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THE INFLUENCE OF SOCIO-ECONOMIC FACTORS ON THE STUDENTS' ACHIEVEMENTS FROM RNM IN TIMSS 2019

Abstract: TIMSS 2019 (the Trends in International Mathematics and Science Study) was conducted in the fourth and eighth grades in 64 countries and 8 benchmarking systems. The Republic of North Macedonia participated with population sample from IV grade.

The TIMSS 2019 are based on the Mathematics and Science 2019 Framework which are organized around two dimensions: a content dimension and a cognitive dimension.

The results from TIMSS 2019 were announced on December 8, 2020.

The aim of this study is to get data and answers for:

- The level of our sudents' achievement compared to the other states and what's the educational system like in the states that great results are acomplished;
- The teaching process, teachers' preparation and their professional development;
- How is the institutional organization of the educational work of the educational systems different from ours.

In the study in R. N. Macedonia 3531 students and their 150 parents from randomly selected primary schools, as well as their class teachers and school principals.

The methodology and the instruments that are used in this study are the same for every country-participant.

The students from R. N. Macedonia are on 45th place from 58 states in Mathematics, and 51st place in Science.

From the received results we can conclude that: there are significant differences in the average achievements of the students from R. N. Macedonia according to the socio-economical status of the students and resources of schools.

Keywords: Assessment, Mathematics, Science, Achivment, TIMSS

Introduction

Large-scale international assessments can play a key role in identifying factors that have an effect on students' learning and achievement. With the implementation of such measurements of student's achievements, in addition to the the one that are measured, numerous data are obtained about educational systems, curricula, the teaching process, students' achievements, the work of teachers, as well as comparing students'achievements at the international level. The

implementation of such international measurements often encourage reforms in education in order to increase the quality in education.

The results of international studies are used for further development and modernization of the educational system, i.e. the educational process for:

- determining the profile of students' basic knowledge and abilities;
- determination of achievements, goals and standards for educational improvement;
- stimulation of curriculum reforms in order to modernize them;
- improving teaching and learning through research and analysis of study data;
- defining students' achievement levels;
- professional training and improvement of the teaching staff;
- defining standards for evaluating students' knowledge in the areas being tested.

All collected data from international studies are used not only to find out where we are today, but also how to be better tomorrow, in which direction to move to increase the quality of our education, what are the world trends in education, in what conditions students learn from countries that achieve better results than us and to make a detailed analysis of all the elements that are part of a good education system.

If we ask ourselves, *"Are international studies relevant to our education system?"*, we would certainly answer with YES. But, *are they the only relevants for the development of education*?, the answer is certainly NO. There are other indicators, such as: state testing, exams that are an integral part of the state matriculation exam, integral evaluation, self-evaluation in schools, etc. Conclusions can be drawn from all of it in the direction of improving the entire educational system.

The international study measures trends of students' knowledge and ability in Mathematics and the IEA's Mathematics and Science Subject Group (TIMSS), as the most significant international study of classroom teaching in these subjects, is increasingly important in supporting the continuous improvement of the quality of education. In the period from April to May 2019, the main TIMSS 2019 testing was carried out. Through the questionnaires students, teachers, parents and directors, obtained data on how the school climate and culture, teaching practice, the goals of the curriculum, the socio-economic conditions of the students and schools, the systematic arrangement of education and others affect the achievements of the students. The results were announced in December 2020. 64 countries participated in TIMSS 2019, of which, 58 countries and 6 economies with a population of the fourth grade. It is especially important that in TIMSS 2019 with a population of 4th grade all the countries of the region participated (Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Kosovo and Albania), so we can see the achievements of our students in relation to the achievements of the students from other countries in the region, as well as the influence of the factors.

Educational researchers have been working for decades on the factors that determine students'achievements. They are a complex phenomenon that is influenced by numerous factors, primarily the personality characteristics of the students, the socio-economic status of the student, and of course the environment and conditions in which the teaching takes place. There are many reasons for school success or failure of students, and they are usually classified into three groups:

- family and peers (family relationships, socio-economic status, family structure, expectations of parents and peers, relationships with peers),
- the school (curriculum, teacher training for educational work, student-teacher relationship, teacher's expectations, student assessment methods),
- students' personal resources (intelligence, values, self-esteem, expectations, assessment of self-efficacy) (Gutwein, 2009).

The research question in this paper is *What is the impact of socio-economic status (SES) on the achievements of students in mathematics and sciences in TIMSS 2019 in RS Macedonia.*

Sample

The population for this study in RNM was all students from the fourth grade of primary schools in which teaching is conducted in Macedonian and/or in Albanian. The average age of students in RNM at the time they were tested is 9.8 years old, making them one of the youngest in the region with an average of years. The sample included 150 primary schools, of which: 86 in the Macedonian language, 30 in Albanian language and 34 in Macedonian and Albanian languages. Out of a total of 3531 students from RNM in the sample on the day of testing, 3270 students were tested, i.e. 93%. Out of the 58 countries participating in the study, RNM is in 45th place in Mathematics with an average score of 472, and in 51st place in Sciences with an average score of 426. Compared to other countries in the region, RSM students achieved better results in Mathematics from: Kosovo, Montenegro and Bosnia and Herzegovina, and in Sciences only from Kosovo.

Data Sources and Analyze

The database from TIMSS 2019 will be used in this analysis.

Students' achievement is analyzed according to Students' Questionnaires and Parents' Questionnaires regarding the availability of five resources on the Home Learning Resources scale that provide insight into families' socio-economic status (SES). In doing so, the focus was placed on the indicators of the socio-economic status of the students: home resources for learning, the education and the occupation of the parents. A scale (Home Resources for Learning) was made from the answers to the questions of the students and parents related to the socio-economic parameters in the home. It contains data on: number of books at home, number of children's books at home, home support for learning (own room, internet connection), education and occupation of parents/guardians. The scale is divided into three categories:

- Students with many resources – students who have: more than 100 books at home, their own room, internet connection and at least one parent with a university degree.
- Students with few resources – students who have: 25 or less books in their home, do not have their own room, do not have internet and parents have not completed more than secondary education.
- Students with few resources – students who do not belong to any of the previous two categories.

Students' achievements will also be analyzed according to the opinions of School Principals from the Questionnaire for Principals regarding how many schools have resources for teaching Mathematics and Sciences in grade school.

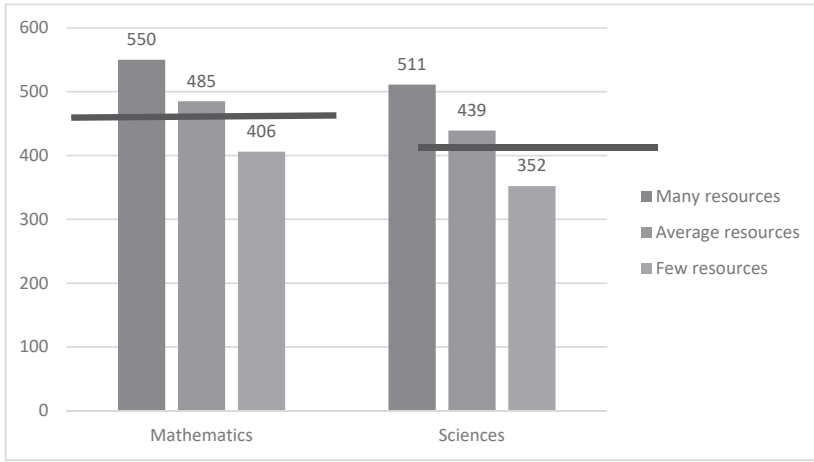
For data analysis it was used IEA IDB Analyzer.

Results and Discussion

The data from TIMSS 2019 show that the SES status of students in RNM, and through them and the school's, are strongly related to the achievements of students in both cognitive areas (Mathematics and Sciences). In R.N. Macedonia, 7% of the students at home have many resources, compared to 17% at the international level. While 15% of the students have several resources, and only 8% at the international level. The largest percentage of students in RNM have average resources at home (78%). The TIMSS study showed that the students who have more resources at home achieve higher results in both Mathematics and Sciences. Between the three categories of the scale there are statistically significant differences in student achievement. The achievements of students in RNM who belong to the categories of many resources and few resources are higher than our national average (472 for Mathematics and 426 for Sciences), while, on the other hand,

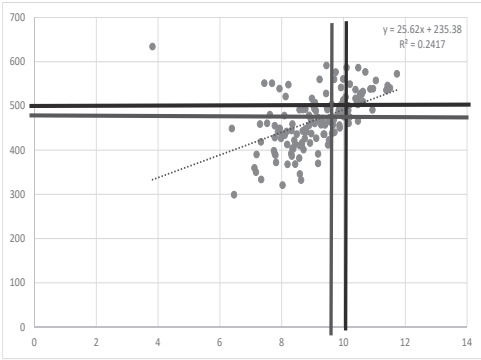
students from the category of few resources are far below the national average. The difference in the achievements of students from the category of many resources with the international average in Mathematics is 12 points, and in Sciences 46 points. These differences increase linearly moving towards the few resources category (for Mathematics the difference is 27 points, and for Sciences even 62 points). The achievements of the students differ statistically significantly in relation to which category they belong to. All of this implies that at the school level, the higher the SES of the school, the higher the achievement at the school level. The analysis by school showed that 73% of the schools in RNM belong to the Average resources category, and the rest are from the Few resources category, while there are no schools at all from the Many resources category.

Graph 1
Home Resources for studying

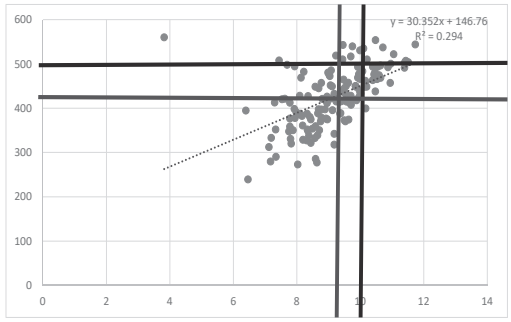


The distribution of schools, by their average Math and Science achievement, and school's SES, by student SES can be seen in the graphs above. Average school-level achievement is significantly related to school SES. In particular, the positive value of the slope of the socio-economic status shows that students with more favorable conditions achieved better results in TIMSS 2019 than students with unfavorable conditions. In particular, 24% of the variation in Mathematics scores and 39% of the variation in Science scores between schools can be explained by the school's socio-economic profile.

Graph 2
Mathematics



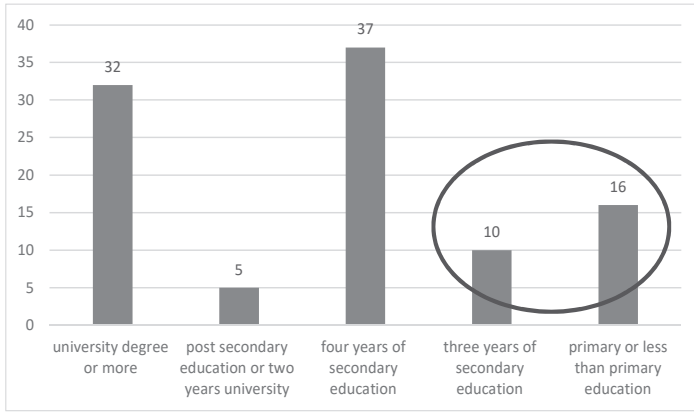
Graph 3
Science



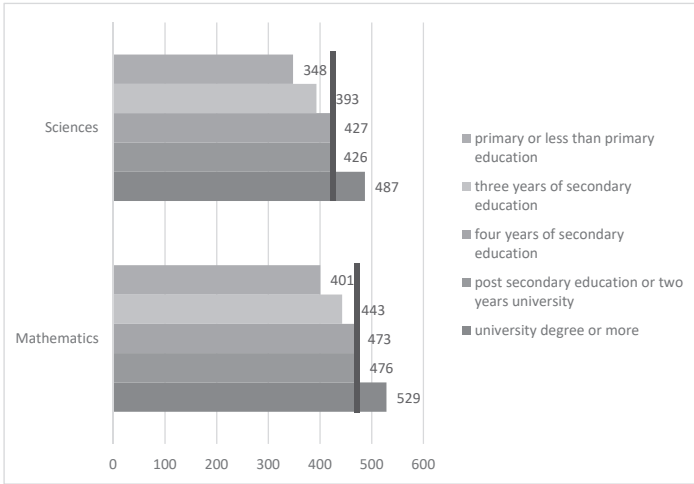
If we consider each of the factors that appear in the SES scale individually, it can be seen that each of them has a statistically significant effect on the average achievements.

This study showed that there is a strong positive relationship between students' achievement and parental education. In general, the higher the parents' education, the more highly paid professions they have, that is, the family has a higher socio-economic status and has more resources at home.

Graph 4

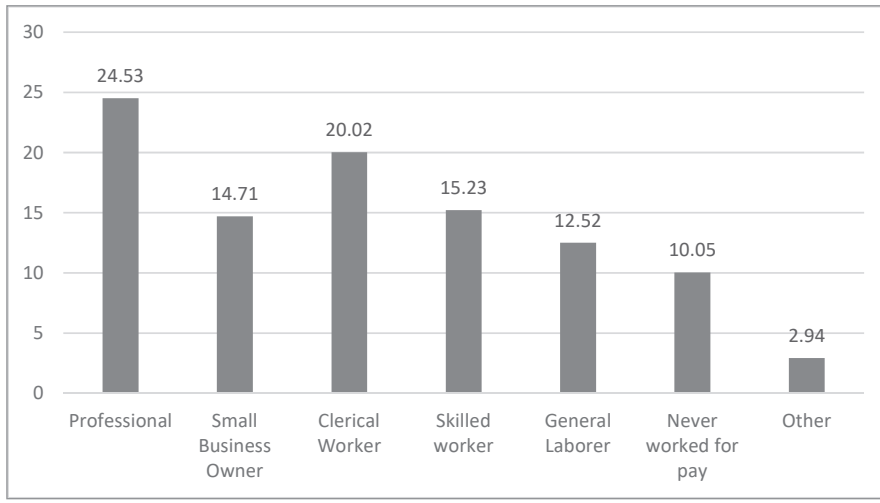


Graph 5

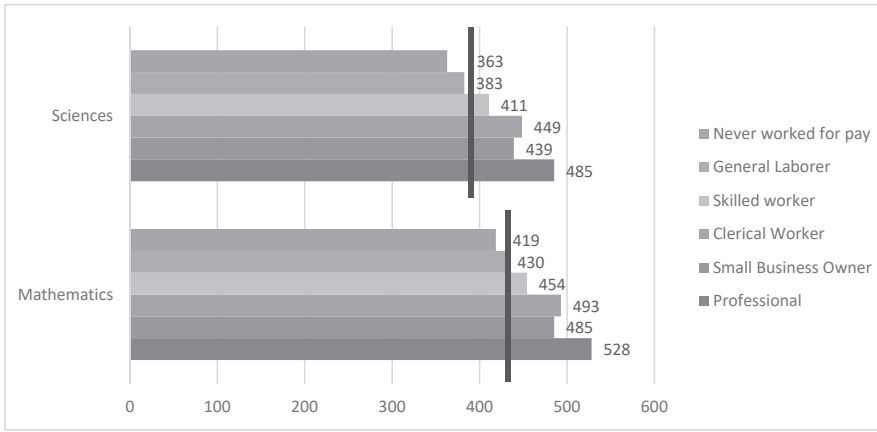


The level of education of the parents can be considered a statistically significant factor of the students' achievements in Mathematics and Sciences. The differences are significant so that students whose parents have a higher level of education have statistically significantly better achievements in Mathematics and Sciences. The average student whose parents completed primary or less than primary education or only three years of secondary education achieve lower results than the average RNM results in Mathematics and Sciences (that's about a quarter of the students). The achievements of these students in sciences are below the low reference level (lower limit of 400 points), and in Mathematics at the minimum level. Students whose parents have a higher education also achieve higher results.

Graph 6



Graph 7



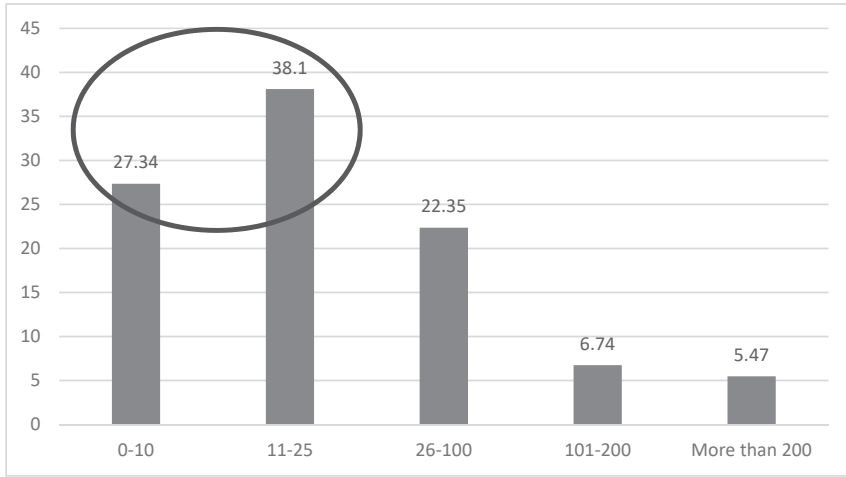
Also, parents who have more prestigious occupations, their children achieve better results. Children whose parents are experts in their profession have the highest achievements in Mathematics and Sciences. Their average achievements are statistically significantly higher than children whose parents have some other profession. Parenting is a significant factor in a child's success on Math and Science tests.

Another factor that enters into students' SES is the number of books in the home. As many as 65% of the students surveyed have under 25 books in their homes. The achievements of students who have up to 25 books at home have statistically significantly lower results than those students who have more than 25 books at home.

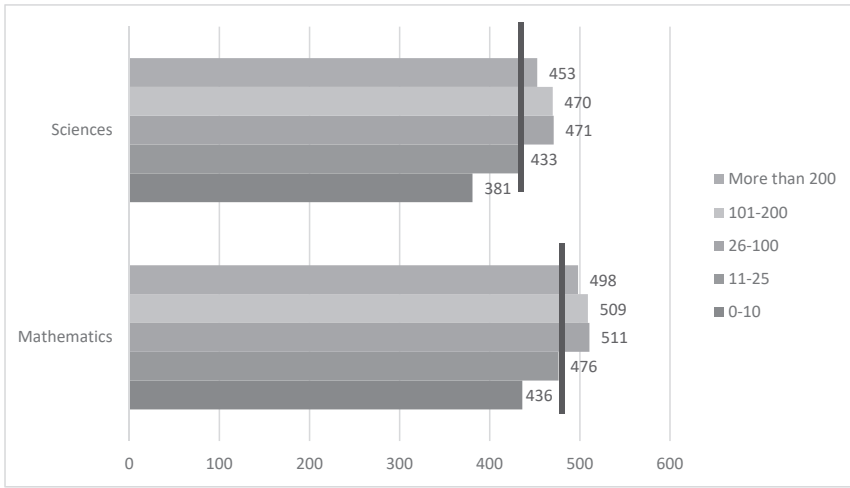
In addition to the students' SES, the resources in the school are also an important factor. According to the answers of the Principals of the schools involved in TIMSS from RSM, 8% of the schools have many resources in Mathematics, and 10% in Sciences. While 13% of schools do not have resources for Mathematics, and 19% for Sciences. The other schools have average resources.

RNM students who attend high-resource schools have higher achievement than those who attend low-resource schools. This difference in achievement in sciences is statistically significant.

Graph 8



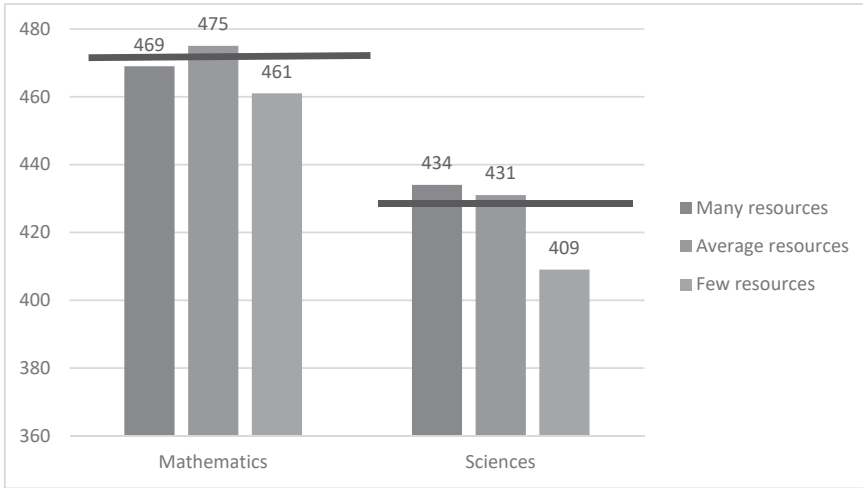
Graph 9



While, on the other hand, those students who attend schools with many resources and schools with few resources do not have large differences in mathematics achievement, even this difference is inversely proportional.

Very important fact for teaching in the field of Sciences are the resources available to schools for the implementation of teaching, especially in the practical part. It certainly has a particular impact on the success of Science students. But resources, in addition to being an important input, are not necessarily a sufficient condition in themselves to achieve the desired results. Appropriate use of resources in the teaching process is also an important factor. The use can be reflected through the implementation of practical research in teaching. Conducting hands-on science research is an important component of science curricula in many states. According to school principals' responses about whether their schools have resources to facilitate hands-on science experiments and use a science laboratory, on average, across TIMSS 2019 participating countries, 36% of fourth grade

Graph 10



students study in schools with a science laboratory, and their average achievement is higher than the 64% of students studying in schools without a laboratory (496 vs. 486). Of course, school lab availability may also be related to other economic factors that are related to achievement. Students were also asked about the frequency with which they conduct experiments in science classes. In the fourth grade in RNM, 40% of the students stated that they conducted experiments "at least once a week", 31% "once or twice a month", 22% "several times a year", while 7% "never". Students who declared that they do experiments "once or twice a month" achieve the best results (454 points), in contrast to those who answered that they do them "at least once a week" (409 points) or "never" (406 points). Just like the international level and in RNM, students who declared that they do experiments "once or twice a month or several times a year" achieved higher average achievements than students who did them once a week or never.

Conclusion

Every educational system should strive for a fairer and more just system, in which the achievements of students should be the result of their efforts and will, and not the consequence of contextual factors such as gender, socio-economic status, family structure or place of residence. It is very important, despite the unfavorable socio-economic status and low achievements, that the school does not reduce the expectations from the students, and sets expectations from the students that are above their current achievements, which together with the students they will revise and gradually increase, with goal-developing their self-efficiency. Schools and teachers should use a blended pedagogic approach in which student-centered learning is combined with clear guidance and guidance from the teacher, continuous formative assessment to monitor and guide progress and ensure adequate understanding of learning content and objectives.[39]

Schools facing low achievement due to unfavorable SES should attract the best quality teachers and be supported in providing conditions for professional development of staff, especially in terms of working with students from vulnerable categories; mentoring new teachers; offering

[39] Villaseñor P. The different ways that teachers can influence the socio-emotional development of their students: A literature review, http://pubdocs.worldbank.org/en/285491571864192787/Villaseno-The-different-ways-that-teachers-can-influence-the-socio-emotional-dev-of-students.pdf

financial and career incentives with the goal of retaining quality teachers. Socio-economic inequality between students clearly reflects inequality in achievement. Although the educational system cannot directly reduce inequality between students, it can, through various mechanisms, mitigate its impact and enable every student to have the same opportunities, conditions and adequate support to achieve high results, regardless of the disadvantages that surround him in the home.

In that context, the schools that have students with the lowest achievements have the greatest need for support, which is not only material and technical, but above all pedagogical and mentoring.

Consequently, the investments in these schools should be primarily in the direction of professional development of the staff and involvement of parents.

Considering that our state provides the basic conditions for free education (textbooks, transportation), additional ways to improve the situation of students with unfavorable SES include:

- Right to free school meals;
- Offering mentoring support by teachers and/or the professional service with the aim of achieving the expected learning outcomes;
- Tutoring help from other students within the school and/or home, as a measure to reduce mutual stereotypes, develop empathy and develop competencies for peer learning;
- Effective use of additional teaching, which should offer approaches to work adapted to the needs of each student, different from the approaches they usually use during classes;
- Inclusion of students with unfavorable SES in all activities in the school, with the aim of their acceptance by other students and developing a sense of belonging to the school;
- Developing additional skills of school inclusive teams and forms of mutual exchange of experiences between teams from different schools.

Considering that parents of students with lower socio-economic status are less involved in their child's education, different communication strategies should be developed between the school and parents/guardians, with the aim of joint action in improving achievements. These strategies can include: support from the wider community where the student lives, home visits to the student, using digital tools to communicate more frequently with parents/guardians, etc. depending on the assessment of the situation and needs.

In addition, the teaching staff should reconsider their potential stereotypes and prejudices in order to be able to develop positive relationships with all students and to give each student the appropriate support. In certain schools, this may mean restructuring the classes in order to have more effective interaction and better opportunities to use more appropriate teaching and learning strategies.[40]

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THE ROLE OF TEACHERS IN SUPPORTING PLURILINGUALISM IN DIVERSE CONTEXTS: INSIGHTS FROM LONDON

Abstract: For educators working in diverse contexts, where they encounter many different languages, a key question is: How can an educator be able to actively support bilingual/multilingual learners to maintain home languages and to support all learners to develop plurilingual skills, if they themselves have no knowledge of languages used by their learners? Many educators see this issue as a significant obstacle for engaging with plurilingual practices in their own school communities and classrooms.

This paper will address that question through an analysis of good practice examples and relevant initiatives in London, as a global city. The theoretical part of this paper will draw on conceptualization of plurilingualism and plurilingual practices as defined by the Council of Europe. Based on the analysis of examples of good practice in London, this paper aims to provide guidance on the role educators have in: supporting bilingual/multilingual learners to integrate their home languages into their learning, create opportunities to develop plurilingual skills for all learners, including those who identify as monolingual, and develop practices which encourage all learners to use their linguistic background as resource for teaching and learning. Examples of good practice come from London as one of the lead global cities, which is characterized by hyper diversity and has 233 world languages recorded in its schools.

Keywords: Plurilingualism, Plurilingual practices, Role of teachers, Home languages

Introduction

This article is aimed at practitioners, researchers and training providers in education looking to gain insights into well-established classroom initiatives which exemplify how teachers can support development of plurilingual skills for all learners in their learning communities. The main focus of this article's analysis is the fact that in diverse contexts teachers cannot be skilled users of all languages their learners use, in some cases teachers may not be at all familiar with many languages used in their school communities. It is therefore not surprising to find that teachers experience linguistic diversity as something they are not able to work with and support.

A select number of classroom practice examples from London schools challenges these views by showcasing different roles teachers may take in order to overcome language barriers and develop plurilingual classroom practices. In the conclusions, further readings and recommendations are provided for those wishing to explore this topic further.

Context

According to the latest figures London has a population of 9 million (https://www.trustforlondon.org.uk/data/geography-population).