism as they focus on the harmony and coherence of the parts that make up the whole. It then uses critical theory, which views culture as the outcome of historic and social forces to assess the findings. Critical theory is also presented through the ideas of sociologist Horkheimer who has a general to specific perception of society, seeing it as set of connections between social structures, and a network of subcultures, ending in a closer look at the individuals who compose it (Stanford Encyclopedia of Philosophy, 2013).

6.1 A Structural functionalist view

To understand the sources that have impacted on the application of LPC in the schools of two nations, this section looks at their societies in their entirety to understand how they work, therefore, looks at the macro-level of their social structure. From the perspective of *structural functionalist theory*, society is formed of interconnecting parts that interact and drive each other to form a coherent whole. All the parts depend on each other and are outcomes of each other (Crossman, 2017). An overview of the social systems of the two nations, as shown in figure 7, reveals how each component that composes their society ends up having an impact on their educational outcomes. The component at the base of society as presented here is what forms the general culture. From the distinct cultures of each nation are generated the educational policies (number 1 in fig.7). These policies are then expressed in documents such as the national curriculums (number 2). The curriculums' directives and aims are then translated into school books, as well as, guide the teachers in their approaches to teaching and managing the classroom (number 3). The final product of this social structure is the pupil who

in the end will enter society, contributing to its culture and repeating the structural functionalist cycle.

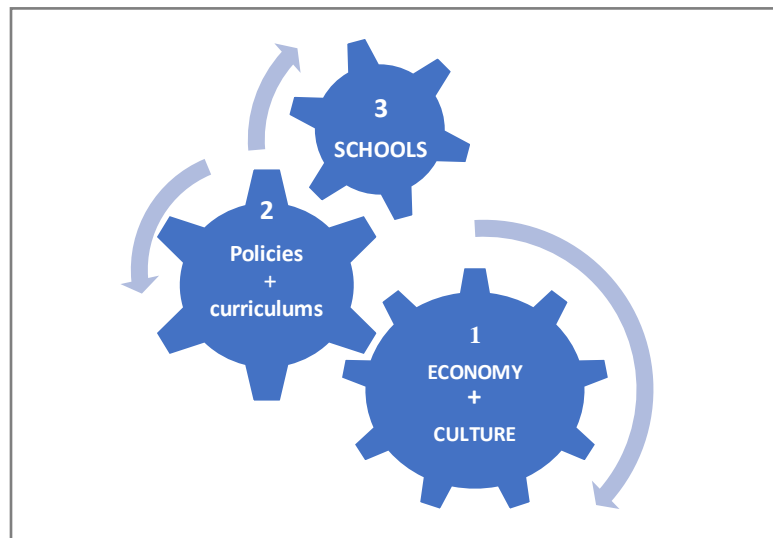


Figure 7 –Structural Functionalist view of Society. The nation’s economies and cultures (1) affect the policies & curriculums (2), these dictate school aims & outcomes (3) that impact the culture & the economy (1).

For the structural functionalists Herbert Spencer, who perceived society as an organic body, the body’s organs such as institutions that form the education system change very slowly with the slow change of the larger social body. In accordance with the theory, change occurs to adjust to new needs and find balance again (Crossman, 2017). A look at the histories of Norway and Finland will help understand how and why change occurred in the two nations and how the needs of the two nations have evolved. This can also clarify what circumstances and transformations have led to different paths in the nations’ educational systems.

Even though the two nations share similarities in their political systems such as the welfare state and common neighborhoods, they have at the base very different economic conditions that have influenced on their distinct cultures. The next sections trace the nations’ economic developments using Horkheimer’s critical theory, and show how the economies have generated policies from the larger body of the two nations, to their aims, and finally comes close to the application of teaching in the schools that the individual pupil.

6.1.1 From the economy to the educational system in Finland

The statement of a school head master in Helsinki illustrates the influence of society’s values, as well as, the quality of the curriculum on the success of Finnish schools:

A school is not a separate island of excellence — ... In my opinion, the results ... are rather an indication of the values and potential of society... Children and adolescents grow up in an environment where education is highly valued and where there is a high level of preparedness to do work. The value base is never questioned, ...and there is a practical approach in all things. The national curriculum is clearly-stated and extensive and by following it we ensure that pupils and students are left with no skill gaps (Korpela, 2008).

To further support the idea of interconnectedness of parts that form a whole, a 2002 educational research team, Välijärvi *et al.* (p.46), also observed that:

Finland's high achievement seems to be attributable to a whole network of interrelated factors, ...the learning opportunities provided by school, parental support and involvement as well as social and cultural context of learning and of the entire education system combine with each other (Hannu, 2005).

For functional theorist Herbert Spencer, the industry, jobs and the economy are society's sustaining systems; they, therefore, provide nourishment to the entire social body. When there are problems or changes in the economic sector, the whole body will have to adjust to its new demands. In line with this thought, many of today's Finnish and Norwegian values that have shaped their nations' cultures are derived from economic needs. Retracing back the nations' economic developments and educational changes will help illustrate this, as follows:

In the early twentieth century, Finnish economy faced difficulties as the nation was poor and agrarian. Industrial development was slow, and in the 1950s, the economy was still based on the industry of forestry, machinery, and engineering. At the time, recession hit Europe and slowed trade with the Soviet Union. This led to a period of depression, resulting in a serious increase in unemployment and drop in the nation's GDP. The scale of the financial crisis influenced major structural changes in Finland. In the 1960s, a rehabilitation process of expansion following the Nordic welfare model placed education under the care of the government. Further uncertainties about the future, in the 1970s, influenced transformations to reorient the nation's economy; this was followed by reforms in the education system to accommodate the new conditions. In the 1980s, Finland was still lagging other OECD nations in education and research and needed to catch-up; a cultural shift to a knowledge-based economy was, therefore, undertaken. From then on, the economy became research-and-development oriented, especially after the nation's successes in the electronic field, mainly with Nokia (Hjerpe, 2005).

This transition which greatly increased the need for the local generation of knowledge, affected the structure of the education system, gearing it toward the production of higher

knowledge (Sahlberg, 2009). Such changes led, in 1998, to a Teaching Qualification Decree No. 986/1998 which was issued requiring teachers from grade 1 and above to complete a Master's degree to be permitted to practice (Subject Teacher Education Programme, 2017). The decree came with the adoption of a policy to extensively select and train teachers. As they became better qualified, teachers became also more reliable, and their status increased, giving them significant independence. This high status allowed them to become in greater control of their classrooms, including deciding about student assessment and differentiation.

In Figure 8, a diagram showing Finnish society as seen by structural functionalists, with its interconnected parts, reveals the influence of the economy on the role of the teacher and student performance. See figure 9 for comparison with Norway.

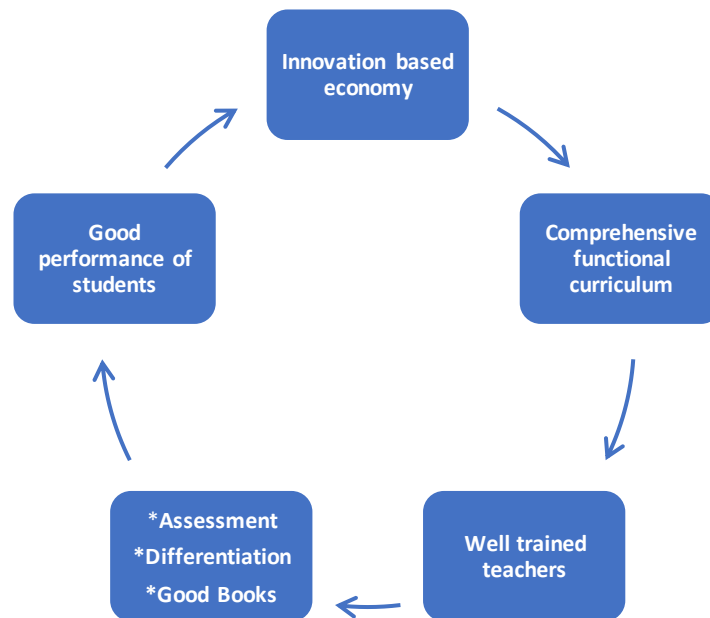


Figure 8 - A functional structuralist view of the effects of society on educational outcomes in Finland. Economic needs lead to the makeover of the curriculum and teacher status, giving them power over assessment and differentiation. This increases their application and improves student performance.

The education system of Norway followed a different and steadier path. Change, there, occurred more slowly.

6.1.2 From the economy to the educational system in Norway

In Norway, where there was a tradition of reliance on raw material, economic development took another trajectory, as the nation was already booming by the end of the eighteenth century. Since then, growth and development were more-or-less steady with occasional slow-downs. In the Great Depression of 1930, for example, the nation was hit by a hard recession which dropped its performance to the bottom of western nations. After recovery in the 1950s,

it witnessed a golden era that was followed by a slight slow-down in the 1970s. Partly because of its welfare system, this growth, as well as, that of other Scandinavian nations, was slower than most western nations (Grytten, 2005). In 1969, after oil was discovered in the Norwegian continental shelf, high profit raised local wages. The nation's production became expensive for export, and businesses lost interest in international markets. This led Norway to rapid deindustrialization. As a recession hit most western economies during the oil price shock of 1973, Norway, wasn't hit as hard. High rate growth which was sustained by the petroleum sector raised the nation's GDP per capita to one of the highest worldwide. During another financial crisis in the 1990s, high oil prices helped the nation recover again (Grytten, 2005).

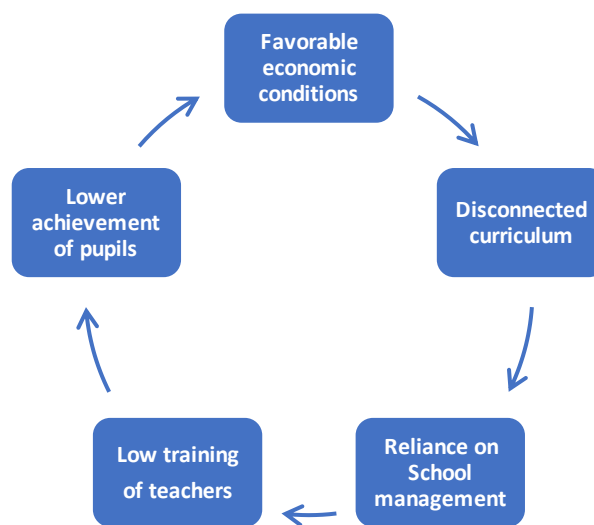


Figure 9 - The following diagram illustrates, from a functional structuralist perspective, how different parts affect educational outcomes in Norway.

While Norway could manage by relying on the export of raw material, especially because of its oil riches, Finland could not. Just depending on natural resources was not profitable enough for the Finns who had, therefore, to focus on innovation and technology. As structural functionalist would see it, it is the needs of society that lead to change, and when the needs of societies differ, change in those societies also differ. The difference between the two nations' economies has led them to have different values. Each nation followed its own path to one that would allow its economy to sustain itself and develop.

Since Norwegian economy was doing well with high oil income, there was no urgent need to make important reforms in the nation's system such as education. Therefore, from a structural functionalist perspective, as a need for major change did not exist, Norway's social body and its institutions kept on building on older structures with little change. As opposed to what

occurred in Finland, demands for teacher qualifications remained low and teacher status, therefore, was not boosted by significant transformations. This has kept Norwegian teachers from gaining as much independence in their classroom as Finnish teachers. For this reason, both assessment and differentiation in Norway have remained attached to administrative decisions. In 2006, the Norwegian education system became less centralized, moving some decisions to the school level. Procedures such as assessment and differentiation, however, have remained attached to administrative control. This lack of independence not only slows down application of pedagogic decisions, but limits them as well (figure 9).

In Norway, the influence of the values of the welfare state, where all the national structures greatly rely on governmental institutions, has remained high. Following this influence, a shift toward centralization took place from 1990 to 1995, requiring state control of pupil performance. Such control is in part achieved with testing. Assessment in Norway, therefore, remains issued by the Ministry of Education and Research, and is required to be used in all the classrooms of the nation's public schools (Elde & Hansen, 2013). Those externally imposed standardized tests to control quality have a negative impact on academic outcomes. According to some studies, such tests divert the teachers' attention from supporting pupil learning processes, to just training them to pass the specific content of tests (Berry & Sahlberg, 2006, p. 24). Freedom from excessive external control of tests, frees teaching to reorient it toward creativity, problem solving, taking risk and greater resiliency instead of conveying only a narrow and standardized knowledge of routine skills. (Sahlberg, 2009). Applying the idea of "less is more" in teaching, such as less standardized tests, gives room to develop more innovative skills and productive learning needed for the knowledge-producing economies of the future (Sahlberg, 2009). These skills have been the focus of Finnish education as they are the ones that their nation's economy requires and are measured by PISA.

As structural functionalism highlights the influence of change in one component of society, such as the economy, which leads to changes in other of its components, such as the education system, accordingly, changes in the economic needs of Finland have led to a total makeover of their educational system. In the 1990s, the reworking of their curriculum was designed to follow the highest pedagogic standards. Different socio-economic factors and stability due to oil income in Norwegian society, did not provoke such changes, therefore, the makeover of the nation's curriculum was not as drastic or thorough. The difference in economic aims of the two nations is revealed by the types of investments each has made in Research and Development (R&D), as Finland has started as early as 1996 to spend 2.45% of its GDP on

R&D. Norway, on the other hand, didn't start investing until 2007. From that year on, while Finland has been using an average of 3.3% per year of its GDP on such research, Norway has been only using less than half with an average of 1,6% of its GDP (The World Bank, 2017). This indicates a higher interest in a national income generated from innovation and therefore the production of human-capital. Such interests give the quality of education greater value and raise focus on creativity rather than on the repetition of old knowledge.

Before the first PISA results, economic growth in Norway had kept the nation in a comfort zone, positive about the quality of its educational system. The Norwegians were sure they were doing well as they have been among the greatest spender on education worldwide. The PISA shock that they received from their poor results on the test, made it evident that relying on spending alone was not enough to get the best outcomes, and other factors had to be improved. Better planning and implementation of strategies based on scientific research needed to be adopted. Characteristics of one major part of society, which is the economy, has influenced different parts of that society, as structural functional theory suggests. One of the miscalculations in Norway has therefore been derived from a strong economy which allowed them to spend more, however, which did not prompt them to re-question enough and renew thoroughly their educational system, to the extent that the Finns have done.

Since Norway wasn't compelled by economic needs to change and consider new possibilities for its future, education didn't need to change focus either. The *Norwegian Core Curriculum*, for example, seems to hold on to older and more conservative and traditional values. When the core curriculum was written in 1997, for example, the ministry was called Ministry of Education Research and Church Affairs, it was, therefore, tied to the church (Norwegian Ministry of Education Research, 2017). Its content reflects this by addressing the 'spiritual human being' and uses a chivalrous, heroic language, mentioning the Monarchy and the Church. The ministry changed its name only in 2002, to become independent from church affairs. Even though the rest of the curriculum was modernized with an updated language and aims, the classical base that is set by the tone of the core curriculum, anchors it in traditional and past values. This presents additional proof that the Norwegians were not compelled to make drastic changes to their education system.

As the entire text wasn't reworked, the Norwegian curriculum shows also a lack of continuity. This is probably in part because it is divided into four sections which were written in different years. The National Core curriculum that uses a classical language, for example, has not been updated since 1997. Additionally, the *framework for basic skills* was written in 2012 and the

quality framework, as well as, the *appendix*, were written in 2013. This could be the cause for a lack of coherence between the different components, as the language and some purposes expressed in the *core curriculum* are outdated and are not followed-up thoroughly in the newer parts of the curriculum. Such discontinuity has led to a lack of application of some of the aims that the core curriculum states, such as the necessity to solicit the pupils' imagination. This incoherence becomes more evident when compared to the Finnish curriculum and application of aims there.

The Finnish curriculum studied in this research was published in its entirety in 2004. Even though it is divided into nine chapters, it is continuous and its parts are interconnected with ideas that are followed through from theory to action. It is worked out to reflect the concerns that Finnish society attaches to the outcomes of education. Policy makers in Finland have given greater attention than many other nations to perfecting their educational system as their economy is heavily reliant on technological innovation, therefore on human capital. Socio-economic factors have driven the Finns to give education high priority, prompting them to modernize their national curriculum, using an up-to-date pedagogic language and a clear, scientific plan of action.

Compared to each other, as they are welfare states focusing on equal opportunity for their children, Norway and Finland have succeeded in increasing equality between their pupils. PISA results have revealed that the performance of pupils from diverse socio-cultural backgrounds in both nations are very close. The problem of Norway, however, compared to Finland as revealed by PISA is an overall weaker performance. In other words, strong, weak and average, all have lower performances than Finnish pupils of the same category.

6.2 Discussion based on Organizational theory

After a functional structuralist perspective, a closer look at the school as an institution helps evaluate it from the lens of *organizational theory*. Like structural functionalism, which looks at the interconnectedness of institutions that form society, *organizational theory* zooms closer and looks at the parts that form organizations. In the school organization, those parts are the administrators, the teachers, the students, the parents, and the curriculum. They are produced by policy makers and state the aims and action plans of the school, as well as, dictate the interactions of the different categories of people within them. The connections between the teachers and administrators, as well as, the teachers and students are dictated by policies found in the curriculums (*Figures 11 and 12*).

Neoclassical theory perceives organizations such as schools to be social systems made of interconnecting human elements where productivity depends on human relations (Witzel, Morgen; Warner, Malcolm; Bruce, Kyle, 2013). Based on the theory, Elton Mayo's experiments, proposes productivity that fluctuates depending on socio-psychological factors and the types of interactions people have. The theory explains further that the quality of the connections between people has an impact on organizational outcomes. When it comes to the Norwegian and Finnish schools, those social relations are dictated by policies found in the curriculum. As there are differences between the two societies, some policies stated in the curriculums also differ. This is especially true when it comes to applying some aims as they define a different path of human interaction and connectivity. Teacher-student connections, for example, are not the same in both nations, especially when it comes to assessments and differentiation (see diagrams in *Figures 10 and 11*).

6.2.1 Training of people in a school organization

Organizational theory is also concerned with the training of people in organizations. A good organization starts with a purpose and a clear laid-out plan of action, and will form or hire people with the most fitting qualifications. As the people and elements that form the school institution contribute each in their way to how well the whole organization works, the qualifications and capacities of those who are managing the tasks contribute to the success and failure of the school. Therefore, the better trained and the more qualified the people are, the more likely they are to succeed. The most important training of two main categories of people are important for the success of the school organization, is that of the teacher and the pupil.

a) Teacher training and status in Finland and Norway:

Economic dynamics led to high teacher status in Finland as the pressure of a knowledge based economy increased cultural awareness of the importance of good teachers to sustain the economy. This led policy makers to place higher demands on the qualifications of teachers which further raised their value. Teachers became viewed as heroes and saviors, with a mission to provide the new generation with the best skills to drive the nation's economy. This status made the field attractive to many candidates, and it became possible to limit its access. As the selection process became stricter with the implementation of a Master's degree, the field gained even more in status. This chain of events did not occur in Norway as the nation's economic well-being was driven by different factors.

The higher training of teachers in Finland gave them great autonomy and allowed them to become managers of their own classroom; they plan their classes and their teaching in any way they deemed appropriate and without external interference. The organization of the educational system is set up to form them, give them the best skills, and support their work to help the students learn and acquire skills.

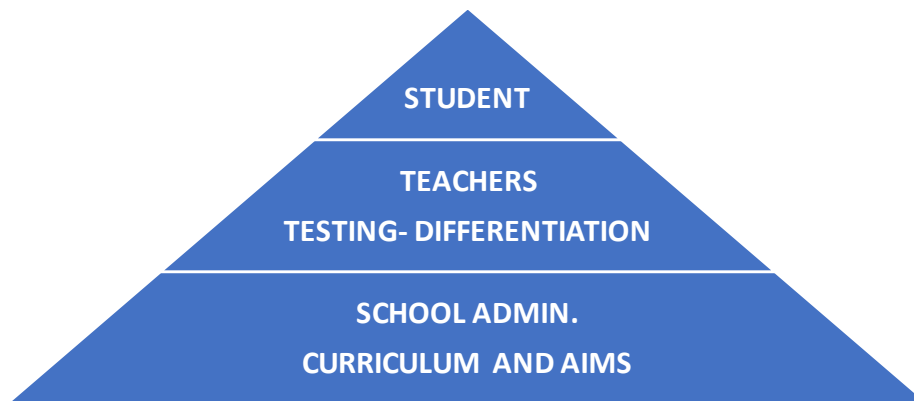


Figure 10. The pyramid shows the school as an organization in Finland, where the curriculum serves as a guide that clarifies the path to reach the aims. With the school administration, it serves as a base of support for the teachers. Teacher autonomy allows them to decide about student assessment and differentiation.

Beyond the analysis of the organizational school, Bourdieu's field theory is another lens that sets sight on the people who compose the school and their role in the institution. From the perspective of this theory, the school is viewed as a *field* which has *doxa* or internal rules set by society and the curriculum. People in the *field* such as administrators, teachers and pupils are *agents* and they bring with them their *habitus* which is their baggage that holds their *capital*. The position of individuals in society, such as the teacher and the pupil, is related to their status as determined by the values of the society they live in. Some differences in the status of teachers between Norway and Finland places Finnish teachers in a higher status within their societies than Norwegian teachers. Compared to Norway, teachers are better trained in Finland as their field is more competitive to access with a strict selection process and more demanding training. Additionally, as education is a major aim in Finland because the nation's economy is reliant on its outcomes, culturally, the Finns have attached great value to its quality since it is viewed as a way to improve their condition. Accomplishing this mission rests on the teachers' shoulders. The role of the teacher, his/her position in the institution, and therefore relation to the management, as well as his/her capacity for action and authority vis-a-vis the pupils depends on his/her status. Figures 10 and 11 show the position and the role of teachers in the schools of the two different societies. As the status of teachers is greater in Finland, they are making more

independent decisions about testing and differentiation, and can work independently with pupils and parents to tailor a study program and LPC adapted to each child.

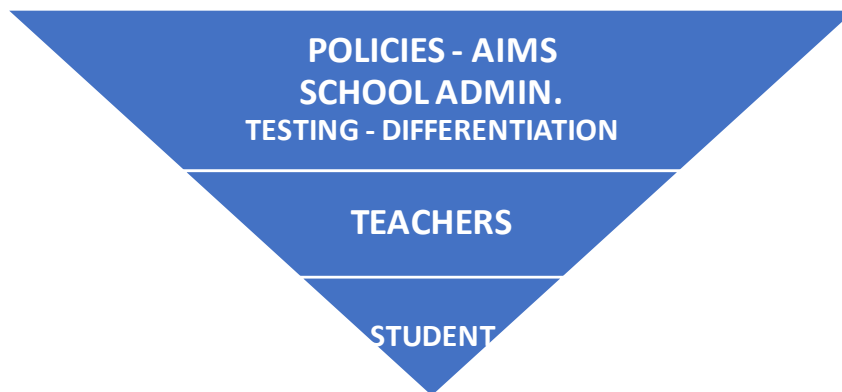


Figure 11. Relationship between the parts that form the school organization in Norway: On top, the policies & aims dominate and control the administration; they guide the school and teachers. The school administration controls testing and differentiation.

Additionally, the working plans drawn in the Finnish curriculum are followed through in well thought-out books. The books in their turn are important tools supporting the teachers' instruction and giving them satisfaction, as revealed in the interviews.

After the training and status of teachers, the following section discusses the training of pupils.

b) Training and assessment of pupils:

Before such training begins, an understanding of the diverse capacities of pupils to handle LPC is essential. Decisions about training, therefore, start with pupil assessment.

Teachers in Finland can select the tests or evaluation methods they want, and use them whenever they deem appropriate. This gives them speed and flexibility of action based on first-hand observation of their pupils. As they are in charge and managers of their classrooms, their responsibility puts them on the look-out and drives them to be actively engaged. In Norway, assessment of pupils is more of an administrative decision, based on a general yearly schedule not tailored to the specific needs of the student. Norwegian teachers are tied to official test contents and need to make sure their pupils will perform well on them. Teachers, therefore, act as subordinate managers, applying directions from superiors who don't have first-hand contact with the pupils (see figure 11). This restrains the teachers' mode of action, as well as, teaching options, and limits their capacity to differentiate to individual needs.

6.2.2 Differentiation of LPC

Two issues about differentiation need to be considered, the first is effectiveness or ease of applying differentiation, the second is choosing the more appropriate and efficient type of differentiation.

In the Finnish system, assessment and differentiation depend on the teachers' decision which speeds up its application, while in Norway the process is slowed down and hindered by managerial control. Additionally, as teachers in Finland are well trained during their Masters' degree to evaluate pupils and differentiate appropriately, they have the right skills, to do so efficiently.

Different types of differentiation:

Using Bourdieu to look at the status of pupils in the *field* of the school organizations, reveals that in Norway, academically stronger pupils were mainly given a role to support weaker pupils (O2G1, O1G2). In Finland, they were additionally often given special attention and differentiation with separate classes for more challenging academic work (H1G1, H4G1). Stronger pupils were, therefore, taken better care of and given more appropriate LPC in Finnish schools than in Norwegian ones. This reflects the cultural status of weaker and stronger pupils as perceived by the two different cultures, and their subsequent status in the classroom. The power relations change, giving priority to the weaker group in Norway, but giving more equality of treatment in Finland.

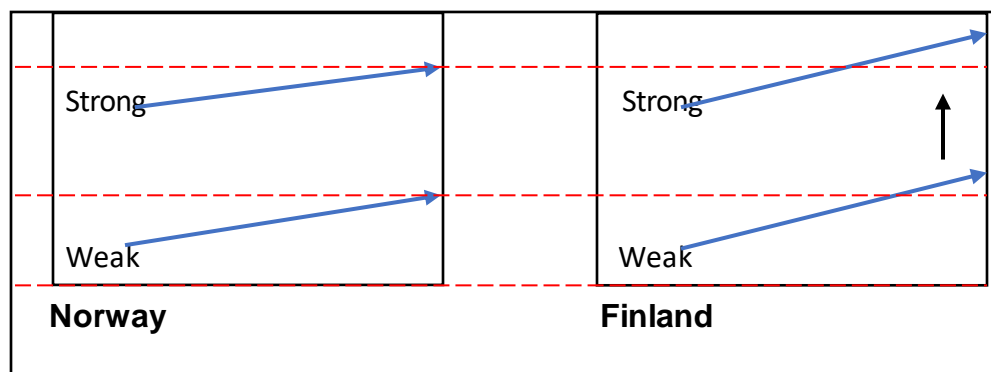
The consequences of this favoritism are revealed by Pisa results that have always placed Finnish pupils at the top of the list of reading performance. Even though Norway has also done reasonably well in reading skills, it has not done as well as Finland. During the school visits, it was noted that both nations used differentiation of home reading assignments, but in-class reading differentiation was never noticed in Norway. Several instances of separating readers from non-readers in first-grade and putting them in different classes were observed in Finland (H1G1, H4G1), demonstrating that early intervention and differentiation are clearly used there. On the other hand, first-grade readers in Norway sit with non-readers and do not get customized teaching in class (O2G1, O2G4), except when they are reading independently a book from the library. Better readers, therefore, get more appropriate challenge in Finland. This means Norwegian pupils will not always be appropriately challenged to improve their reading skills as Finnish pupils do. There is sometimes reluctance to overchallenge pupils and

a fear that it could cause them harm. A review of over 38 studies, however, suggest otherwise, revealing that:

Skipping a grade is beneficial for gifted children academically and socially and doesn't show significant disadvantages. Pupils who skipped grades were better off academically than their equally qualified peers who remained in the "appropriate" grade level (Flanagan, 2017).

Some research further indicates that this can be a disservice to the strong and the weak, as stronger pupils have the capacity to raise the performance of the entire class (figure. 12).

Figure 12. The following figure illustrates the positive effect of differentiation on stronger pupils that raises the performance of the entire class:



On the other hand, the type of streaming that separates pupils by academic ability for the whole year is not recommended because it has shown to increase performance gaps between the strong and the weak (see section 3.5.2). Such types of streaming, weakens the weak and does not show major advantages for the strong (Adams, 2014; Hattie, 2009). Partial streaming, however, as was observed in this study in Finland, which is only for a few hours per week, seems to be effective as studies and the nation's PISA results indicate. Results show that partial ability grouping, does not increase performance gaps between pupils of diverse capacities, but contributes to the betterment of the entire class (see section 3.5.2). Since previous research shows advantages to putting the strong with the weak, as it helps the weak improve their performance (Adams, 2014, Hattie, 2009), this likely means that when strong pupils are being limited in their improvements, they will also be limited in their capacity to lift-up weaker pupils. This then leads to a weakening of the entire class. Therefore, the logic of paying attention mainly to the weak, as mostly practiced in Norway, seems flawed, especially when PISA results of the two nations are compared.

Better outcomes are also thought to be reached with the help of group work. In organizational theory creating teams can contribute to better tailor the tasks and needs to the pupils and maximize output (Markgraf, 2017). In this study on LPC, such tailoring and adaptation to the

different capacities of pupils is essential. The following section discusses the efficiency of groups and teams.

6.2.3 LPC differentiation through teams and groups

Functional and organizational theory encourage the creation of group and team work for the sake of greater efficiency (Walonick, 1993). For functionalists, the success of a team depends on the capacity of its components to work in harmony. This highlights in part social skills and the creation of groups of balanced capacities in the classrooms. In Finland, the strategy of grouping temporarily pupils based on their capacities was often observed (H1G1, H4G1). Such a method was not seen in Norwegian schools during visits. In ability grouping, LPC are adjusted to the capacity of a group of pupils, increasing the challenge or decreasing it depending on the overall capacity of the group.

Another type of grouping is mixed groups where pupils of diverse capacities work together rather than separately. In Norway, the mixed group strategy was often observed, which was used to allow pupils to cooperate. About this type of grouping, teacher O2G1 said: “I have a sort of mix where...they help each other”. Only one of the Finnish classroom observed had mixed groups (H3G4). From the perspective of organizational theory, mixed groups permit different types of skills to be combined to increase quality of the overall output. Studies usually don't support ability grouping, but validate the use of mixed groups as it is shown to improve the overall academic output of pupils and decrease performance gaps (Adams, 2014, Hattie, 2009). Long-term ability grouping, on the other hand, was shown to increase performance gaps and disadvantage weaker pupils. The present research indicates that partial ability grouping as practiced in Finland has better results than just using mixed groups with no ability grouping at all. The two types of grouping don't share all the same purposes or outcomes and have both advantages. For this reason, this study estimates that the greatest academic benefits come from using a balance between occasional ability grouping and mixed grouping to best adjust LPC.

6.2.4 Well-being, stress, motivation

Neoclassical organizational theory is concerned with the human needs in organizations (Walonick, 1993). Well-being of people in the school organization depends on diverse factors. Here are discussed the likely impact on well-being from issues investigated in the study, especially as related to LPC.

The impact of well-being and stress on the performance of an organization are important considerations for organizational theorist (Walonick, 1993). The study of LPC in this research helps evaluate how these might affect the well-being and motivation of pupils. The right balance of stress impacts motivation, prompting pupils to make an effort and progress, or hindering them from efficiently moving on.

The 2012 PISA survey shows that while in Norway, around 85% of pupils reported being happy at school, that number drops to around 65% in Finland. The results for Norway are well above the OECD average, while Finland's results are well below, close to the bottom of the list (OECD 2013). Therefore, as academic performance of pupils is higher in Finland, Norway's pupils have expressed healthier social and emotional states. These results are surprising because Finnish pupils get more outdoor time and shorter teaching periods compared to Norwegian pupils (see 5.3.2 & 5.3.3). They also get more handwork and creative assignments. However, such results might make more sense when comparing the two nations' teaching modes, as this study has found that *formal modes* were used more often in Finland. In Norway, on the other hand, *informal modes* were used more often (see table 9). The study also revealed that Norwegian pupils get fewer math exercises and repetition than Finnish pupils (see 5.1.1).

When it comes to homework, while during the interviews, Finnish teachers gave it greater value and longer time spent on it by their pupils (see 5.4.2), the online survey (see appendix) gave different answers as the time spent on homework was estimated to be longer by Norwegian teachers. This neutralizes the findings related to time, however its importance as expressed by Finnish teachers remains.

As to the mathematic books, in Finland they are more even paced and often repeat the same concept (5.1.1). On the positive side, this can help pupils retain long term information. On the negative side, this presentation can be perceived as routine, therefore, dull to a certain extent. Norway's mathematic books, on the other hand, move from a concept to another, which might bring a sense of renewal with each chapter and break away from routine. This method might not be as efficient for long term storage of tasks, it might, however, be more entertaining. Therefore, several qualities make Norwegian classrooms less routine than Finnish ones, such as: more irregularities in length of teaching time and break time, teaching modes are more often informal, and math books are less repetitive.

The balance of work ethos and social well-being, in light of PISA results, has been a discussion point in regard to several Asian countries. The findings in this study seem to reiterate the point, even when comparing two apparently similar Scandinavian countries. This raises the question as to whether a balance can be found, the relevance of PISA results in determining the achievements of pupils, and whether a different approach to teaching, learning and assessment are necessary.

6.2.5 Impact of LPC as seen from teaching-time vs. break-time

In organizations, output efficiency is also reliant on the capacity of the humans involved to recover after an effort. The period of recovery in a school is spent during breaks from classes. Break time reflects a slow-down of *pace* and a lessening of academic *load*. The longer the break, the slower the pace. New studies reveal that the types of breaks that pupils have can contribute to learning and the acquisition of new knowledge. Several studies support the idea that some types of exercises after lessons help remembering new information. One such study, a research conducted in the Netherlands by Radboud University, tested the effect of exercise on memory (Rathi, 2016), where participants were given to memorize image associations. They were divided into three groups and each group had a different activity after the memorization session. Those who had intensive exercise a few hours after the learning session had the best capacity for recall. Researchers suspect that the release of chemicals in the brain such as dopamine and noradrenaline during exercise contribute to this improved memory. As new information is processed, new connections are created in the brain, and these are reinforced by some of the chemicals released during exercise (Rathi, 2016).

Other research indicates that a classroom with controlled activity, such as physical education, does not to produce the same positive cognitive effects as free play does (Bjorkland and Pellegrini 2000). This finding, therefore, tends to encourage outdoor, rather than constrained indoor break time that was often observed in Norwegian classrooms (see 5.3.3). Additional findings suggest that an ideal recess time ranges between 10 and 20 minutes, and break time that was more than 30 minutes had negative effects on learning (Pellegrini and Holmes 2006). This indicates that breaks longer than 30 minutes slow down the learning pace, and a faster pace with shorter break intervals and greater learning load contribute to better learning. Here again, the observed Finnish classrooms always had rightly measured breaks, as opposed to great irregularities observed in Norwegian classrooms where break-time varied beyond the beneficial time (see 5.3.1, 5.3.2 & 5.3.3).

More studies also suggest improvement in cognitive function with physical activity, such as one that tested aerobic exercise on mice and humans over a period of 14 days, which showed an increase in the number of maturing neurons, raising the subjects' capacity in memory retention (Van der Borght & Al., 2007).

Most of these studies mainly tested the impact of physical activity on memory. Another study, however, showed improved overall academic performance of primary class students aged 9 to 10 with twenty-minute walks. Such exercise revealed an increase in attention in preadolescent children and better focus in the classroom (Hillman, 2009). Additional studies show that children pay more attention in class after recess (Pellegrini and Holmes 2006).

Since research shows that free break-time, without teacher control, has greater benefits for learners, therefore, a recess time of 15 minutes spent outdoors, as practiced in Finland, is more beneficial for learning than the recess-time spent indoors observed in Norway. Indoor breaks limit physical movement and the capacity for free play, this reduces the benefits of more focus and better recall that outdoor recess can procure.

6.3 Pace, a Cognitive Constructivist view

As pace of learning is connected to advancement in learning, a forward move happens only when new knowledge is presented to the learner. For Vygotsky, in cognitive constructive theory, learning occurs when one is exposed to new knowledge that is slightly more advanced than a knowledge one already has (Chaiklin, 2003). This means, that when differentiation is more frequently applied and where it is based on the pupils' needs, they will more often get appropriate LPC and reach the Zone of Proximal Development (ZPD) (McLeod, 2012). In an environment where differentiation happens less often and where it is not custom fit, teaching will not respond as often to the pupils' needs, therefore, learning will be reduced as they will not reach the ZPD as frequently. In Norway's first-grade, as evaluation of pupils happens according to set schedules and usually toward the end of the school year, pupils who are ahead are kept with the others without differentiation. This means, they will remain in the Zone of Actual Development (ZAD) where they will not build any new knowledge or skills and will not improve. The first year in Norway tends to be used to equalize the capacities of pupils for the sake of equality. This is done for the purpose of reducing social inequalities in application of the Knowledge Promotion Reform of 2006 (Kunskapsløftet) (Bakken & Elstad, 2012), and for practical reasons of class management. It leads, however, to a neglect of pupils who are ahead, as the main focus in the classroom is on supporting the weak. This logic of equalization which is derived from the culture of the welfare state is flawed as previously

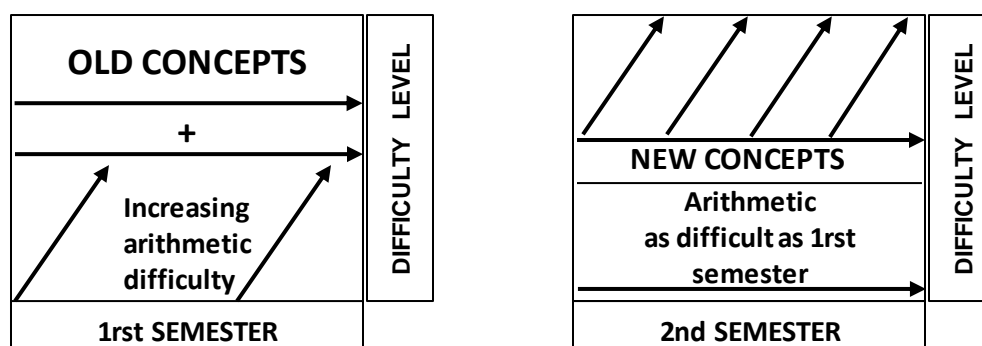
explained, since by holding strong pupils back, the entire class is held back, including the performance of weaker pupils. A research on the outcomes of the Knowledge Promotion Reform did not find reduction of inequalities after four years of its application, a forceful equalization of pupils, therefore, does not present advantages for the weak (Bakken & Elstad, 2012).

In Finland, on the other hand, some teachers intervened early with high performing pupils and acted as ‘*more knowledgeable other*’ or MKO based on Vygotsky’s theory (McLeod, 2014). The MKO, according to the theory, plays a role in guiding pupils toward the ZPD. The theory is, therefore, likely to favor more training of the teacher and more MKO intervention.

6.4 Discussion of LPC through math book analysis

The designs of math books and their impact on learning can be analyzed using several theories. Constructivist theorists, such as Piaget, Vygotsky and Dewey, suggested that new knowledge is built upon previous knowledge, and cognitivist theory believes that lessons should start with a review to reactivate old knowledge. The organization and design of the Finnish math books apply such concepts as first semesters books always start with a review of the previous year. This is not the case for Norwegian math books as teachers often take the initiative to review the previous year using material from outside their books. And while reviewing the previous year is often limited to the first week of the school year in Norway, in Finland this review is throughout the first semester of each new school year. This constant approach indicates that Finnish math books follow a clear and consistent system.

Figure 13. Finnish math books have two designs for each semester, with different purposes. The first semester (on the left) reviews old concepts and uses exercises with increasing arithmetic difficulty. The second semester (on the right) uses the same arithmetic difficulty as the previous semester while introducing new concepts.

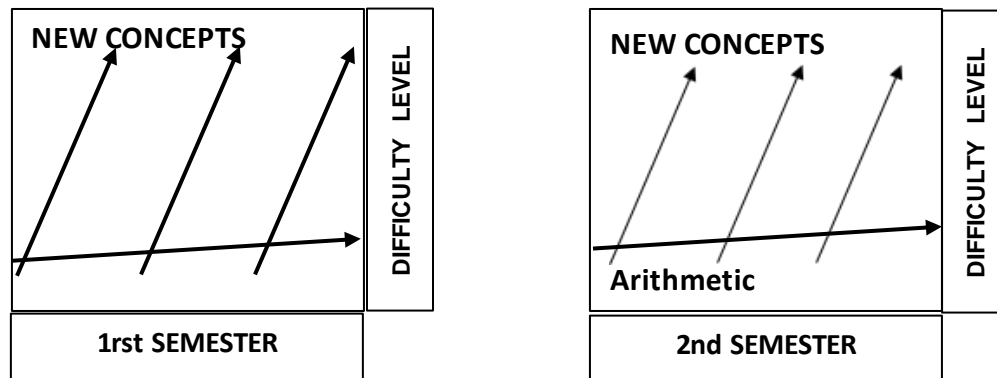


Further, the theory of cognitivism explains learning as derived from understanding through experience. Experience can be acquired with practice and this is found in Finnish math books

that are focused on providing many same difficulty, yet varied exercises. This allows Finnish pupils a diverse experience and plenty of practice to create more meaning, and learning.

Repetition and review also creates the scaffolding that is proposed by Vygotsky, which he suggests is a necessary process to support learning. New knowledge is re-used often enough to anchor it in the mind of the learner.

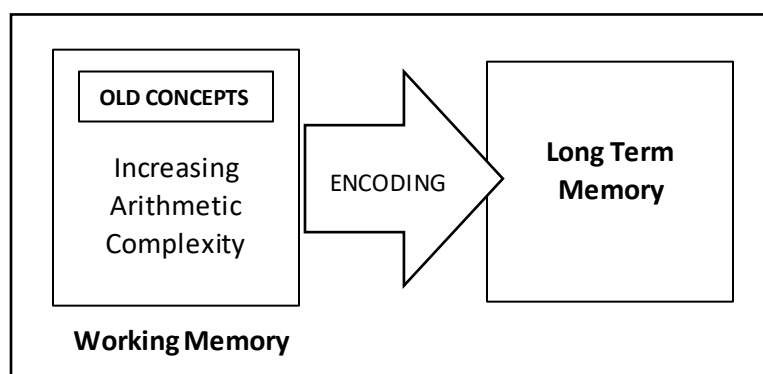
Figure 14. Same math book design for the two semesters in Norway with new chapters presenting new concepts. Difficulty in arithmetic varies within a small range.



Furthermore, looking at the books through the lens of cognitive load theory helps evaluate them as follows:

First semester Finnish math books review concepts which were introduced the previous year. They reinforce the encoding of previous knowledge and its storage in Long-Term Memory. Then, the Working Memory is busy with two processes: first, to reinforce the encoding of old concepts, and second, to process numbers of a new level of complexity.

Figure 15. First semester in the Finnish math books: This figure shows the encoding to reinforce storage of older concepts in Long-Term Memory.

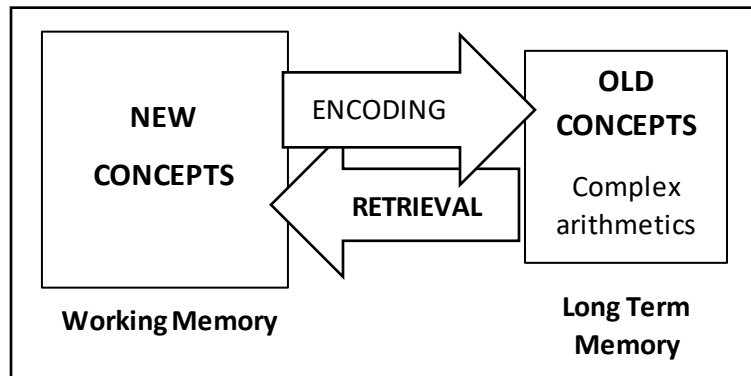


During the second semester (fig. 16), Working Memory (WM) is focused on only processing new concepts. This processing is supported by the use of information stored in the long-term memory, such as arithmetic and older concepts that were worked on the previous semester.

New concepts are introduced in small doses, as not to overload the Working Memory, which

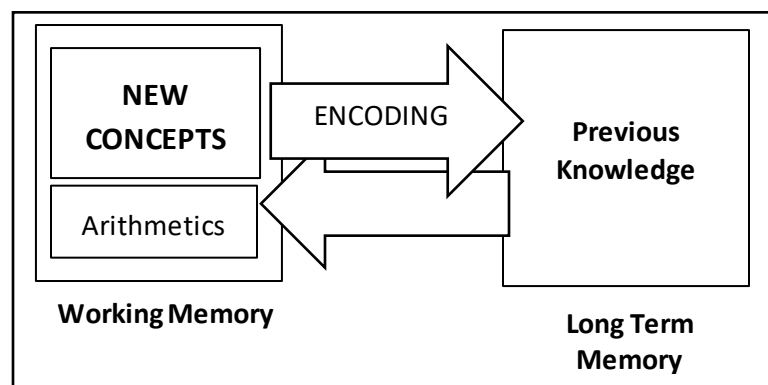
makes them easy to process and encode since the Working Memory is not busy with other processes.

Figure 16. Design of Finnish math books used in the second semester:



In the Norwegian math books, new concepts are introduced throughout the two semesters, keeping the Working Memory continuously busy. As the processing of concepts and arithmetic is occurring simultaneously and continuously, the *load* to process the new knowledge in the Working Memory is greater than that using Finnish books. This means that Norwegian math books allow less time to process and encode new tasks compared to their Finnish counterparts.

Figure 17. The following illustrates the Norwegian math books based on Cognitive Load theory; both semesters use the same process as shown here:



On the other hand, the Finnish math books have more exercises, therefore, their work *load* is greater. This could have positive outcomes as well, as a study on overlearning suggests:

During learning, the brain produces glutamate, a chemical that makes the brain plastic and more adept to learn. Overlearning leads to a decrease in glutamate and an increase of GABA, another chemical that stabilizes the brain. Overlearning, therefore changes the brain from a plastic to a stable state, giving it more time to retain a lesson and preventing it from being overwritten.

To make sure that students get a foundation in a basic topic before moving onto a more complex, related topic, it may make sense to overlearn the first topic before tackling the second with the goal of revisiting the latter at a later date (Kendra, 2017).

To be effective over time, overlearning needs to be used with a variation of methods. Some studies indicate that the advantages of overlearning can dissipate over a month if not used with other techniques such as spacing-out learning, and mixing-up topics:

Overlearning can add fluency to your processing. It can increase response speed—and can help produce an answer when multitasking, when one is therefore tired, or cognitively limited". For the rest of us, it may be useful but most likely in conjunction with other learning techniques (Kendra, 2017).

According to another researcher Pablo Celnik, a slightly varied practice routine can almost *double* learning speed. However, it is important not to alter the practice too much. Otherwise the gains observed will be cancelled: "Repeating the exact same task during learning is not as fast and effective as using a slightly modified version of a task" (Stillman, 2016). The Finnish math books do a lot of repetition, they also do some variation such as increasing arithmetic complexity. Norwegian books use less repetition and don't apply the increasing arithmetic approach in a systematic way as Finnish books do.

6.5 LPC through Learning time

Time spent on learning occurs in and out of school such as during homework. This is discussed here, verifying the quantity and quality of this time used in the two nations.

6.5.1 Time spent in class and teaching modes

Overall, Norway has 190 school days while Finland has 187, only three fewer days. More significant, however, is the number of hours spent in the classroom on learning every week which, based on the findings of this study, is at least 7% longer in Norway. This indicates a heavier *load* in Norway in terms of number of hours and quantity of time spent on learning. When this measurement is evaluated next to the modes of teaching in the classrooms, 5% more time per day is spent on the formal mode in Finland, which considerably increases the *load* of teaching on the Finnish side (see 5.3.1, 5.3.2 & 5.3.4).

Therefore, in terms of LPC, there are fewer teaching hours per week in Finland, however, *load* of teaching is heavier during the time spent in class. As there are fewer hours during the week and heavier load during class, this implies also a faster *pace* to cover approximately as much teaching material as Norway. This creates a pattern of teaching/break intervals in

Finland, where lessons and breaks are short, regular, and intensive. A different pattern is drawn in Norway, which is longer, more irregular but less intense.

6.5.2 Homework

The interview of teachers and online survey have given different and sometimes contradictory results when it comes to LPC of homework. While during interviews, Finnish teachers estimated the time spent on it to range between 30 minutes and one hour, all three participants in the online survey estimated it to be 10 to 25 minutes. And while in Norway, interviewed teachers estimated a 15 to 45 minutes range, the online survey showed an estimate of 25 minutes to one hour.

This result is based on answers gathered from the primary class teachers. Different estimates are given by the OECD for time spent on homework by 15-year-olds in Finland and Norway. Weekly hours spent on homework in Norway was 4.7 hours according to PISA 2012. It was much less in Finland at 2.8 hours. Out of 65 countries Finland had the least time spent on homework, while Norway was in the middle range. The average time for all participating nations was 5 hours per week, therefore, twenty minutes more than Norway and almost double the time spent in Finland (Kohli, 2014).

The report gives also indications that time spent on homework tends to have an influence on academic performance, however, it's not the most important factor for better performance. On the other hand, it is important to note that according to research, pupils of higher socio-economic backgrounds spend 1.6 more hours per week on homework (Kohli, 2014), and they usually do better at school than their lower socio-economic counterparts.

6.6 Conclusion

The concluding remarks for this research are presented in this section under five headings: a summary of the thesis (6.7.1), its limitations (6.7.2), its impact on research and policy (6.7.3), further research (6.7.4), and a final conclusion (6.7.5).

6.6.1 Summary of study

The thesis has evaluated outcomes of differences in the load, pace and complexity of school work, between the primary classes of Finland and Norway. It has investigated several aspects of those differences such as found in hard material, as the curriculums and the books, and as

found in active applications through teaching modes, learning time vs. break time, assessments, differentiation, and homework. The research questions and their findings are:

1. What are the differences in *load, pace and complexity* of school work in primary levels between Norway and Finland?

The data has revealed several differences in the complexity of school work, the load and pace of teaching between the classrooms of the two nations and details about the differences and their consequences were laid out. They were analyzed in this chapter using several theories.

2. How could differences in *load, pace and complexity* and methods of differentiation between Norway and Finland impact on pupil performance in PISA tests?

This question was answered through the lens of selected theories, as well as, the findings of existing research that were used to explain the consequences and different outcomes of the diverse aspects of LPC investigated.

Differences were identified on several levels starting from the policies, to the pedagogic applications on individual pupils in the classroom and at home. These differences were analyzed using several theoretical lenses to understand how they have originated from each society, the way they were translated into the pedagogic process, and their impact on learning. Previous research was also used to estimate the advantages and disadvantages of the different pedagogic paths adopted in each nation, and to evaluate the impact of these choices on the academic achievement of pupils, especially as measured by PISA.

The highlights of the findings were: The status of teachers has resulted from the nations' economies, and gives more freedom to Finnish teachers in making decisions about pupil evaluation and differentiation. This increases efficiency, helping to focus on what the pupils are actually learning and on adapting challenges & LPC appropriately. A greater tendency in Finland to use early differentiation, was observed, especially in first-grade reading.

Differentiation was additionally used not only for weaker pupils but also for stronger ones. Such practice included separating pupils for a few hours every week, depending on their capacities. Previous research has shown that differentiation of LPC has the greatest influence on pupil performance, and helping the strong has a positive impact on the rest of the class. The study also found that mother tongue books had weekly assignments that explicitly solicited the pupils' imagination which required more complex and creative thinking. Such skill was only occasionally used in Norwegian books and assignments. Adding creative

assignments in any subject might help raise pupil scores on PISA, as it is meant to measure creative skills as well. When it comes to Finnish mathematic books, they are organized using methods that support long-term storage and easy retrieval of information, by relying in part on review of learned material and on a progressive increase of load and complexity. On the other hand, Norwegian math books have also an overall increase in complexity, however, they move from one subject to another and don't use clear teaching methods in accordance with learning theories. When it comes to differentiating homework, the tendency was for more complexity in Finland while it was for more quantity in Norway. As repetition is already in use by Finnish math books, teachers don't have to actively assign more work, instead, they give more complexity. This has also positive consequences, as research shows that, even though repetition is better for recall and deep learning, higher thinking assignments contribute to better academic performances. Therefore, increased complexity in Finnish assignments is beneficial. Break time and lesson time were more regular in Finland, and a greater work *load* and faster *pace* were used during lessons, as less time is spent to cover as much material as in Norway. Finland, however, had outdoor free-play recess-time that offers greater learning benefits according to research than the indoor break-time often used in Norway. Finnish recess-time was also more regular with 15-minute breaks, while in Norway it was irregular and varied up to one hour. More time spent indoor and less break time made the *pace* of Norwegian school-day slower and decreased learning efficiency. However, this slowness combined with teaching modes that were more informal in Norwegian classrooms might be the contributors to greater happiness and satisfaction with school that the pupils of Norway have expressed.

6.6.2 Limitations

Interpreting the strengths and weaknesses of any pedagogic system remains a complicated task, as intricate components and many factors independent from the full control of any stake-holder also influence the quality of learning. Expecting rigid answers, for this reason, is unrealistic, therefore, flexibility and approximations remain the most truthful measures in such evaluations.

Additionally, evaluating the quality of education of Finnish and Norwegian schools based on their PISA results is limited as the test which is on paper checks only a small amount of what is learned at school. Even though PISA has expanded on older tests, it still overlooks many skills that children can acquire by the time they are fifteen. At best, such tests evaluate analytical and critical thinking, as well as, problem solving capacities, however, as of now, no international assessments can truly estimate real-world and future achievements or accurately

measure creativity, assess the complex handling of tasks and interpersonal skills, among other things. Additional limitations of PISA are that they do not predict the quality of the ultimate outcome of secondary education or college, nor do they give any information about the skills and capacities of people when they enter the workforce. Making pupil assessments based on any standard test limits the evaluation of personal, as well as, academic skills primarily to the mastery of specific forms of standardized tasks.

Sahlberg himself stated “The higher the test results stakes, the lower the degree of freedom for experimentation in classroom learning.” (Sahlberg, 2011, p.101) This statement might even give a clue as to why the performance of Finnish pupils has been steadily declining since their initial participation on the PISA test. Early success is likely to have pressured their teachers to make students perform well on similar types of tasks, which might have led them to lose focus of the actual learning that takes place in the classroom.

Other limitations are due to the partial reliance on the judgment of teachers, since this will depend on the teachers’ degree of cooperation and the accuracy of their answers (as they can be subjective).

Further, few asymmetries that exist between the two compared samples, such as, differences between the subjects taught, complicates interpretations of data. For example, English in Norway is taught few years earlier than in Finland. Also, more arts and crafts, as well as, music lessons are taught in Finland. A focus on one of the subjects alone could help reduce such imbalances. This research has mainly focused on math, while other subjects have had a far more general look.

Additional limitations come from the small number of schools in the sample: a total of eleven classes and teachers, or twenty if the survey is included, and only from first to fifth-grade. Also, the limited number of Norwegian schools that were willing to participate, and the few visits to the schools. A longitudinal study might give different results and reveal aspects that can be hard to discern in one or two visits. Even though an extra online questionnaire was sent to schools nationwide, its revelations cannot be generalized due to limited responses. The study could, however, open further discussion about advantages and disadvantages of priorities given in each nation and its curriculum, and the approaches of its school system.

6.6.3 Impact on research and policy

The two nations can learn from each other with recommendations based on the findings; starting with recommendations for Norway to improve their PISA performance, such as:

- . Requiring more education and training from its teachers, especially helping them develop *skills to use assessments*, and *differentiation* methods.
- . This should be followed by giving teachers more *freedom to evaluate their pupils and differentiate LPC* as they deem appropriate, and remove restraints from administrative control.
- . *Early intervention* for all pupils with *early evaluations* in first-grade and differentiation for all, including giving more complex material to stronger pupils.
- . Creating a *structure that facilitates the application of assessment and differentiation*, and making it easy to manage by putting the right material at the disposal of teachers.
- . *Reorganize math books to include a review of the previous year in the first semester*, and *give more same level exercises* to help processes of storage in long term memory and support automatization and easy retrieval. Therefore, *give more load*, but also more *complexity* to stronger pupils.
- . Give free-play outdoor breaks instead of indoors ones and limit them to 10 to 30 minutes.
- . As creative skills are beneficial, and can come in handy during periods of economic slow-down and lower oil prices, this study also recommends including more routine creative tasks in diverse subjects, such as in mother tongue assignments.

When it comes to Finland, recommendations are also to increase the application of differentiation early on, especially to math as this was not observed in first-grade. More adapted material to stronger pupils is essential and perfecting the structure that helps teachers differentiate with more readily available material. Additionally, more attention should be placed on the satisfaction and happiness of pupils at school.

6.6.4 Further research

Several levels of inquiry can be conducted based on the findings of this study:

More accurate and complete results to confirm the general observations generated would require a wider research that includes far more schools and classrooms. Also, one that focuses specifically on each grade studying LPC for each of its subjects in separate enquiries.

Since this research has mostly focused on mathematics, further research can focus on other subjects such as science, especially as it is the area where Norwegians are the weakest.

When it comes to time spent on homework in primary classes, the answers were inconclusive as they were contradictory, more research can, therefore, be conducted to verify not only how long pupils spend on it but also how it is more precisely differentiated.

More research can be conducted to understand the most efficient assessment methods. Also, to know how to best train teachers to do such assessments on their own.

Study differentiation techniques, to find the right balance between hours spent in mixed classes and time spent in a separate classroom for a specific capacity of students.

Finally, compare the impact of gifted pupils who get support and differentiation on the rest of the class, to the impact of gifted pupils who don't get such support.

6.6.5 Final Conclusion

As more countries are joining PISA to test their pupils and find where they stand compared to other nations around the world, there is an increase in the perception of the test as a predictor of the future of nations by estimating the 'true' capacity of their youths to use academic skills in real life. And as Finland's outstanding achievement on PISA has turned it into a role model, this thesis has dug deeply into the sources of its powers, seeking answer to the research questions. The role of Finland and Norway's economy and government in drawing the plans and deciding about hierarchies revealed the origin of teacher status in both nations. The training and status of teachers in Finland gave them power to make independent decisions about assessment and differentiation, which directly affect LPC. The right differentiation is shown to have the highest impact on academic outcomes and is more readily applied in Finland; more *complex* work given to stronger pupils contributes to raise the performance of the entire class. Additionally, greater *load* with repetition used in Finnish math books was shown to help recall and automatization. This combined with more outdoor break-time, and accurately measured recess, allow for appropriate relief from *load* and reinforce mental processes of learning. Free play, also contributes to better concentration in class and recall of lessons. The main recommendations are therefore to:

- 1- Train Norwegian teachers to assess pupils and differentiate LPC on their own, and build a structure that helps them manage it.
- 2- Give more complex assignments to stronger pupils.
- 3- Reorganize math books to contain reviews of previous years and give more same level exercises.
- 4- Turn breaks into 10 to 30 minutes outdoor free-play time.

On the other hand, looking at the educational systems beyond the PISA test, Norway and Finland have different economies; Finland requires more innovative local production and relies

on human capital; thus, it has focused on creativity and imagination in its classrooms. This Finnish reliance on higher human capital is also clear in the extra support that stronger pupils get in differentiation of LPC, and the high demand and training required of teachers. On many levels, more effort is exerted in the Finnish education system to achieve greater academic success. In Norway, creativity and the development of industries are not as much needed because exporting local products is expensive due to the nation's high wages inflated by oil exports. Norway's educational system has, therefore, focused instead on the wellbeing of its people by helping the weak and creating friendly environments at school. They have succeeded in this endeavor according to PISA as Norway's pupils are among the happiest in the world, much happier than Finnish pupils who are close to the bottom of the list in satisfaction. Should the two nations restrain their pupils' potential for happiness or academic achievement based on the nation's present economies? Both can resolve to achieve more happiness and academic success, especially as the future world is marked by constant economic change; it is important to continue improvement by redirecting the focus of education based on research such as this.

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Appendix A

Predictors of academic success based on meta-analysis research:

<i>Right differentiation</i>	1,28
<i>Acceleration</i>	0,84
<i>Parents' expectations</i>	0,58 to 0,88
<i>Understanding the different stages of pupil development</i>	0,73
<i>Pupil's present performance</i>	0,67
<i>Mixed ability grouping</i>	0,5
<i>Teacher</i>	0,32
<i>Same ability grouping (in mixed class)</i>	0,30 (strong pupils)
.....	0,18 (average pupils)
.....	0,16 (weak pupils)

Teacher training influence on pupil success:

<i>Professional development</i>	0,66
<i>Education + years of experience</i>	0,39
<i>Theoretical training</i>	0,11
<i>Poorly trained</i>	- 0,01

Teacher influence on gifted pupils:

<i>Good experience with gifted</i>	0,88
<i>Poorly trained with gifted</i>	- 0,88

Appendix B

Discussion of the most significant answers from the online survey

This section presents the questions with the most significant answers and the ones that can clarify answers to the research questions:

- When asked if they evaluated the full potential or maximum capacity of each student, all three Finnish teachers answered 'yes,' and while three Norwegian teachers answered 'yes', two answered 'no' and one answered 'sometimes'.

Two of the Finnish teachers who answered 'yes' said they tested reading and math, and one answered just 'reading'. The Norwegian answers were divided in half, three tested both, and the others tested just reading. In both nations, there was more care to test reading capacities.

- All Finnish teachers said it was as important to identify early *stronger* and *weaker* pupils, while they were divided in half in Norway three thought identifying both was important and three others favored identifying the weak.

- Two Finnish teachers gave same assignments with increasing difficulty and one gave different assignments with differentiated strengths. In Norway, three gave different strength assignments and two gave similar assignment that has increasing difficulty.

- Two Finnish teachers believed that the school system often helps weak and strong pupils get differentiated assignments, and one believed this happened sometimes. In Norway, four answered sometimes and two answered often.

- Two Finnish teachers thought stronger pupils could get more challenge than they were getting now, while one thought they were getting enough. In Norway, all teachers thought strong pupils could get more challenge, indicating that strong pupils weren't challenged to their full potential.

- Two Finnish teachers said, it was easier to adjust math assignments, the third one picked writing. In Norway, the answers were quite different as none chose math, two chose writing, and the other four chose reading, which seems to be the type of home assignment that most often is differentiated for Norwegian pupils.

- All Finnish teachers answered that they mostly differentiated in the classroom, while two said in the classroom in Norway, four answered they differentiated in class and at home. Note

should be taken here that while Finnish teachers are rather referring to math assignments, Norwegian answers are probably referring to reading assignments.

- In both nations, the answers were divided in half as to dividing the class into stronger and weaker groups.

- All Finnish teachers answered that they divided sometimes the classes into weaker and stronger groups and put them in separate classes for differentiated teaching, while two Norwegian teachers also answered using this method, three answered they kept the students together all the time, and one said they gave sometimes the weaker pupils support in separate classes. This supports previous findings that Finnish pupils get sometimes differentiated lessons in separate classes for stronger and weaker pupils, a method that wasn't applied as often in Norway.

- When asked about how much time pupils should spend on homework each day, the answers were surprising as they didn't entirely correspond to the answers in the interviews, because more Norwegian teachers gave a longer time than Finnish teachers. All Finnish teachers evaluated the time to vary between 10 and 25 minutes while only one Norwegian estimated the same time and four estimated 25 to 1 hour and just one teacher with the least experience (about 5 years) estimated 10 minutes or less.

- When it comes to adjustment of homework, two Finnish teachers said they always differentiated depending on the level of the pupil, and two answered giving more if pupils spent too little time on it. In Norway, it was a bit contrary as three answered giving less if pupils spent too much on it, four answered adjusting if parents requested it, and two answered they always differentiated. It should be noted that Finnish teachers estimated a shorter time spent on homework than Norwegian teachers. It is, therefore, normal to expect the one who gave initially less to give more when needed, and the one who gave more to give less when it's too much.

- Another surprise came to the question about the method used most often to teach a subject, as all three Finnish teachers answered presenting the subject in different ways, while five Norwegian teachers answered using repetition. Study of class books have shown that Finnish math books, for example, used more repetition. As the Finnish math books have lots of repetitive exercises, teachers were adding more variations and complexity when needed. And as Norwegian math books lacked repetition, teachers were compensating with repetition in the extra assignments they gave.

Appendix C

Online Survey Questionnaire

Comparing the Curriculum of Norway in Primary Classes: Load, Pace, Complexity And Life Skills

Dear Teacher,

A better understanding of how Norway's schools work is essential to improve the system and offer the best to our children. Your contribution by answering this questionnaire will help deepen this understanding.

Please answer as many of the questions as possible; your answers will be treated with the utmost confidentiality. It will take up to 10 minutes to complete and will be greatly appreciated. Choose the answer that fits best.

Kjære lærer,

En bedre forståelse av hvordan Norge skoler arbeid er viktig for å forbedre systemet og tilby det beste for våre barn. Ditt bidrag ved å svare på dette spørreskjemaet vil hjelpe utdype denne forståelse. Det tar fra 10 opptil 15 minutter å fullføre, og vil bli verdsatt.

Vennligst, velg det svaret som passer best.

1- What grade are you teaching now?

Hvilken klasse lærer du nå?

1st___ 2nd___ 3rd___ 4th___ 5th___

Answers:	F: 1 st , 1 st , 4 th	N: 1,2,4,1,4,3
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2- What grades have you taught previously? (You can choose several answers)

Hvilke klasse har du lært tidligere? (Du kan velge flere svar)

1st___ 2nd___ 3rd___ 4th___ 5th___

Answers:	F: (1 st , 2 nd), All, All	N:..., all, jan., jan., alle, jan.
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3- How many years have you been teaching?

Hvor mange år har du vært lærer?

Under 4 years___ 4 to 8 years___ More than 8 years___
Under 4 år___ 4 til 8 år___ Mere en 8 år___

Answers: F: More than 8, More than 8, more than 8 N: More than 8, more than 8, more than 8, under 5, more than 8, more than 8

4- In your school, do the teachers of the same grade meet to prepare the weekly class planning?

I din skole, møtes lærerne av samme klasse for å forberede den ukentlige klassen planlegging?

Yes/often___ No___ Sometimes___

Answers: F: yes/often, yes/often, yes/often N: yes, ..., yes, yes, yes, yes

5- Do same grade classes move at the same pace and in the same order of teaching?

Flytter undervisningen i klasser av samme trinn i samme tempo og i samme rekkefølge?

Yes ___ No___ Not Sure___

Answers: F: yes, yes, not sure N: yes, yes, yes, yes, yes

6- Do you rely on the teaching plans that were developed for the same grade in previous years?

Har du stole på planene som ble utviklet for den samme tinn i tidligere år?

Yes___ No___ Sometimes___

Other___

Answers: F: sometimes, sometimes, sometimes N: No, sometimes, yes, yes, no, no
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7- Are class teaching plans saved to be used as guides for the following years?

Er klasselæreplaner lagres for å brukes som guider for de neste årene?

Yes___ No___ Sometimes___

Answers: F: yes, no/not sure, sometimes N: yes, yes, sometimes, yes, sometimes, yes

8- How do you assess and monitor the level of attainment of the students during the year? Hvordan vurdere og overvåke nivået av oppnåelse av studentene i løpet av året på?

(You can choose several answers) (Du kan velge flere svar)

- a) You take each student alone to test the capacity of each separately.____
- b) You give tests in the classroom to all students together.____
- c) You look at student work in the classroom during class assignments.____
- d) You check student homework.____
- e) Other____

Answers: F: abcd, abcd, cd

N: abc, b and sometimes a, abcde, a, abcde, abcde

- a) Du tar hver elev alene for å teste kapasiteten til hver for seg. ____
- b) Du gir tester i klasserommet til alle studenter sammen. ____
- c) Du ser på studentarbeid i klasserommet under klassen oppdrag. ____
- d) Du sjekke student lekser. ____
- e) Andre____

9- On question 8 if you answered a or b, when do you conduct such tests?

(You can choose several answers)

På spørsmål 8 hvis du svarte på a eller b, når utfører du slike tester?

(Du kan velge flere svar)

- a) At the beginning of the school year.
- b) During the school year.
- c) At the end of the school year.

Answers: F: abc, b, b N: b, abc, b, a, abc, abc

- a) I begynnelsen av skoleåret.
- b) I løpet av skoleåret.
- c) På slutten av skoleåret.

10- If you conducted tests during the year, how often did you do this?

- a) Almost every week.
- b) Almost every month.
- c) One or two times during the year.

Answers: F: a, b, c N: b, b, a, a, b, b

10- Hvis du gjennomført tester i løpet av året, hvor ofte?

- a) Nesten hver uke.
- b) Nesten hver måned.
- c) En eller to ganger i løpet av året

11- **Do you check the full potential or maximum capacity of each student?**

Sjekke du ut det fulle potensialet eller maksimal kapasitet på hver elev?

Yes ___ No ___

Answers: F: yes/often, yes/often, yes/often N: no, sometimes, no, yes/often, yes/often, yes/often
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12- **If you answered 'Yes,' in what do you usually test maximum capacity?**

Hvis du svarte «Ja,» for hvilket område tester du vanligvis maksimal kapasitet?

Reading ___ Mathematics ___ Both ___

Answers: F: both, reading, both N: reading, both, reading, reading, both, both

13- **Which one do you believe is more important:**

- To identify weak student early
- To identify strong students early - both are as important

Answers: F: both, both, both N: identify weak early, both as important, identify weak, weak, both, both
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14- **What do you do if the students in your class have different levels and capacities?**

- a) You give the same assignments to everyone for the sake of equality.
- b) You give the same assignments to everyone, but the assignments have increasing complexity and stronger students can finish and be challenged on the more difficult questions.
- c) You give different assignments with different levels of difficulty depending on the student level.

Answers: F: b, b, c N: c, c, c, d (other), b, b

Hva gjør du hvis det er flere nivåer av elever i klasserommet?

- a) Du gir de samme oppgavene til alle for å få til likestilling.
- b) Du gir de samme oppgavene for alle, men oppdragene har økende kompleksitet og sterkere elevene kan fullføre og bli utfordret på de vanskeligste spørsmålene.
- c) Du gir ulike oppgaver med forskjellige vanskelighetsgrader avhengig av studentnivå

15- Do you believe the school system usually helps weaker students get assignments adjusted to their level?

Often___ Sometimes___ Rarely___

Answers: F: sometimes, Often/yes, often/yes
N: sometimes, sometimes, sometimes, often, often, sometimes

Tror du Norske skolesystemet tillater svakere elevene å får oppgaver tilpasset deres nivå?

Oftes___ Noen ganger___ Seldom___

16- Do you believe the school system usually helps stronger students get assignments adjusted to their level?

Tror du skolesystemet tillater vanligvis sterkere elevene får oppgaver tilpasset deres nivå?

Often___ Sometimes___ Rarely___

Answers: F: often/yes, often/yes, sometimes N: som, som, som, oft, oft, som

17- Do you believe that stronger students could often get more challenges than what they currently receive?

Tror du at sterkere elevene kunne ofte får flere utfordringer enn hva de er i dag mottar?

Yes___ No, they are getting enough___ Rarely___

Answers: F: No/ they are getting enough, Often/yes, often/yes
N: oft, oft, oft, oft, no, oft

18- Which of the books you use are easier to adjust to different student levels?

Hvilke av bøkene du bruker er lettere å justere til ulike student nivåer?

Reading books___ Mathematic books___ Equal___

Answers: F: reading books, equal, equal
N: equal, equal, equal, read, read., equal

19- Do you use material other than the class text books in order to better adjust the level to some of your students?

Bruker du annet materiale enn klasse lærebøker for å bedre justere nivået til noen av elevene dine?

No___ Rarely___ Often___

Answers:	F: often, often, often	N: oft, oft, oft, no, oft, oft
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20- Which levels are easier to adjust?

Hvilke nivåer er lettere å justere?

Language and reading levels___ Mathematics levels___

Answers:	F: writing, math, math	N: read, read, writ, read, writ, read
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21- When do you most often adjust to student level?

Når justerer du til student nivå oftere?

In the classroom___ In homework assignments___ Both___

I klassen___ I hjemme lekser___ Begge___

Answers:	F: in the class, in the class, in the class	N: both, both, both, class, class, both
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22- Do you sometimes divide the class into stronger and weaker groups?

Deler du noen ganger klassen i sterkere og svakere grupper?

Yes___ No___

Answers:	F: yes, kyllå=yes, no	N: no, yes, yes, no, yes, yes
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23- Do you keep all students together in the classroom with different student levels?

Holder du alle elevene sammen i klasserommet med ulike student nivåer?

a) Yes___

b) No, stronger students are sometimes grouped to study together in a separate classroom___

c) No, weaker students are sometimes grouped to study together in a separate classroom___

d) No weaker and stronger students are sometimes given special separate classes with teaching adjusted to their capacities___

Answers:	F: d, d, d	N: c, a, d, a, d, a
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- a) Ja___
- b) Nei, sterkere elevene er noen ganger gruppert for å studere sammen i et eget klasserom ___
- c) Nei, svakere elevene er noen ganger gruppert for å studere sammen i et eget klasserom___
- d) Nei, svakere og sterkere elevene er noen ganger gruppert sammen for å studere i et eget klasserom.

24- How much time do you believe students should spend on homework each day?

Hvor mye tid bruker tror du studenter bør bruke på lekser hver dag?

- 10 minutes or less___ 10 to 25 minutes___ 25 minutes to 1 hour___ More than 1 hour___

Answers: F: b, b, b N: c, b, c, a, c, c

25- Do you adjust quantity and difficulty of homework depending on how much time students spend on it? (You can choose several answers)

- a) Always___
- b) Mostly if parents request it___
- c) Mostly if they are spending too much time on it___
- d) Mostly if they are spending too little time on it___

Justerer du mengde og vanskelighetsgrad av lekser avhengig av hvor mye tid elevene bruker på det?

- a) Alltid___
- b) For det meste hvis foreldrene ber it___
- c) For det meste hvis de bruker for mye tid på det___
- d) For det meste hvis de bruker for lite tid på det___

Answers: F: a, ad, de N: c, ab, bc, a, b, bc
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26- What do you believe is the role of homework? (You can choose several answers)

- a) To review and reinforce what was learned in class___
- b) To prepare for the class lessons___
- c) To expand on what is learned in class___

Hva tror du er rollen til lekser? (Du kan velge flere svar)

- a) Å gjennomgå og forsterke det ble lært i class___
- b) For å forberede klassen lekser___
- c) For å utdype hva som er lært er klass___

Answers: F: a, a, a N: a, a, a, a, a, a

27- Choose one you believe is true:

- a) Homework is important in primary classes____
- b) Homework does not improve learning so much in primary classes____

Answers: F: b, a, a N: a, a, a, a, a, a

Velg en:

- d) Lekser er viktig i grunnskolen ____
- e) Lekser ikke forbedrer mye læring i grunnskolen ____

28- Choose the one you believe is more important:

- a) To slightly over-challenge the students in order to help them move forward.____
- OR
- b) To slightly under-challenge the students to help them remain confident in their capacities.____

Velg hva du tror er mer viktig?

- a) Å litt over-utfordre elevene for å hjelpe dem å gå videre .____
- Eller
- b) Å litt under-utfordrer elevene til å hjelpe dem forbli trygg i sine kapasiteter

Answers: F: (doesn't want to choose), a, a N: b, a, a, a, a, b

29- Which method do you use more often to teach a subject?

- a) Present the subject in different ways to help the students understand it.
- b) I use repetition

Answers: F: a, a, a N: b, b, b, a, b, b

30- Outside the classroom, what do you spend the most time working on?

- a) School meetings
- b) Correct homework
- c) Prepare and correct exams
- d) Prepare for the class teaching

Answers: F: d, d, a N: a, d, a, a, d, d

Utenfor klasserommet, hva gjør du tilbringer mest tid på?

- a) Skole møter
- b) Riktig lekser
- c) Utarbeide og riktige eksamener

31- Choose 4 life skills that you focus mostly on with your pupils?

- a) Caring
- b) Cooperation
- c) Self-confidence
- d) Curiosity
- e) Effort
- f) Friendship
- g) Initiative
- h) Integrity
- i) Organization
- j) Patience
- k) Perseverance
- l) Problem solving
- m) Responsibility
- n) Other:____

Answers:	F: abce, bcmn, bcmn	N: cbln, cdblfn, mbdc, a, vclld, blnk
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Hva er ferdigheter som du fokuserer mest på med elevene?

- a) Omsorg
- b) Samarbeid
- c) Selvtillit
- d) Nysgjerrighet
- e) Innsats
- f) Vennskap
- g) Initiative
- h) Integritet
- i) Organisering
- j) Tålmodighet
- k) Utholdenhet

- l) Problemløsning
- m) Ansvar
- n) Andre:___

32- What other skills do you focus on?

Answers: **F:** ..., friendship & patience, effort & problem solving

N: 1. utholdenhet, ansvar, vennskap, integritet/ 2. Alle skal lære å les, tenk selv og vet hvor de kan lete etter informasjon. De skal ha omsorg og tenk på hverandre/ 3 ... / 4.blå/ kapasitet, relasjoner/ 5.Yte det beste man kan, konsentrasjon/ 6. trygghet

Thank you for taking the time to answer the questions. If you have any questions, please contact me via email xxxxx.