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School Rationalization Baseline Study: The Situation of Crowded and Underutilized Schools in Jordan

Supervised by
Prof. Dr Abdalla Ababneh

Prepared by:
Dr. Emad Ababneh Dr. Sheren Hamed Dr. Nayel Hijazeen
Dr. Khaled Alqudah Dr. Khattab Abu Lebdeh

With Technical Assistance of

Dr. Haiyan Hua **Dr. Valeria Rocha**

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Executive Summary

The primary objectives of this School Rationalization Baseline Evaluation Report are to outline what progress has been made from 2007-2008 to 2010-1011 with regard to crowded and underutilized Ministry of Education (MOE) schools, to present the current characteristics of MOE schools in 2010-2011, and to define some of the key factors contributing to over-crowdedness and underutilization[1]. To achieve the first objective, NCHRD utilized EMIS data from 2007-2008[2] and 2010-2011. To achieve the latter objectives, NCHRD utilized preliminary 2010-2011 EMIS data (April 2011) and information collected from key education stakeholders (teacher, parents, students, teachers, and directorate officials) through focus group discussions and interviews.

In addition to meeting the objectives outlined above, this report proposes an integrated definition of "over-crowdedness" and "over-underutilization" to select extremely overcrowded and extremely underutilized schools, which includes the following three domains: 1) overall classroom capacity (# of students per classroom); 2) classroom area per student (square-meters allocated to each student in a classroom); and 3) student-teacher ratio. This integrated definition was used to select and analyze the current status of the top 25% extremely overcrowded and extremely underutilized schools. This is a unique approach to the subject, which we believe is more comprehensive than a simple evaluation of classroom area per student.

Follow are a few summary findings under each main section of the report.

Progress that has been made in the last few years:

1) The total number of underutilized schools (1,891) is greater than the number of crowded schools (1,244). However, there has been a slightly larger decrease in the number of crowded schools (3.0%) than underutilized schools (2.4%) from 2007-2008 to 2010-2011.

2) The most noticeable changes occurred in:

    a. **Female schools**: reduction of 24.2% in the number of crowded schools and 28.1% of underutilized schools.

    b. **Owned + rented schools:** reduction of 15% in the number of crowded schools and 14.4% of underutilized schools.

    c. **Secondary schools:** reduction of 13.9% in the number of crowded schools.

    d. **Double-shift schools:** reduction of 15.4% in the number of crowded schools and 13.5% of underutilized schools.

    e. **Rural schools:** reduction of 22.4% in the number of crowded schools and 7.1% of underutilized schools.

[1] The MOE criterion to define crowded and underutilized schools was used (1.2 m^2 per student in a classroom unit)

[2] These data were extracted from: Parolin, B. (2008). Interim report: Situational analysis and needs assessment (Project preparation study: School planning), The Hashemite Kingdom of Jordan Education Reform for Knowledge Economy II. The report was requested by and presented to the MOE.

f. **Mixed and urban schools:** Increases in the number of crowded schools were observed in mixed schools (12.5%) and urban schools (16.3%).

Current status of crowded schools in Jordan:

For this section, we also based our analysis on the current MOE criterion for crowdedness: less than 1.2 m^2 per student in a classroom unit.

- By the MOE criterion 1,244 (36.5%) of MOE schools are considered crowded in Jordan.
- Crowdedness affects mostly mixed (45.5%) and male (37.1%) schools.
- Owned and rented schools seem to be the most affected by crowdedness (55.7% and 42.9%, respectively). Crowding is also most prevalent in basic schools (78.1%), single shift schools (89.9%), and urban areas (60.4%) more frequently than rural areas (39.6%).

To expand the profile of crowded schools, we also presented data on overall classroom capacity (# of students per classroom) and student-teacher ratios in "crowded" schools.

- The largest average student-teacher ratios can be observed in double-shift schools (21:1) and schools in the middle of the country (also 21:1). The smallest student-teacher ratio is found in southern schools (13.7:1).
- The largest number of students per classrooms can be found in female schools (31.7 students per classroom) and owned schools (31.5 students per classroom). There are only small differences in classroom size between school cycles and school shifts, however, important differences in classroom sizes can be observed in urban (31.4 students per classroom) and rural (24.5 students per classroom) schools as well as in schools located in the northern, middle, and southern parts of the country (26.9, 32.1, and 23.5 students per classroom, respectively).

To present a more comprehensive look at school crowdedness in terms of planning and resource allocation, we looked at enrollment and capacity levels, utilization rates, and school facilities.

- Actual enrollment and current capacity levels in crowded schools vary by directorate. Although all directorates have schools that are operating above their enrollment capacity level, 17 directorates have the most serious capacity problems (they operate 25% or above their capacity level). We have also identified four directorates with enrolment of 30% or more above their capacity. These are Ma'an (33%), Tafeelah (32%), Eain Albash (31%) and Ajlune (30%).
- The school utilization rate (school student enrolment over estimated capacity of the school) in crowded schools exceeds 100%. A total of 404 schools (32.5%) have utilization rates above 150%. It is also important to note that 7.8% of crowded schools have utilization rates above 200%.

- The total number of crowded schools without computer and science laboratories is 93 (9.9%) and 378 (40.2%), respectively. The total percentage of students without computers is 10.3%. The total percentage of students without science laboratories is 23.6%[3].

Finally, based on data collected from qualitative interviews and focus groups, we present some of the factors that may contribute to crowdedness as well as the challenges faced by crowded schools.

- The most commonly cited reasons for crowdedness were: 1) Population density around the school is high (in some cases, there is a high influx of Egyptian, Syrian, Iraqi immigrants); 2) School has a good reputation in comparison to other schools; 3) School is the only basic school in the area that teaches grades 1-4, no other public school; 4) Good and easy transportation is available for students to reach the school; 5) Good relations between principal and teachers. Community trusts the school; 6) Families' incomes prevent accessing to private schools; 7) School is rented and the classes are small; and 8) Teaching staff is competent.
- The most cited challenges faced by crowded schools include: 1) Poor quality of school facilities and management and deficiency in provision of resources for learning; 2) For teachers, crowdedness is seen as an obstacle to applying new instructional and assessment strategies. In addition, students do not have as many opportunities to interact in the classroom. Some parents expressed concern over the lack of communication with teachers over curricular activities.

Current status of underutilized schools in Jordan:

As with the previous section, we based our analysis in this section on the current MOE criterion for underutilization: more than 1.2m² per student in a classroom unit.

- Based on the preliminary EMIS data (2010-2011), utilizing the $1.2m^2$ MOE criterion, 1,891 schools (55.4%) in Jordan are considered underutilized.
- The largest average percentage of underutilized schools is present among female (13.7%) and male schools (35.5%). Owned schools also constitute the largest percentage of underutilized schools (84.5%). Another important characteristic of underutilized schools is that most are single shift (95.6%) and located in rural areas (61.9%).

To expand the profile of underutilized schools, we also factored in data on overall classroom capacity (# of students per classroom) and student-teacher ratios in "underutilized" schools.

- Underutilized schools have average student-teacher ratios below 20:1, with the exception of double shift schools (21:1). The lowest average student-teacher ratio can be found in rented and owned + rented schools (8:1).
- Classroom sizes vary substantially, depending on the type of school. Rented and owned + rented schools have, on average, less students per classroom (10.4 and 11.8, respectively) than other

[3] Percentages calculated over the total number of crowded schools.

types of schools. We further observe that even in underutilized schools, the average classroom size in urban and double shift schools is relatively high (30 and 31.9 students per classroom).

To present a more comprehensive look at school utilization in terms of planning and resource allocation, we looked enrollment and capacity levels, utilization rates, and school facilities.

- Actual enrollment and current capacity levels in underutilized schools vary by directorate. Although all directorates have schools that are operating below their enrollment capacity level, we have identified four directorates with enrolment 70% or less below their capacity. These are: Shoobak (121%), Theeban (86%), Badia Wasta-Gezah (83%), and Qasser (76%).
- The school utilization rate (student enrolment over school capacity) in underutilized schools is below 100%. Schools that are 30% or below their capacity can be considered an extreme case in the utilization rate scale. 142 (5.2%) schools fall under that category.
- The total number of underutilized schools without computer and science laboratories is 173 (11.5%) and 401 (26.7%), respectively. The total percentage of students without computers is 10.7%. The total percentage of students without science laboratories is 9.3%4.

Finally, based on data collected from qualitative interviews and focus groups, we present some of the factors that may contribute to underutilization and the challenges faced by underutilized schools.

- The main cited reasons for underutilization are: 1) Distance from residential areas; 2) The majority of residents are elderly. There is a small number of residents and students; 3) Bad/difficult transportation; 4) Youth movement to work in cities (internal migration); and 5) Lack of proper facilities (science and computer labs, WCs, classrooms, and water) and maintenance.
- The main challenges faced by underutilized schools include: Lack of qualified teachers, students' low academic achievement, and lack of facilities and programs to attract and motivate students.

Current status of extremely crowded and extremely underutilized schools

In this report we have proposed to establish a new criterion for crowded and underutilized schools, taking into account the following three categories of reference: 1) area allocated to each student in a classroom; 2) student-teacher ratio; and 3) classroom size. Based on this new criterion, we selected extremely overcrowded schools (25% of schools that had the smallest area per students, the largest number of students per classroom, and the largest student-teacher ratio) and extremely underutilized schools (25% of schools that had the largest area per students, the smallest number of students per classroom, and the smallest largest student-teacher ratio). Characteristics of these schools are presented below:

[4] Missing cases = 391

Characteristics	Extremely Crowded (n=187)	Extremely Underutilized (n=557)
Average area per student	0.75 m²	3.5 m²
Average class size (# of students per classroom)	36.5	7.9
Average student-teacher ratio	24 : 1	5.6 : 1
Number and % of schools without computer labs	13 (8.2%)	55 (11.7%)
Number and % of schools without science labs	58 (36.5%)[5]	202 (42.8%)[6]
Gender		
Male	38.5%	27.3%
Female	21.4%	4.7%
Mixed	40.1%	68.0%
Location		
Rural	17.1%	91.6%
Urban	82.9%	8.4%

In addition to the main conclusions presented above, this study investigated the correlations between area occupied by students, students' scores on the National Assessment for Knowledge Economy (NAfKE), and teachers' scores on the Student Centered Active Learning and Teaching Methodologies (SCALT) assessment. We found that students in crowded or "normal" schools tend to have higher average NafKE scores than students in underutilized schools. Only in 11th grade, crowdedness might negatively affect students' scores in all three subjects. Despite these results, the current study found no statistically significant relationship between area allocated to students in a classroom unit and students' performance in NAfKE. As regards SCALT scores, there were inconsistent patterns in average SCALT scores across grades and subjects. Once again, there was no statistically significant correlation between area allocated to students and teachers' application of student-centered methodologies. These results put into question some assumptions that teachers might be more likely to apply SCALT and students are more likely to perform better in less crowded environments. In fact, the trend found in the current analysis suggests that an inverse relationship might exist between progressive teaching and learning methodologies, students' scores, and area occupied by students.

Policy Discussion

Some important trends in crowdedness and underutilization have been pointed out in this report. Although the overall number of crowded and underutilized schools has decreased in the last three years, some important trends in crowdedness and underutilization persist.

First, there has been a considerable decrease in the percentage of crowded and underutilized female schools over time, even though they did not represent the largest percentage of crowded and underutilized schools in Jordan. On the other hand, crowded mixed schools seem to continue to increase. The MOE should clarify whether those changes have been a result of deliberate policy or a "natural" movement across female and mixed schools. In either case, the MOE should focus on

[5] Missing cases = 28

[6] Missing cases = 85

decreasing the number of crowded mixed and male schools, which are the most affected by crowdedness.

EMIS data has shown a substantial increase in urban crowded school and a large decrease in rural crowded schools, followed by a small decrease in rural underutilized schools. These findings suggest that students might be migrating to larger cities. This trend will pose a great challenge to the MOE in controlling the number of crowded schools in urban centers. We suggest the government examine carefully the location and overall infrastructure and capacity of underutilized schools in urban areas and make an attempt to transfer/transport students from the most crowded to the underutilized schools.

As regards the creation of an "ideal" standard for teacher-student ratio, it is important to consider the following: previous research has generally shown that teachers are more likely to give individualized attention to students if the student-teacher ratio is low. This type of interaction may in turn result in better student achievement or performance. However, some researchers have also suggested that student-teacher ratio does not correlate with student achievement or performance, particularly when the teacher utilizes a teacher-centered traditional classroom approach to teaching. Therefore, if student-teacher ratios are blindly reduced, this may only cause a heavy financial burden with little educational return in student learning or quality school[7]. It also is important to keep in mind that many of the top performing PISA and TIMSS countries have student-teacher ratios and classroom sizes larger than the Jordanian MOE averages. Jordan has, on average, student-teacher ratios below several of the top five high performing TIMSS and PISA countries. For example, in Singapore, the student-teacher ratios for primary and secondary schools are 23.5:1 and 17.2:1, respectively. Korea's teacher ratios in primary and secondary public schools are 25.6:1 and 18.2:1, respectively. Again, we observe that the average classroom sizes in Jordan are smaller than some top five high-performing countries in TIMSS and PISA. In Japan, the average classroom size is 28.9 at the primary level and 34.5 at the secondary level. In Korea, classroom sizes are substantially larger, with 36.5 and 38.7 students in primary and secondary levels, respectively.

Further, the results from interviews and focus group discussions point out that one of the reasons why some schools become overcrowded is the perceived quality of education offered in those schools. This presents a challenge for policy makers. On one hand, students and parents are drawn to schools which have a good reputation and good teachers. On the other hand, once class sizes or student-teacher ratios become too large, this might negatively affect quality of teaching or learning. Again, it is important to utilize a more specific criterion to determine crowdedness and underutilization and to attempt to decrease the number of students in extremely crowded schools while at the same time, addressing education quality issues such as improvement of school facilities and improved teaching. An analysis of ten top performing countries in education has shown that what matters most when it comes to improving education is getting the right people to become teachers, developing them into effective instructors, and ensuring that the system is able to deliver the best possible instruction for every child[8]."

[7] Hua, H. (2010). Indicator 23: Student Teacher Ratio. Egypt Ministry of Education.

[8] McKinsey and Company (2007). How the world's best performing schools systems come out on top (p.6).

The MOE should therefore consider improving its teacher recruitment and training, particularly in underutilized schools in rural areas.

In discussing the future of underutilized schools, it is important not to make decisions to close a school based on the 1.2 m² per student criterion alone. The government should take into account the diverse needs of scarcely populated areas to ensure that every child has access to the basic right to education. That could mean keeping many underutilized schools open or simply providing free transportation to take children to the closest school in their residential area. The decision should be based on the cost of each alternative and the cultural reality of the communities affected.

Finally, the government of Jordan has invested heavily on improving EMIS data over the last years. However, the overall quality of the EMIS database can be further improved. More specifically, the MOE might develop best practices with regard to planning, data collection and analysis, information sharing and transparency in the education sector.

Policy Options

Based on the above findings and discussion, the following policy options are proposed:

1) Develop more comprehensive criteria for identifying crowded and underutilized schools in order to allocate resources more appropriately. Many schools are considered crowded or underutilized by the MOE standard of 1.2 m² per student in a classroom. However, we recommend that the MOE expand its definition of crowdedness and underutilization to include information about classroom size and student-teacher ratio. By developing a more comprehensive criterion, the MOE would be better able to identify schools that need the most attention.
2) Prioritize areas and schools with the largest percentage of extremely crowded schools, such as Amman III and Zarqa II Directorates. More specifically, focus on male, co-ed and rented schools. To decrease the number of extremely overcrowded schools, the MOE could do the following:

- Consult parents and other key stakeholders about the possibility of transferring students from extremely overcrowded schools to neighborhood underutilized schools, taking into consideration the financial implications for parents and the MOE.

- Increase the classroom areas in overcrowded schools where it might be difficult to transfer students elsewhere.

- Create a long-term planning strategy with funders to build schools in catchment areas where students are likely to migrate to in the near future.

- Review student per teacher ratios as well as classroom sizes in the overcrowded schools and try to modify them to be close to the national levels. One way to do that is to turn single shift schools into double shift schools.

3) Consider improving teacher recruitment and training, particularly in underutilized schools in rural areas.

4) Create a long-term planning strategy with funders to build schools in densely populated catchment areas in the near future.

The results from interviews and focus group discussions reveal that schools might become overcrowded because parents and communities believe those schools offer better quality education than underutilized schools. We suggest the MOE focuses on issues that matter most to improve education quality, namely: 1) getting the right people to become teachers; 2) developing them into effective instructors; 3) ensuring that the system is able to deliver the best possible instruction for every child (McKinsey and Company 2007). It is critical to offer teachers incentives to move to underutilized and sparsely populated schools.

5) Examine carefully the location and overall infrastructure and capacity of underutilized schools in urban areas and make an attempt to transfer/transport students from the most crowded to the underutilized schools

We suggest the government study the mapping of extremely underutilized schools in order to:

• Close the rented schools where underutilized schools are available, and provide transportation where needed to facilitate regular attendance in these schools.

• Merge neighboring underutilized schools.

• Refrain from building schools in locations where there are underutilized schools.

• Conduct community-based campaigns about the current evidence on underutilized schools and students' performance.

• The MOE could improve the infrastructure and the quality of teaching resources and facilities, such as computer and science laboratories, in order to attract some students from extremely overcrowded schools to underutilized schools in the same or close to the same catchment area.

Acronyms List

ADETA	Assistant to the Director of Education and Technical Affairs
ECD	Early Childhood Development
ECE	Early Childhood Education
EMIS	Education Management Information System
ERfKE I and II	Education for the Knowledge Economy I and II
E-TVET Council	Employment–Technical and Vocational Education and Training Council
GOJ	Government of Jordan
ICT	Information and Communications Technology
KE	Knowledge Economy
KG	Kindergarten
M&E	Monitoring and Evaluation
MEP	Monitoring and Evaluation Partnership
MOD	Ministry of Defense
MOE	Ministry of Education
MOHE	Ministry of Higher Education (and Scientific Research)
MOL	Ministry of Labor
MOR	Ministry of Religion
MOSD	Ministry of Social Development
NCHRD	National Center for Human Resources Development
NES	National Education Strategy
PI	Principal Interview
TOR	Terms of Reference
SE	Special Education
SPSS	Statistical Package for the Social Sciences
SR	School Rationalization
UIS	UNESCO Institute for Statistics
UNRWA	United Nations Relief and Works Agency
VE	Vocational Education
WEI	World Education, Inc.

1. Introduction

1.1 Background and Context

The Government of Jordan (GOJ) is committed to making basic education compulsory, free of charge, and available to all. To ensure equal access to quality education, the Jordanian education system should ensure equal learning opportunities for all students, be responsive to all demands and needs, and allocate resources in a better way so as to balance more effectively the expansion of spaces for learning and learning quality.

Education Reform for the Knowledge Economy (ERfKE)

In early 2003, the GOJ launched the comprehensive Education Reform for Knowledge Economy (ERfKE) program with the aim to empower general education graduates with the knowledge, skills and competencies that will enable them to effectively participate in the Knowledge Economy (KE) and thus to improve their futures. The ERfKE program is implemented in two stages. ERfKE I (2003-2009) aimed to produce high-quality graduates who could effectively compete and participate in a competitive global knowledge based economy. The ERfKE II program (2010-2015) is designed to build on the objectives of ERfKE I but with a renewed focus on the system changes necessary for a shift to education for a knowledge economy. ERfKE II reflects a deliberate focus on ensuring that these system changes (curriculum and assessment reform, teacher development, policy and strategy capacity) are manifested in changes in learning outcomes in schools and classrooms. ERfKE II components are as follows:

Component I: Establishment of a National School-Based Development System

Component 2: Policy, Planning, M&E and Organizational Change

Component 3: Teaching and Learning Resources

Component 4: Special Focus Program Development (Early Childhood Development, Vocational Education, Special Education)

Component 5: Quality Physical Learning Environments

Established in 1990, the National Center for Human Resources Development (NCHRD) is a parastatal research body in Jordan. The primary goal of NCHRD is to create a balance between the outputs of training and education programs on the one hand and the knowledge, skills, abilities and attitudinal requirements of the labor market on the other hand. NCHRD is also in charge of executing the external evaluation studies for the various educational interventions of the Government of Jordan (GOJ). This role considered an extension to what has been done by NCHRD during the first phase of ERFKE (2003-2009), namely the implementation of 35 evaluation studies in the areas of curriculum, student assessment, teacher training, information and communication technology and early childhood development. Under ERfKE II, NCHRD is charged with implementing 32 studies, of which five baseline studies, including this baseline evaluation of School Rationalization.

Previous Relevant Studies for the Jordan MOE

In 2007, NCHRD completed the "*Site Supervision Study*" designed to evaluate newly constructed MOE schools under ERfKE I. Results showed that the planned capacity of MOE schools ranged from 325 to 1200 students based on several factors, including economic migration (rural to urban), an influx of immigration, as well as other educational and social factors. However, for the fifteen schools sampled, the occupancy rates show significant underutilization, ranging from 35% to 88% of school capacity. It is surmised that factors contributing to this were found to be largely attributable to the fact that these are newly constructed schools, however further evaluation would have been needed to confirm specific contributing factors.

In 2008 the MOE commissioned a "Project Preparation Study in School Planning" in preparation for ERfKE II[9]. This study showed the existence of 172,951 additional (extra or unfilled) seats in 1,937 schools (59.3% of the total MOE schools). These schools were classified as underutilized schools, with the average available space per student at 2.1m^2. In addition to school capacity, the results also showed a percentage of 17.9% students per teacher and 26.8% students per classroom. On the other hand, the results showed the presence of 101,467 students studying in 1,282 schools (39.4% of total MOE schools), with the average available space per student at 0.91m^2. These schools were classified as overcrowded. Again, further evaluation is needed to confirm specific contributing factors.

In another study prepared by NCHRD in 2008, the "*National Report for World Education Indicators,*[10]" results showed that the average number of students per class in Jordan in 2008 was 27.5. The report also recorded fluctuations from year to year in the students per teacher ratio that were attributed in part to the instability of teacher appointments by the MOE. However, the ratio of students per teacher (13.6:1) at the secondary level was consistently less than that of students per teacher at the primary level (19.4:1). Overall, Jordan ranked in the middle in terms of students per teacher compared with average in developed countries in the academic year 2003-2004: with the overall average ranging from 27-30 students per classroom.

The above data shows clearly a substantial number of underutilized schools and a smaller number of overcrowded schools in Jordan. But what particular factors contribute to this situation (geographic, economic, institutional, pedagogical…)? Before we address these questions, we should first understand is the current situation any different from previous reports? Have we made any progress? Once we've established this baseline for ERfKE II, we will examine the factors contributing to underutilization and overcrowding, and any correlation between underutilization and overcrowding in particular areas of the country. These are the issues that are addressed in the following report.

[9] Parolin, Bruno (2008). Final report: Project Preparation Study 1: School Planning, The Hashemite Kingdom of Jordan Education Reform for Knowledge Economy II.

[10] Study commissioned by UNESCO Institute for Statistics and analysis based on MOE EMIS data available at that time.

1.2 Study Objectives

The primary objectives of this School Rationalization Baseline Evaluation Report are to outline what progress has been made from 2007-2008 to 2010-1011 with regard to crowded and underutilized MOE schools, to present the current characteristics of MOE crowded and underutilized schools in 2010-2011, and to define some of the key factors contributing to over-crowdedness and underutilization. Our aim is that these findings will be used by MOE and related institutions to:

- Set a new benchmark for measuring educational efficiency in Jordan;
- Inform policy makers and planners for improving the efficiency level for delivering quality education for Knowledge Economy (KE); and
- Continuously monitor progress in terms of resource and facility allocations.

Finally, we created an integrated definition of "over-crowdedness" and "underutilization" which includes the following three domains: 1) overall classroom capacity (# of students per classroom); 2) classroom area per student (square-meters allocated to each student in a classroom); and 3) student-teacher ratio. This integrated definition was used to select and analyze the current status of the top 25% extremely overcrowded and extremely underutilized schools. This is a unique approach to the subject, which we believe is more comprehensive than a simple evaluation of classroom area per student.

1.3 Research Questions

To meet the objectives, we developed a set of principle research questions that guided our development of the data collection instruments as well as the data analysis process. These questions were developed based on the interests of MOE policy stakeholders in the in conjunction with ERfKE II program stakeholders, partners and reform managers. The four principle research questions are as follows:

1. What is the current status of overcrowded and underutilized MOE schools in Jordan and what changes can be seen from the previous status under ERfKE I?
2. What are the characteristics of crowded and underutilized MOE schools in Jordan?
3. What is the average status of school science labs, and computer facilities in MOE crowded and underutilized schools?
4. What are the key factors contributing to over-crowdedness and underutilization in Jordanian MOE schools?

The above principle research questions guided us in developing the key measures as well as specific data analysis questions. Although these questions are slightly different from those written in the TOR for the study, these questions which better reflect the policy interests of MOE stakeholders as well as all MEP project partners and ERfKE II program implementers.

This report is organized in three major sections. First, we present the methodology used for the present study. Then we present the findings, which are organized in six major sub-sections (listed below), followed by a conclusion.

1) ***Trends*** in the overall education system in Jordan (MOE and private schools) and trends in crowded and underutilized MOE schools for the 2007-2008 and 2010-2011 period.

2) ***Current Situation of Crowded MOE Schools by Category*.** Main characteristics, current enrollment and capacity at the directorate level, and utilization rates of crowded schools (based on the MOE current criterion for crowdedness—less than 1.2 m^2 per student in a classroom unit). We follow with an in-depth look at the extremely overcrowded schools that fall under the following three criteria: 1) 25% of schools with smallest area per students; 2) 25% of schools with the largest number of students per classroom; and 3) 25% of schools with the largest student-teacher ratio.

3) ***Reasons for Crowdedness and Major Challenges Facing Crowded Schools.*** Based on data collected from qualitative interviews and focus groups, we present some of the factors that may contribute to crowdedness and the challenges faced by crowded schools.

4) ***Current Situation of the Underutilized MOE Schools by Category*.** Main characteristics, current enrollment and capacity at the directorates level, and utilization rates (based on the MOE current criterion for underutilization—more than 1.2 m^2 per student in a classroom unit). Again, we follow with an in-depth look at the extremely underutilized schools that fall under the following three criteria: 1) 25% of schools with the largest area per students; 2) 25% of schools with the smallest number of students per classroom; and 3) 25% of schools with the smallest student-teacher ratio.

5) ***Reasons for Underutilization and Major Challenges Facing Underutilized Schools***. Again, based on data collected from qualitative interviews and focus groups, we present some of the factors that may contribute to underutilization and the challenges faced by underutilized schools.

6) ***Policy Implications***.

7) ***Policy Options***

2. Methodology

2.1 Methods and Data Sources

In order to address the *what* as well as the *why* questions raised in the previous section, we have used both quantitative and qualitative methods for this baseline evaluation study. The data source for the **quantitative** data analyses is the preliminary 2010-2011 Education Management Information System (EMIS) data provided to NCHRD by the MOE in April 2011. EMIS was used to define the current status of underutilized and overcrowded MOE schools in Jordan. Data from 2007-2008, used to analyze any changes from the previous condition under ERfKE I, was extracted from an earlier report commissioned by the MOE[11].

The **qualitative** component of this study aimed to provide information on why schools are overcrowded and how overcrowded schools affect the teaching-learning environment. NCHRD worked with several hypotheses that would help to justify the existence of overcrowded and underutilized schools, namely: 1) geographic location; 2) change in population; 3) school catchment area and population density; 4) school distance; 5) perceptions of low school safety, low usefulness of education; and 6) historical, cultural, economic, and political reasons. Data sources for the qualitative component included focus group discussions with parents, teachers, students, and individual interviews with directorate officials and principals. The main reason for interviewing different stakeholders was to gain a better understanding of the reasons and impact of crowding or underutilization and to triangulate the data obtained through the discussions. The results of the above discussions and interviews have been used in combination with the quantitative analyses to define some of the key factors contributing to over-crowdedness and underutilization in Jordanian MOE schools.

2.2 Sampling and Instruments

Sampling

The population of MOE schools (N=3,422), derived from EMIS preliminary data, was used to conduct trends analysis on *KG*-G12 schools. The **quantitative** data analyses on crowded and underutilized schools utilized G1-G12 data (information on KGs was excluded).

For the **qualitative** component of the study, a sample of 30 schools (15 overcrowded and 15 underutilized) was selected from the above MOE schools in order to provide additional information about schools through focus group discussions and interviews with principals and school officials. For our initial selection, the MOE current criterion of $1.2m^2$ per student was used to determine overcrowded or underutilized schools. Schools that allocate less than $1.2m^2$ per student in a classroom were considered overcrowded. Schools that allocate $1.2m^2$ or more per student are considered underutilized. The sample was selected as follows:

- Firstly, overcrowded schools were sorted by descending order, based on the $1.2m^2$ rule above.

[11] Parolin, B. (2008). Interim report: Situational analysis and needs assessment (Project preparation study: School planning), The Hashemite Kingdom of Jordan Ministry of Education Reform for Knowledge Economy II.

- Secondly, 500 of the most overcrowded and 500 of the least overcrowded schools were selected from the total.
- Thirdly, a random selection of 100 overcrowded and 100 underutilized schools was carried out.
- Finally, from the 200 randomly selected schools, 15 overcrowded and 15 underutilized schools were selected purposefully, based on school sex, school level, school cycle, and school location.

The following table summarizes the characteristics of the overcrowded and underutilized sampled schools selected for focus group discussions and interviews.

Table 1: Characteristics of Sampled Overcrowded and Underutilized Schools

School Set # 1	Overcrowded (n=15)							School Set # 2	Underutilized (n=15)						
	Gender			Cycle		Location			Gender			Cycle		Location	
	M	F	Mixed	B	S	U	R		M	F	Mixed	B	S	U	R
1	√			√		√		16	√				√		√
2	√			√		√		17			√		√	√	
3	√			√			√	18	√				√		√
4	√				√		√	19	√				√	√	
5	√				√		√	20	√				√		√
6			√		√	√		21		√			√		√
7		√		√		√		22		√			√	√	
8		√		√		√		23		√			√		√
9		√		√		√		24			√		√		√
10		√			√	√		25	√			√			√
11		√			√		√	26	√			√			√
12			√		√	√		27	√			√			√
13			√		√	√		28			√	√		√	
14			√	√		√		29			√	√			√
15		√		√s		√		30	√			√		√	

M=male; F=female; B=basic; S=secondary; U=urban; R=rural

Qualitative Instruments

For the qualitative component of the study, the following instruments were created to collect data about reasons for and the consequences of overcrowded and underutilized schools in Jordan[12]:

- Principal Interview (PI) questionnaire.
- Assistant to the Director of Education and Technical Affairs (ADETA) interview questionnaire.
- Focus group discussion protocols for parents, teachers, and students.

The process of developing these instruments included the following steps: (1) literature review and examination of research questions; (2) development of questions for each instrument; (3) review of questions to ensure clarity and relevance of questions for the study; (4) fine tuning the questions in light of the teams' feedback; and (5) finalization of instruments for field administration.

[12] All instruments are available upon request.

PI and ADETA questionnaires consisted of ten structured, open-ended questions developed to assess interviewees' perceptions of over-crowdedness/underutilization and its effect on school administration. The questionnaires also collected information about challenges faced by the school, availability of facilities, effects of migration on the quality of learning, and future expectations about school improvement. PI and ADETA questions were identical, with the exception of background information.

Researchers carried out structured, individual interviews with 30 School Principals and 18 Assistants to the Director of Education and Technical Affairs. Twelve researchers transcribed and analyzed the data by identifying and summarizing main ideas, issues and themes brought up by students, parents, teachers, principals, and officials, separately.

In addition to the instruments described above, three distinct sets of questions were created for parents, teachers, and students' focus groups discussion. The questions were designed to gather conditional information including but not limited to: overcrowding/underutilization, positive and negative aspects of school of overcrowded and underutilized schools, relationship between students, teachers, and parents in those settings, and level of safety.

2.3 Procedures

Preliminary EMIS data was analyzed with SPSS (versions 15 and 17). Relevant indicators were created to identify overcrowded and underutilized schools. NCHRD researchers were responsible for managing the data and conducting the data analysis.

The qualitative sampling process and results were shared with and approved by the MOE. A total of 90 focus group discussions were carried out by twelve researchers. All researchers had at least a university degree in education. A few had PhDs. The researchers were trained by NCHRD at the center in Amman (one day training of approximately eight hours). Post training, each researcher visited two or three schools and conducted three focus groups in each school (one with parents, one with teachers, and one with students), in a total of 30 schools across the country. Focus group participants were selected by the MOE based on criteria provided by NCHRD. Focus groups were grouped into six-ten participants each. Each focus group discussion was recorded, and lasted from approximately one hour to 90 minutes.

Thirty individual interviews were conducted with schools principals at their respective schools (total 30 schools as indicated above). Thirty interviews (one for each school) were conducted with twelve Assistants to the Director of Education and Technical Affairs in each of the regional field directorate offices[13]. Each interview lasted approximately one hour. Interviewers recorded principals' and directorate officials' responses in writing on the questionnaire.

Data generated by focus group discussions and interviews were coded and grouped by topics to answer our main evaluation questions. The same twelve researchers who conducted the interviews were also trained by NCHRD at the center in Amman (one day training of approximately four hours).

[13] Some Assistants to the Director of Education and Technical Affairs were interviewed more than once depending on the number of schools included in their directorates.

2.4 Limitations

EMIS data provided by the MOE in April 2011 is preliminary. In addition, the current data set had some missing data and a few calculation errors. Therefore, it is possible that small discrepancies between the results provided in this report and future analysis conducted with the final version of the 2010-2011 EMIS database might exist.

The qualitative component of this study, like many others, utilizes participants' perceptions to assess the reasons for and consequences of overcrowding in schools. The quality of the data collected through focus groups and interviews depends on participants' characteristics, their motivation level, in addition to their knowledge of the schools environment. We attempted to verify the accuracy of the information provided by all interviewees by triangulating the data provided by all interview/focus group participants. However, it is possible their responses could have been affected by situational factors, including social desirability bias.

3. Findings

3.1 Jordanian School Trends between 2005-2008 and 2010-2011

Trends in MOE and Private Schools

In this first part of the findings section we present a summary of the Jordanian MOE and private education services between 2007-2008 and 2010-2011.

As Table 2 indicates, there has been an overall 3.1% increase in the total number of students in the public education system, with the largest increase occurring among KG students (71.7%), followed by secondary school students (10.4%), and basic education students (1.1%). An increase of 3.8% in the number of private school students can also be observed. The dramatic increase in the number of KG students can be explained by continuous efforts by the Jordanian MOE to improve access to kindergarten. Simultaneously, there have been significant advances in promoting the value of secondary education. The low increase in enrollment rate among basic students might be reflective of the stabilization of the population growth for 4-5 year olds in the population. These trends have been presented in a previous report[14], and they are expected to continue during the implementation of ERfKE II.

The increase in the number of secondary (6.6%) and basic schools (3.6%) reflects the MOE response to the anticipated growth of secondary and basic students, respectively. To attend the fast growing demand for secondary education, the government has built a larger number of secondary schools than basic schools. Further analyses presented later in this report will take a more in-depth look at the overall adequacy of the distribution of those schools across the country.

The average student-teacher ratio in Jordan is 16.1:1. However, we observed variations among basic and secondary MOE schools education. For primary education the ratio is 17.1. For secondary education, the ratio is 15.0. That indicates that Jordan has, on average, student-teacher ratios below several of the top five high performing TIMSS and PISA countries. For example, in Singapore, the student-teacher ratios for primary and secondary schools are 23.5:1 and 17.2:1, respectively[15]. Korea's teacher ratios in primary and secondary public schools are 25.6:1 and 18.2:1, respectively.

As regards classroom size, the average classroom size in Jordan is 26.4. However, we have observed variations between primary and secondary levels in MOE schools. For primary, the average classroom size is 25.8 students. For secondary, the classroom size is 27.2 students. Again, we observe that the average classroom sizes in Jordan are smaller than some top five high-performing countries in TIMSS and PISA. In Japan, the average classroom size is 28.9 at the primary level and 34.5 at the secondary

[14] Parolin, B. (2008). Interim report: Situational analysis and needs assessment (Project preparation study: School planning). The Hashemite Kingdom of Jordan Ministry of Education Reform for Knowledge Economy II.

[15] http://www.nationsencyclopedia.com/WorldStats/WDI-edu-pupil-teacher-ratio-secondary.html

level. In Korea, classroom sizes are substantially larger, with 36.5 and 38.7 students in primary and secondary levels, respectively[16].

Table 2: Changes in Education between 2007-2008 and 2010-2011 in Jordanian Schools[17]

School and Student Information	Year		Change
	2007-2008[18]	**2010-2011**	
Total MOE Students	1,108,717	1,143,117	3.1%
Total KG Students	9,828	16,878	71.7%
Total Basic Students (1-10)	937,882	948,515	1.1%
Total Secondary Students (11-12)	161,007	177,724	10.4%
Total MOE Schools (all cycles)	3,270	3,422	4.6%
Total KG Schools[19]	2	3	50.0%
Total Basic Schools	2,155	2,232	3.6%
Total Secondary Schools	1,113	1,187	6.6%
Student : Teacher Ratio	17.9	16.1	-14.5%
Basic	18.9[20]	17.1	-9.5%
Secondary	12.2	15.0	23.0%
Student : Classroom Ratio	26.8	26.4	-1.5%
Basic	28.5	25.8	-9.5%
Secondary	24.6	27.2	10.6%
Private Students	359,742	373,476	3.8%
Number of private schools	2,171	2,254	3.8%

Trends in Crowded and Underutilized Schools

The current MOE standard to determine the adequacy of classroom space is 1.2 m² per student in a classroom unit. Schools where students occupy less than 1.2 m² are considered crowded. Schools where students occupy more than 1.2 m² are considered underutilized. Different levels of crowdedness and underutilization will be explored further in the following sections of this report.

Table 3 below shows that the number of underutilized schools (1,891) is greater than the number of crowded schools (1,244) in 2010-2011. Further, the overall number of crowded and underutilized schools decreased slightly from 2007-2008 to 2010-2011. The decrease was most noticeable in female schools, with a reduction of 24.2% in crowded schools and 28.1% of underutilized schools. Crowded and underutilized male schools also experienced a decrease, but at smaller rates (6.9% and 2.0%, respectively). Conversely, there has been an increase in the percentage of overcrowding and underutilization in mixed schools (12.5% and 7.7%, respectively).

[16] Ibid.

[17] Preliminary EMIS data was used for all 2010-2011 analysis presented in this report.

[18] Parolin, B. (2008). Interim report: Situational analysis and needs assessment (Project preparation study: School planning).The Hashemite Kingdom of Jordan Ministry of Education Reform for Knowledge Economy II.

[19] Total KG schools include number of schools that are exclusively KGs. Some schools in Jordan offer KG education, in addition to basic education.

[20] MoE Annual Report 2007-2008.

Table 3 also shows decreases in crowdedness and underutilization in owned and owned + rented schools[21]. The largest decrease happened in owned + rented crowded and underutilized schools (15% and 14.3%, respectively). However, in rented schools the number of crowded schools increased 6.6%.

Changes were also observed in basic and secondary cycle schools. Although there were minor changes in the status of basic crowded and secondary underutilized schools, the number of secondary crowded schools decreased 13.9%. Basic underutilized schools decreased 4.2%. Double shift schools also presented a substantial decline in crowded and underutilized schools (15.4% and 13.5%, respectively).

Finally, considerable changes were also observed among urban and rural schools. The number of crowded schools in urban areas increased 16.3%. Underutilized schools also increased, but at a smaller rate (6.8%). In rural areas, the number of crowded schools decreased 22.4% while the number of underutilized decreased 7.1%. These results suggest that students might be moving from rural to urban areas. However, the distribution of students who migrate might be concentrated in some urban schools, as we observe an increase (at a smaller rate) in the underutilization of urban school spaces by students.

[21] Schools that include rented buildings associated to the buildings owned by MoE

Table 3: Changes in Crowdedness and Underutilization between 2007-2008 and 2010-2011 in MOE Schools

Type of School and Student Information		Year		Change
		2007-2008[22]	2010-2011	
Crowded		1,282	1,244	-3.0%
Underutilized		1,937	1,891	-2.4%
Schools meeting the 1.2 m² criterion		N/A	276	
Male	Crowded	496	462	-6.9%
	Underutilized	685	671	-2.0%
Female	Crowded	285	216	-24.2%
	Underutilized	360	259	-28.1%
Mixed	Crowded	503	566	12.5%
	Underutilized	892	961	7.7%
Owned	Crowded	760	693	-8.8%
	Underutilized	1,623	1,598	-1.5%
Rented	Crowded	501	534	6.6%
	Underutilized	285	269	-5.6%
Owned + Rented	Crowded	20	17	-15.0%
	Underutilized	28	24	-14.3%
Basic	Crowded	966	972	0.6%
	Underutilized	1,136	1,088	-4.2%
Secondary	Crowded	316	272	-13.9%
	Underutilized	801	803	0.2%
Double shift	Crowded	162	137	-15.4%
	Underutilized	96	83	-13.5%
Single shift	Crowded	1,120	1,107	-1.2%
	Underutilized	1,841	1,808	-1.8%
Urban	Crowded	646	751	16.3%
	Underutilized	674	720	6.8%
Rural	Crowded	635	493	-22.4%
	Underutilized	1,261	1,171	-7.1%

3.2 Current Situation of Crowded MOE Schools by Category

As mentioned earlier, the MOE criterion for determining crowdedness or underutilization is 1.2 m² per student in a classroom unit. Based on that norm, we observed that 1,244 schools in Jordan allocate less than 1.2 m² per student in a classroom unit. The total number of students who study in those schools is 448,006. To expand the profile of these schools, in this section, we present our analyses based on the MOE criterion for crowdedness, but look at other relevant profile information, such as overall classroom capacity (# of students per classroom), student-teacher ratios, school capacity and enrollment, and utilization rate information.

[22] Parolin, B. (2008). Interim report: Situational analysis and needs assessment (Project preparation study: School planning). The Hashemite Kingdom of Jordan Ministry of Education Reform for Knowledge Economy II.

Table 4 shows the characteristics of crowded schools, based on the above MOE criterion, in addition to providing the average student-teacher ratio and classroom sizes under each school characteristic. Based on EMIS data, crowdedness affect mostly mixed (45.5%) and male (37.1%) schools. We observe that female schools are usually less crowded, but have higher student-teacher ratio and bigger classrooms than male and mixed schools.

Owned and rented schools seem to be the most affected by crowdedness (55.7% and 42.9%, respectively). Crowding is also most prevalent in basic schools (78.1%) and single shift schools (89.9%). In addition, crowdedness seems to affect urban areas (60.4%) more frequently than rural areas (39.6%). This specific result represents a shift in the profile of crowded schools. In 2007-2008, there was an even split between rural and urban crowded schools. Finally, crowded schools are split almost evenly in the northern and central parts of the country, which are the most densely populated areas. The percentage of crowded schools in the south is small in comparison.

An overview of crowded schools suggests that as regards the average student-teacher ratio, the largest average ratios can be observed in double-shift schools (21:1) and schools in the middle of the country (also 21:1). These ratios are above the national student-teacher ratio (16:1). The smallest student-teacher ratio is found in southern schools (13.7:1). The largest average student-teacher ratio in Jordanian crowded schools is comparable to the student-teacher ratio in some TIMSS and PISA high-performing countries, as it was presented earlier.

Average classroom sizes in crowded schools also vary by school characteristic. The largest classrooms can be found in female schools (31.7 students per classroom), although in male schools the number of students per classroom is not much smaller (29.5 students per classroom). Owned schools also have larger numbers of students per classroom (31.5 students per classroom) than owned + rented and rented schools (26.5 and 23.5 students per classroom, respectively).
There are small differences in classroom size between school cycles and school shifts. However, important differences in classroom sizes can be observed in urban (31.4 students) and rural (24.5 students) classrooms as well as in classrooms located in the northern, middle, and southern parts of the country (26.9, 32.1, and 23.5 students per classroom, respectively). The largest average number of students per classroom in crowded schools in Jordan (32.1 students) is above the national average (26.4 students). When compared to top five high performing TIMSS and PISA countries, we observe that crowded classrooms in Jordan are, for example, still smaller than the average classroom sizes in Korea (36.5 and 38.7 students per classroom in primary and secondary levels, respectively). In Japan, the average classroom size is 28.9 at the primary level and 34.5 at the secondary level. In Singapore, there is an average of 30 students per class for Primary 1 and 2 classes[23].

It is important to note that although the average student-teacher ratio and classroom size in Jordan appear low, there are severely overcrowded schools with student-teacher ratios above 30:1 and classrooms with more than 36 students. Those schools will be discussed in more detail in a separate section.

[23] http://www.moe.gov.sg/education/primary/changes/

Table 4: Characteristics of Crowded MOE Schools (n=1,244)

School Characteristic		Number and % of Crowded MOE Schools	Average Student-teacher ratio	Average Classroom Size
School sex	Female	216 (17.4%)	19.0	31.7
	Male	462 (37.1%)	17.9	29.5
	Mixed	566 (45.5%)	18.7	27.6
School ownership	Owned	693 (55.7%)	19.2	31.5
	Owned+ rented	17 (1.4%)	16.3	26.5
	Rent	534 (42.9%)	16.2	23.5
School cycle	Basic	972 (78.1%)	19.2	28.9
	Secondary	272 (21.9%)	16.8	29.9
School shift	Double shift	137 (11%)	21.0	30.8
	Single shift	1,107 (89.9%)	18.1	29.0
School locality	Urban	751 (60.4%)	15.4	31.4
	Rural	493 (39.6%)	19.8	24.5
School geographical location	North	536 (43.1%)	16.6	26.9
	Middle	543 (43.6%)	21.0	32.1
	South	165 (13.3%)	13.7	23.5

In addition to the characteristics presented above, we observed that the number of crowded schools without computer labs is substantial (Table 5), but the absence of science labs is more prominent. Lack of those resources may have a negative impact on teaching and learning, particularly when it comes to implementing innovative methodologies in the classroom.

Table 5: Computer and Science Lab Availability in Crowded MOE Schools[24] (n=941)

Characteristics	Numbers and %
Schools without computers	93 (9.9%)
Students without computer labs	10.3%
Schools without science labs	378 (40.2%)
Students without science labs	23.6%

Crowdedness in MOE schools can be found in all directorates, but there is large variation in enrollment capacity among them. Table 6 shows the number of rural and urban schools and the actual enrollment and current capacity level in each directorate. Although all directorates have schools that are operating above their enrollment capacity level, we have identified 17 directorates with the most serious capacity problems (those operating 25% or above their capacity level). We have also noted four directorates with enrolment 30% or more above their capacity. These are Ma'an (33%), Tafeelah (32%), Eain Albash (31%) and Ajlune (30%).

[24] 303 cases missing from EMIS database

Table 6: Enrollment and Capacity in MOE Schools by Directorate

Directorate	Number of Schools		Enrollment	Capacity	% above capacity level
	Rural	Urban			
Irbid1	9	68	36,270	26,467	27.0
Irbid3	6	19	9,122	7,034	22.0
Irbid2	14	34	16,814	12,837	23.7
Aghwar Janoobia	13	4	6,329	4,728	25.3
Aghwar Shmalia	18	5	5,545	4,021	27.5
Badia Janoobia	11	6	3,078	2,384	22.5
Badia N.E	30	1	6,208	4,879	21.4
Badia N.W	55	9	14,869	10,698	28.1
Badia Wasta-geezah	7	-	1,374	1,136	17.3
Bdia Wasta_moqar	15	2	4,268	3,136	26.5
Petra	3	10	1,670	1,361	18.5
Rsyfa	4	21	15,880	12,408	21.9
Ramtha	3	35	12,574	9,571	23.9
Zarqa1	1	81	42,007	31,438	25.2
Zarqa2	31	7	11,600	8,822	23.9
Shoobak	1	-	58	50	13.8
Shoona Janoobia	6	1	1,897	1,533	19.2
Tafeelah	10	9	3,247	2,217	31.7*
Aqaba	4	2	3,307	2,543	23.1
Qasser	3	12	2,840	2,380	16.2
Koora	25	27	13,523	9,737	28.0
Mazar Janoobi	16	9	5,377	4,388	18.4
Bani Kenana	28	13	8,920	7,501	15.9
Jarash	25	23	14,149	10,527	25.6
Deer Alla	5	8	3,904	3,112	20.3
Theeban	6	2	1,494	1,269	15.1
Ajlune	18	29	15,241	10,750	29.5*
Amman1	-	66	38,986	29,572	24.1
Amman2	-	24	12,067	9,590	20.5
Amman3	10	58	37,157	27,312	26.5
Amman4	-	75	37,925	29,365	22.6
Amman5	21	14	13,286	10,414	21.6
Eain Albash	12	11	12,197	8,399	31.1*
Alsalt	12	17	7,504	5,352	28.7
Karak	25	3	5,389	4,198	22.1
Mafraq	20	22	8,385	6,445	23.1
Bseera	10	5	3,316	2,403	27.5
Ma'an	-	9	2,081	1,390	33.2*
Madba	16	10	8,148	6,109	25.0
Total	**493**	**751**	**448,006**	**337,473**	**24.7**

In addition to examining the enrolment capacity in each directorate, it is important to identify the various levels of utilization rate among crowded schools, and to identify the schools that require most urgent attention from the MOE. As Table 7 indicates, the school utilization rate (school student enrolment over estimated capacity of the school area) in crowded schools exceeds 100%. A total of 404 schools (32.5%) have utilization rates above 150%. It is also important to note that 7.8% of crowded schools have utilization rates above 200%.

Table 7. School Utilization Rate for Crowded Schools

Utilization rate %	Number of schools	Percent %
101-110	175	14.1
111-120	248	19.9
121-130	145	11.7
131-140	153	12.3
141-150	119	9.6
151-160	112	9.0
161-170	66	5.3
171-180	62	5.0
181-190	38	3.1
191-200	29	2.3
201-300	85	6.8
>300	12	1.0
Total	**1,244**	**100**

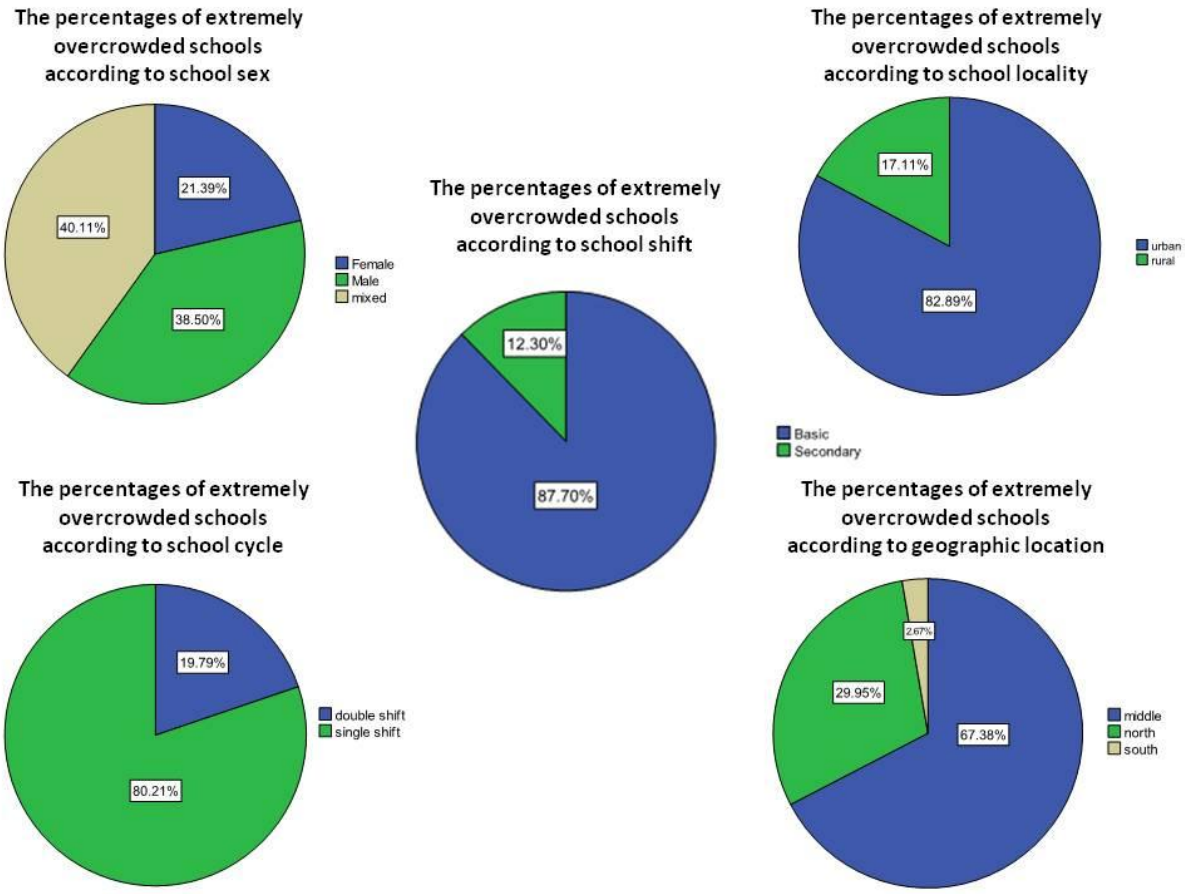
Extremely Crowded Schools

In the above current profile of crowded schools we started with the basic MOE criterion of 1.2m^2 space per student. However, we believe that to better identify schools that are overcrowded, we should look at different school characteristics that might influence not only students' and school staff's well-being, but learning and teaching. Therefore, we suggest a new criterion to select the extremely overcrowded schools, which include a combination of the following: 1) 25% of schools with smallest area per students; 2) 25% of schools with the largest number of students per classroom; and 3) 25% of schools with the largest student-teacher ratio. Schools that fall under these three categories were selected for the purposes of the analyses below and are considered to be in ***urgent*** *need* of government intervention to minimize the crowdedness problem.

Following the above criterion, the total number of extremely overcrowded schools is 187[25], which are mostly present in urban areas. The average student teacher ratio in those schools is 24:1. The average area per student: 0.75 m². The average classroom has 36.5 students. Most overcrowded schools are mixed schools (40.1%), although there are considerably large percentages of male and female schools (38.5% and 21.4%, respectively) that are extremely overcrowded. Also, the majority of those is basic cycle (87.7%), located in the middle of the country (77.4%), and is single shift (80.2%). Finally, most extremely overcrowded schools are primarily urban.

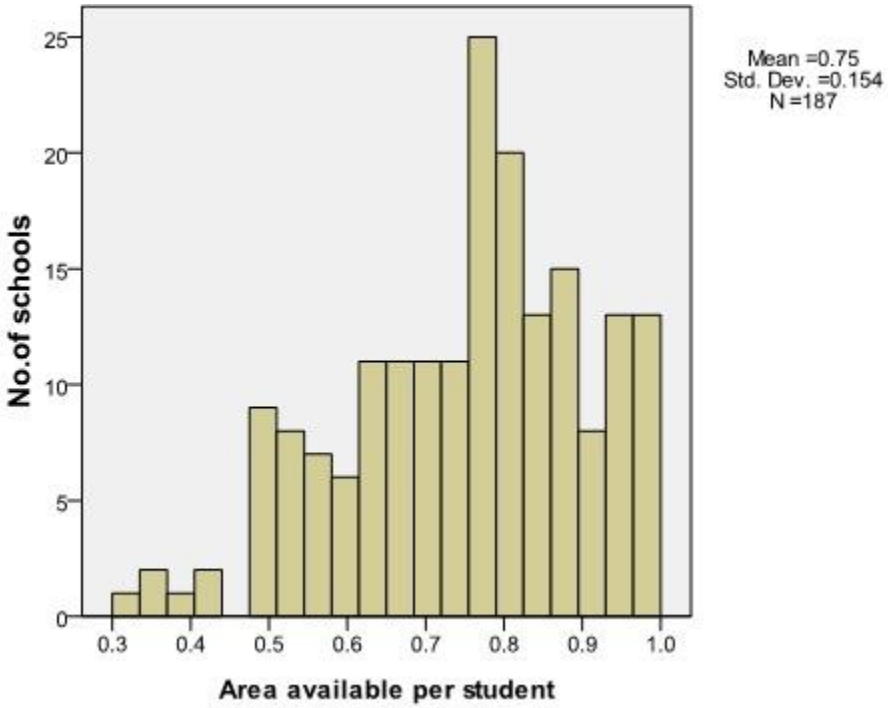
[25] A list of those schools names and IDs is available upon request.

Figure 1: Characteristics of Top 25% Extremely Overcrowded Schools (n=187)



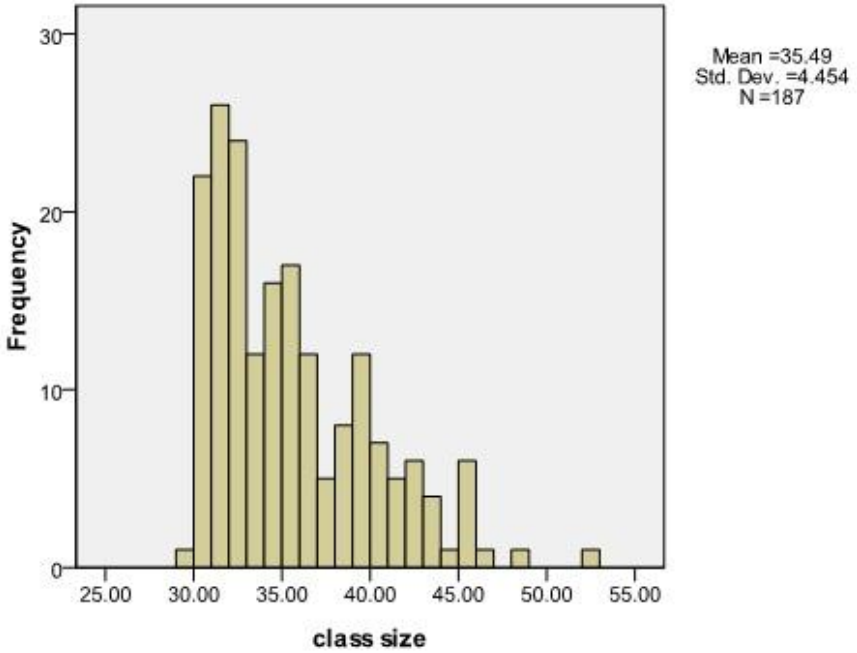
Figures 2, 3, and 4 show the breakdown distribution of the 187 extremely overcrowded schools according to area allocated to students (Figure 2), class size (Figure 3), and student-teacher ratio (Figure 4). As regards the distribution of the extremely overcrowded schools according to the area allocated to each student, Figure 2 shows that there is considerable variation among schools, and very few schools allocate 0.5 m² or less to each student. Several schools allocate between 0.8 m² and 0.9 m² per student.

Figure 2: Square-Meter Distribution in Extremely Overcrowded Schools



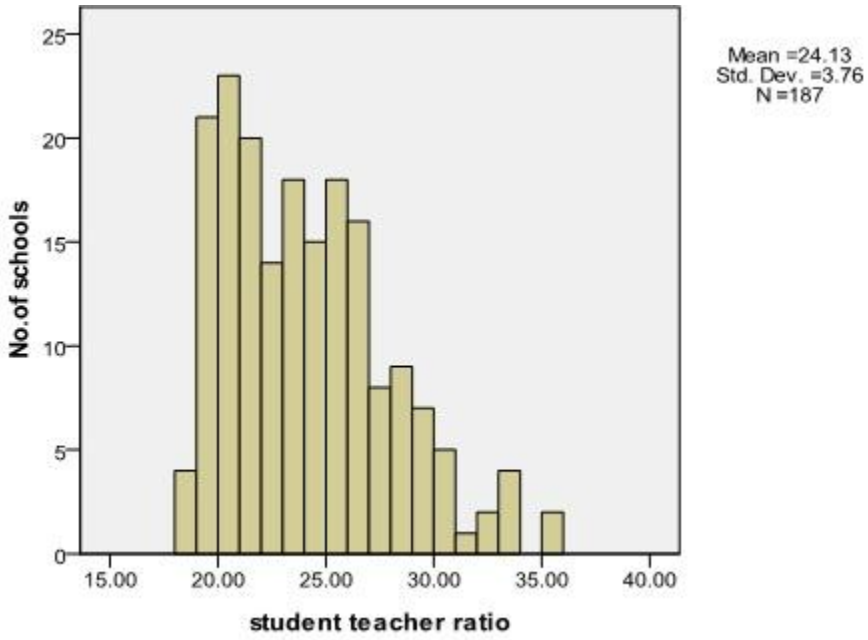
In addition, we observe a large variation in classroom size among extremely overcrowded schools. However, Figure 3 indicates that a substantial number of those schools have, on average, more than 40 students per classroom. In fact, in some schools the average number of students per classroom exceeds 46.

Figure 3: Class-Size Distribution in Extremely Overcrowded Schools



Finally, we observe that the student-teacher ratio in extremely overcrowded schools also varies. A large number of schools have on average student-teacher rations between 20-30:1. In some schools the student-teacher ratio exceeds 30:1, which is almost twice the average student-teacher ratio in Jordan.

Figure 4: Student-Teacher Ratio in Extremely Overcrowded Schools



In extremely crowded schools, we find a large percentage of schools without science labs (36.5%) and a smaller percentage of schools without computer labs. Science and technology are hands-on subjects that require the appropriate tools and, as mentioned earlier, computer and science labs are essential to implement innovative teaching and learning methodologies in the classroom.

Table 8: Computer and Science Lab Availability in Extremely Crowded MOE Schools[26] (n=159)

Characteristics	Numbers and %
Schools without computers	13 (8.2%)
Students without computer labs	9.6%
Schools without science labs	58 (36.5%)
Students without science labs	23.6%

[26] 28 missing cases from EMIS database

3.3 Reasons for Crowdedness and Major Challenges Facing Crowded Schools

Factors Contributing to Crowdedness in MOE Schools

As presented in the methodology section, from 100 randomly selected crowded schools (of the top 500 most crowded schools based on the current MOE criterion of 1.2m^2), 15 schools were selected purposefully, based on school sex, school level, school cycle, and school location for the qualitative component of this study. The main findings are presented below.

The most commonly cited causes for school overcrowding by all principals, directorate officials, parents, teachers, and students were associated with the school catchment area and population density of the neighborhood where schools are located (Table 9). Population density, in some cases, may be affected by the influx of immigrants. Some interviewees mentioned that in many instances, crowded schools are the only public (free) basic education schools available to those who cannot afford a private education. Furthermore, many crowded schools seem to be close to good and easy transportation, a reason cited by some as a determining factor in their school choice. Finally, school reputation as provider of high quality education, in a safe environment, in comparison to other schools, seems to contribute to school crowdedness.

Table 9: Most Cited Reasons for Crowdedness in Schools

1. Population density around the school is high (in some cases, there is a high influx of Iraqi, Egyptian, Syrian immigrants).
2. School has a good reputation in comparison to other schools.
3. The only basic school in the area that teaches grades 1-4, no other public school.
4. Good and easy transportation is available for students to reach the school.
5. Good relation between principal and teachers. Community trusts the school.
6. Families' incomes prevent accessing to private schools.
7. The school is rented and the classes are small.
8. Teaching staff is competent.

Challenges Faced by Crowded Schools

Overall, parents, teachers, and students in overcrowded and underutilized schools had more negative than positive opinions to highlight about their schools' facilities, teaching and learning processes, and the ability of the school to meet individual students' needs.

School facilities. In crowded schools, the recurrent concern expressed by principals, directorate officials, and by parents, teachers, and students was lack of proper facilities for teaching and learning. The majority pointed out that crowded schools were not suitable for learning. Many cited concrete problems, such as old building infrastructures, lack of clean drinking water and playgrounds, inadequate classroom lighting, and overall deterioration of the buildings structures and maintenance. Many teachers expressed discontent over the size and the proximity of very small classrooms, where they can hear all activities that are taking place in another classroom. In some cases, classrooms are so small that they cannot accommodate new learning resources. In one particular school, the classroom could not accommodate a teacher desk. Several students also mentioned the existence of broken windows, lack of WCs and play grounds in some schools.

Some of the infrastructural problems identified during interviews and focus group discussion are also associated with the lack of facilities and resources for learning. Several teachers mentioned the lack of computer labs, libraries, ICT tools and internet connection in some schools, which might affect their ability to utilize more innovative teaching techniques. In overcrowded schools with computers facilities, some parents and teachers mentioned the excessive number of students per computer as a problem. Those views were shared by several principals.

Teaching and learning. Parents, teachers, and students in general expressed concerns over the teaching/learning capacity and the quality of relationships in crowded schools. In some schools, parents expressed concern over teachers' workload. Several people have stated that regulations for teachers are unfair and that teachers' efforts to improve learning are many times hampered by negative school environment. For teachers, crowdedness is seen as an obstacle to applying new instructional strategies and new student assessment strategies. Some teachers mentioned that in crowded schools, students do not have as many opportunities to interact in the classroom. Some parents expressed concern over the lack of communication with teachers over curricular activities. They have also expressed concern over violence and the differences in socio economic status among students. According to many of the stakeholders, all the challenges presented above may result in lack of opportunities to address the needs of students who come from underprivileged backgrounds and face learning difficulties.

***School management*.** Principals attribute several school management difficulties to schools crowdedness. For example, many mentioned that they are unable to have periodic follow-up meetings with teachers. Parents' repeated visits to the school and the management of an oversized budget to provide basic school needs may take a large portion of some principals' time. A few directorate officials also mentioned that principals are unable to follow up with students' learning in the most effective way. Some officials have explained they face continuous problems in trying to coordinate administrative and pedagogical school issues. They may also face challenges to meet the demands of teachers and parents who complain about school infrastructure and poor facilities.

Despite all the negative aspects of some crowded schools, mentioned during focus group discussions and interviews with principals and directorate officials, many stakeholders expressed satisfaction with the overall conditions of their schools. More specifically, they cited many positive aspects associated to their schools' teaching and learning practices and students' performance. The most common positive aspect mentioned is that, at least in some crowded schools, quality of education is good. Further evaluations to determine whether that perception is actually translated into desirable student performance in standardized assessments need to be carried out.

3.4 Current Situation of the Underutilized MOE Schools by Category

In this section, we present our analyses based on the MOE criteria for underutilization (1.2m^2), but look at other relevant profile information, such as overall classroom capacity (# of students per classroom), student-teacher ratios, school capacity and enrollment, and utilization rate information.

Table 10 displays the distribution of underutilized schools by school characteristics. The largest average percentage of underutilized schools is present among mixed and male schools (50.8% and 35.5%, respectively). Owned schools also constitute the largest percentage of underutilized schools (84.5%). Another important characteristic of underutilized schools is that most are single shift (95.6%) and located in rural areas (61.9%). That is expected because rural areas are usually more scarcely populated.

As regards the student-teacher ratio in all underutilized schools, all schools have average student-teacher ratios below 20:1, with the exception of double shift schools (21:1). The lowest average student-teacher ratio can be found in rented and owned + rented schools (8:1). Classroom sizes also varied substantially, depending on the type of school. Rented and owned + rented schools have, on average, less students per classroom (10.4 and 11.8, respectively) than other types of schools. We further observe that even in underutilized schools, the average classroom size in urban and double shift schools is relatively high (30 and 31.9 students per class).

Table 10: Characteristics of Underutilized MOE Schools (n=1,891)

Characteristics		Number and % Underutilized MOE Schools	Avg. Student-Teacher ratio	*Average Class Size
School sex	Female	259 (13.7%)	15.6	28.6
	Male	671(35.5%)	14.4	25.2
	Mixed	961(50.8%)	12.8	19.9
School ownership	Owned	1598 (84.5%)	14.4	24.5
	Owned+ rented	24(1.3%)	7.9	11.8
	Rented	269(14.2%)	7.6	10.4
School cycle	Basic	1088(57.5%)	14.0	21.1
	Secondary	803(42.5%)	13.9	25.3
Shift of schools	Double shift	83(4.4%)	20.7	31.9
	Single shift	1808(95.6%)	13.6	22.8
School location	Rural	1171(61.9%)	10.2	16.2
	Urban	720(38.1%)	17.1	30.0
School geographical Location	North	730(38.6%)	12.7	21.7
	Middle	723(38.2%)	16.6	26.6
	South	438(23.2%)	10.8	19.3

Table 11 demonstrates that the percentage of schools without science labs is considerably smaller than the schools without computer labs.

Table 11: Computer and Science Lab Availability in Underutilized MOE Schools[27] (n=1,500)

Characteristics	Numbers and %
Schools without computers	173 (11.5%)
Students without computer labs	10.7%
Schools without science labs	401 (26.7%)
Students without science labs	9.3%

Table 12 shows the actual average enrollment and current capacity level among underutilized schools in all directorates. Although the problem of over capacity is present in all directorates, there is large variation in enrollment capacity among them. Below we have identified directorates with schools that are, on average, operating 50% their original capacity. We have also found four directorates with enrolment 70% or less below their capacity. These are: Shoobak (-121%), Theeban (-86%), Badia Wasta-Gezah (-83%), and Qasser (-76%).

[27] 391 cases missing from EMIS database

Table 12: Enrolment and Capacity in MOE Schools by Directorate

Directorate	School location		Total school	Enrollment	Capacity	Difference
	Rural	Urban				
Irbid1	20	50	70	36,144	44,613	-23.0
Irbid3	14	7	21	6,365	8,519	-34.0
Irbid2	9	26	35	12,281	17,019	-39.0
Aghwar Janoobia	11	5	16	5,300	7,621	-44.0
Aghwar Shmalia	29	6	35	11,468	16,661	-45.0
Badia Janoobia	45	3	48	5,643	9,321	-65.0
Badia N.E	105	3	108	13,566	21,766	-60.0
Badia N.W	65	6	71	9,644	15,104	-57.0
Badia Wasta-gezah	78	1	79	8,999	16,469	-83.0*
Bdia Wasta_moqar	25	1	26	4,637	6,307	-36.0
Petra	7	18	25	4,588	7,386	-61.0
Rsyfa	4	36	40	27,820	32,006	-15.0
Ramtha	3	21	24	15,172	18,273	-20.0
Zarqa1	6	44	50	29,051	36,106	-24.0
Zarqa2	45	7	52	11,297	15,049	-33.0
Shoobak	31	2	33	2,908	6,424	-121.0*
Shoona Janoobia	19	9	28	8,316	13,078	-57.0
Tafeelah	32	32	64	13,241	18,873	-43.0
Aqaba	30	25	55	17,764	24,808	-40.0
Qasser	28	14	42	6,442	11,360	-76.0*
Koora	18	23	41	13,685	18,118	-32.0
Mazar Janoobi	39	10	49	8,900	13,462	-51.0
Bani Kenana	45	7	52	12,063	17,832	-49.0
Jarash	74	31	105	23,057	34,204	-48.0
Deer Alla	20	11	31	8,326	12,573	-51.0
Theeban	49	3	52	6,292	11,713	-86.0*
Ajlune	42	20	62	15,148	21,464	-42.0
Amman1	-	56	56	29,929	37,166	-24.0
Amman2	-	33	33	18,112	21,695	-20.0
Amman3	5	32	37	23,136	28,681	-24.0
Amman4	2	48	50	36,521	43,399	-19.0
Amman5	41	21	62	22403	29,103	-30.0
Eain Albash	19	5	24	6,731	9,778	-45.0
Alsalt	43	26	69	16,631	24,197	-45.0
Karak	54	18	72	14,697	22,503	-53.0
Mafraq	87	19	106	18,656	27,833	-49.0
Bseera	8	5	13	1,983	2,664	-34.0
Ma'an	-	21	21	6,108	9,053	-48.0
Madba	19	15	34	12,165	16,313	-34.0
TOTAL	**1,171**	**720**	**1,891**	**545,189**	**748,514**	**-37.0**

In addition to examining the enrolment capacity in each directorate, it is important to identify the various levels of utilization rates among underutilized schools, and as to identify the schools that require most urgent attention from the MOE. As Table 13 indicates the school utilization rate (student enrolment over school capacity) in underutilized schools is below 100%. Schools that are 30% or below their capacity can be considered an extreme case in the utilization rate scale. Based on the results presented below, 142 (5.2%) schools fall under that category.

Table 13: Utilization rate for underutilized schools.

Utilization rate %	Number of schools	Percent %
0.0-10	6	0.3
10.0-20.0	38	2.0
20.0-30.0	98	5.2
30.0-40.0	127	6.7
40.0-50.0	180	9.5
50.0-60.0	222	11.7
60.0-70.0	272	14.4
70.0-80.0	321	17.0
80.0-90.0	369	19.5
90.0-100	258	13.6
Total	**1,891**	**100**

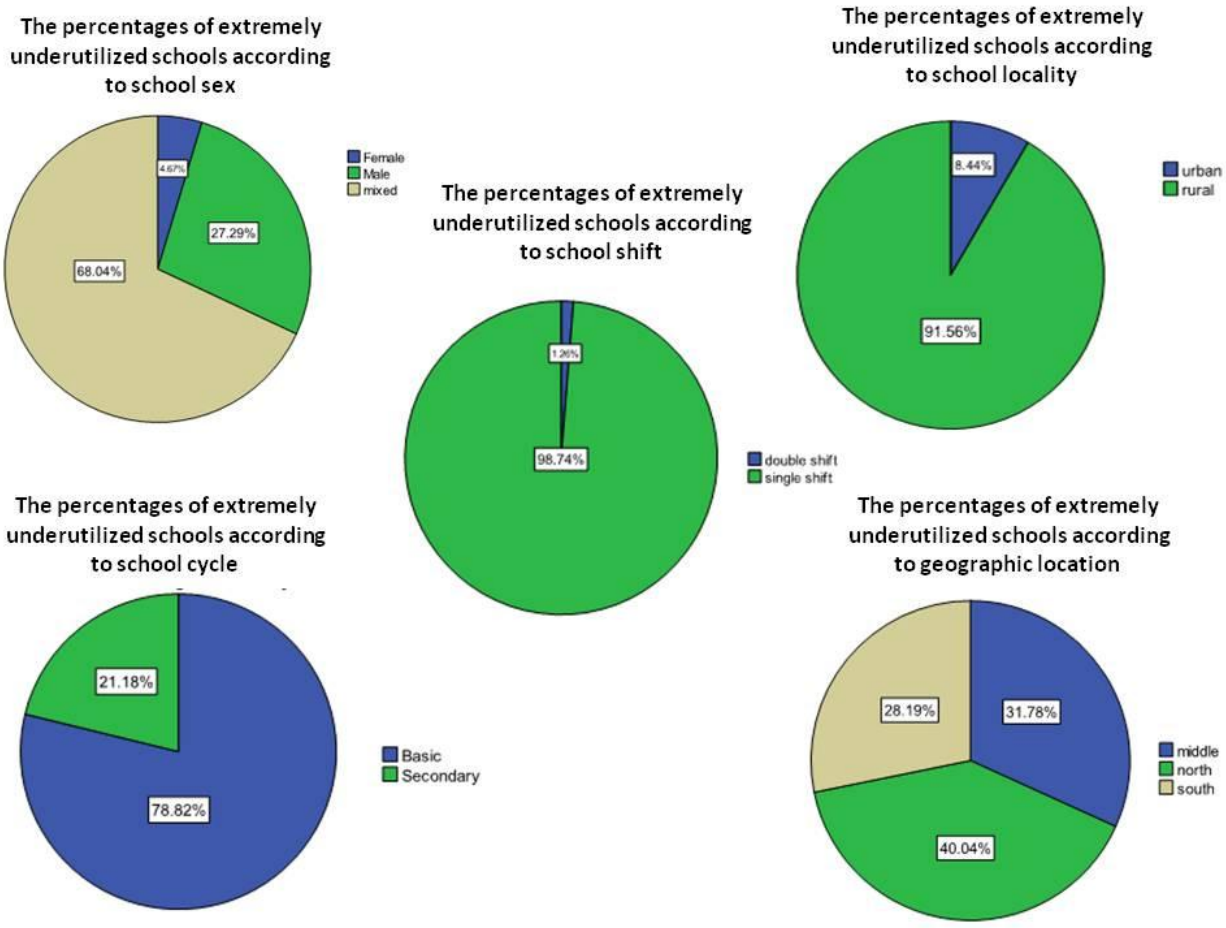
Extremely Underutilized Schools

As with the overcrowded schools, the new criterion utilized to select the extremely underutilized schools is a combination of the following: 1) 25% of schools with largest area per students; 2) 25% of schools with the smallest number of students per classroom; and 3) 25% of schools with the smallest student-teacher ratio. Schools that fall under these three categories were selected for the purposes of the analyses below and are considered to be in urgent need of government attention to minimize the underutilization problem. However, as it will be pointed out in the policy implication section, each case of extremely underutilized schools should to be reviewed carefully, as to not compromise every child's right to education.

Figure 5 shows that extremely underutilized schools comprise 557 schools[28], which are mostly present in rural areas (91.6%). The average student-teacher ratio in those schools is 5.9:1. The average area per student: 3.5 m². The average classroom has 8.5 students. Most extremely underutilized schools are mixed schools (68.0%) and a much smaller percentage are male (27.3%) or female (4.7%) schools. Also, the majority of those schools are double shift (98.7%) and offer basic cycle (78.8%). They are distributed in the north (40%), middle (31.8%) and south (28.2%).

[28] A list of those schools names and IDs is available upon request.

Figure 5: Characteristics of Top 25% Extremely Underutilized Schools (n=557).



The distribution of extremely underutilized schools by area (Figure 6) shows that a large number of schools allocate more than 2 m² per student in a classroom. A substantial number allocates less than 2 m², but more than the 1.2 MOE standard. Very few schools allocate 6 m² or more per student.

Figure 6: Square-Meter Distribution in Extremely Underutilized Schools

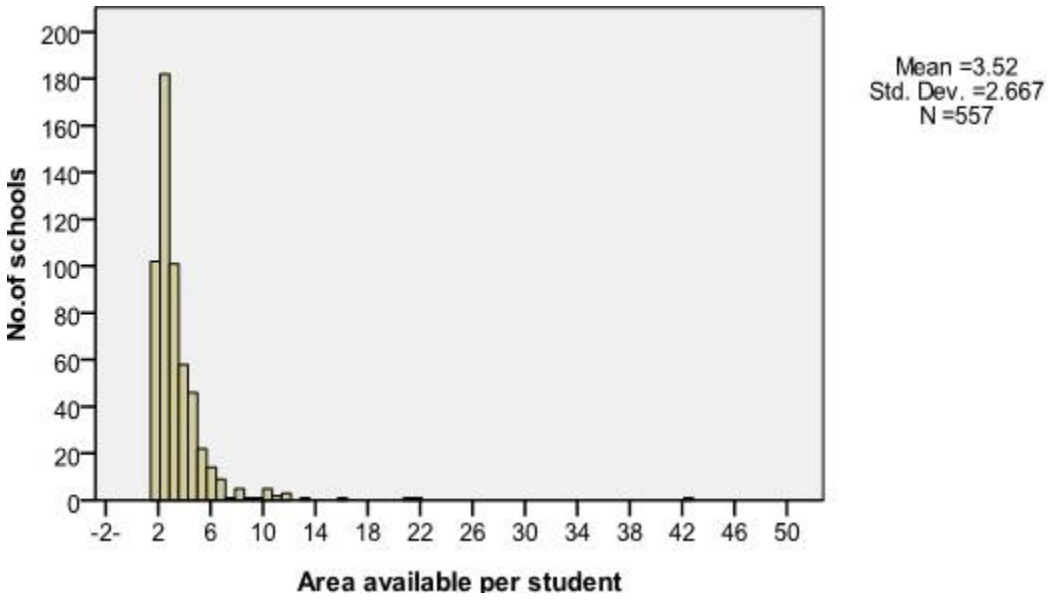
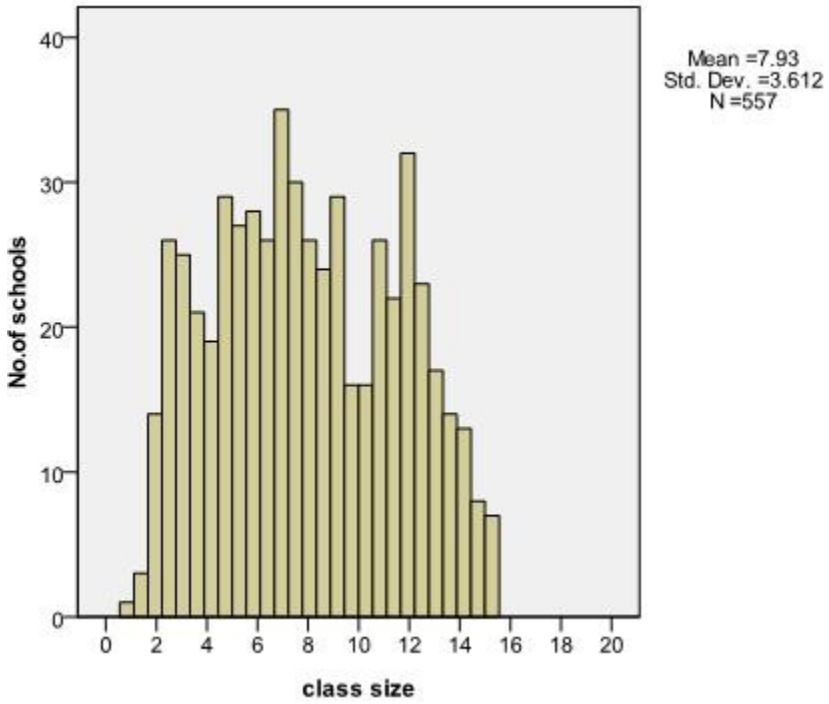


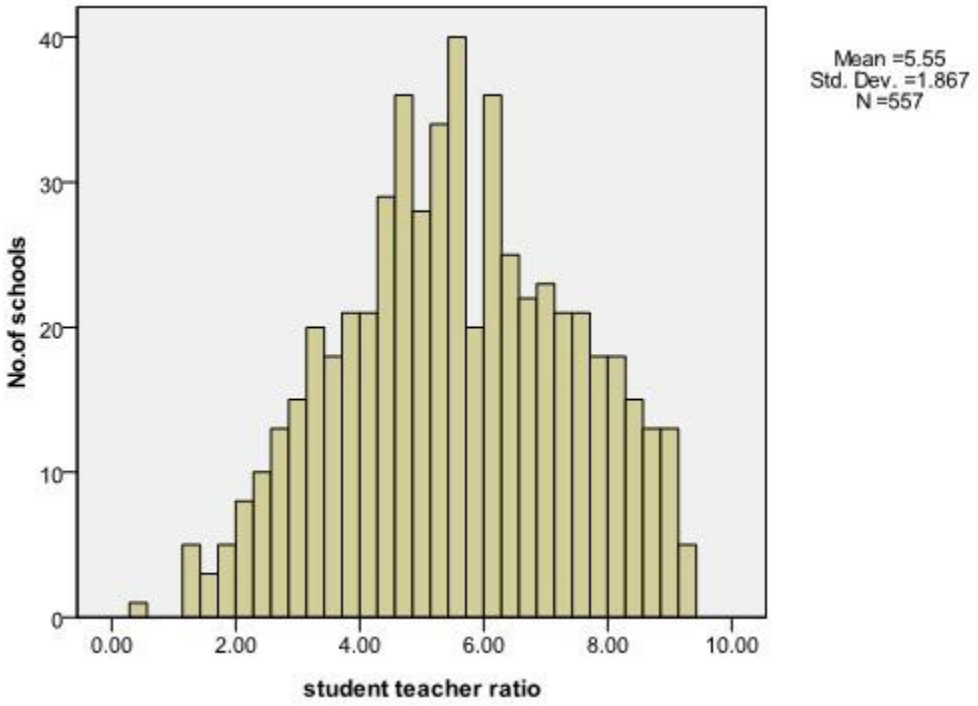
Figure 7 displays the distribution of classroom size across all extremely underutilized schools. It shows there is great variation among them. Most schools under this category have between six and eight students per classroom. However we can note some extreme cases, with one student per classroom or more than 14 students in one classroom.

Figure 7: Class-Size Distribution in Extremely Underutilized Schools



In Figure 8 we observe substantial great variation in student-teacher ratios among extremely underutilized schools. The majority seem to have between three to eight students per teacher. Very few have student-teacher ratios below 2:1 or above 9:1.

Figure 8: Student-Teacher Ratio Distribution in Extremely Underutilized Schools



In the extremely underutilized schools the lack of computer labs and science labs seem more acute than in other times of schools presented earlier. In fact, almost half of the students in those schools have no access to science lab facilities (Table 14).

Table 14: Computer and Science Lab Availability in Extremely Underutilized MOE Schools[29] (n=472)

Characteristics	Numbers and %
Schools without computer labs	55 (11.7%)
Students without computer labs	12.6%
Schools without science labs	202 (42.8%)
Students without science labs	45.9%

[29] 85 cases missing from EMIS database

3.5 Reasons for Underutilization and Major Challenges Facing Underutilized Schools

Factors Contributing to Underutilization

For the qualitative component of this study, 15 schools (from 100 randomly selected crowded schools of the top 500 most underutilized schools based on the current MOE criterion of 1.2m^2) were selected purposefully based on school sex, school level, school cycle, and school location. The main findings are presented below.

The most commonly cited causes for school underutilization by principals, directorate officials, parents, teachers, and students were associated with the school catchment area. Some interviewees mentioned that schools are far from residential areas and transportation to school might be difficult in some cases. Further, some interviewees mentioned that residents close to underutilized schools are elderly and the overall student population surrounding the school is low. Others mentioned that in many instances, migration of youth from rural to urban centers is high. An additional reason for underutilization is the lack of proper facilities and building maintenance. In some places, water is not available, restrooms are insufficient, and the schools lack science and computer labs and libraries.

Table 15: Most Cited Reasons for School Underutilization

1.	Far from residential areas.
2.	The majority of residents are elderly. There is a small number of younger residents and students.
3.	Bad/difficult transportation.
4.	Youth movement to work in cities (internal migration).
5.	Lack of proper facilities (science and computer labs, WCs, classrooms, and water) and maintenance.

Challenges Faced by Underutilized Schools

Lack of qualified teachers and low academic achievement. Some principals, parents, students, teachers, and school officials in underutilized schools mentioned that teachers lack the necessary experience and in many cases are not qualified to teach all necessary subjects. Further, many teachers are temporary. The motivation level is low among teachers and students, which might result in student drop out.

Lack of facilities and programs to attract and motivate students. Several underutilized schools seem to have limited financial resources for adequate school maintenance, learning resources, and materials to ensure good teaching and learning outcomes. The overall conditions of many schools generate lack of motivation to teach and to learn among teachers and students.

In this area, some crowded and underutilized schools face similar challenges. Lack of proper infrastructure and learning facilities, can affect both types of schools. However, in crowded schools more students may be affected negatively. Both types of schools may also suffer from poor teaching and learning practices differently. In the case of crowded schools, teachers' workload and inability to interact with students at a more individualized level may affect students' learning. On the other hand,

underutilized schools might attract teachers who lack the necessary qualifications to promote student learning and increase their motivation.

It is important to emphasize the fact that although many parents, teachers and students seemed dissatisfied with many aspects of crowded and underutilized schools, some stakeholders who participated in the study pointed out positive aspects about their particular schools. More specifically, we observed that in some underutilized schools the relationships among teachers, parents, principals, and students can be positive and favorable for learning. The direct and constant interactions among them seem to lead to reduced internal competition in schools and improved collaboration among the school community, in some cases. Positive parent-teacher-student-principal interactions were also reported among some stakeholders from crowded schools.

Finally, although the problems raised during focus group discussions cannot be generalized to the overall population of MOE schools in Jordan, the results presented above suggest that many crowded and underutilized schools have serious infrastructural problems that need to be addressed. Studies have demonstrated that the availability of basic infrastructure and services (water, sewage, labs, ICT, libraries, etc.) may have a significant effect on achievement[30]. That suggests that investments in infrastructure should continue if Jordan intends to improve students' academic performance, particularly among the most underprivileged students.

3.6 Policy Discussion

Although the overall number of crowded and underutilized schools has decreased in the last three years, some important trends in crowdedness and underutilization have been pointed out in this report.

First, there has been a considerable decrease in the percentage of crowded and underutilized female schools over time, even though they did not represent the largest percentage of crowded and underutilized schools in Jordan. On the other hand, crowded mixed schools seem to continue to increase. The MOE should clarify whether those changes have been a result of deliberate policy or a "natural" movement across female and mixed schools. In either case, the MOE should focus on decreasing the number of crowded mixed and male schools, which are the most affected by crowdedness.

EMIS data has shown a substantial increase in urban crowded school and a large decrease in rural crowded schools, followed by a small decrease in rural underutilized schools. These findings suggest that students might be migrating to larger cities. This trend will pose a great challenge to the MOE in controlling the number of crowded schools in urban centers. We suggest the government examine carefully the location and overall infrastructure and capacity of underutilized schools in urban areas and make an attempt to transfer/transport students from the most crowded to the underutilized schools.

[30] Murillo, F.J. & Roman, M. (2011). School infrastructure and resources do matter: Analysis of the incidence of school resources on the performance of Latin American Students. School Effectiveness and School Improvement, 22 (1), 29-50.

Crampton, F.E. (2009). Spending on School Infrastructure: Does Money Matter? Journal of Educational Administration, 47(3), 305-322. DOI: 10.1108/09578230910955755.

As regards the creation of an "ideal" standard for teacher-student ratio, it is important to consider the following: previous research has generally shown that teachers are more likely to give individualized attention to students if the student-teacher ratio is low. This type of interaction may in turn result in better student achievement or performance. However, some researchers have also suggested that student-teacher ratio does not correlate with student achievement or performance, particularly when the teacher utilizes a teacher-centered traditional classroom approach to teaching. Therefore, if student-teacher ratios are blindly reduced, this may only cause a heavy financial burden with little educational return in student learning or quality school[31]. It also is important to keep in mind that many of the top performing PISA and TIMSS countries have student-teacher ratios and classroom sizes larger than the Jordanian MOE averages. Jordan has, on average, student-teacher ratios below several of the top five high performing TIMSS and PISA countries. For example, in Singapore, the student-teacher ratios for primary and secondary schools are 23.5:1 and 17.2:1, respectively. Korea's teacher ratios in primary and secondary public schools are 25.6:1 and 18.2:1, respectively. Again, we observe that the average classroom sizes in Jordan are smaller than some top five high-performing countries in TIMSS and PISA. In Japan, the average classroom size is 28.9 at the primary level and 34.5 at the secondary level. In Korea, classroom sizes are substantially larger, with 36.5 and 38.7 students in primary and secondary levels, respectively.

Further, the results from interviews and focus group discussions point out that one of reasons why some schools become overcrowded is the perceived quality of education offered in those schools. This presents a challenge for policy makers. On one hand, students and parents are drawn to schools which have a good reputation and good teachers. On the other hand, once class sizes or student-teacher ratios become too large, this might negatively affect quality of teaching or learning. Again, it is important to utilize a more specific criterion to determine crowdedness and underutilization and to attempt to decrease the number of students in extremely crowded schools while at the same time, addressing education quality issues such as improvement of school facilities and improved teaching. An analysis of ten top performing countries in education has shown that what matters most when it comes to improving education is getting the right people to become teachers, developing them into effective instructors, and ensuring that the system is able to deliver the best possible instruction for every child[32]." The MOE should therefore consider improving its teacher recruitment and training, particularly in underutilized schools in rural areas.

In discussing the future of underutilized schools, it is important not to make decisions to close a school based on the 1.2 m^2 per student criterion alone. The government should take into account the diverse needs of scarcely populated areas to ensure that every child has access to the basic right to education. That could mean keeping many underutilized schools open or simply providing free transportation to take children to the closest school in their residential area. The decision should be based on the cost of each alternative and the cultural reality of the communities affected.

[31] Hua, H. (2010). Indicator 23: Student Teacher Ratio. Egypt Ministry of Education.

[32] McKinsey and Company (2007). How the world's best performing schools systems come out on top (p.6).

Finally, the government of Jordan has invested heavily on improving EMIS data over the last years. However, the overall quality of the EMIS database can be further improved. More specifically, the MOE might develop best practices with regard to planning, data collection and analysis, information sharing and transparency in the education sector.

3.7 Policy Options

Based on the above findings and discussion sections, the following policy options are proposed:

1) Develop more comprehensive criteria for identifying crowded and underutilized schools in order to allocate resources more appropriately. Many schools are considered crowded or underutilized by the MOE standard of 1.2 m^2 per student in a classroom. However, we recommend that the MOE expand its definition of crowdedness and underutilization to include information about classroom size and student-teacher ratio. By developing a more comprehensive criterion, the MOE would be better able to identify schools that need the most attention.

2) Prioritize areas and schools with the largest percentage of extremely crowded schools, such as Amman III and Zarqa II Directorates. More specifically, focus on male, co-ed and rented schools. To decrease the number of extremely overcrowded schools, the MOE could do the following:

• Consult parents and other key stakeholders about the possibility of transferring students from extremely overcrowded schools to neighborhood underutilized schools, taking into consideration the financial implications for parents and the MOE.

• Increase the classroom areas in overcrowded schools where it might be difficult to transfer students elsewhere.

• Review student per teacher ratios as well as classroom sizes in the overcrowded schools and try to modify them to be close to the national levels. One way to do that is to turn single shift schools into double shift schools.

3) Consider improving teacher recruitment and training, particularly in underutilized schools in rural areas.

4) Create a long-term planning strategy with funders to build schools in densely populated catchment areas in the near future.

The results from interviews and focus group discussions reveal that schools might become overcrowded because parents and communities believe those schools offer better quality education than underutilized schools. We suggest the MOE focuses on issues that matter most to improve education quality, namely: 1) getting the right people to become teachers; 2) developing them into effective instructors; 3) ensuring that the system is able to deliver the best possible instruction for every child (McKinsey and Company 2007). It is critical to offer teachers incentives to move to underutilized and sparsely populated schools.

5) Examine carefully the location and overall infrastructure and capacity of underutilized schools in urban areas and make an attempt to transfer/transport students from the most crowded to the underutilized schools

We suggest the government study the mapping of extremely underutilized schools in order to:

• Close the rented schools where underutilized schools are available, and provide transportation where needed to facilitate regular attendance in these schools.

• Merge neighboring underutilized schools.

• Refrain from building schools in locations where there are underutilized schools.

• Conduct community-based campaigns about the current evidence on underutilized schools and students' performance.

• The MOE could improve the infrastructure and the quality of teaching resources and facilities, such as computer and science laboratories, in order to attract some students from extremely overcrowded schools to underutilized schools in the same or close to the same catchment area.

3.8 Correlations between Area Occupied by Students, NAfKE, and SCALT Results

a) Descriptive Information about National Assessment for Knowledge Economy (NAfKE) and Student Centered Active Learning and Teaching (SCALT) Scores by Grade and Subject in MOE Schools.

Descriptive information about students' NAfKE scores and teachers' SCALT scores by subject and grade are presented in Table 1. NAfKE scores ranged from 0—100. SCALT scores ranged from 0—26. A higher score means high performance while a low score implies poor performance in those subjects and grades. As shown in the table below, students' average NAfKE scores across grades and subjects in MOE schools range between 20.8 and 44.4. However, within subjects or grades, there is quite large variation. Scores are mostly normally distributed, indicating there is a significant level of reliability in NAfKE results to distinguish students' performance levels within each subject or grade.

As regards teachers' SCALT scores, most MoE teachers score somewhere in the middle in the SCALT composite (around 50% of the total possible score). However, teachers of different subjects have different SCALT scores indicating that their utilization of SCALT methodology in the classroom varies by subject and grade. The lowest SCALT scores were reported among 5th and 11th grade math teachers (11.2 and 11.9, respectively). The highest scores were observed among 5th grade science and 11th grade Arabic teachers, who scored 14.0.

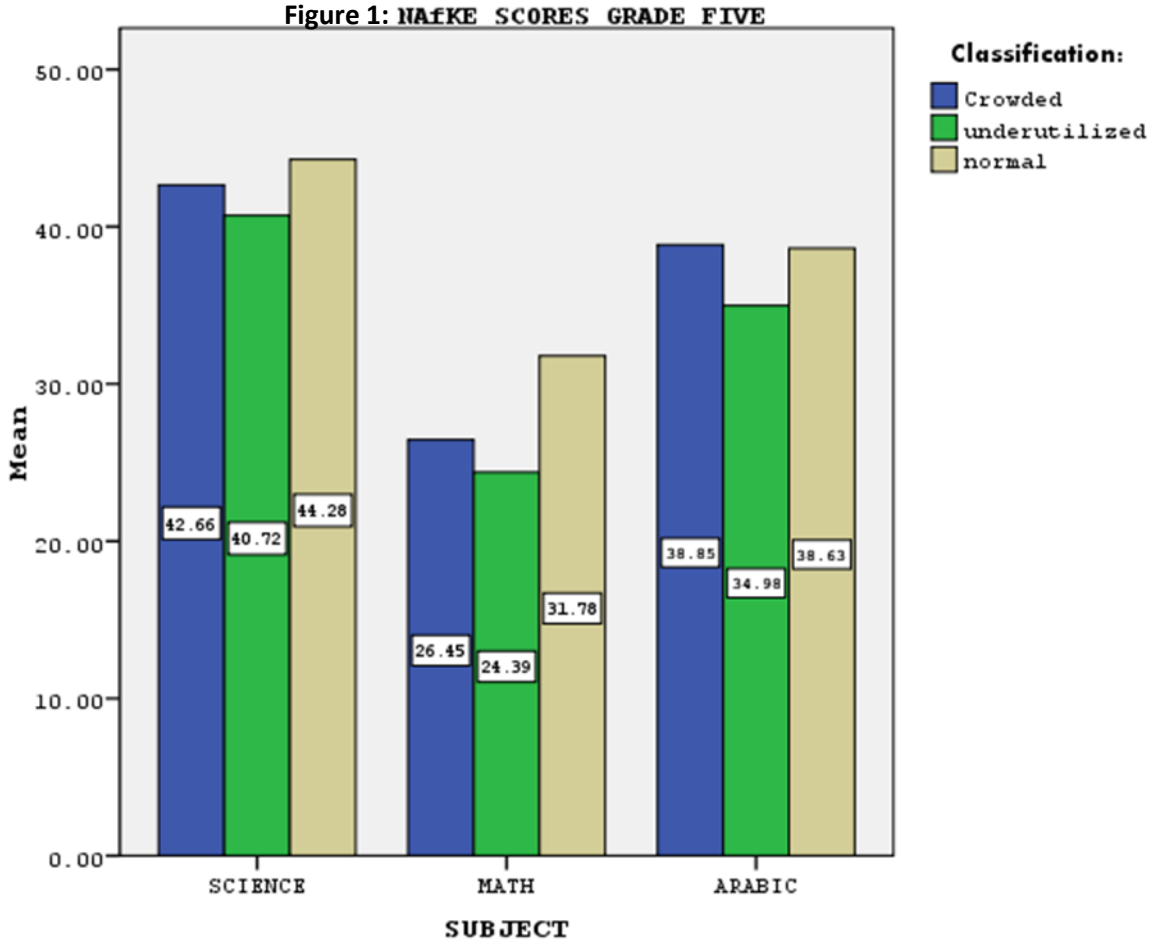
Table 16: Students' Mean NAfKE Scores and their Teachers' Mean SCALT Scores in MOE Schools by Grade and Subject.

Subjects	Grades	Students' NAfKE Scores M (SD)	*n*	Teachers' SCALT Score M (SD)	*n*
Math	5th	26.1 (13.9)	944	11.2 (5.9)	58
	9th	30.7 (13.2)	942	12.8(5.9)	67
	11th	20.8 (11.1)	1101	11.9(5.6)	74
Science	5th	42.0 (17.9)	948	14.0(5.6)	56
	9th	34.1 (17.2)	935	12.7(6.2)	63
	11th	26.7 (16.5)	1026	12.4(6.9)	39
Arabic	5th	37.0 (18.8)	927	13.2(4.9)	55
	9th	38.3 (16.7)	941	13.5(6.2)	67
	11th	44.4 (17.0)	1105	14.0(5.4)	73

b) Variations in Means of NAfKE and SCALT Scores by Grade and Subject in Crowded, Underutilized, and "Normal" schools

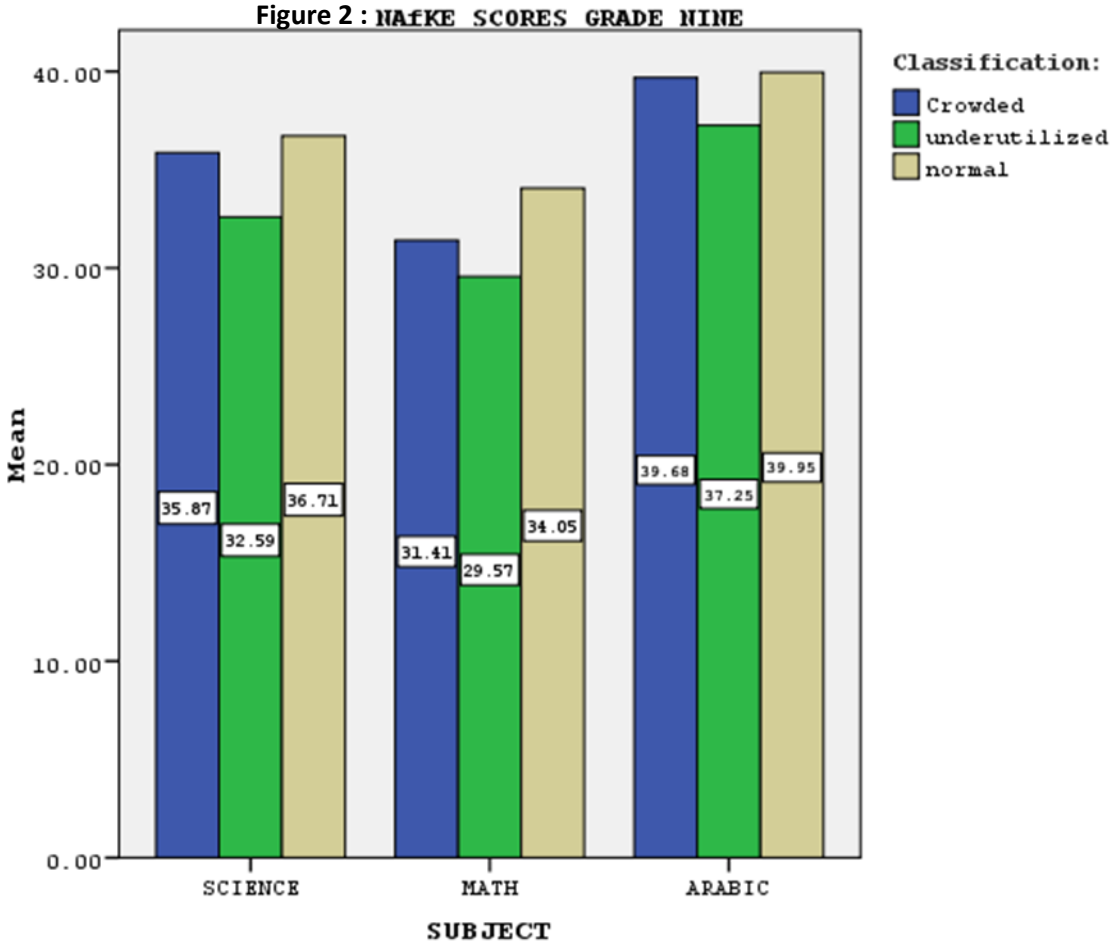
The MOE criterion of 1.2 m^2 per student in a classroom unit was utilized to classify schools. As Figures 1, 2 and 3 demonstrate, there is some variation in NAfKE scores across three categories of school occupancy (i.e., crowded, underutilized, and "normal") by subject. In Figure 1, which represents students' NAfKE scores in grade 5, we notice "normal" and crowded schools outperform underutilized schools in all subjects. The largest NAfKE score difference exists between "normal" and underutilized schools in math (approximately 8 points). Student's science and Arabic performance in crowded and "normal" schools is almost equals.

Figure 1: NAfKE SCORES GRADE FIVE



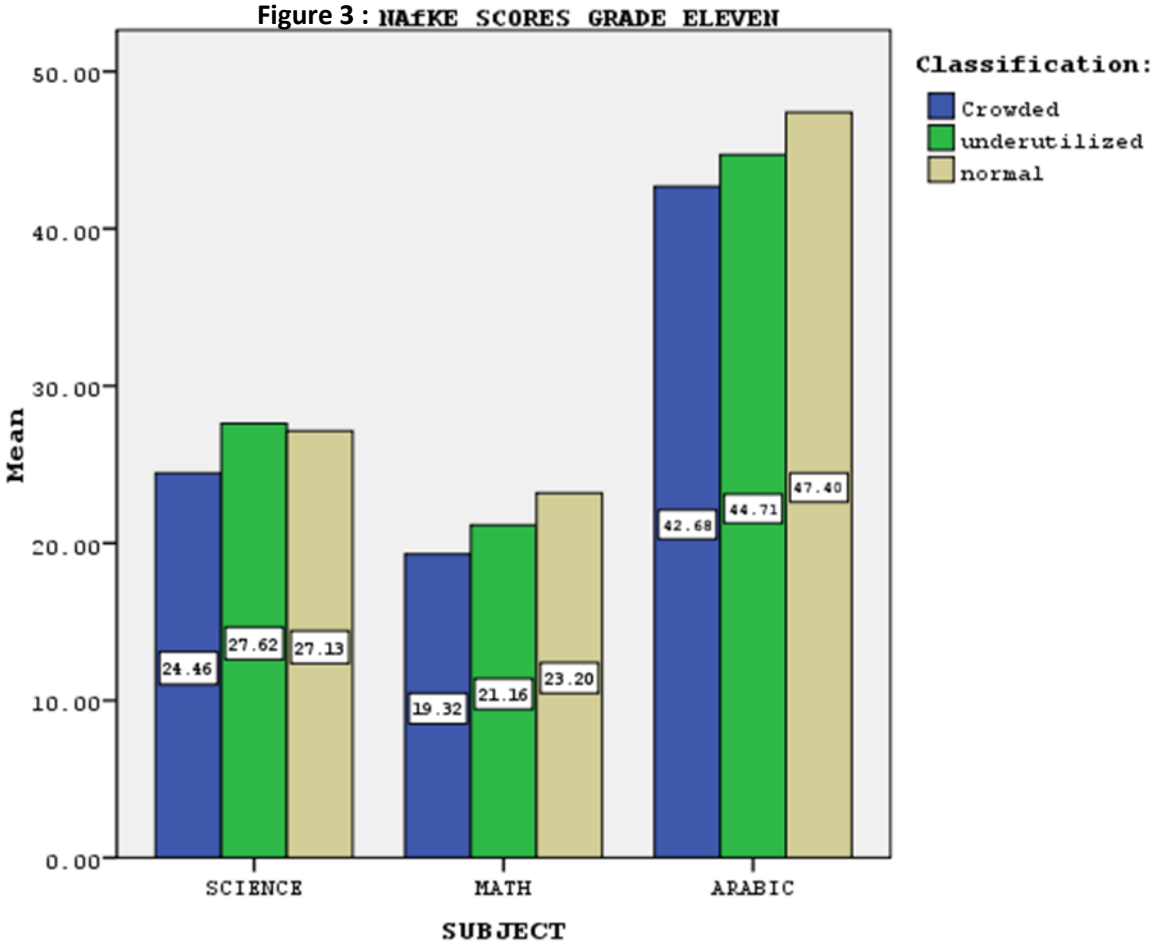
The same pattern mentioned above is observed among 9th graders' scores in all three subjects (Figure 2). "Normal" and "crowded" schools outperform underutilized schools in all three subjects. Score differences between "Normal ' and "underutilized" schools are greatest in math and science (4.5 and 4.1, respectively). Once again, student's science and Arabic performance in crowded and "normal" schools is similar.

Figure 2 : NAfKE SCORES GRADE NINE



In 11th grade, "normal" schools continue to outperform crowded and underutilized schools in math and Arabic. However, students' science scores in underutilized schools are almost the same as in normal schools. Further, students' scores in math and Arabic in underutilized schools surpass students' scores in crowded schools.

Figure 3 : NAfKE SCORES GRADE ELEVEN

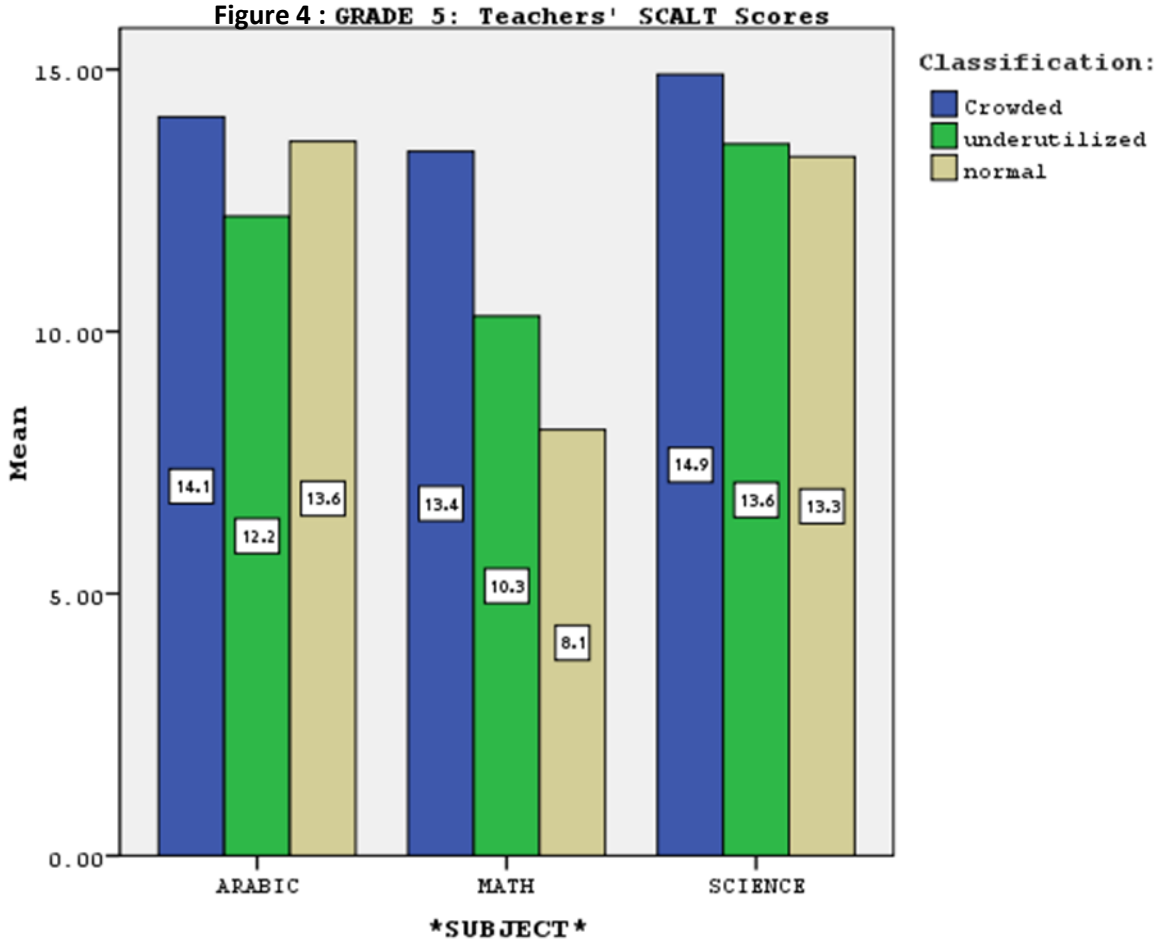


Based on the results presented in Figures 1, 2, and 3, we observe that, on average, students in crowded or "normal" schools performed better students in underutilized schools. Nevertheless, in 11th grade, crowdedness might negatively affect students' scores in all three subjects. Interestingly, students in "normal" schools continue to do better than their counterparts in underutilized schools.

Figures 4, 5, and 6 show there is some variation in teachers' SCALT scores across three school categories (i.e., crowded, underutilized, and "normal"), but there are no consistent patterns in teachers' utilization of SCALT by school occupancy. Once again, the MOE criterion of 1.2 m² per student in a classroom unit is utilized.

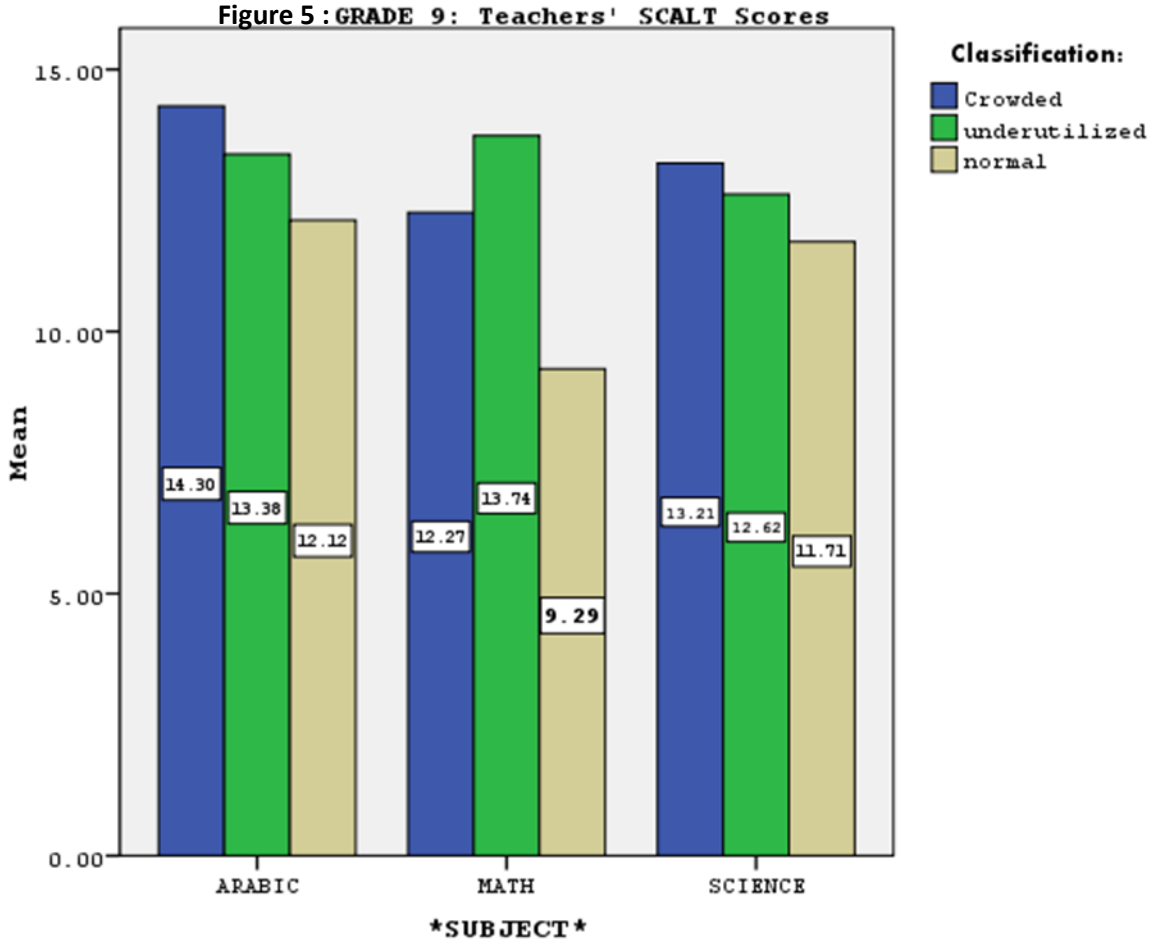
As Figure 4 demonstrates, in 5th grade, teachers' in crowded schools scored higher on the utilization of SCALT methodologies than teachers in underutilized and "normal" schools. The largest differences in scores are observed among math teachers in crowded and "normal" schools (5.3 points).

Figure 4 : GRADE 5: Teachers' SCALT Scores



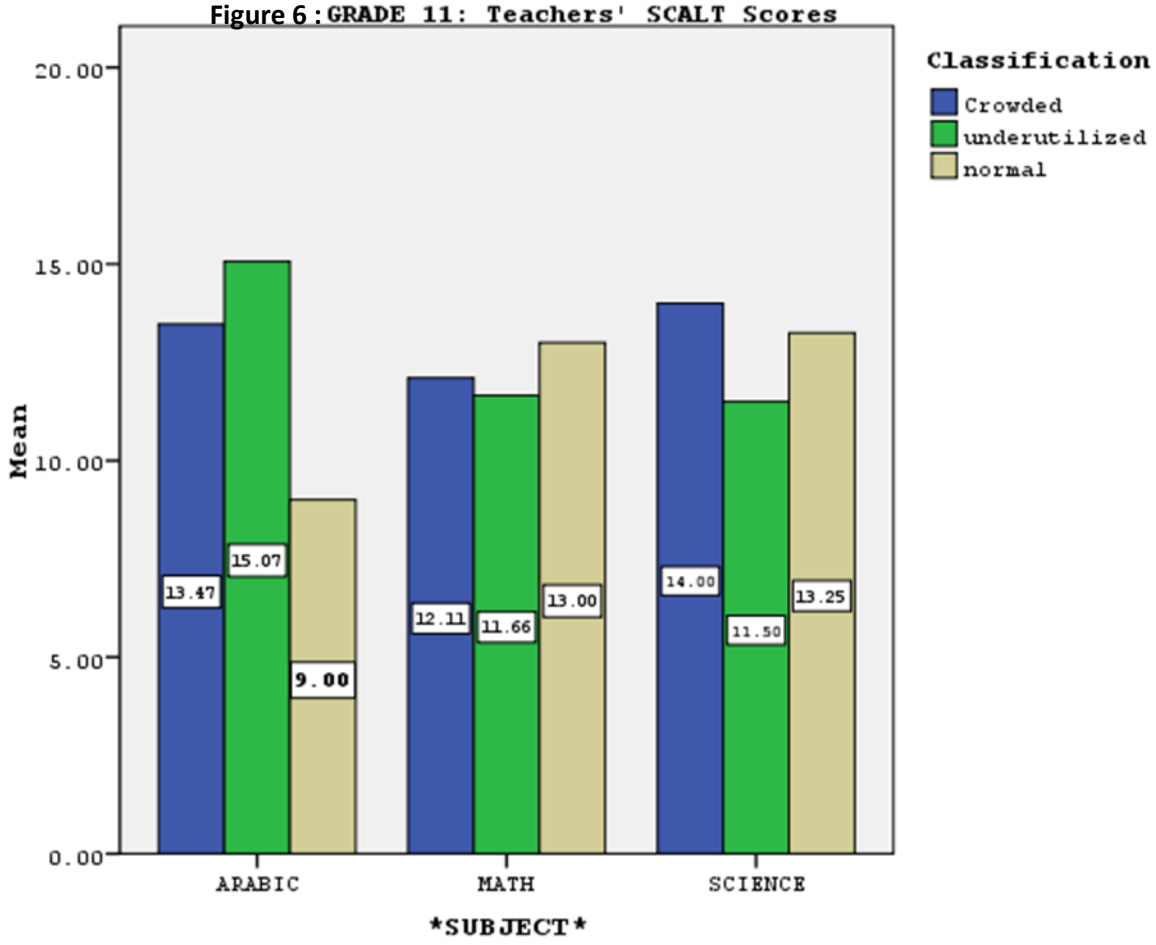
In grade 9 (Figure 5), Arabic and science teachers in crowded schools scored higher on the application of SCALT methodologies than their counterparts in underutilized and normal schools. However, math teachers in underutilized schools utilized more SCALT methodologies than math teachers in crowded and “normal” schools. In fact, teachers in “normal” schools scored the lowest in the utilization of SCALT methodologies. The largest difference in scores is observed among math teachers in "underutilized" and "normal" schools (2.98) points.

Figure 5 : GRADE 9: Teachers' SCALT Scores



In 11th grade, the inconsistencies in the utilization of SCALT methodologies across school types persisted. Science teachers in underutilized schools scored higher than their counterparts in crowded and normal schools. The score difference among Arabic teachers in underutilized and "normal" schools reached, on average over 6 points. Math teachers in "normal" schools scored higher than their counterparts in crowded and underutilized schools, although only by a small margin. Conversely, Arabic teachers in underutilized schools outperform teachers in normal and crowded schools.

Figure 6 : GRADE 11: Teachers' SCALT Scores



b) Correlations between Students' NAfKE Scores and Teachers' SCALT Scores and Area Occupied by Students by Grade and Subject

A major question to be answered is whether teachers' SCALT scores and students' NAfKE scores are correlated with area occupied by student in a classroom unit. In other words:

1) Is the application of SCALT methodology in Jordanian classroom associated with the area occupied by a student in a classroom unit?
2) Are students' NAfKE scores associated with the area occupied by a student in a classroom unit?

Correlations establish the existing relationship, of lack thereof, between variables. In the current analysis, presented in Table 2 we observe there is no statistically significant association between students' NAfKE scores and the area occupied by students in a classroom unit across grades and subjects. In other words, there is no concrete evidence that being in a crowded, underutilized or "normal" school might affect students' scores. However, the presence of several negative coefficients

suggests there might exist a negative trend between students' scores and area across grades and subjects, such that students in underutilized schools might be more likely to obtain lower NAfKE scores.

Table 17: Correlation between Students' NAfKE scores and Area Occupied by Student

Students' NAfKE Scores/Area Occupied by Students	Subjects		
	Science	Math	Arabic
Grade 5	-.067	-.139	-.160
Grade 9	-.118	.009	.034
Grade 11	-.009	.006	-.014

Similarly to the findings presented above, we found no statistically significant association between teachers' SCALT scores and the area occupied by students in a classroom unit across grades and subjects. These findings suggest that the application of student-centered approaches in the classroom might not be correlated with the area allocated to students in the classroom. However, as with the results presented above, we notice the presence of several negative coefficients, which might suggests a negative trend between teachers' application of SCALT methodologies and area, such that teachers in underutilized schools might be less likely to score higher in SCALT.

Table 18: Correlation between Teachers' SCALT scores and Area Occupied by Students

Teachers' SCALT Scores/Area Occupied by Students	Subjects		
	Science	Math	Arabic
Grade 5	-.070	-.237	-.099
Grade 9	-.032	-.120	-.045
Grade 11	-.232	-.120	.172

Conclusion

The government of Jordan, more specifically the MOE, established a series of important educational achievement goals to be reached during ERfKE II (2010-2015). The current study presents relevant information to assist the MOE to reach its goals by defining and describing the quality of the physical learning environments. The study primary objectives were to: 1) outline what progress has been made from 2007-2008 to 2010-2011 with regard to crowded and underutilized MOE schools; 2) present their current characteristics in 2010-2011; and 3) define some of the key factors contributing to over-crowdedness and underutilization. We have expanded those goals by creating a new criterion to classify extremely overcrowded and underutilized schools, which includes information about area allocated to students in the classroom, number of students in a classroom, and student-teacher ratio. We believe this new criterion will better assist the MOE in prioritizing the schools in need of immediate assistance.

Based on the analyses presented, we conclude that there is great dichotomy in the provision of physical learning environments in Jordan. The country has a large percentage of schools that are overcrowded, and an even larger percentage of schools with excess capacity. Although the number of crowded and underutilized schools has decreased over the last few years, the problem persists.

One strong recommendation of this report is for the MOE to identify the extremely overcrowded and underutilized schools and develop a scheme to attend to those schools' needs. Firstly, the MOE might have to resolve their infrastructural problems as well as their lack of computer and science facilities. Secondly, the government might have to develop a transportation strategy to move student from overcrowded to underutilized schools. Many schools may be so overcrowded that learning and teaching might be hampered by those conditions. At the same time, the MOE should continue to focus on providing teacher training and incentives for teachers in general, but specifically for teachers in underutilized rural schools. With the more narrowly defined criterion suggested in this report as well as tailored plans to meet the varied needs of these extreme cases, the MOE could address the challenge of crowding and underutilization in a cost-effective, comprehensive and sustainable manner.

In addition to the main conclusions presented above, this study attempted to investigate any correlation between area occupied by students, students' NAfKE scores and teachers' SCALT scores. We found that students in crowded or "normal" schools tend to have higher average NafKE scores than students in underutilized schools. Only in 11th grade, crowdedness might negatively affect students' scores in all three subjects. Despite these results, the current study found no statistically significant relationship between area allocated to students in a classroom unit and students' performance in NAfKE. As regards SCALT scores, there were inconsistent patterns in average SCALT scores across grades and subjects. Once again, there was no statistically significant correlation between area allocated to students and teachers' application of student-centered methodologies. These results put into question some assumptions that teachers might be more likely to apply SCALT and students are more likely to perform better in less crowded environments. In fact, the trend described above suggests that an inverse relationship might exist between progressive teaching and learning methodologies, students' scores, and area occupied by students.