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Factors and parameters affecting the success of students' achievements in Mathematics: A comparative study between Israel and Finland

ABSTRACT

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Contents

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Introduction

This thesis includes comparative research between Israel and Finland that have examined what are the sociological factors that influence student achievement in mathematics in the PISA test. Finland was selected as a comparative country due to the change its education system had while emphasizing the changes made in mathematical education and curricula that caused this country to be at the top of international research (the PISA research) grading for the last two decades as the country with high achievements in mathematics.

About 88% of adults ages 25-64 in Finland have successfully graduated secondary education (a datum higher than the OECD average of 74%), while 85% of men have successfully graduated compared to 91% of the women. This country is also graded in one of the first places in the number of study years - about 19.8 study years average (a datum higher than the OECD of 17 study years). In addition, according to the PISA research findings in 2015, this country was one of the countries with the lowest achievement gaps among OECD countries (a gap of only 62 points while the OECD average is 99 points), because this country offers a model to reduce gaps and promotes weakened populations, children with difficulties, students with learning disabilities and special needs and also leads in gap reduction between boys and girls (girls achievements are higher in 23 points than boys achievements, while the OECD average is only 9 points (OECD, 2016; OSF, 2017).

Therefore, it seems that researching the change process in this country may teach the Israeli society methods of gap reduction in mathematics that will help to reduce heterogeneity among students in Israel, identify the classic sociologic mistakes and promote the mathematics teaching process out of the research concussions.

Chapter 1 Literature Review, conceptualization and Document Analysis

The educational system should help students from a lower economic or social background to progress in their scholastic achievements and realize their full potential gives them a ticket to a better future and enables cultural mobility in society. A society, which enables every individual a real opportunity to advance in the educational, professional, economic and social hierarchy, is not only a more valuable and humane society,

but also a stronger and more prosperous society whose members are more established and happier (Shapira and Ben-Eliezer, 1988; Brandes, 1996).

The factors influencing the education systems quality in the world

The common assumption is that human beings are born equal. In the West and in the East, there are various ideologies that show the path to social equality or opportunity equality among human beings. In reality, however, inequality is prominent, in all life areas, and it reflects the result of social reality, in which individuals and groups struggle for distribution of resources and rewards. Inequality itself does not create stratification in society and the distinction between different positions and roles also does not necessarily indicate a social stratification, but strata are undoubtedly an institutionalized expression of the continuing existence of inequality in society. There are two main inequality manifestations: 1) In resources Distributive as: income, employment, prestige, education, skills and power among the society members. 2) In Relational: between people, which are differentiated by the unequal resources distribution. The two inequality manifestations are social. Resources distribution is based on various criteria as: seniority, gender, age, race, skill, schooling years or religion, each criterion serves as a pretext for the struggles in society. The inequality in control over resources creates ranking of people, which determines their relationships. This inequality explains the existence of strata in society (Shapira and Ben-Eliezer, 1988). Hence the individual's starting point in his economic ability, education level and personal skills - often causes enormous gaps in his personal standard of living and his social status as a citizen. Basic economic and educational inferiority is maintained and even extends in the course of life, and it seems that the weaker groups in society have difficulty to actualize the available opportunities (Brandes, 1996).

Factors that reflect the social cultural status

The correlation between education, employment and income is significant in our society, therefore, one of the main sociologic questions in social stratification is the meaning of this correlation. Due to employment structure in the modern society, which sometimes called "specialists society", education is perceived as the most important means for social mobility. School provides the individual's starting point in accomplishing the expectations of society and employment system and uses to catalog allocating people in society. Although school's role is to be open to all and provide full opportunity equality, it seems that there are significant gaps even on the child's entrance to school which project his future success. One of the main factors found in the researches of the famous sociologist, researcher and theoretician Pierre Bourdieu (1984) is the dimension of cultural capital, which is a social arena of coping between life styles in which valued and legitimate cultural values are compared to excluded and marginalized contents. **Cultural capital**: refers the power based on the content and knowledge world that owning it confers social superiority and allegedly

belonging to social classes that enjoy legitimacy and even dominance and benefits in the entire social structure or part of it. Cultural capital, unlike economic capital, mostly cannot be directly transferred to others (to be inherited) and its transfer from generation to generation involves the re-acquisition of knowledge, proficiency and skill. The main components of cultural capital that grant social superiority are objects, products and works, education, knowledge and taste related to the culture and high art world, i.e., contents that have been institutionalized as canon and the modern science world. Taste preferences that tend to classical artistic music, the painting traditions, literature, poetry, the drama of modern Western civilization, knowledge in the history of science and geography. (Bourdieu, 1984)

According to Bourdieu, it was found that there is a significant influence on grades' gaps, since schools reward the students on the basis of their cultural capital, which is defined as "a socially symbolic wealth transfer tool". (Bourdieu, 1984) The arena is not static and characterized by struggles between forces that preserve, protect and replicate the existing situation, and forces that try to change it. This is a struggle over the character and location of cultural content and certain lifestyle patterns in it. This approach see in the cultural activity and all actions concerning aesthetic judgment and taste preferences a tool that create and preserve cultural uniqueness and social differentiation between groups, sectors and communities (Regev, 2011).

Factors related to technology at home and in school

There are five critical dimensions that may lead to digital inequality. (1) Inequality in using end means - this dimension describes the end means quality the individual uses. low quality end means (as slow connections, old software and hardware) will reduce technology advantages and make the individual to use it less and prevent the benefit of technology advantages. (2) Inequality in autonomic use – this dimension describes the individual's control level of using the internet and the internet access scope – is there access at home, at work, at school, in libraries or other access? Is the access out of home or is their limited hours? Is access in specific hours? How far should the user go to achieve access? Is access limited by regulations, filters or other technical obstacles? If access is at home, how much autonomy does the user get? Is it limited by family members or internet supplier policy? The researchers found strong correlation between education, income and internet access at home. The larger the using autonomy, the greater the user advantages. (3) Inequality in required skills for using digital means – technology improves and expose the user to wide verity of information resources that enrich him with new knowledge, but in using these information resources requires skills to assess the information the user is looking for as knowledge skills: how to search and download information, technical knowledge regarding the software and hardware, integrative knowledge – about how to operate the internet, knowledge about problem solving, knowledge about information security etc. it was found that the user emotional influence in his online experiences is a direct

function of his success / failure in achieving his search goal. (4) Inequality in social support – observations have found that social support in acquiring search skills of new users by experienced users became very important as technology entered new sectors in population. The social environment benefit in assisting (by friends / family / professionals / work staff at work / librarians / teachers etc.) is in emotional positive reinforcement of the user and increasing the user motivation to reuse technology. (5) Differences in using technology – this dimension deals with the scope of using technology for learning, consumption etc. An increased use was found among internet users with lower income and less educated and that accessibility to new and varied technologies improves learning in schools and profits at work (DiMaggio& Hargittai, 2011).

As for 2018, about 84.3% of households with children in Israel own a computer at home and about 76.4% has internet subscription (CBS, 2018). The head economist department data indicate large gaps between Arab population group and the Jewish that is not ultra-orthodox. About 6% of Jewish students that is not ultra-orthodox do not have a computer and about 8% do not have internet. However, about 26% of Arab students do not have computer at home and about 72% do not have internet. Public opinion survey performed among 1050 children ages 3-16 found that the "main reasons that the child occasionally did not actually learn in the offered learning hours are the child's lack of interest, technical problems and not having available computer" (Rabinowitz, 2020).

Factors reflecting school

In 2007, the McKenzie report was published and included the Prof. Michael Barber and Dr. Mona Morshad research findings regarding "the best educational systems in the world's causes of success". The research question was "why some education systems consistently perform better than others and why some of them are improving faster than others". In this research, a thorough and systematic examination was performed in twenty-five educational systems in the world, including the top ten. This research was based on the achievements analysis of the best educational systems in the world, as defined by the PISA program, a comprehensive review of current literature, and interviews of more than 100 experts, policy makers, teachers and principals. During the research, researchers visited many schools from Wellington to Helsinki, from Singapore to Boston, to compare education systems in Asia, Europe, North America and the Middle East.

The report findings showed unequivocally that the most effective educational influence factor is the teachers: "Good teachers are the key to a quality education system. The educational system quality cannot exceed the quality of its teachers". the report found three main factors mutual to the best education systems in the world: 1) attracting suitable people to teach, 2) developing teachers to be effective teachers, 3)

guarantee that the system provides the highest education quality possible for all the students (Barber& Moushed, 2007; Olson, 2000).

Additional research examined and found that two students with similar abilities may develop a gap of about 50% in their knowledge and achievements within only three years if one of them has a good teacher and the other not. It was also found that the success / failure of students coming from weak background also depends on the teacher knowledge and proficiency (Sanders & Rivers, 1996). Moreover, performance gap between students who have studied with three effective teachers in a row and students who studied with ineffective teachers in a row was 49 percentiles. Researches that consider all available data about teacher effectiveness indicate that students who study with excellent teachers will progress three times faster than students studying with poor teachers. Poor teacher negative impact is hard, especially in the first years of school education, students who study with poor teachers several years in a row in elementary education suffer from irreversible educational shortage. It was also found that teacher seniority years (except for the three first teaching years), their pedagogic training, their occupational status and teaching experience has very little impact on students, but teacher language and mathematical skills have great influence on student achievements (Rivkin & Others, 2005). Therefore, attracting the suitable people to teaching has to be performed by acceptance requirements to the teacher training program, which will include cognitive skills, emotional – social skills and personal growth skills of the candidates (Rockoff & Others, 2011; DeMonte,2015).

The second factor in the best educational systems in the world is the professional development given to teachers that directly influences teaching improvement by tight guidance in the issues of work in class, transferring training into the classes, developing strong school leadership and giving teacher opportunities to peer learning (Barber & Moushed, 2007). Seven necessary advantages for the professional development success in teaching were found: (1) forming clear vision for good teaching, (2) defining professional practices standards, (3) thorough measurement plan, (4) extensive practical experiencing, (5) extensive use in case study, research and evaluation tools, (6) strategies to manage student emotions, (7) forming relationships, general knowledge and mutual perceptions about teaching (Sperling, 2017). Teachers should be highly motivated while being aware to their weaknesses in teaching methods, be aware to the way they think and constantly want to improve it with shared sense of purpose and great will to influence their students (Barber & Moushed, 2007). It was also found that teacher who experience effective professional training have greater sense of competence and therefore feel self-realization in teaching and significantly improve their students' performance. The greater the teacher's sense of competence, the higher academic achievement of his students (Kass, 2000).

Raising the bar for student performance as an individual: the McKinsey (2007) report findings indicate that the system has to set strict standards with clear expectations and support both for the teachers and the students. Good education systems build for each student increased expectation bar while interfering where there is a gap, so a low correlation form between student results and their background, because school succeed in "compensating" the student for socio-economic impacts and his home background (Barber & Moushed, 2007). Defining high bar for the student by the teacher in school means setting the individual challenges comparing to himself and such development with proper escort lead to success, to sense of capability and self-development. Developing the student faith in himself and accuracy in assessing his abilities along with practical and valuable challenge sets the student worthy, valuable goals that developing the ability to achieve it leads to learning perseverance, adherence and makes him dare despite the difficulty and obstacles in achieving the goal. In order to achieve this principle, the teacher has to set a standard not only to the student but to himself since the faith in the student success in the very mission set the teacher a high standard aspiring to achieve teaching purpose, teacher professionalize and important for his development. The bar the teacher sets to his students can be in the content field - learning new things from different angles as well as in the pedagogical field - to improve in imparting knowledge and succeed in challenges related to the act and methods of teaching (Azulay, 2015). Three qualities a learner must develop in order to foster his learning and get the student perform it in the best: (1) focusing on specific target or performance criterion – it was found that giving a student a task by clear description of performance and defining the required performance level improve student performance. Goal focused practice predicts the student learning quality – students who have studied target focused, deepen mor and focused on the small details. (2) adjustment to the proper challenge level – the condition for an effective practice is correct adjustment of standard set by the teacher. When the set challenge is too hard the student keeps mistaking and will eventually feel frustration and despair, when the task is too easy the student will not feel challenged and will get bored. Therefore, the "estimated development zone" has to be found – a stage that the student can reach with another person's help. (3) sufficient amount of quantity and continuity - this criterion refers the assignment time that must be set to the learner - this time should be sufficient for progress (Harpaz, 2015).

In conclusion, equality of opportunity in education is a key tool for alleviating adversity, reducing social gaps and sustaining a just and solidary society. Providing high-quality education to every resident in the country is the way to social equality, so that the individual's achievements will not be a function of national origin, ethnicity, gender or place of residence. No equality in more important than the equality given to a child in the beginning of his life. An educational system that can help students from a lower economic or social background to progress in their scholastic achievements and realize their full potential gives them a ticket to a better future and enables cultural mobility in society. A society, which enables every individual

a real opportunity to advance in the educational, professional, economic and social hierarchy, is not only a more valuable and humane society, but also a stronger and more prosperous society whose members are more established and happier (Brandes, 1996).

Research questions and hypotheses

Researching the change process in this country may teach the Israeli society methods of gap reduction in mathematics that will help to reduce heterogeneity among students in Israel, identify the classic sociologic mistakes and promote the mathematics teaching process out of the research concussions.

The research questions examined:

- What are the most essential factors test that influence most student achievements in mathematics in Israel, in comparison with Finland?
- What are the reasons of achievement gaps between mathematics grades in Israel and in Finland?

To answer questions 1 a statistical analysis was performed between the student background questionnaires and their grades in mathematics in the PISA test in 2015 and 2018. The analysis included two parts. The first is descriptive statistics of the research indices that examined the correlation significance between the variables and the second inferential statistics analysis that examined the background variables that may explain the differences between students' mathematics grades.

Hypotheses:

- I assume that the most essential factor that influence most student achievements in mathematics in Finland will be perceived feedback (PERFEED).
- The most essential factor that influence most student achievements in mathematics in Israel will be the economic, social and cultural status (ESCE).
- The reasons of achievement gaps between mathematics grades in Israel and in Finland will be depended on factors related to the school. I assume that maybe the differences between

the quality of teachers can be one of the reasons of the different grads between the countries.

The first and second hypotheses will be tested by statistical analysis using a regression model that will construct and examine the effect of sociological parameters on students' achievement in mathematics.

In order to examine the third hypothesis, in-depth interviews will be conducted which will examine the reasons for the gaps in mathematical achievement between Israel and Finland. The interviews will be constructed from the findings of statistical analyzes (theoretical and inferential statistics).

Chapter 2 Methodology

To answer research questions 1 a statistical analysis was performed between the student background questionnaires and their grades in mathematics in the PISA test in 2015 and 2018. The analysis included two parts. The first is descriptive statistics of the research indices that examined the correlation significance between the variables and the second inferential statistics analysis that examined the background variables that may explain the differences between students' mathematics grades.

This part examined about 6,501 Israeli students and 5,812 Finnish students from the class of 2015 and about 6,456 Israeli students and about 5,557 Finnish students from the class of 2018 (total of 24,326 students). For the comparison, this research has selected from the PISA test background questionnaires the questions that were identical in both terms. The examined background variables were divided into three main categories: (1) variables that reflect the gender and the social cultural status at home, (2) variables related to technology, (3) variables related to school itself: number of mathematics learning hours at school, feedback from teacher. An additional comparison was performed between Israel and Finland on the 2018 questionnaire and examined the correlation between student motivation and their mathematics grades. This examination was performed only in this year since there were no overlapping questions between the two terms, so the last and most recent term was selected.

At the second stage of this research were performed in-depth interviews that were built following the statistical data findings. The purpose of these interviews is getting wider image of the reasons for gaps in student grades in mathematics, which will provide an answer to the third research question.

Chapter 3: The empirical results

The main results of the thesis:

This research engaged with the sociological factors influencing student achievements in mathematics. A comparison was made between Finland - a social country, where there are very small learning gaps, the OECD countries and Israel (which today is in capitalist trend), which is currently placed first in achievement gaps in mathematics. It was found that the gaps in Israel are a result of the student socioeconomic status and his sector, while in Finland the first factor influencing student achievements is socioeconomic status, but it has less influence than in Israel.

Four regression analyses were performed in this research:

1. Regression model that predicts the factors influencing the grads in Finland in 2015.
2. Regression model that predicts the factors influencing the grads in Finland in 2018.
3. Regression model that predicts the factors influencing the grads in Israel in 2015.
4. Regression model that predicts the factors influencing the grads in Israel in 2018.

The four analyses findings were summarized in tables 74, 75 and 76:

The findings in table 74 indicate that

In Finland: The variables in model 3 that reflecting the home socio-economic status +Technology related variables+ Variables related to school influence student achievements in mathematics about 15.2%- 16.5%. In Israel**:** The variables in model 3 that reflecting the home socio-economic status +Technology related variables+ Variables related to school influence student achievements in mathematics about 33.4%- 35.4%.

The table findings indicate that the first sociological factor that is the most influencing on student achievements in Finland is the student socioeconomic status. The second most influencing factor is cultural capital at home and then the parameter list changes between 2015 and 2018. It is interesting to see that the two sociological factors that are the most influencing on student achievements in mathematics are due to situations reflecting his family status rather than external factors as school or technology.

The findings in the table indicate that the first sociological factor that is the most influencing on student achievements in Israel is student language, namely the sector the student comes from. The second most influencing factor on student achievements is the student socioeconomic status and then the parameter list changes between 2015 and 2018. Here too, the two sociological factors that are the most influencing on

student achievements in mathematics are due to situations reflecting his origin and his family status rather than external factors as school or technology.

The findings confirm our first assumption that most essential factor in the Pisa test that influence most student achievements in mathematics in Israel will be the economic, social and cultural status (ESCE). This assumption was made in recognition that a student in a low socioeconomic status may be find it difficult adjusting to the educational system and use it as a social mobility system. Additionally, in the literature review that was done, we found findings from studies have shown that there is a correlation between social status and lifestyle is prominent among all classes in society, but the medium and high classes translate their money to consumption patterns that encourage scholastic achievements and bring the child closer to school while the lower-class child, on the other hand, lives in conditions of overcrowding and family instability.

Question no 2: What is the most essential factor in the Pisa test that influence most student achievements in mathematics in Finland?

The table findings indicate that the first sociological factor that is the most influencing on student achievements in Finland is the same as in table 76: the student socioeconomic status. But the second most influencing factor on student achievements is different and it is student motivation. This change provides deeper observation of student achievements and indicate that one state stems from the student family status, but the second state stems from the student desire to succeed. It is interesting to see that in Israel this datum has only minimal place (9 out of 11).

The findings refute Our assumed that the most essential factor in the Pisa test that influence most student achievements in mathematics in Finland will be perceived feedback (PERFEED). We hypothesized that since Finland is a socialist country, the impact of income and culture coming from the student home would be negligible. We assumed that the school may provide the student's financial infrastructure to study. From the findings we find that both in Israel and in Finland the impact of the student's socioeconomic status is significant.

In order to answer the third research question:

Question no 3: What are the reasons of achievement gaps between mathematics grades in Israel and in Finland?

Throughout the years of PISA research in mathematics literacy, in the dispersion index (the difference in the grade between in the 95^{th} percentile and the 5^{th} percentile) Finland was graded in low places (44-61)

while Israel was graded in the highest places in the dispersion index (1-3) (OECD 2007-2019). In the last PISA research (2018) Israel was ranked first (among the 78 countries participated) in grade differences (see figure 14) while Finland was ranked 61. The figure indicates that the grade distribution in Israel is about 356 points, the largest among the OECD countries and economic entities (RAMA, 2019).

It seems that the Finnish education system is an autonomic system that succeeds in making its students equal in school space, starting from providing the students basic needs (as breakfast and lunch to all students in school for free and providing health and welfare services) and a sense of security. The literature review indicates that in Finland, unlike Israel, the free education law is really free: all the students receive learning materials and enrichment is provided to all students free of charge, unlike Israel where all the required equipment as well as nutrition and health and welfare services are paid by the student parents. Maybe when a child's basic needs for learning are provided - there is true learning that enables the child to be available to his future aspirations. Maybe it is the reason why the second most influencing factor for student success in mathematics in Finland is student motivation to fulfil his aspirations in his future profession. The interviews indicated that the gaps between societies in Israel - the Jewish and the Arab - are probably caused by differences in the socioeconomic status in Israeli society. the research findings indicated that possession at student home in Finland is lower than in Israel, maybe because school in Finland neutralize the classes of possession at student home does not influence his learning achievements while in Israel the class difference is the main factor in acquiring education means. Although parent education and educational possession at student home (as books etc.) were found influencing student achievements in both societies because they provide cultural capital for students.

Interview-oriented questions

The research findings an interesting question arises: why is the Arab society weaker in general in mathematics grades compared to the Jewish society? We obtained a significant correlation in this research between socioeconomic status and the sector, but deeper observations in the whole PISA research over the years indicate that regardless of the socioeconomic status, the Arab society greatly falls behind the Jewish society.

Research question 3, which deals with the reasons for the large gaps in student achievements in Israel, emerges from these findings. To respond this question, we will refer to all the data collected so far and deepen in the data engages with Israel vs. Finland.

So far we saw that there are significant differences between Israel and Finland. First we found that the grades in Finland are higher than in Israel. We have also found that the cultural capital, parent education, educational and technological resources at home, the technological resources at school and the feedback the student gets from the teacher are higher in Finland than in Israel. In the literature review in chapter 1 we found that the higher this data the higher the student success chances to higher educational achievement - namely it may be concluded that the Finnish student opening data is higher than the average Israeli student in all these parameters. However, it was found that possession at student home and the time of learning mathematics in Finland is lower than in Israel. The summary chapter will refer this.

Referring research questions 1 and 2 we may be able to explain some of question 3.

We will try to explain the gaps in Israel. We have found in question number 2 that the most influencing factor on student grades in Israel is the sector and the second most influencing is the student socioeconomic status. For deeper understanding we will examine the correlation between these two variables as presented in table 79 that examine the correlation between the student socioeconomic status and sector.

An additional fundamental difference between the two countries is teacher training: in Israel only 40% of mathematics teachers in schools are qualified to teach the subject, while in Finland all the teachers are qualified to teach the subject. The training in Finland in elementary schools is for all subjects and in Junior high school the teachers are trained to teach only mathematics. In the two courses teachers are required to pass classification tests before training and the acceptance requirements are very high. In Israel there is a separate training for mathematics in elementary and in secondary schools and the acceptance requirements are very low and there are no initial classification tests. Therefore, teachers who are not suitable to teach the subject are accepted to training and eventually become part of the system that worsen student achievements. In addition, 60% of teachers are not qualified to teach the subject and harm the students since they do not hold legitimate qualifications.

It may also be seen that the teacher training courses in Finland and in Israel are very different. In Finland teacher training is completed only after the student graduates two degrees and a thesis, while in Israel the teacher has BA training only. The research findings indicated that there is less learning time in Finland than

in Israel, maybe because the Finnish teachers are more professional and trained better, the time of learning mathematics shortens and becomes clearer and more professional.

Due to the findings the interviewees were asked what their recommendations are to improve student achievements in the Arab sector and reduce the gaps between sectors. herein the summary of their recommendations:

1. investing money and resources in Arab schools
2. supervising the teacher's knowledge level before accepting his candidacy.
3. subsidizing and reinforcing students with difficulties in schools.
4. reducing the number of students in class or adding a teacher to each class to divide the class into groups and helping students with difficulties during class.
5. increasing the number of study hours in mathematics in schools.
6. reducing the learning material in the curriculum.
7. training teachers in the Arab sector for experiential learning adjusted to the 21st century skills.
8. opening learning centers free of charge after school hours to help and practice students with difficulties.
9. providing diverse enrichment programs for Arab sector students.
10. developing class learning spaces or Arab sector students.

The findings of the study partially refute our hypothesis that the reasons of achievement gaps between mathematics grades in Israel and in Finland will be depended on factors related to the school.

We assume that maybe the differences between the quality of teachers can be one of the reasons of the different grads between the countries, but we found that in Israel the gender and the socio-economic situation are the most influential factors and also that there is a clear correlation between them. It seems that in Arab society in the State of Israel there is poverty and lack of resources both in the school and in the student's home which adversely affect his grades in mathematics.

Conclusions and Recommendations

This research engaged with the sociological factors influencing student achievements in mathematics. A comparison was made between Finland - a social country, where there are very small learning gaps, the

OECD countries and Israel (which today is in capitalist trend), which is currently placed first in achievement gaps in mathematics. It was found that the gaps in Israel are a result of the student socioeconomic status and his sector, while in Finland the first factor influencing student achievements is socioeconomic status, but it has less influence than in Israel.

Reviewing Finland culture history, we may see that Finland in its history is characterized by a high level of social coherence and its main goal is offering all its citizens genuine equal opportunity for education, regardless their age, nationality, living place, economic status or native language.

The story of Finland is a survival story where education was a main strategy for building the Finnish nation, which turned from a poor, agricultural and not very educated country into a modern, knowledge established society with a high-performance education system and global level innovation climate.

In the years 1939 - 1945 Finland had less than 4 million residents, in this time it was in a war (World War II) that charged a heavy price - 90 thousand dead, 60 thousand seriously injured, 25 thousand widows and 50 thousand orphans. following the peace agreement signed between Finland and Moscow in September 1944 (despite the agreement the German troops left Finland only on April 1945), Finland was forced to sign far-reaching conditions and hand more than 12% of its territory to the Soviets, which included the evacuation of 450 thousand people (that were about 11% of the population), giving up of about 7% of its Gross National Product (GNP), renting the peninsula near Helsinki to establish a military base for the Soviet army, release political prisoners and prosecute war leaders in military courts. In addition, it was also forced to outlaw certain political organizations from which it formed a Finnish Communist Party that was considered a legitimate political entity. Despite all this, it may be said that Finland did win the war since it stayed an independent state. The time after the war was characterized by political and economic instability, but also grew new social ideas and new social policy from which the first fundamental educational change emerged, which is **the idea of equal education opportunities**, applied between 1954 and 1970 and became the main tool in the social and economic transformation and was inseparable part form Finland transformation from a northern agricultural nation into industrialized society than and until now. it was clear to Finland that in order to become a known society among the western democracies' community and the market economies, it needs more educated human capital. This rule became its main vision. Since then, until now and during all the years Finland made changes in the education system, but its main goal stayed the same (Salberg, 2015).

It seems that the Finnish education system is an autonomic system that succeeds in making its students equal in school space, starting from providing the students basic needs (as breakfast and lunch to all students in school for free and providing health and welfare services) and a sense of security. The literature review

indicates that in Finland, unlike Israel, the free education law is really free: all the students receive learning materials and enrichment is provided to all students free of charge, unlike Israel where all the required equipment as well as nutrition and health and welfare services are paid by the student parents. Maybe when a child's basic needs for learning are provided - there is true learning that enables the child to be available to his future aspirations. Maybe it is the reason why the second most influencing factor for student success in mathematics in Finland is student motivation to fulfil his aspirations in his future profession. The interviews indicated that the gaps between societies in Israel - the Jewish and the Arab - are probably caused by differences in the socioeconomic status in Israeli society. the research findings indicated that possession at student home in Finland is lower than in Israel, maybe because school in Finland neutralize the classes of possession at student home does not influence his learning achievements while in Israel the class difference is the main factor in acquiring education means. Although parent education and educational possession at student home (as books etc.) were found influencing student achievements in both societies because they provide cultural capital for students.

An additional fundamental difference between the two countries is teacher training: in Israel only 40% of mathematics teachers in schools are qualified to teach the subject, while in Finland all the teachers are qualified to teach the subject. The training in Finland in elementary schools is for all subjects and in Junior high school the teachers are trained to teach only mathematics. In the two courses teachers are required to pass classification tests before training and the acceptance requirements are very high. In Israel there is a separate training for mathematics in elementary and in secondary schools and the acceptance requirements are very low and there are no initial classification tests. Therefore, teachers who are not suitable to teach the subject are accepted to training and eventually become part of the system that worsen student achievements. In addition, 60% of teachers are not qualified to teach the subject and harm the students since they do not hold legitimate qualifications.

It may also be seen that the teacher training courses in Finland and in Israel are very different. In Finland teacher training is completed only after the student graduates two degrees and a thesis, while in Israel the teacher has BA training only. The research findings indicated that there is less learning time in Finland than in Israel, maybe because the Finnish teachers are more professional and trained better, the time of learning mathematics shortens and becomes clearer and more professional.

Regarding the confirmation / refutation of the hypotheses, we can conclude the following:

The findings confirm our first assumption that most essential factor in the Pisa test that influence most student achievements in mathematics in Israel will be the economic, social and cultural status (ESCE). This assumption was made in recognition that a student in a low socioeconomic status may be find it difficult

adjusting to the educational system and use it as a social mobility system. Additionally, in the literature review that was done, we found findings from studies have shown that there is a correlation between social status and lifestyle is prominent among all classes in society, but the medium and high classes translate their money to consumption patterns that encourage scholastic achievements and bring the child closer to school while the lower-class child, on the other hand, lives in conditions of overcrowding and family instability.

The findings refute Our second assumption that the most essential factor in the Pisa test that influence most student achievements in mathematics in Finland will be perceived feedback (PERFEED). We hypothesized that since Finland is a socialist country, the impact of income and culture coming from the student home would be negligible. We assumed that the school may provide the student's financial infrastructure to study. From the findings we find that both in Israel and in Finland the impact of the student's socioeconomic status is significant.

The findings refute Our third assumption that the differences between the quality of teachers can be the reason of the different grads between the countries. This study findings found that in Israel the gender and the socio-economic situation are the most influential factors and also that there is a clear correlation between them. It seems that in Arab society in the State of Israel there is poverty and lack of resources both in the school and in the student's home which adversely affect his grades in mathematics.

My recommendation as an education researcher is to bring this research findings to the responsible factors (the Ministry of Education) with the following recommendations

• An inequality situation between Hebrew and Arab education must be addressed immediately, with regard to the social aspects concerning the student's study environment.

- Nutrition should be budgeted for in schools that are located in areas where the socio-economic situation is low.

• Welfare services should be provided if necessary for students coming from disadvantaged families that include providing free school uniforms.

• In order to reduce the problem of heterogeneity in the classrooms - mathematical mapping must be performed in each classroom in the schools. After the mapping is done, a personal work program must be prepared for each student. The program will be taught in small groups during and outside school hours.

• Learning centers should be opened in the afternoon that will be financed by the state, which will provide students classes and tutoring in the mathematics subjects for free.

• Mathematics teaching students should be recruited as part of the teaching training to assist and reinforce school students. Students can help teachers every day at work or help in the evening in the learning centers.

• Providing an opportunity for school principals to interview the teachers who come to the school and decide whether they will suit the needs of the school.

• Enrichment classes should be held at the school that deal with the development of mathematical thinking and are adapted to the 21st century.

• A "Parental Counseling Center" should be opened in weakened areas that will assist parents in receiving guidance regarding the advancement of their children in Israeli society.

In addition, depth research must be promoted and continue this research in the subject of promoting the Arab society in Israel and engage in research examining the skills of teachers and education training institutes. For me, education reflects the Israeli society, therefore we have to act efficiently and quickly to improve it.

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