GOVERNMENT OF DUBAI

هيئة المعرفة و التنمية البشرية
KNOWLEDGE & HUMAN DEVELOPMENT AUTHORITY

DUBAI
PISA 2009
Report

How Prepared are our Students for Life?

Dubai and the Programme for International Student Assessment (PISA) 2009

Analysis of Student Performance in
Dubai's First Participation in PISA

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GLOSSARY

Domain: The literacy skills needed are categorised by the OECD into three major domains: Reading, Mathematics and Science.

Interquartile range: The distance between the 25th and the 75th percentiles, or the range of the middle 50% of the data.

Literacy skills: The intended outcome in modern education systems, this describes students' capacity to extrapolate their knowledge to real-world settings.

OECD: The Organisation for Economic Cooperation and Development

OECD average: This is the average for all OECD countries, weighted by its number of 15-year-old students. It is not the simple arithmetic mean of OECD participants.

Percentile: In ranked data, the nth percentile is the score that has n% of the data below it. For example, the 75th percentile is the score below which 75% of the population lie.

PISA: Programme for International Student Assessment

PISA score: A figure representing a measurement of student literacy skills. It is comparable over time and accounts for question difficulty. Students with higher PISA scores can answer more difficult questions and are thus said to have higher skills.

Proficiency levels: A scale that maps PISA scores to well-defined skills in each domain. Level 3 is identified by the OECD as the minimum required to successfully function in today's knowledge economy while students at Level 5 or above are said to be high achievers. Descriptions of proficiency levels in each domain are listed in Appendix A3.

Readiness for life: The fundamental goal of PISA, students' ability to use knowledge and skills to meet real-life challenges is defined as their readiness for life. Questions in PISA are designed to capture the capacity to utilise skills in everyday life scenarios.

Scale average: To ensure historical comparability, scores are scaled to a fixed average of 500 for each domain. The scale average is linked to the OECD average Reading score in 2000, the Mathematics score in 2003 and the Science score in 2006.

Standard deviation: A measure representing variation within data, it is set to 100 in the same technique as the scale average.

Sub-domain: Each round of PISA emphasises one domain providing a finer breakdown of its building blocks, known as sub-domains. In Reading these are Access & Retrieval, Integration & Interpretation and Reflection & Evaluation. The Mathematics sub-domains are Replications, Connections and Reflections. The Science sub-domains are Identification, Explanation and Evidence Utilisation.

EXECUTIVE SUMMARY

THE PROGRAMME FOR INTERNATIONAL STUDENT ASSESSMENT (PISA)

Policymakers worldwide prioritise the development of human capital through the enhancement of a nation's education system. Dubai and the UAE have actively engaged in education reform to cultivate a competitive knowledge economy. To benchmark the quality of its education system and establish a baseline for reform measurement, Dubai has led the nation in participation in internationally comparable assessments.

Since the first round in 2000, the Programme for International Assessments (PISA) has grown to include 65 participants, covering nearly 90% of the global economy. All rounds include assessments of Reading, Mathematics and Science skills. PISA today stands as the key data instrument for policymakers and educators alike due to its assessment of literacy skills, defined as 15-year-old students' capacity to apply knowledge in a real-life context. This represents the end of compulsory schooling and therefore constitutes the best measurement of students' readiness for life.

There is a growing realisation that the success of any system depends on how well it enables students to use school-acquired knowledge in modern society. No longer is it sufficient to simply relay facts for students to memorise without adequately endowing them with skills for life. PISA assesses readiness for life by posing all questions in real-life scenarios to determine students' ability to effectively function in the knowledge economy.

TOP PERFORMERS

Students from Shanghai–China were found to have the highest skills in all three domains in the city's first participation in PISA. Other economies where students displayed strong proficiency were Korea, Finland and Singapore.

LITERACY SKILLS IN DUBAI

In Dubai, a representative sample of 5,620 students was selected. Students in Dubai displayed the highest skills amongst MENA participants, outperforming 15-year-olds in other MENA countries by at least 50 points in each domain. The Dubai average was 459, 453 and 466 points in Reading, Mathematics and Science respectively, falling below the OECD scaled average of 500.

GENDER DIFFERENTIALS

Gender patterns in Dubai and the region matched global trends in direction but greater differentials were found. Additional analysis located most of the gender variation amongst students at lower levels of achievement in Dubai.

Worldwide, females displayed higher Reading skills while the average gender differential was only 4 points in Science. In Mathematics the gap is reversed, with most countries witnessing higher skills amongst their males.

MENA participants in PISA had some of the world's largest gender differentials.

In Dubai on average, higher female skills in Reading and Science were found, but no significant difference in Mathematics.

Underperforming males in Dubai, in all skill domains, are concentrated in the bottom half of the distribution.

SCHOOL CURRICULUM

Though not the only explanatory variable, school curriculum was found to be strongly correlated to performance in Dubai.

Students attending IB schools had the highest average proficiency scores in Dubai, surpassing the OECD scaled average in all three domains. They were followed by students in private UK curriculum schools, while students at private Indian schools also displayed strong readiness for life with average scores slightly below the OECD scaled average.

15-year-olds in public schools had the lowest proficiency while those at private MoE schools had only marginally higher skills. The analysis finds variation is likely to be driven by differences in background, resources and student composition of schools as well as the curriculum.

READINESS FOR LIFE

The average student in Dubai is below the OECD-recommended minimum skill level 3 required to be adequately prepared for life in the knowledge economy. Significant variation, however, was found to exist within Dubai.

Across Dubai, level 2 proficiency was found to be the average, representing only direct reasoning and literal interpretation.

The curricula with the highest average scores are also those with the least variation between their students. These are also the curricula with the largest proportion of high achievers – at or above level 5 – suggesting a balanced approach to excellence and equity.

Over 5% of students in Indian schools and 10% of students in UK and IB schools were found to be high achievers, while at least half of those studying the MoE curriculum are at level 1 or below.

OTHER FACTORS

Gender, grade retention and school curriculum cannot explain all the variation in student performance. Family background and life circumstances were found to be strongly related to student skills.

55% of Emirati students, 35% of Arab students and 16% of Non-Arab students were found to have proficiency levels at level 1 or below. Less than 0.5% of Emiratis attained high Reading skills compared to 1.5% of Arab students and 9.4% of non-Arab expatriates.

The nationality differential was found to be correleted with differences in parents' education and, consequently, socioeconomic background. More parents of Emirati students were found to have not completed secondary school than their Arab or non-Arab counterparts.

Further research is ongoing to fully determine the effect of contextual factors, in the classroom and at home, driving variation in student performance.

FROM MEASUREMENT TO PROGRESS

The PISA profile in Dubai has identified that its 15-year-olds are better prepared to use their skills in life than their MENA counterparts but are below the OECD recommended minimum level. Today, policymakers in Dubai have filled the data void and, through PISA, Dubai completes its entry into the age of evidence-driven policymaking in education. Reliable comparisons can now be made to other educational systems and within Dubai itself. This enables Dubai to look towards localised implementation of international best practice on its pathway to achieving a first rate education system.

Section 1

Introduction

Summary Box 1

Only the enhancement of a nation's education system can develop the human capital required for the productive knowledge economy. Through internationally comparable assessments, Dubai can benchmark the quality of its education. This will establish a baseline for monitoring the impact of ongoing reforms and the development of measurable progress targets.

The improvement of the quality of educational services increasingly underpins government policies worldwide. The prosperity of resilient economies and societies now derives to a large extent from their stock of human capital. To succeed in a rapidly-changing world, individuals must aspire to the advancement of knowledge and skills throughout their lives. Education systems therefore serve a dual role: they must lay strong foundations to foster learning while strengthening the capacity and motivation of young adults to continue learning beyond school.

EDUCATION REFORM AND INTERNATIONAL BENCHMARKING

In Dubai and elsewhere in the United Arab Emirates (UAE), numerous projects are underway to reform the education system. Strategic guidelines from the Dubai Strategic Plan (DSP) 2015 to the UAE Federal Government Strategy 2011-2013 underscore the importance of education reform for the future of the country. Human capital development has been designated a key enabler for the nation's long-term strategies.

DSP 2015 and the UAE's Vision 2021 statements emphasise the importance of a country united in knowledge, aspiring to be a competitive economy driven by knowledgeable and innovative Emiratis. These statements further outline the government's desire for a diverse and flexible knowledge-based economy powered by skilled Emiratis. The role of education is further highlighted by an explicit federal target to achieve a first-rate education system. Vision 2021 identifies that access to quality education is critical for all Emiratis to "develop into well-rounded individuals, enhance their educational attainment and achieve their true potential, contributing positively to society".

As part of its commitment to the enhancement of human capital in Dubai, the Knowledge and Human Development Authority (KHDA) has embarked on the reform of Dubai's education system. Since its inception in 2007, KHDA has recognised the importance of evidence-based policymaking, using international benchmarking as a primary tool in the assessment of the quality of education in Dubai.

Qualitative appraisal is the first form of benchmarking applied. Every school in Dubai has been inspected annually between 2008 and 2011. The fourth year of inspection of private schools starts in 2011-12. The annual inspection program by the Dubai Schools Inspection Bureau (DSIB) identifies and reports schools' strengths and the areas for improvement against a standards framework that has been locally developed by a team of international and Emirati experts. The inspection reports encourage schools to adopt more rigorous self-evaluation strategies and publicise relative performance against agreed criteria. By providing valid quality indicators in a diverse environment comprised of over 13 different curricula offered in Dubai, inspections have proven successful in stimulating public debate around education. Their success is reflected in the ongoing improvements in performance noted in both public and private sector schools in Dubai[*].

Parents, students, educators, employers and the general public need robust information on the extent to which their education systems effectively prepare students for life. While national examinations gauge the internal consistency of an education system, they are an insufficient measure of preparedness because their main aim is to assess academic knowledge. Furthermore, Ministry of Education curriculum examinations are unable to measure the progress of education systems over time due to varying subject inclusions and difficulty levels, nor do they facilitate cross-country comparisons.

WHY PARTICIPATE IN PISA?

As the world develops toward knowledge-intensive forms of production, prosperity has become inextricably linked to the cultivation of a knowledge economy. This is one driven by skills and creative thinking. The Government of Dubai has prioritised the growth of a knowledge economy for Dubai's future. In order to achieve the local and federal governments' aim of developing national human capital, an essential task is to identify, understand and develop local implementation of international best practice in education.

Comparative international skill-based tests are designed to help countries evaluate their areas of relative strength and weakness. The aim of the tests extends beyond the ranking of education systems to define high quality education and determine the contextual factors in classes, schools and homes that influence education outcomes. By regularly monitoring progress, standardised tests of skill can also stimulate countries to raise aspirations. By informing national efforts to help students learn better, teachers teach better and schools run more effectively.

In 2007, Dubai took part in the Trends in International Mathematics and Science Study (TIMSS), an international education assessment undertaken by 57 countries. A cyclical test conducted once every four years by students in grades 4 and 8, TIMSS formed a foundation for international benchmarking in Dubai and indeed served to spark deeper interest and understanding of the interrelated nature of education systems. In its first participation in an international test, Dubai topped participants from the Gulf Cooperation Council (GCC) and the region at both grade levels. Though an impressive first showing, scores were not highly competitive on a global scale. This highlighted the need for education reform.

Since Dubai's initial participation in the study, TIMSS results and analysis have provided a critical point of reference and an informative tool for decision-making. Notable findings, such as the length of the academic year and the influence of curriculum on student performance, have informed recent policy deliberations that extended beyond Dubai to the UAE at large.

[*] Dubai Schools Inspection Bureau. Annual Report 2011.

In 2009, Dubai participated for the first time in the Programme for International Student Assessment (PISA) – a highly-regarded tool for policymakers and educators used in over 65 countries worldwide. The Assessment was launched in 1997 by the Organisation for Economic Cooperation and Development (OECD), and is characterised by a unique policy orientation and a pioneering view of educational outcomes. Its innovative definition of literacy focuses on students' capacity to extrapolate from what they have learned and apply their knowledge in novel settings. The regularity of testing and its emphasis on lifelong learning have confirmed PISA's status as the most comprehensive global assessment program. By participating in PISA 2009, Dubai joins countries that comprise close to 90% of the world economy, and can benefit from the lessons learnt elsewhere while synthesising the local knowledge most needed by educators. Using data on students, families and institutional factors, Dubai is now well positioned to understand and explain differences in educational outcomes.

Standardised tests such as PISA emphasise consistency and regularity in their design framework, with questions linked over consecutive assessments and a regular scaling method employed. In addition to its progressive view of educational outcomes, PISA's status as a quality measurement tool derives from the battery of survey questions administered alongside the test. Known as background questionnaires, the survey results provide a holistic view of the education experience of each student at school and in the home.

Because PISA attempts to provide cross-nationally comparable evidence on student performance, it is important for policymakers to understand the determinants of a quality education system. By surveying principals, students and parents, the PISA background questionnaires connect data on student learning outcomes, student characteristics and the key factors shaping their learning inside and outside school. By using PISA alongside school inspections, education stakeholders in Dubai can gain a holistic view of the quality of education in Dubai.

Section 2

The Implementation of PISA

Summary Box 2

Since the first round in 2000, the number of participants in PISA has grown to 65, covering nearly 90% of the global economy. All rounds include assessments of Reading, Mathematics and Science skills with each cycle placing greater emphasis on one of the three domains. In Dubai, a representative sample of 5620 students was selected using advanced statistical methodologies. PISA today stands as the key data instrument for policymakers and educators alike due to its unique approach. PISA assesses literacy skills, defined as 15-year-old students' capacity to apply knowledge in a real-life context. This represents the end of compulsory schooling and therefore constitutes the best measurement of students' readiness for life.

WHAT DOES PISA TEST?

Designed in 1997, the initial framework called for a three-yearly assessment of Reading, Mathematics and Science. Each round of testing emphasises one of those domains through an expanded assessment of sub-domains. The first PISA survey, conducted in 2000, tested Reading. The survey revealed substantial variation in countries' success in enabling young adults to access, manage, integrate, evaluate and reflect on written information. PISA 2000 highlighted significant differentials in the performance of schools and raised concerns about equity in the distribution of learning opportunities. However, PISA 2000 also demonstrated that some countries were successful in achieving high and equitable learning outcomes. In many countries, the findings sparked unprecedented research and policy debate about which factors drive enhanced educational performance.

The PISA 2003 assessment focused on Mathematical competencies and, following the 2006 testing of Science, the first detailed assessment cycle of all domains was complete. Countries which participated in the first round of testing in 2000 will have a unique opportunity to measure their progress in Reading over nine years when the testing cycle returns to the initial domain. In 2009, Reading literacy was further split into three sub-domains for which distinct results can be reported:

- Accessing and retrieving information from texts

- Integrating and interpreting relationships within and between texts

- Reflecting and evaluating the stated and implied purposes of texts

In the Reading domain, PISA assesses the degree to which students can understand and interpret various types of written material that they are likely to encounter as they negotiate their daily lives. Mathematical capabilities are tested using numerical and spatial problems. Finally, Scientific skills are judged by students' capacity to understand, interpret and resolve various kinds of scientific situations and challenges. Specifically, the 2009 PISA assessment defined the three literacy domains as follows:

FIGURE 1: THE PISA APPROACH TO LITERACY

READING LITERACY
An individual's capacity to understand, use, reflect on and engage with written texts, in order to achieve one's goals, to develop one's knowledge and potential.

MATHEMATICAL LITERACY
An individual's capacity to identify and understand the role that Mathematics plays in the world to make well-founded judgements with Mathematics in ways that meet the needs of that individual's life as a constructive, concerned and reflective citizen.

SCIENTIFIC LITERACY
An individual's scientific knowledge and use of that knowledge to identify questions, to acquire new knowledge, to explain scientific phenomena, to draw evidence-based conclusions about science-related issues and our environment and a willingness to engage in science-related issues as a reflective citizen.

As described, PISA's concept of literacy is much broader than the traditional definition of the ability to read and write. Furthermore, literacy is measured on a continuum, not as a skill an individual can possess or lack. While it may be necessary or desirable to define a competency benchmark on the literacy scale, the underlying continuum retains significance.

This concept is driven by the view that the acquisition of literacy is a lifelong process which occurs not just at school or through formal learning, but also through interactions with family, peers, colleagues and wider communities. Fifteen-year olds cannot be expected to have learned everything they will need to know as adults, but they should have developed a solid foundation of skills in areas such as Reading, Mathematics and Science. In order to continue learning in these subject areas and to apply their learning to the real world, students also need to understand fundamental processes and principles as well as their flexible application.

Accordingly, PISA measures the ability to complete tasks relating to real life which depends on a broad understanding of key concepts, rather than limiting the assessment to the understanding of subject-specific knowledge. Tests are a mixture of multiple-choice questions and construct responses, with an emphasis on an understanding of concepts, mastery of processes and the ability to function in various situations within each domain.

WHO TOOK PART IN PISA?

While the composition of PISA participants mirrors that of TIMSS, there are crucial distinctions in PISA that have led to its status as one of the primary decision-making tools in education. One such distinction is its targeted cohort of students who have reached 15 years of age. In the majority of countries around the world, this age signals the end of compulsory schooling and, therefore, represents an ideal measurement point to determine the efficacy of an education system.

PISA focuses on a functional definition of literacy which assesses how 15-year-olds apply knowledge in everyday tasks and challenges. As this cohort becomes eligible to make decisions about whether to continue education or enter the labour market, the information revealed is invaluable. Typically, at least 4,500 students from a minimum of 150 schools are tested in each country, providing a strong sample from which results can be analysed according to student characteristics.

The target population for PISA is students aged between 15 years 3 months and 16 years 2 months, at the time of the assessment, who have completed at least six years of formal schooling. Students in public or private schools, pursuing academic or vocational programmes on a part- or full-time basis, are all considered part of the sampling frame.

Initially conceived to measure the quality of education in OECD countries, the number of partner economies participating alongside the 30 members has consistently grown since the first round of testing. In 2009, 65 economies around the world participated in the most recent round of PISA with the test administered to between 4,500 and 40,000 students in each country/economy. Table 1 presents a list of those participants.

TABLE 1: PROGRAMME FOR INTERNATIONAL STUDENT ASSESSMENT 2009

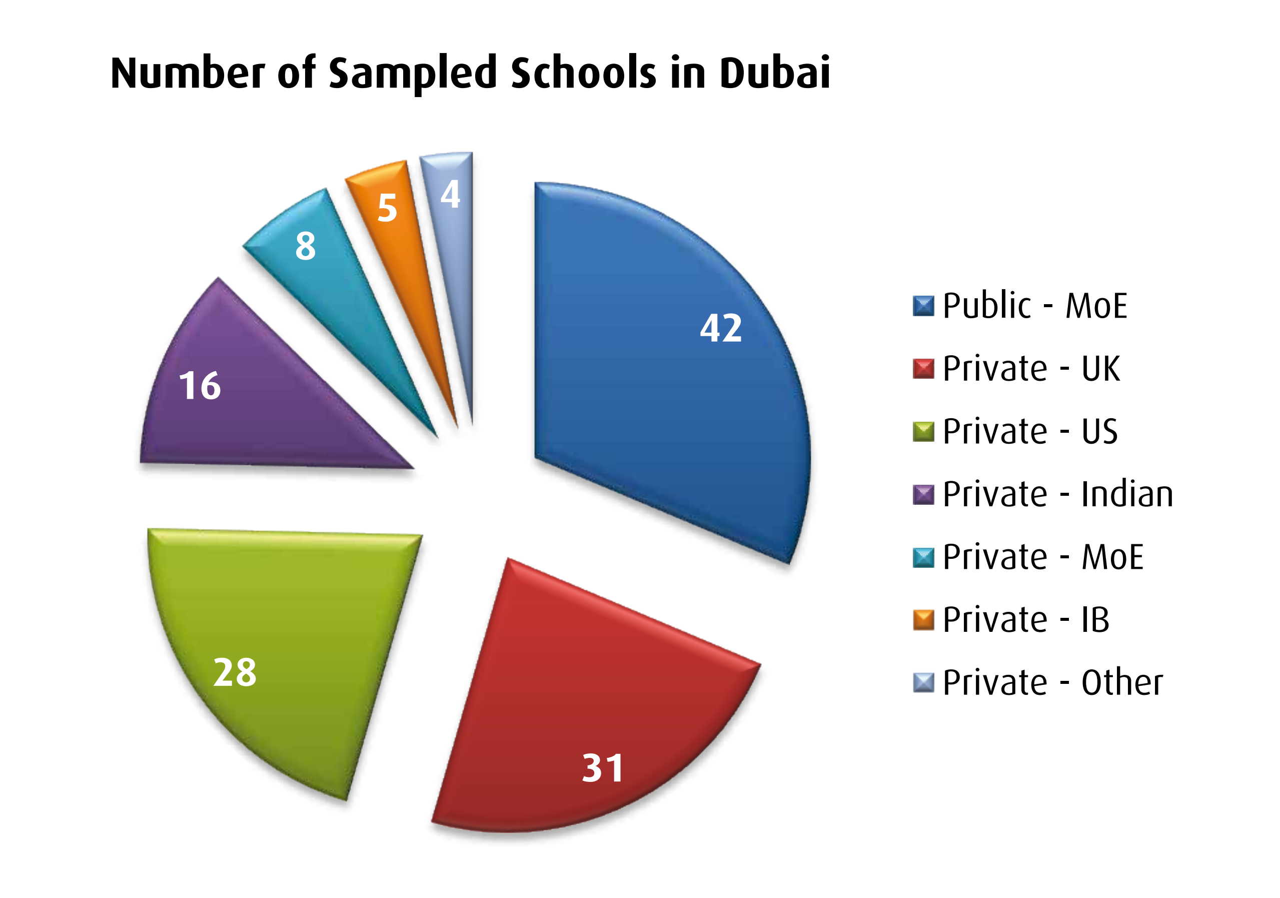
Albania*	Argentina*	Australia
Austria	Azerbaijan*	Belgium
Brazil*	Bulgaria*	Canada
Chile	Colombia*	Croatia*
Czech Republic	Denmark	**Dubai (UAE)***
Estonia*	Finland	France
Germany	Greece	Hong Kong-China*
Hungary	Iceland	Indonesia
Ireland	United Kingdom	Italy
Japan	Jordan*	Kazakhstan*
Korea	Kyrgyz republic*	Liechtenstein*
Lithuania*	Luxembourg	Latvia*
Macao-China*	Mexico	Republic of Montenegro*
The Netherlands	New Zealand	Norway
Panama*	Peru*	Poland
Portugal	Qatar*	Romania
Russian Federation	Republic of Serbia*	Shanghai (China)*
Singapore*	Slovak Republic	Slovenia
Spain	Sweden	Switzerland
Chinese Taipei*	Thailand*	Trinidad and Tobago*
Tunisia*	Turkey	
Uruguay*	United States	

***Non-OECD member countries/economy** **Regional comparators**

The comprehensive range of countries and cities participating in PISA today comprises close to 90% of the global economy. The PISA assessments include tasks from more than 40 countries to ensure cross-national and cross-cultural validity. Co-ordinated through the OECD, the project gives rise to informative national, regional and international analyses and reports with in-depth country peer reviews to guide education policy development.

Dubai's first participation in PISA encompassed a broad and representative portion of the student population at age 15 with 5,620 students assessed. Figure 2 provides a breakdown of the number of schools sampled within each of Dubai's diverse curricula:

FIGURE 2: PISA 2009 PARTICIPANTS IN DUBAI BY CURRICULUM



Students were selected using an advanced statistical technique, designed by the OECD, known as stratified random sampling. The standardised approach was used in a similar fashion in all participating economies. Thus while some categories above may comprise only a few schools, this is representative of their rare presence in the total population of schools in Dubai.

As an age-based form of assessment, PISA will include students from different grade levels. In the presence of multiple curricula in Dubai with varying school commencement ages, 15-year-olds are likely to be enrolled in different grades across Dubai. Approximately 57% of 15-year-old students who participated in PISA were in Grade 10. 23% of students of the same age were enrolled in Grade 11, while nearly 1 in 5 students were in Grade 9 or below at age 15. It is noteworthy that the worldwide grade distribution is by no means uniform with 26 participants reporting Grade 9 as the modal grade of 15-year-olds. In the United Kingdom on the other hand, nearly all students are enrolled in Grade/Year 11 by the age of 15.

Section 3

Benchmarking Literacy in Dubai

Summary Box 3

Students from Shanghai–China were found to have the highest skills in all three domains in the city's first participation in PISA. Other economies where students displayed strong proficiency were Korea, Finland and Singapore. Students in Dubai displayed the highest skills amongst MENA participants, outperforming 15-year-olds in other MENA countries by at least 50 points in each domain. The Dubai average lagged behind the OECD scaled average of 500 by 41, 47 and 34 points in Reading, Mathematics and Science, respectively.

The drive to achieve excellence or apply best practice is manifest throughout the UAE in fields extending beyond education. However, in order to understand the local implications of best practice, countries must have analogous grounds for comparison. International benchmarks and performance indicators such as PISA, coupled with comparative policy research, enable education systems to quantify their objectives and the methods required to achieve them.

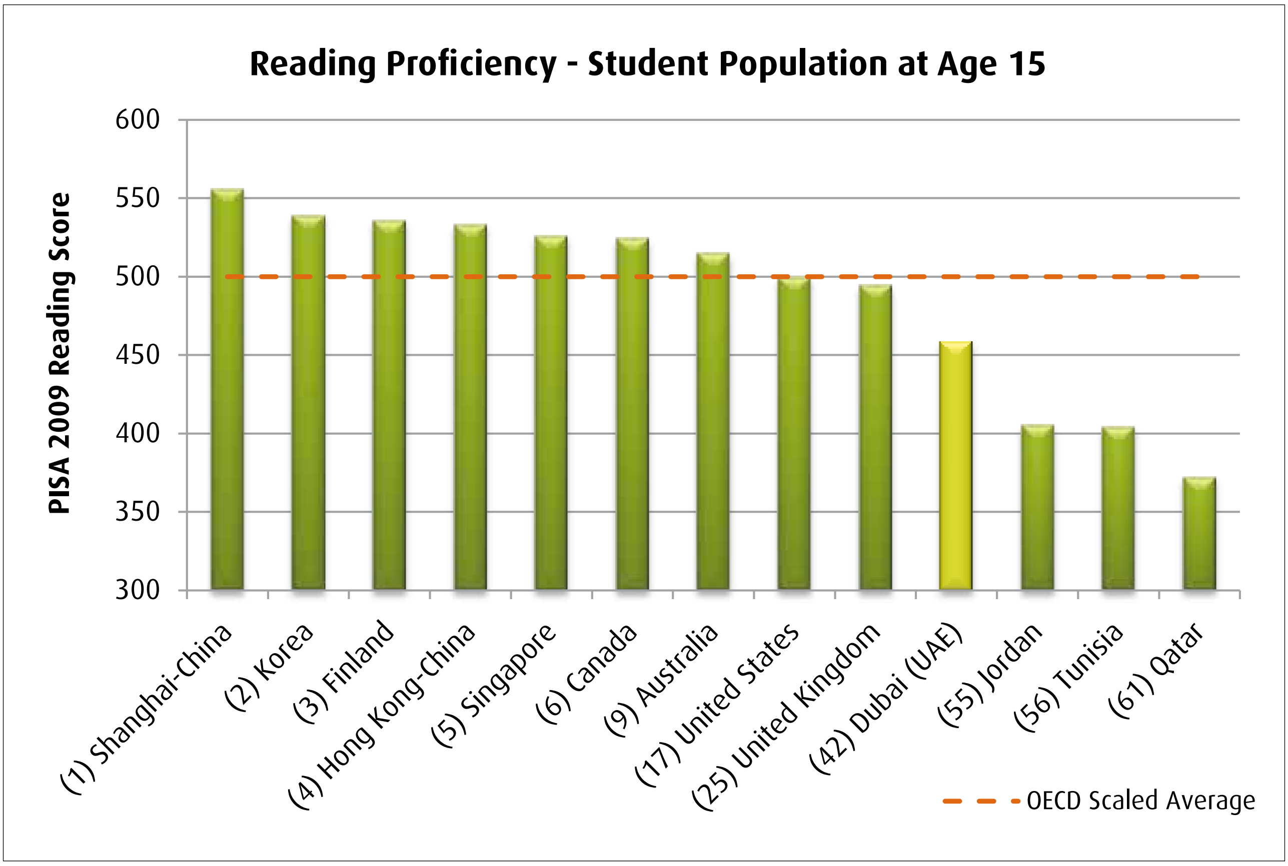
READING PROFICIENCY

Reading was the first skill domain tested in the inaugural PISA survey in 2000 and assessed students' capacity to understand, use, reflect on and engage with written texts. The assessment provides countries with a baseline to gauge the effects of reforms over the last decade on the Reading proficiency of their 15-year-old students. Reading, consistent with other domains and sub-domains assessed in PISA, was scaled to have an average of 500 across OECD countries and a standard deviation of 100. At least 95% of student proficiency scores are thus expected to lie between 300 and 700.

The top five ranking economies in Reading in 2009 were Shanghai-China (556), Korea (539), Finland (536), Hong Kong-China (533) and Singapore (526). The comparison between the average Reading scores for the Middle East and North Africa (MENA) countries and the high achieving countries is shown in Figure 3.

Of the 65 participants, Dubai was ranked 42nd for Reading proficiency, with a mean score of 459, leading fellow MENA participants Jordan, Tunisia and Qatar in its students' first attempt at PISA. Dubai in fact ranked below Turkey at 464, but the difference is not statistically significant. The performance in Reading of all MENA countries was lower than the OECD scaled average of 500. While Dubai lagged the international average by one-half of a standard deviation, all other MENA participants were approximately one full standard deviation or more below 500.

FIGURE 3: A GLOBAL COMPARISON OF READING SKILLS - PISA 2009

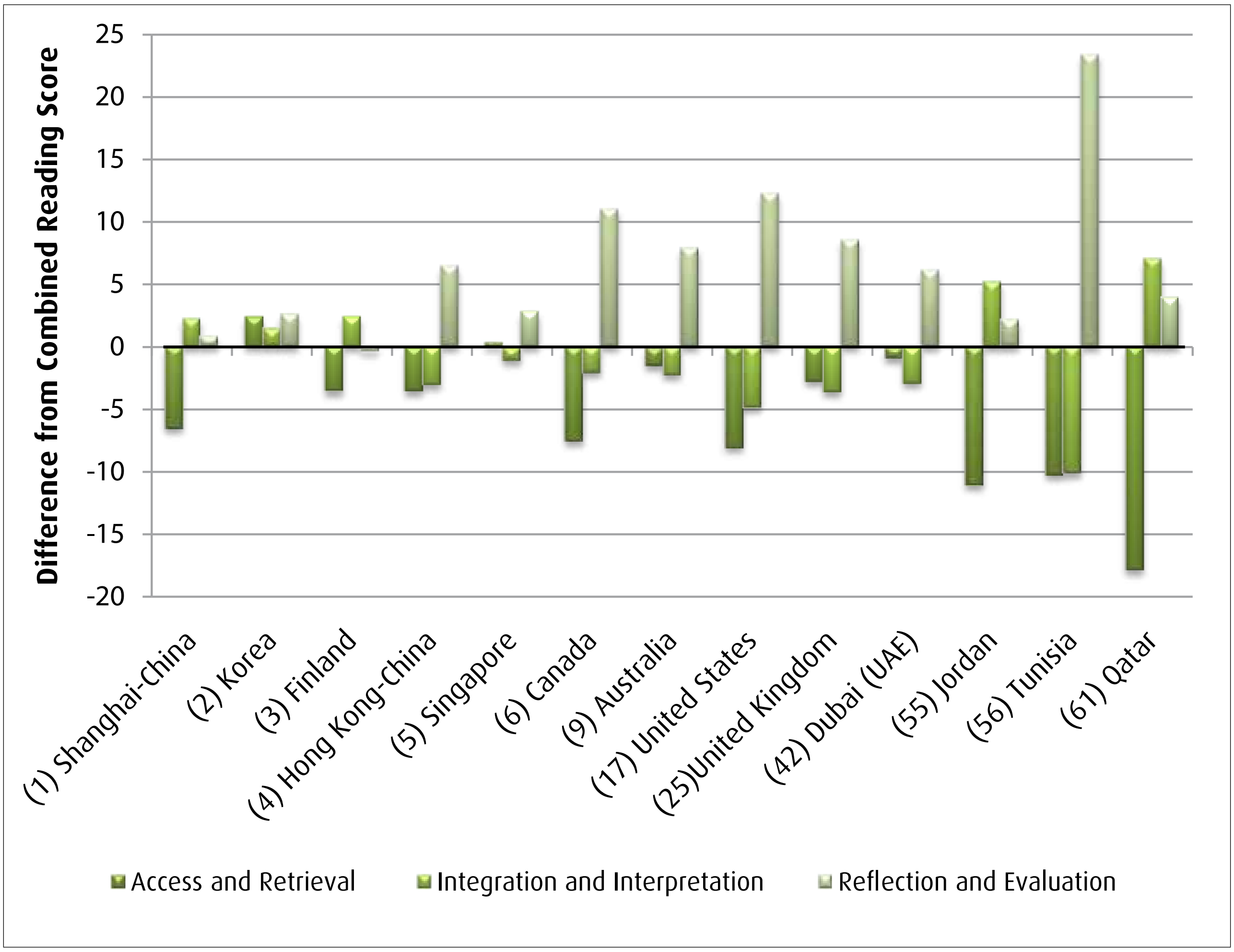


Note: Participants' world ranking by overall Reading score shown in parenthesis.

In every PISA round, students are asked proportionally more questions from the main assessment area to discern the skill-sets in the domain. In Reading, the sub-domains gauge the extent to which young adults access, manage, integrate, evaluate and reflect on written information. Analysis of students' scores on the sub-domains reveals contrasting trends throughout the world.

In the United States, for example, students displayed stronger proficiency in reflection and evaluation but significantly weaker ability to access and retrieve information from texts. Variation between sub-domains was still found in the highest achieving systems albeit in smaller magnitudes. Students in Dubai performed best in the 'reflection and evaluation' subscale while the weakest domain was 'integration and interpretation.' All MENA participants underperformed in accessing information relative to their respective mean Reading performance. Students in Qatar, for example, scored 17 points lower in access and retrieval compared to their overall Reading score. In comparison to other countries, however, the scores of Dubai for all three subscales were relatively close to the combined score, suggesting that there are no particular areas of divergent Reading proficiency.

FIGURE 4: A BREAKDOWN OF READING LITERACY INTO SKILL SUB-DOMAINS - PISA 2009



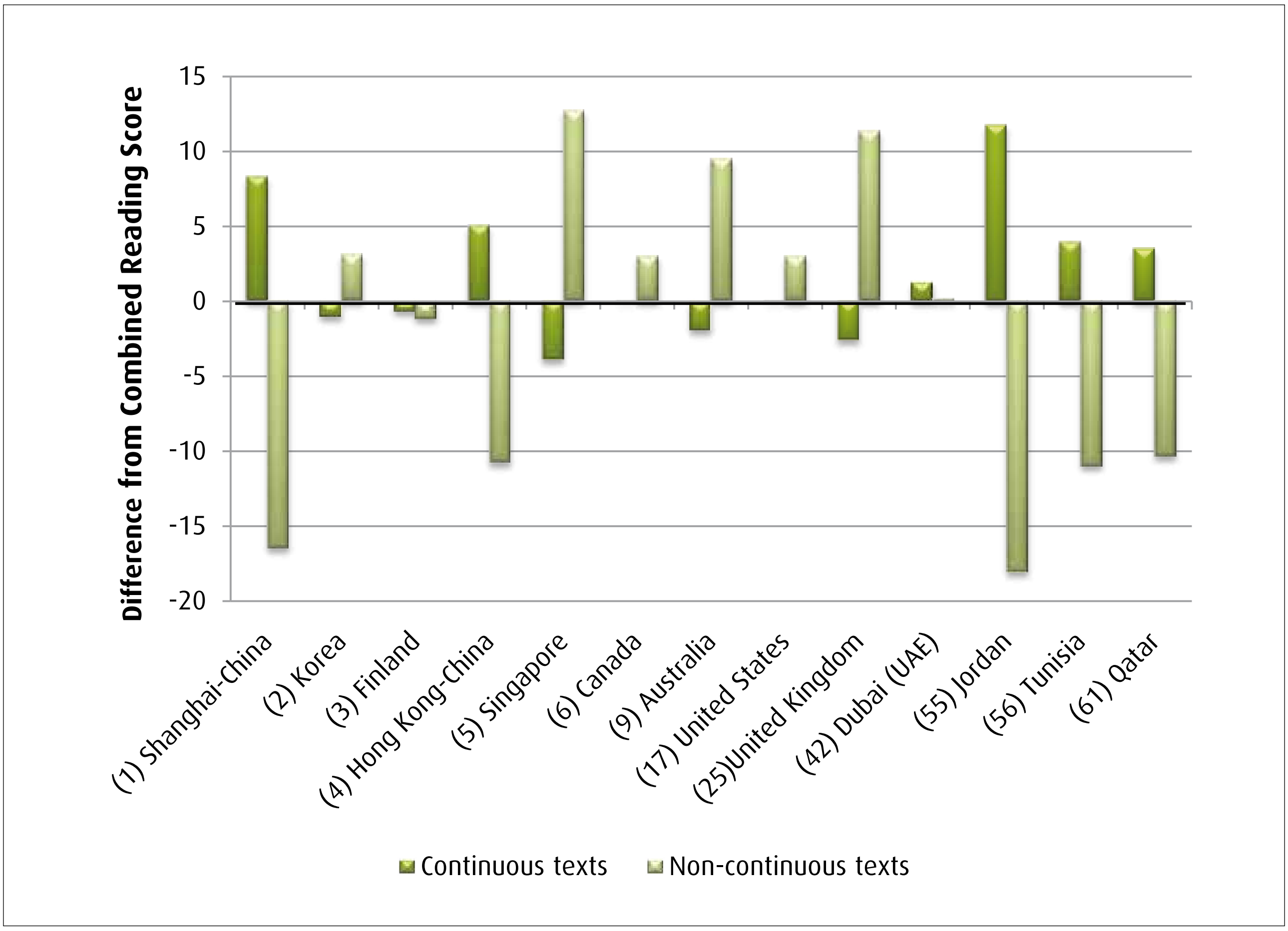
Note: Figure represents the difference between participants' combined Reading score and that on each sub-domain. Columns above the horizontal line at 0 indicate the sub-domain score is higher than the combined Reading score. Participants' world ranking by combined Reading score shown in parenthesis.

In line with a change in the nature of texts and new communication technologies, Reading literacy was further categorised by the OECD into either continuous or non-continuous texts. The former represented traditional reading forms with clear signalling of paragraph structures, such as in articles or book excerpts, while the latter represented a broader definition of texts including lists, advertisements, indices and instruction manuals.

Figure 5 indicates that the performance of students in Dubai in both the continuous and non-continuous texts was almost identical to its overall Reading performance. This is in contrast to Jordan, which among all countries had the largest differences between these two subscales and their overall performance. The world leader in Reading proficiency, Shanghai, noticeably displayed a large differential between the two textual forms, suggesting its students have greater capacity to utilise continuous texts over non-continuous texts.

The reverse is suggested in Singapore students' continuous text proficiency 15 points below their ability to process non-continuous texts. Dubai appears to match the OECD average in this category, with no substantial variation on average between students' proficiency in reading continuous or non-continuous texts.

FIGURE 5: READING LITERACY SKILLS AS A COMBINATION OF CONTINUOUS AND NON-CONTINUOUS TEXTS

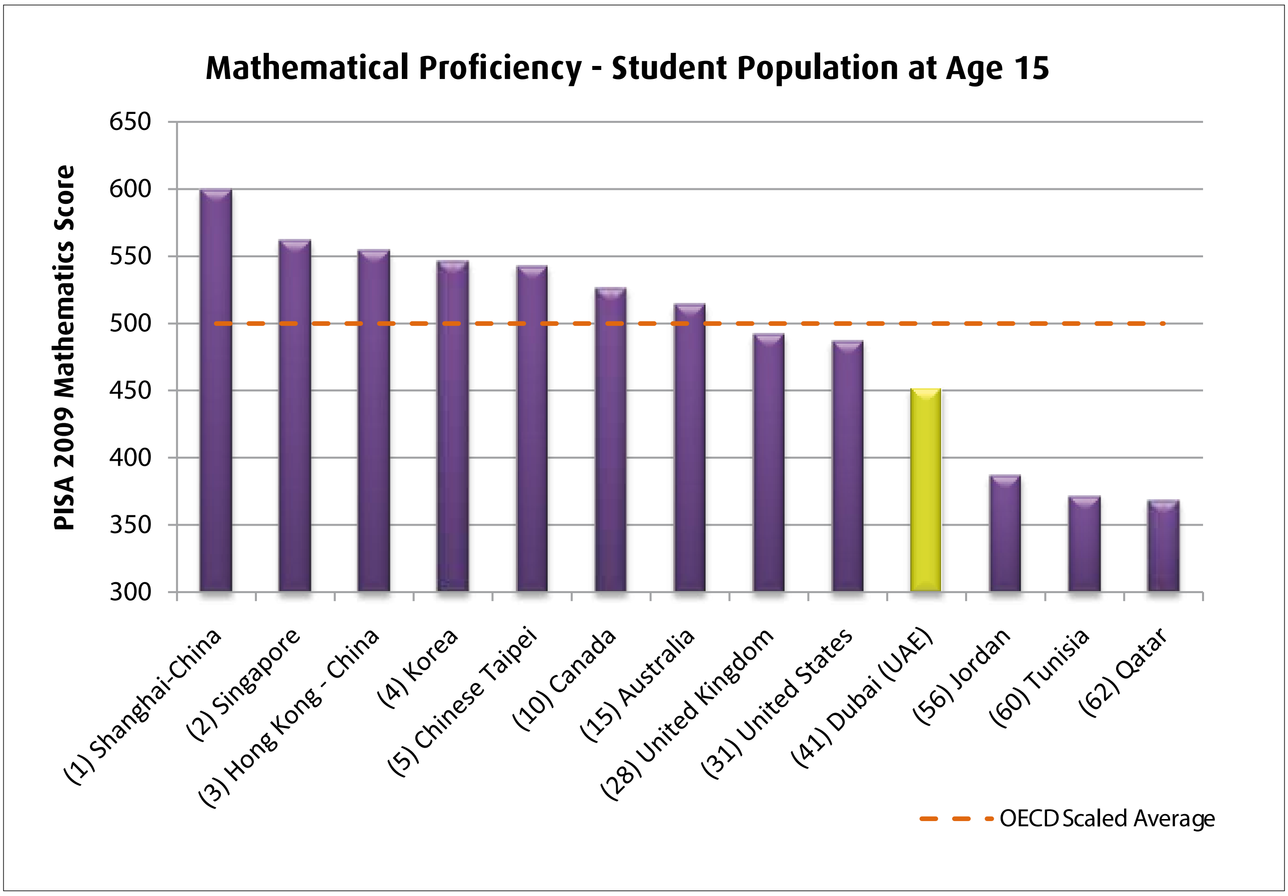


Note: Figure represents variation in reading proficiency by text type. Columns above the horizontal line at 0 indicate the score on particular types of texts is higher than the combined reading score. Participants' world ranking by combined Reading score shown in parenthesis.

MATHEMATICAL PROFICIENCY

Relative to other participants in PISA 2009, Dubai performed better in Mathematics, moving up one position to 41st among the 65. Dubai's score of 453 in Mathematics led the entire region, 66 points above students in Jordan and over 80 points higher than those in Qatar and Tunisia. MENA participants again fell short of the scaled OECD average of 500.

FIGURE 6: A GLOBAL COMPARISON OF MATHEMATICAL SKILLS - PISA 2009



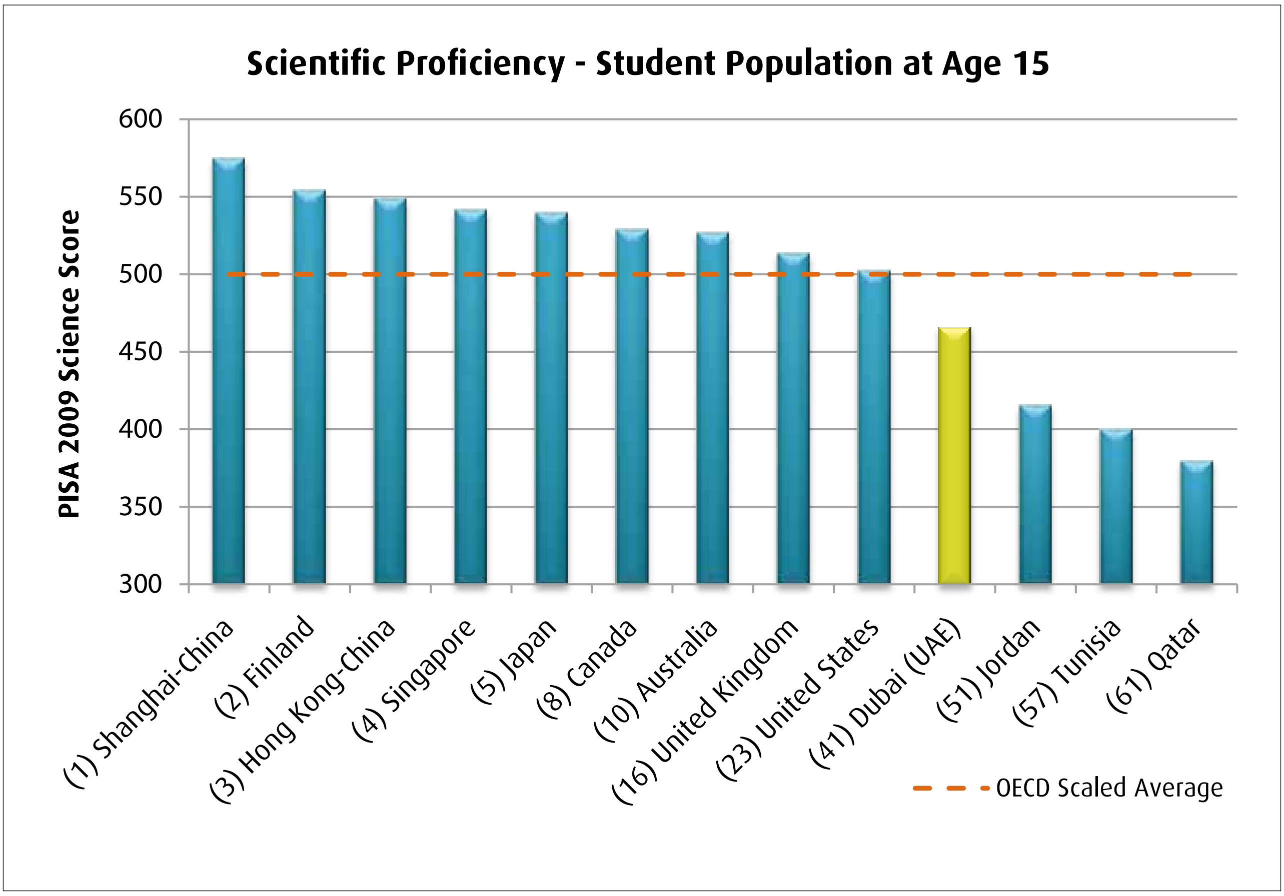
Note: Participants' world ranking by overall Mathematics score shown in parenthesis.

The potential for substantial improvement in short periods was highlighted by Mexico, showing a rise of 33 points - the biggest improvement in mathematical proficiency across all countries that had participated in PISA 2003. Short-term improvement was also noted in Qatar with a 50-point increase from what was the second lowest score in 2006, while Tunisia recorded a 13-point increase over two PISA cycles. Countries which witnessed an average decline in excess of 10 points in this domain since the last cycle focusing on Mathematics include Australia, Denmark and Sweden.

SCIENTIFIC PROFICIENCY

Of the three literacy domains, Science is the area where Dubai students at age 15 appear closest to international trends. Dubai's scientific proficiency score of 466 was marginally lower than the average of all country scores in 2009 at 471. It is the closest of the three domains to the OECD scaled average – 33 points below the long-term target set by most developing education systems.

FIGURE 7: A GLOBAL COMPARISON OF SCIENCE SKILLS - PISA 2009



Note: Participants' world ranking by overall Science score shown in parenthesis.

The differential between MENA participants is smallest in scientific proficiency with 51 points separating Jordan from Dubai compared to at least 60 in Reading and Mathematics. Scientific skills amongst students in Qatar were further identified to be higher than those found for the other two skill domains.

More countries exhibited increases than decreases compared to 2006, but no statistically significant difference was found in some countries such as Jordan. Substantial progress was identified for Qatar with a mean score 30 points higher than that attained three years prior, while Tunisia improved by 15 points. These changes, though impressive for their respective education systems, are not likely to be repeated in similar magnitudes in future cycles as the two nations had occupied two of the lowest four ranks in 2006.


Prewriting
Publishing
The Writing Process
Prewriting:
Drafting:
Revising:
Editing:
Evaluating:
Publishing:
Drafting
Evaluating
Revising
Editing

Section 4

Gender Differentials in Dubai

Summary Box 4

Worldwide, females displayed higher Reading skills while the average gender differential was only 4 points in Science. In Mathematics the gap is reversed, with most countries witnessing higher skills amongst their males. Interestingly, MENA participants in PISA had some of the world's largest gender differentials in skills. Analysis of Dubai's results reveals higher female skills in Reading and Science, but no significant difference in Mathematics on average. Investigating the location of the gender gap finds underperforming males, in all skill domains, are concentrated in the bottom half of the distribution.

Variations in academic progression and attainment between males and females have recently received increased attention in Dubai. Amongst Dubai's population that has recently completed their schooling, females are now more likely to have completed further education than their male counterparts. One reason for this is an increased tendency amongst males to leave school prior to successful completion or graduation.

Indeed, the dropout rate among Emirati males in particular is at least three times that observed for females[*]. In the UAE, students meet minimum schooling requirements at the age of 15 and are thus permitted to voluntarily exit schooling. In its assessment of students who have reached 15 years of age, PISA can provide an accurate depiction of student skills at the closest point to potential departure from formal education. The analysis of gender differentials reveals that, on average, males of all nationalities in Dubai fall behind females in two skill domains but a positive finding emerges from a third domain.

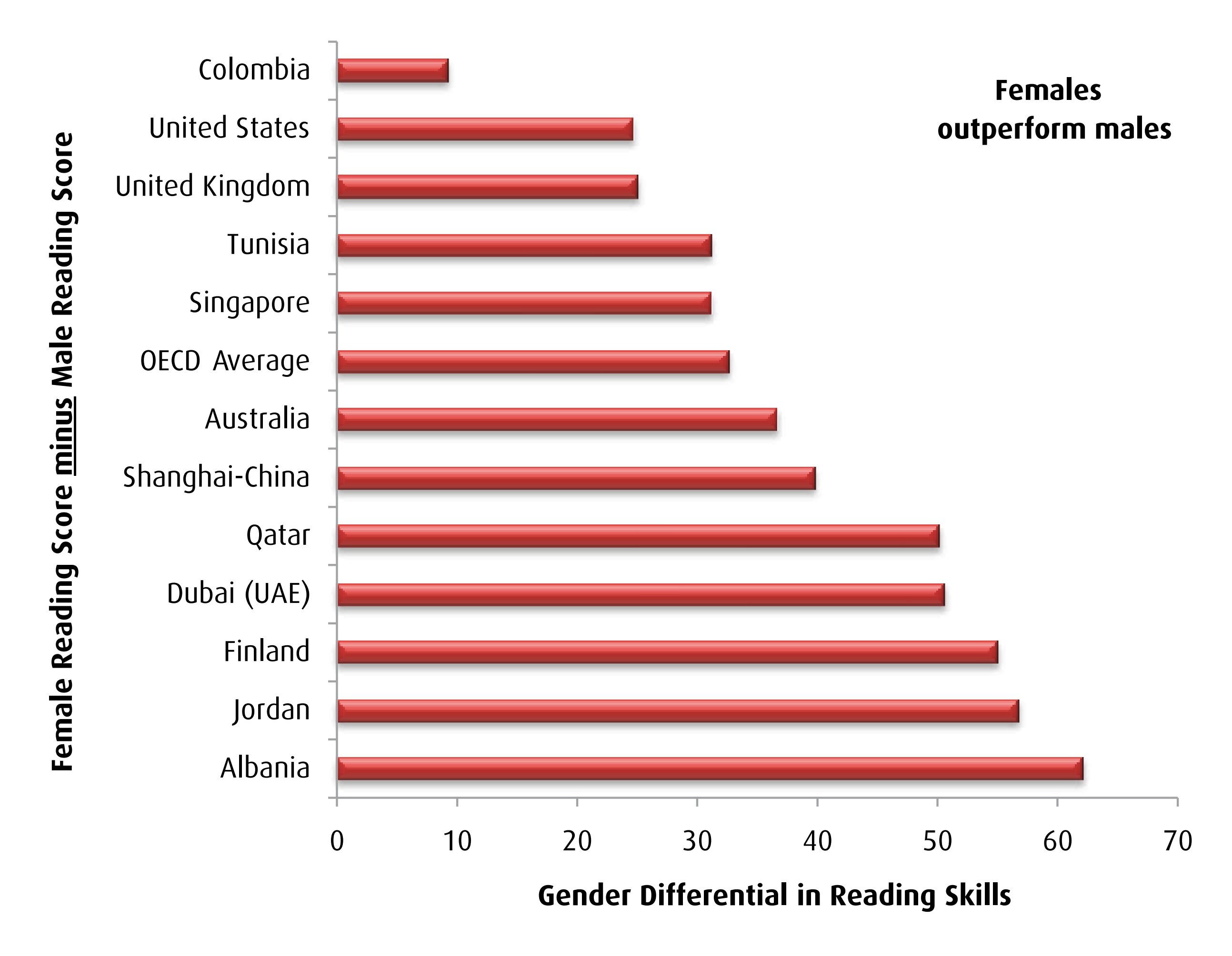
VARIATION ACROSS DOMAINS

Analysis of the 2009 PISA round reveals interesting phenomena relating to the reading skills of males and females. In every participating country, a statistically significant gender differential in favour of females was identified; 15-year-old females in each of the countries or states that undertook PISA outperformed their male counterparts in Reading proficiency. The differential ranged from 9 points in Colombia to nearly two-thirds of a standard deviation, or 66 points, in Bulgaria and Albania.

The gender differential in Reading is high in Dubai, with analysis identifying that Dubai had the 11th highest disparity between males and females. The gender differentials in Dubai and a number of education systems are presented in Figure 8 below. Females outperformed in Reading by 39 points on average across OECD countries, while this differential is significantly higher at 51 points in Dubai. Female Reading proficiency within each MENA participant in PISA 2009 exceeds that of males by half a standard deviation – a substantial divide separating the genders.

[*] UAE Ministry of Education Strategy 2010-2020

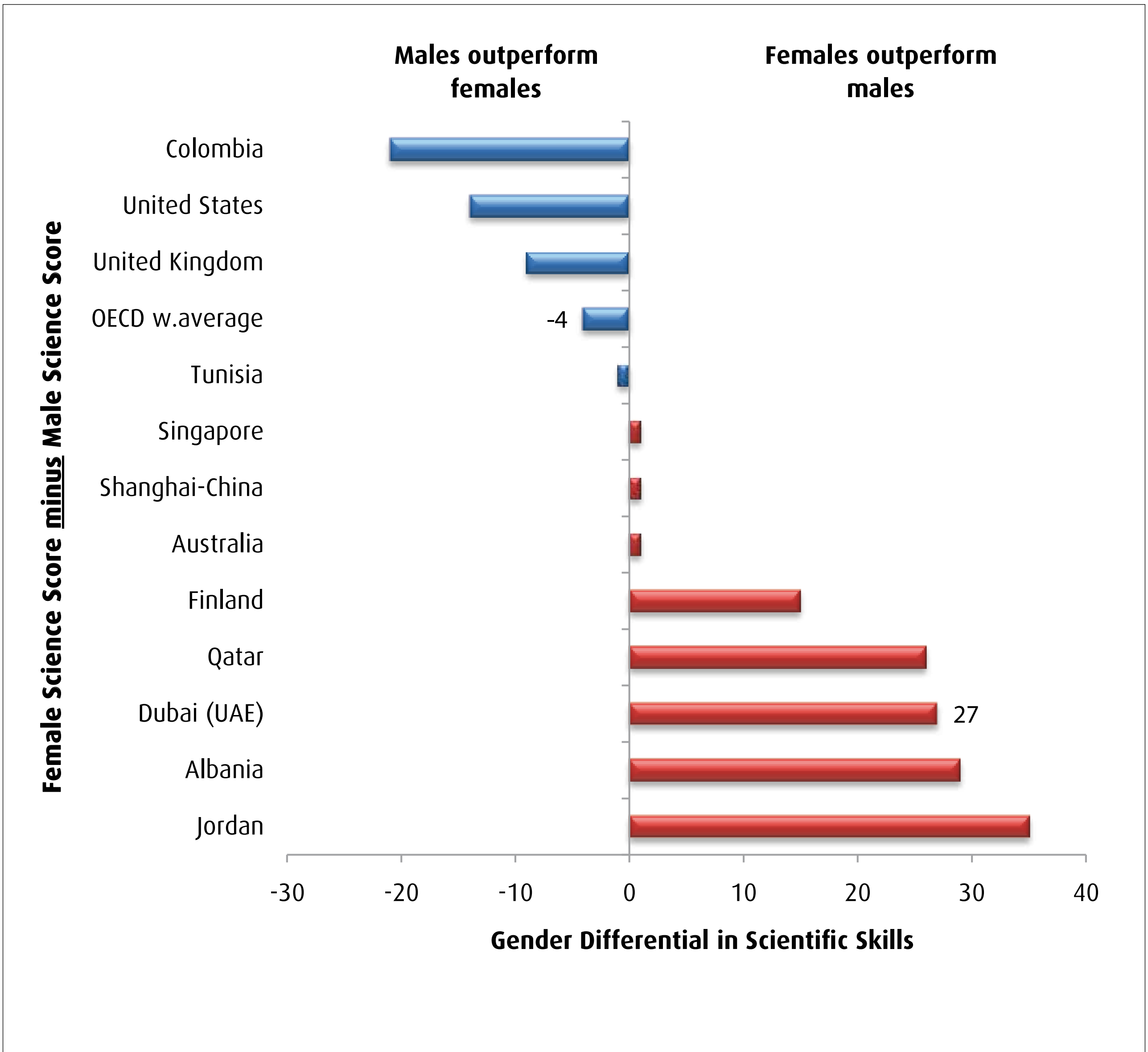
FIGURE 8: A UNIFIED GLOBAL PHENOMENON - FEMALES OUTPERFORMING IN READING



The universal gender divide identified in the Reading domain is not observed in Science. Indeed, the experience around the world ranges from males in Colombia outperforming females by 21 proficiency points to a female advantage in excess of 30 points in Jordan.

It is noteworthy that MENA countries occupied three of the four highest gender differentials in Science performance. Following Jordan in first place, Dubai had the third highest disparity between genders with females outperforming males by 27 points on average. This suggests that Dubai's comparatively better Science position is likely to be driven by higher performance amongst females. Indeed, further analysis found females in Dubai were ranked 39th in the world while males were three places behind in 42nd.

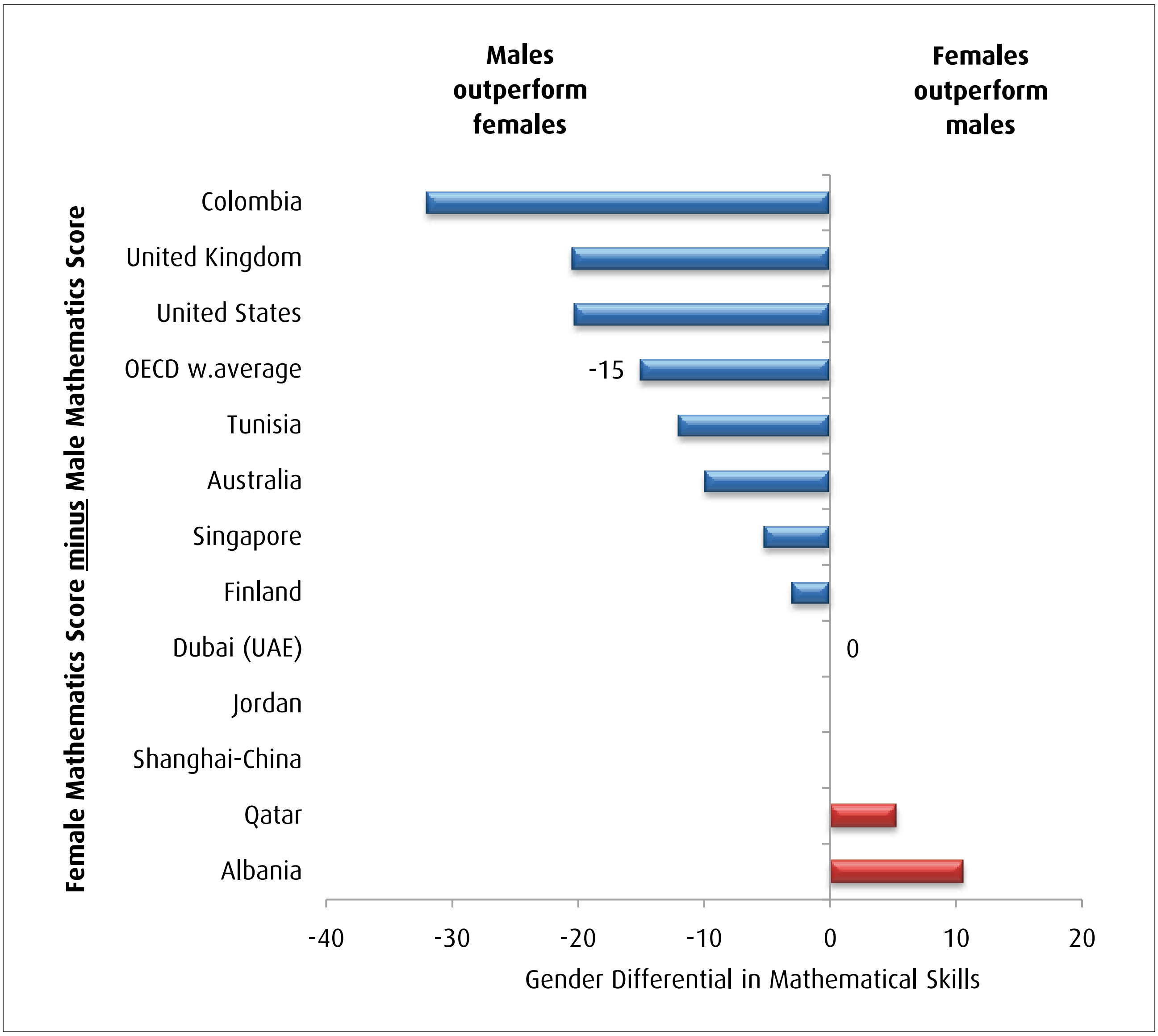
FIGURE 9: COUNTRY-SPECIFIC CHARACTERISTICS IN SCIENCE GENDER VARIATION



An area that will attract heightened interest from policymakers and educators alike is the performance differential in mathematics. Contrary to the international findings for Reading, males appear to have significantly higher mathematical skills than similarly aged females. In the United Kingdom and the United States, for example, males outperformed females in Mathematics by an average of 20 points. The OECD average differential was found to be 15 points in favour of males.

While the gap significantly shrinks in the Middle East, amongst MENA countries females only outperform males in Mathematics in Qatar. Both Jordan and Dubai display similar phenomena as the world leaders, Korea and Shanghai, with no statistically-significant difference between the genders overall in Mathematics.

FIGURE 10: THE REVERSE – MALES OUTPERFORMING IN NEARLY ALL COUNTRIES IN MATHEMATICS

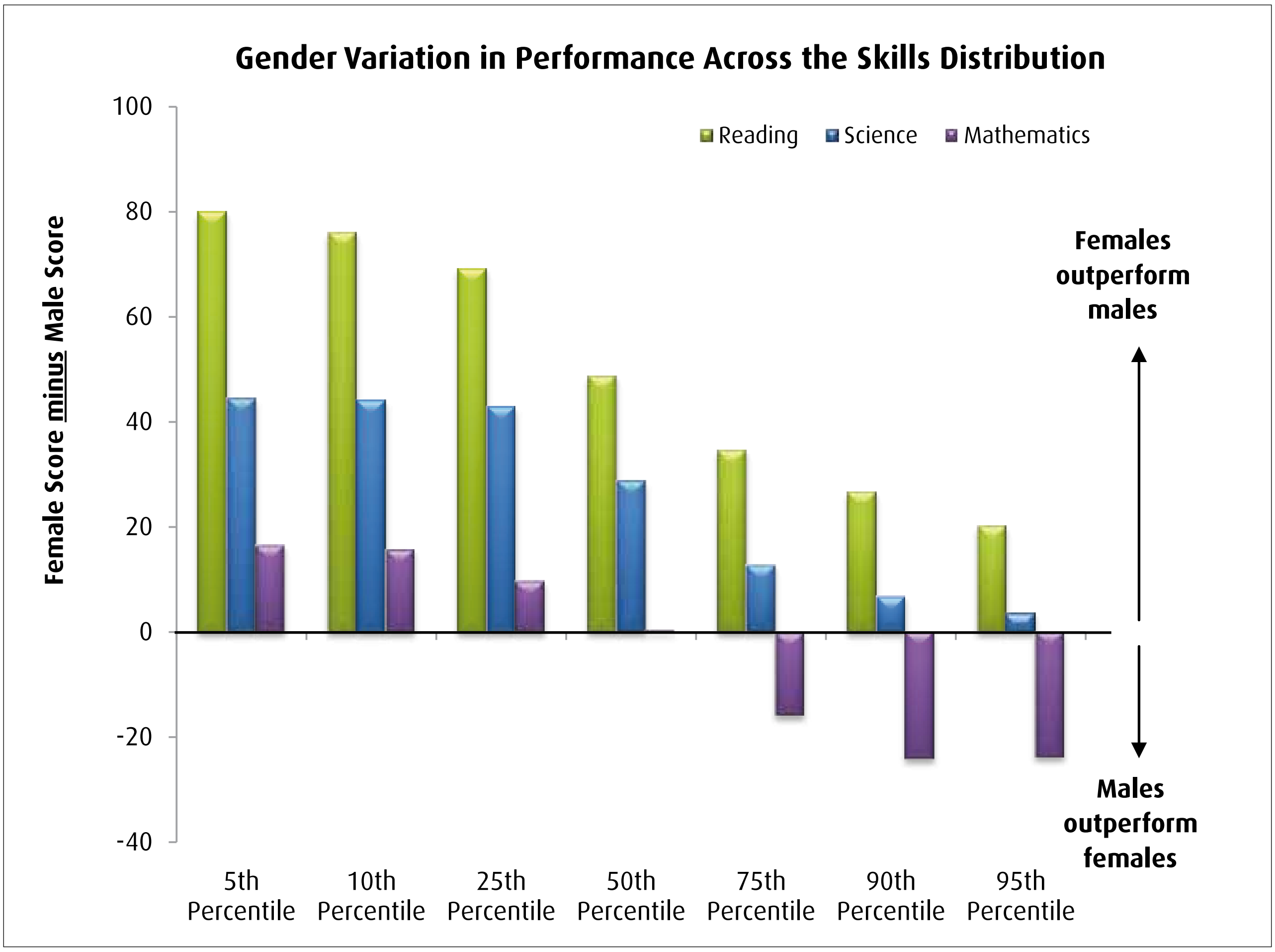


LOCATING THE GENDER GAP

Figure 11 will be useful to decision-makers aiming to reduce the gender divide. It represents the gender gap at various points of the proficiency distribution. A wider gap was found to exist at the lower end of the proficiency scale. Had the differential between males and females been constant across all levels of skill proficiency, one would expect to witness horizontal bars rather than the declining steps exhibited here. It indicates that the biggest disadvantage faced by males in all skill domains lies in the bottom half of the distribution. In other words, amongst low achieving students, males have lower proficiency levels than females. Females still display higher skills in the upper percentiles of Reading and Science, but this is less than half the margin seen at the lower end.

In Dubai, females outperform males in the bottom half of the Mathematics score distribution, that is, below the median score. Though the margin is not as pronounced as that found in Reading and Science, females are still 5 to 17 points higher in the lower half of the skills continuum. At the midpoint of the data, this trend neutralises to an almost identical score between males and females. From there on, males significantly outperform females by as much as 22 points amongst the top 10% of students.

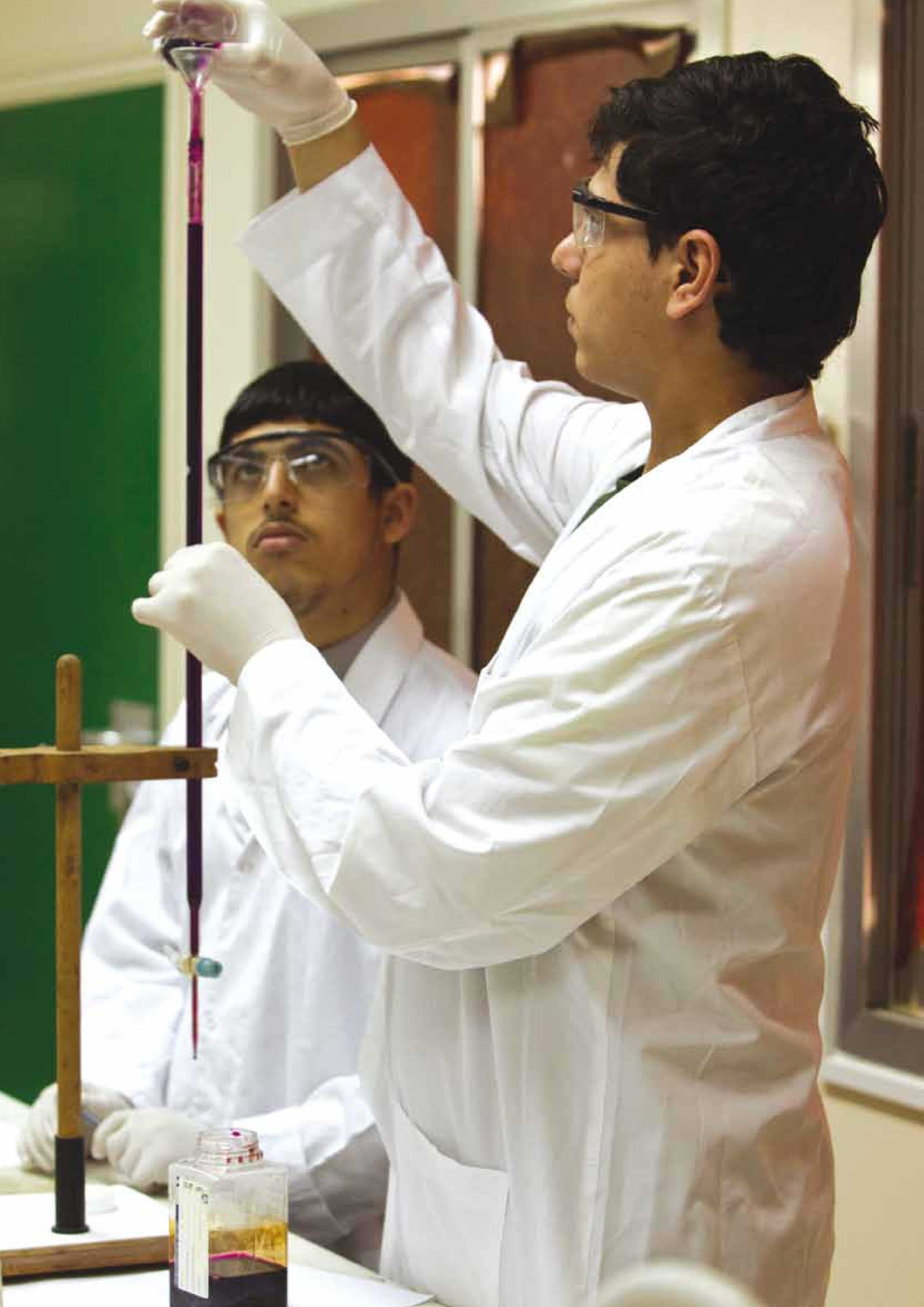
FIGURE 11: UNDERSTANDING THE GENDER SKILLS GAP AMONGST 15-YEAR-OLDS IN DUBAI



Note: Figure represents the gender gap by achievement levels. Columns above the horizontal line at 0 indicate females have higher skills at that point of the proficiency distribution.

It is important to note that the analysis of students' grade distribution found males more likely, particularly in the Ministry of Education curriculum schools, to be in lower grades due to higher retention rates compared to similarly aged females. To the extent that students gain skills with additional grade levels, a finding confirmed by this research, some of the gender differential in skills is partly explained by slower male progression. KHDA is undertaking further research to better ascertain the impact of retention on students' proficiency.


Expectations
Expected
3b
All Level 3a
listened carefully through making comments or asking questions.
I can sometimes change the way I speak in order to suit my listener.
I know what standard English is and when it should be used.
the main points of a piece of writing.
I can formulate my own ideas and opinions about a text I have read.
I can use my knowledge of the alphabet to help me find books and information in a library or index.
for variety and interest.
My sentences are usually formed correctly.
I can spell simple words correctly.
I can use full stops, capital letters and question marks accurately.
My handwriting is legible.
Some Level 4c
Many Level
I can talk and listen in a range of different situations.
When I speak, I usually think about my audience and make sure that what I'm saying is appropriate.
I can develop my ideas when I'm speaking.
I listen carefully in
I can read a range of texts and show understanding of their main ideas, themes, events and characters.
I can sometimes infer and deduce meanings from the texts that I read.
I understand how texts reflect the time and culture in which they were written.
I can refer to the text when explaining my views.
I am able to find the information that I need.
My writing in a range of forms can be lively and thoughtful.
My ideas are often sustained and sometimes developed in interesting ways.
My vocabulary choices are sometimes adventurous and I do occasionally use words for effect.
I can use complex sentences to extending meaning.
I am generally able to spell simple words accurately.
I am beginning to use some punctuation within my sentences e.g. commas
I am generally able to spell words with complicated spelling patterns correctly.
I use a range of punctuation, including commas, apostrophes, inverted commas.



Section 5

How Is the Curriculum Related to Skills in Dubai?

Summary Box 5

Though it is not the only explanatory variable, school curriculum was found to be correlated to performance. Students attending IB schools had the highest average proficiency scores of any curriculum in Dubai, surpassing the OECD scaled average in all three domains. They were followed by students in private UK curriculum schools while students at private Indian schools also displayed strong readiness for life with average scores slightly below the OECD scaled average. 15-year-olds in public schools had the lowest proficiency while those at private MoE schools had only marginally higher skills. The analysis finds variation is likely to be driven by differences in background, resources and student composition of schools as well as the curriculum.

The education environment in Dubai is unique in its composition with the majority of students enrolled in one of 13 different curricula on offer at private schools. The Ministry of Education (MoE) curriculum is delivered in public schools as well as 15 private schools. The Dubai PISA team designated seven distinct curricula groupings in the stratification phase prior to the implementation of the survey. The different curricula are presented in Table 2 below. Through stratification, statistical techniques* were applied to generalise outcomes from the survey results to population findings.

TABLE 2: CURRICULUM STRATA IN DUBAI – PISA 2009

Curriculum	Number of schools sampled	Number of students tested
Public – MoE	42	1318
Private – MoE	8	391
Private – US	28	1121
Private – UK	31	1334
Private – Indian	16	1121
Private – IB	5	151
Private – Other	4	184

VARIATION IN AVERAGE PISA SCORES BETWEEN CURRICULA

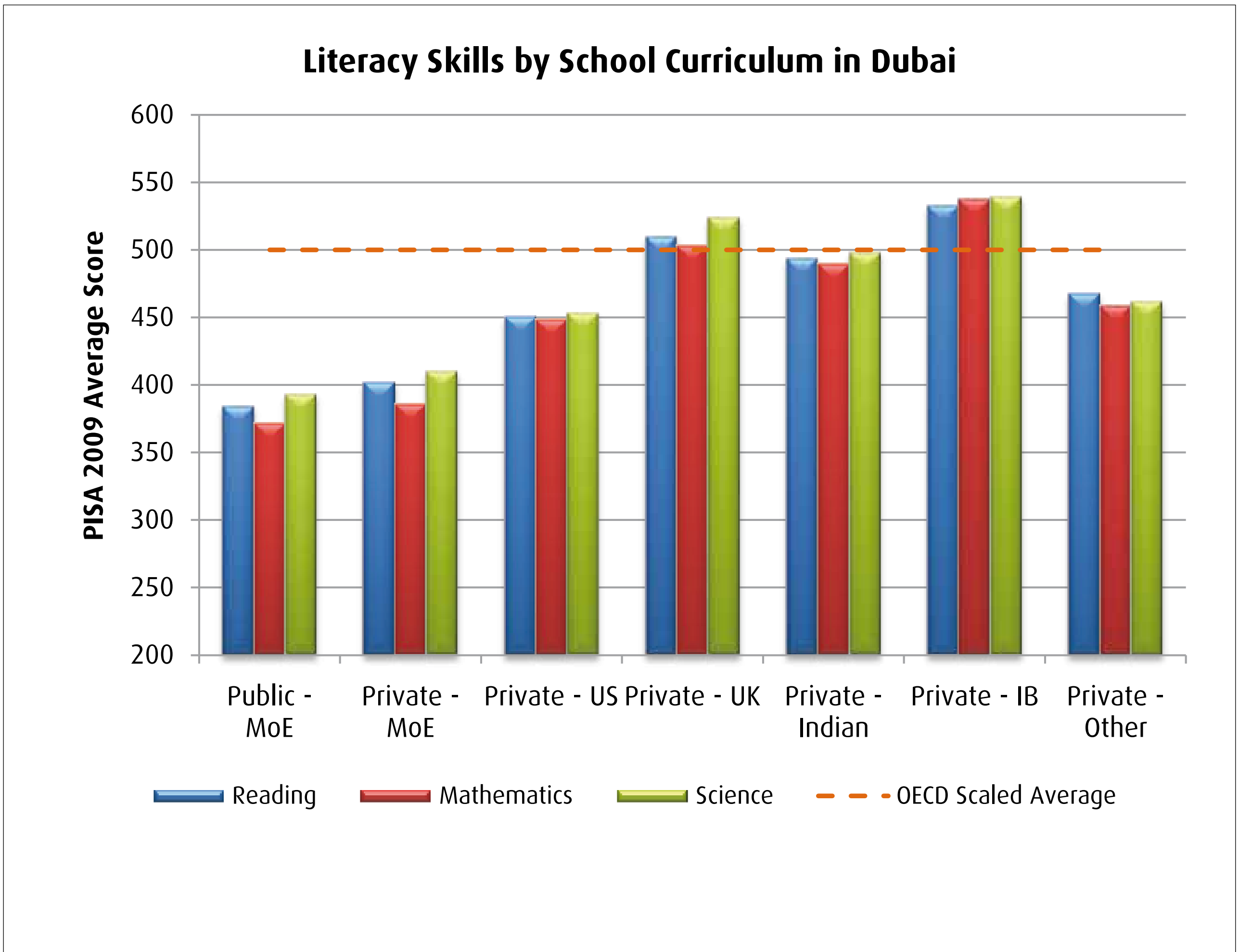
Analysing skills attainment by curriculum provides stakeholders with a better understanding of variation in performance between schools in Dubai. Two points must be noted prior to this analysis. The first is that

* Fay's modification of Balanced Repeated Resampling was employed using a factor of 0.5.
450 replicate samples are constructed to enable the calculation of unbiased estimates.

schools offering different curricula in Dubai differ in their student composition. These differences include parents' education and socioeconomic background, both of which are found by the research to significantly impact performance. The second caveat to note is that 15-year-old males in Dubai are eligible to enrol in vocational education institutes, namely, the Institute of Applied Technology (IAT). However, IAT schools were not included in PISA 2009. With demanding entry criteria, these schools attract skilled students from public schools which may result in the reduction of high achievers in the public MoE schools participating in PISA. Thus, the difference in skill scores is likely to be the compounded effect of student background, school resources and the curriculum.

In each of Reading, Mathematics and Science, students at International Baccalaureate (IB) schools were found to have the highest proficiency. The mean score amongst IB students is well in excess of the OECD scaled average with average Reading skills, nearly 30 points above 500. In 2009, IB students were followed by students at private schools teaching the UK curriculum with a mean Reading score of 510. These students were only marginally above 500 in Mathematics.

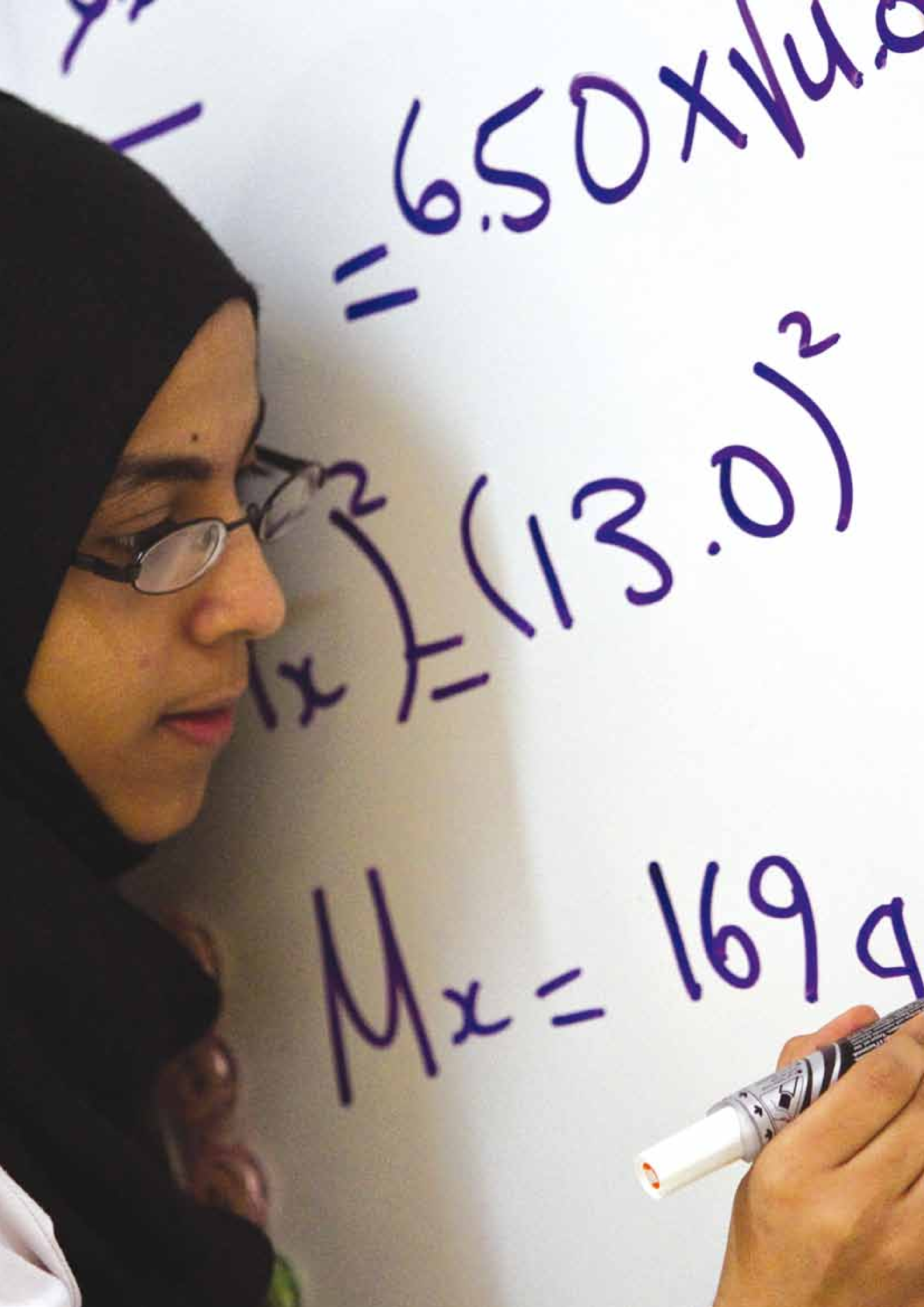
FIGURE 12: VARIATION BETWEEN CURRICULA IN DUBAI – PISA 2009



The strong performance of students in the Indian curriculum schools is noteworthy. Although PISA represents a different form of assessment by gauging the readiness of students' skills for the real world, the curricular findings for Indian schools are consistent with those from TIMSS 2007. In 2009 these students again surpassed the Dubai average by nearly half of one standard deviation and were marginally under the OECD scaled average in all three domains.

The comparative underperformance of 15-year-olds studying the Ministry of Education curriculum is apparent in Figure 12, with an average Reading score of 384 in public schools. The average score of their counterparts in private schools teaching the official curriculum is 402. The average OECD differential between public and private schools was found to be 30 points. However, in Dubai this is greater than one standard deviation on average, with IB schools 150 points above MoE schools. In each of the literacy domains, students of the Ministry of Education curriculum at public schools have the lowest proficiency levels, with their counterparts in private MoE schools only marginally higher. The caveats earlier mentioned emphasise the differences in student background between curricula. Thus, the variation in performance is the result of more than just curricular influence.

Scientific proficiency is highest of all three skill domains in all curricula in Dubai. IB students attained 539 on average, a result that would place them on par with Japan - the fifth highest performing country in Science. The average Scientific skills of students of the UK curriculum was identified at 525 while Indian schools just missed the OECD scale average with a score of 498. Here, an important variable must be noted - the academic selectivity of some schools. By applying high admission criteria, such as entrance examinations or applicant screening, these schools may only select students of higher proficiency. This would at least partly explain the higher scores exhibited by schools following the IB curriculum.




themes to justify my views.
I can make connections between texts from different times and cultures; I can link these to my own experiences.
I can summarise a range of information from different sources.
developed, linked paragraphs.
My spelling, even of irregular words, is generally accurate.
I use a range of punctuation to clarify my meaning, for example, semi colons.
My handwriting is neat and legible.
I understand the ways in which meaning and information are conveyed in a range of texts.
I can articulate personal and critical responses to poems, plays and novels.
I show awareness of the thematic, structural and linguistic features of a range of texts.
I understand why some texts are particularly valued and influential.
I can select, synthesise and compare information from a variety of sources.
I am a confident writer and adapt my work appropriately and imaginatively to suit purpose and audience.
I develop both character and setting in my narrative writing.
I frequently demonstrate my appreciation of and ability to comment on a wide range of texts.
I can evaluate how authors achieve their effects.
I can select and analyse information and ideas, and comment on how these are conveyed in different texts.
I can explore some of the ways in which texts from different times and cultures have influenced literature and society.

Section 6

Analysing the Skills of 15-year-olds in Dubai

Summary Box 6

PISA scores are mapped by the OECD to a six-level scale describing student proficiency in each domain. The average student in Dubai is at level 2 representing only direct reasoning and literal interpretation. Further analysis reveals the curricula with the highest average scores are also those with the least variation between their students. These are also the curricula with the largest proportion of high achievers – at or above level 5, suggesting a balanced approach to excellence and equity. More than 5% of students in Indian schools and 10% of students in UK and IB schools are high achievers, while at least half of those studying the MoE curriculum are at level 1 or below.

While analysing mean performance is an essential component of attainment research, additional observations may be concealed within distributions.

VARIATION IN SKILLS IN READING, MATHEMATICS AND SCIENCE

READING

Amongst students in public MoE schools, the analysis found extensive variation in performance with observations ranging from the low 200s to the high 500s. Earlier analysis in this report showed that the mean score for this group was less than the Dubai average. Findings point to more than 70% of students in public and private MoE schools falling below the Dubai average Reading score. In contrast, less than half of students at private US schools and a quarter of those at private UK schools were below the Dubai average.

The research additionally contrasted variation between curricula in Dubai. Three-quarters of students (the 75th percentile level) at MoE schools had scores that were below 448 points which is equal to the median in private US schools. This suggests that only 25% of public MoE-schooled students have the same set of Reading skills held by over half of those schooled at private US schools. A larger contrast exists relative to students in other private curricula. Nearly 80% of those at public MoE schools were found to have Reading skills equal to the lowest 25% of the distribution at private UK and IB schools. This is only marginally better for private MoE students where only 30% have attained the same reading level reached by over two-thirds of students in schools with the US, Indian, IB or UK curriculum.

Substantial variability exists within better performing systems, such as the UK system, but less than one-quarter of students in these schools fall below the Dubai Reading average. A final point on variability in Reading skills across curricula in Dubai is that schools with the highest achieving students are also those with the lowest variability. IB schools have the highest mean and median scores with the lowest variability. The admission policies at schools lead to visibly different equity outcomes within curricula – evidence of the joint forces of the curricular effect and the complementary effect of socioeconomic background.

The interquartile range is a measure often used as an informative indicator of statistical dispersion and hence the extent of performance variability within groups. It measures the distribution of the middle 50% of the student population. A comparison using the interquartile range reveals within-curriculum variability to be greatest in Reading proficiency followed by Science and Mathematics respectively.

SCIENCE

Reduced variability is found in Scientific performance compared to Reading, with the largest disparity identified in private US and UK schools. This variation within the UK and US curricula is not surprising given the eclectic mix of schools with varying quality as found by consecutive inspection rounds. The mean and median of Scientific skill scores in public and private MoE schools are closer together than the positively-skewed Reading skill distribution.

MATHEMATICS

The least variation within and across curricula was found in mathematical proficiency, with the underperforming curricula closest in mean and distribution to the Dubai average. The preparedness for life of IB students, as reflected by their real-world mathematical skill score in PISA, is further emphasised in the distributional analysis. Nearly 75% of IB students exceed the OECD scaled average and over 80% of students are above the Dubai mean.

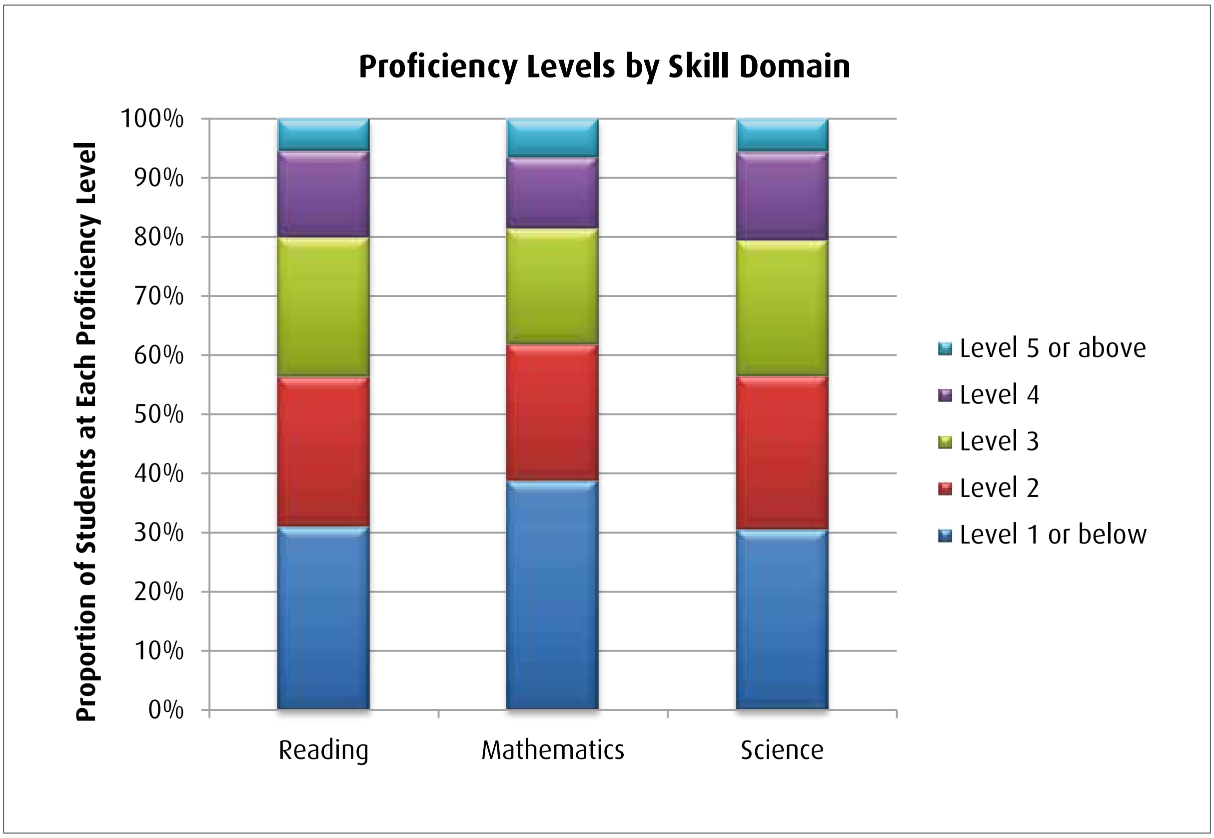
READINESS FOR LIFE

Average skill measures are beneficial for benchmarking performance within and between economies, but are not readily comprehensible for policy analysis. For this reason, the OECD has defined ascending proficiency levels to provide easily interpretable indicators that remain comparable over multiple rounds of assessment. Appendix A3 outlines the proficiency level descriptions and the score thresholds associated with each level.

In Reading, for example, levels attempt to capture the extent to which students display complexity and sophistication of mental processes. This includes the capacity to retrieve information to be assimilated by the reader and the ability to interpret or reflect upon knowledge that the reader must draw on both from within and outside the text.

Figure 13 presents the proficiency levels as calculated for all 15-year-old students in Dubai in 2009, revealing that at least 5% of students are in the highest levels of achievement in each of Reading, Mathematics and Science at levels 5 and 6. This compares favourably with the OECD average of 7.6%. Furthermore, approximately 20% of students display skills at or above level 4 in Dubai compared to 28.3% on average across the OECD. Strong performance in some schools is evident in this analysis, but there is cause for concern about the lack of readiness for life of students in other schools.

FIGURE 13: PROFICIENCY LEVEL ATTAINMENT IN DUBAI



Since the introduction of PISA, level 3 is considered by international experts to be the minimum level required to function well in a knowledge economy. Students immediately below this level, at level 2 for example, are thought to face challenging times when entering the workforce as they are insufficiently prepared to utilise their knowledge. Those substantially below the minimum prescribed level 3, such as students at level 1 or less, are said to be at risk of significant disadvantage in real life beyond school. This derives from lack of skill as captured by low PISA scores and the inability to extrapolate or apply acquired knowledge in genuine life settings.

Roughly 71% of 15-year-old Canadian students, for example, performed at or above level 3. Across all OECD countries, 18.8% of students were found to have proficiency skills below level 2 in Reading while 22% were at the same level of proficiency in Mathematics.

In Dubai, the 2009 round of PISA reveals that over 54% of the student population at age 15 is yet to reach level 3 in each of the skill domains. Of particular concern are the 31% of students who are at level 1 or below in Reading and Science and nearly 40% of students in Mathematics.

Based on the overall average score for Dubai, Table 3 provides an overview of the average capacity of students in Dubai. Dubai's mean in each domain was identified within the level 2 classification of the OECD proficiency scale.

In Reading, this means that the average 15-year-old student in Dubai can locate some information from texts, construing meaning to a limited extent. The Mathematics score indicates that the average student in Dubai interprets single-dimensional situations and can employ basic procedures. The inability of the average student to extrapolate knowledge is further found in Science where they are only able to conduct direct reasoning and literal interpretation of Scientific results.

TABLE 3: WHAT CAN STUDENTS IN DUBAI DO, ON AVERAGE?

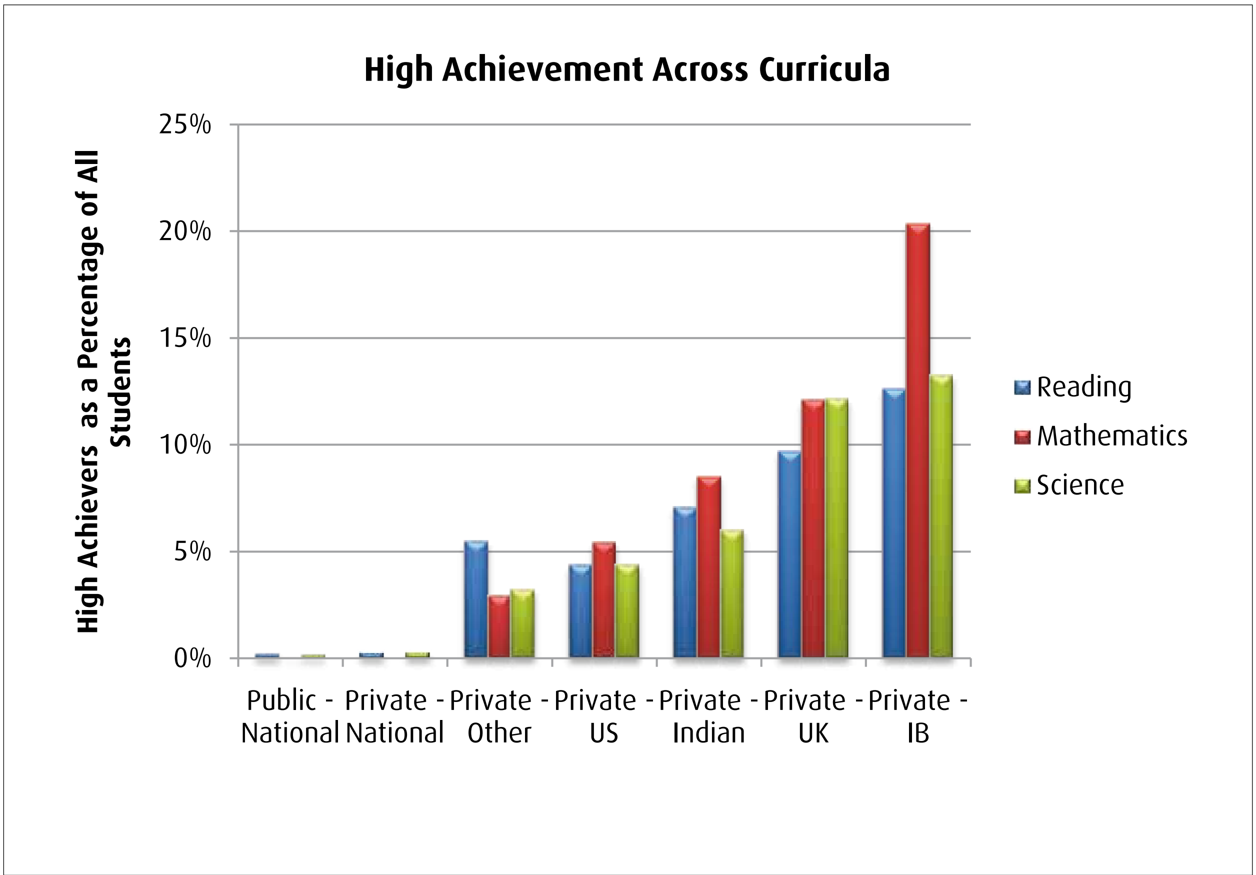
Reading	
Level 2	Some tasks at this level require the reader to locate one or more pieces of information, which may need to be inferred and may need to meet several conditions. Others require recognising the main idea in a text, understanding relationships or construing meaning within a limited part of the text when the information is not prominent and the reader must make low-level inferences. Tasks at this level may involve comparisons or contrasts based on a single feature in the text.
Mathematics	
Level 2	At level 2 students can interpret and recognise situations in contexts that require no more than direct inference. They can extract relevant information from a single source and make use of a single representational mode. Students at this level can employ basic algorithms, formulae, procedures or conventions. They are capable of direct reasoning and making literal interpretations of the results.
Science	
Level 2	At level 2, students have adequate scientific knowledge to provide possible explanations in familiar contexts or draw conclusions based on simple investigations. They are capable of direct reasoning and making literal interpretations of the results of scientific inquiry or technological problem solving.

Education stakeholders are further interested in student performance at either extreme of the proficiency distribution. This characterises high achievement while allowing for the identification of students in need of further support. The former is defined by OECD and existing literature as those who are at level 5 or above. Although level 3 is recommended as a minimum for functional operation in a modern knowledge economy, the OECD has not specified particular cut-off points at the lower end of the distribution. The research literature emphatically warns of the under-preparedness of students below level 2 – the extent of their disadvantage is dependent upon idiosyncratic features of local economies. For this reason, the definition of students at risk will be taken as those at or below level 1 as revealed by any of the domains.

COMPARING PROFICIENCY LEVELS BETWEEN CURRICULA

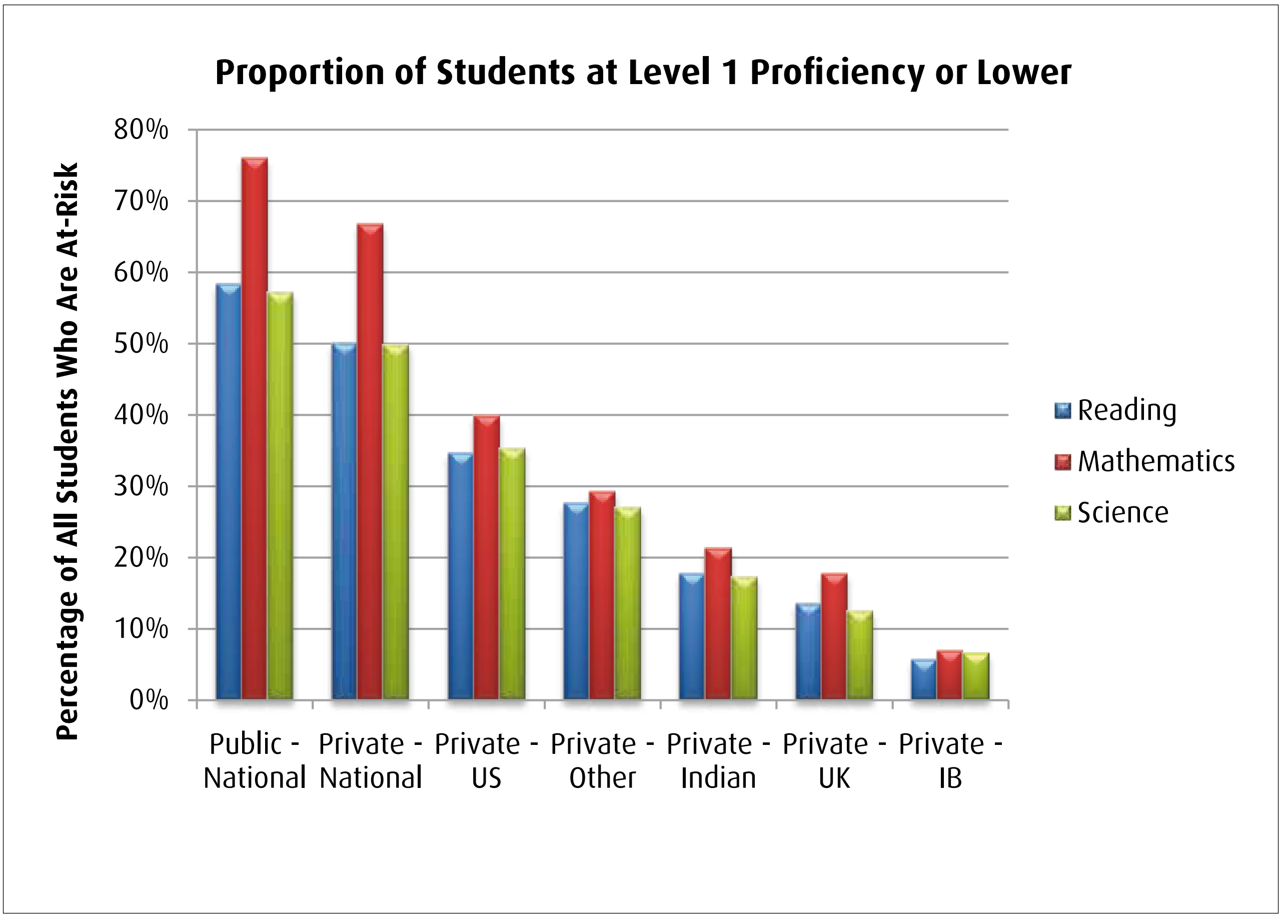
Figure 14 outlines the proportion of high achievers relative to total students within each curriculum. Using level 5 as the criterion for high achievement, students in the IB curriculum are seen to have the highest likelihood of being high achievers as well as Dubai's highest mean proficiency. At least 12% of IB students have Reading and Science skills that would define them as high achievers, while over 20% have the highest achievement levels in Mathematics – an equivalent proportion to that observed in Shanghai, Korea and Finland. Excellence is still evident in other curricula where at least 5% of students at Indian schools and 4% at US schools are high achievers, while virtually no high achievers are identified in schools teaching the Ministry of Education curriculum.

FIGURE 14: PROPORTION OF STUDENTS AT LEVEL 5 AND ABOVE IN DUBAI – PISA 2009



The curricula that manifested low mean proficiency levels were found to be those that had the highest proportion of at-risk students as shown in Figure 15. At MoE schools in general, at least half the student population were identified to have Reading, Mathematics and Science skills at level 1 or below. Three-quarters of 15-year-old students at public MoE schools were found to be at risk with their current level of mathematical preparedness for life where at least 55% can carry out only basic routine procedures according to direct instructions. Their proficiency levels in Reading and Science are additionally correlated with the performance of mostly simplified actions that follow immediately from given stimuli.

FIGURE 15: AT-RISK STUDENTS IN DUBAI – PISA 2009

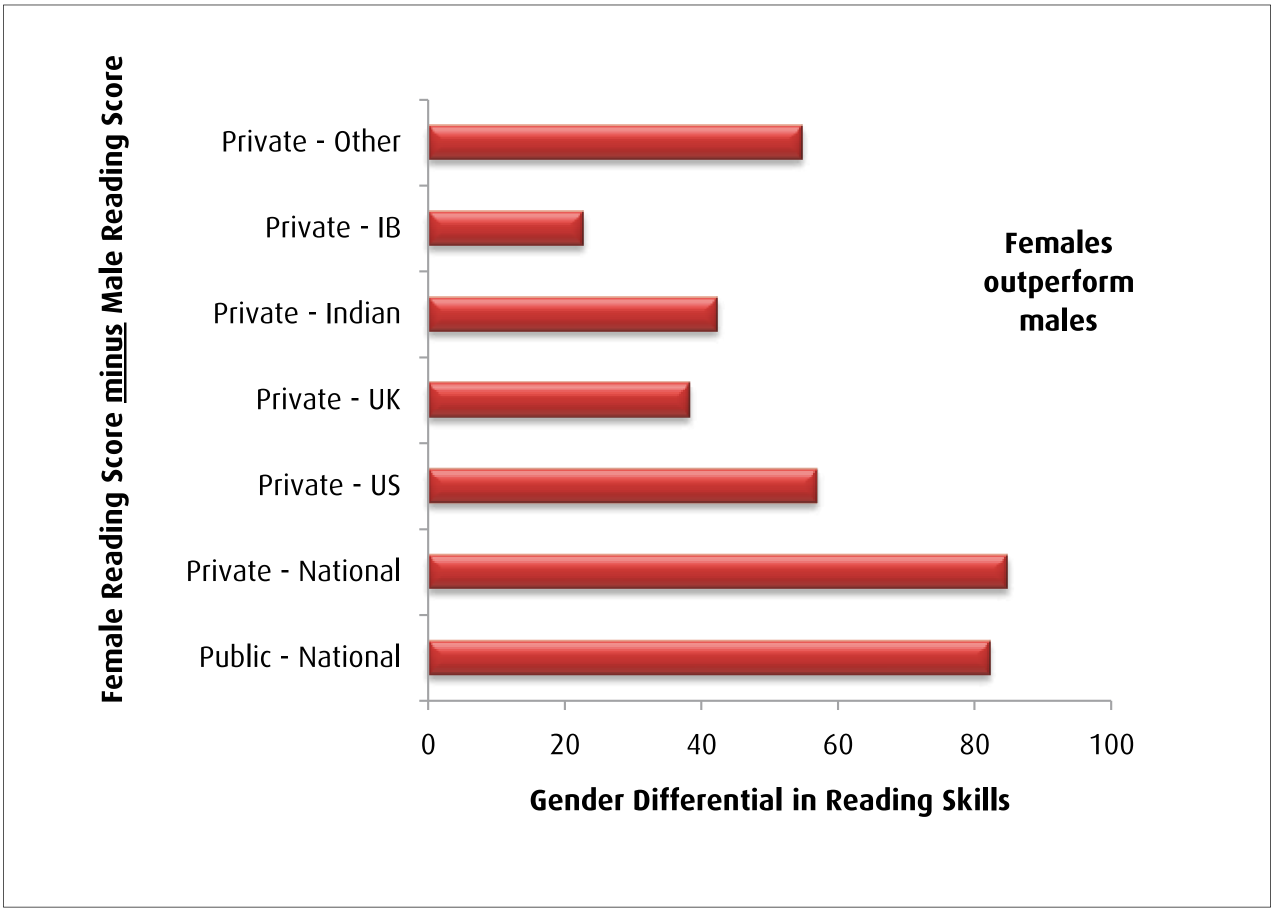


UNPACKING THE GENDER DIFFERENTIAL

The gender dynamics in Dubai have been outlined in Section 4 but it remains to be seen how it varies between different curricula. As evident in Figure 16, the female advantage in Reading proficiency is mirrored in every curriculum on offer in Dubai. There is, however, a strong correlation between the curriculum and the magnitude of the gender divide.

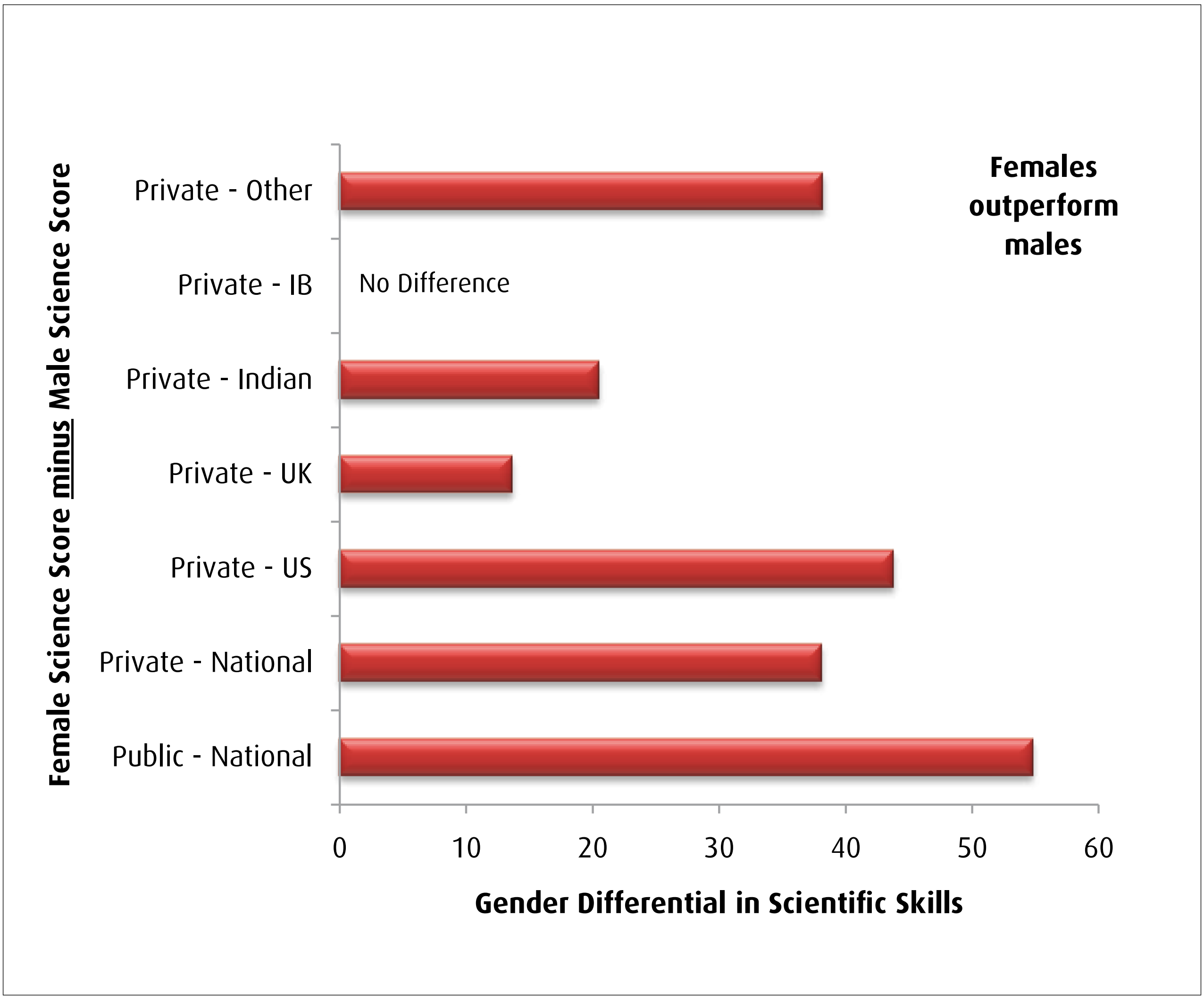
At public MoE schools, the Reading differential is 82 points while in private MoE schools it is even higher at 85 points. This could be consistent with significantly improved learning occurring in female-only schools using the MoE curriculum (an observation noted in successive school inspection reports). Indeed, performance at MoE schools was found to be 64 points below the Dubai female average Reading score while the male Reading score in the same curriculum was 96 points less than the average Dubai score for males. Students at the highest achieving curriculum, the IB schools, have the least gender variation of all curricula in Dubai.

FIGURE 16: GENDER SKILL DIFFERENTIAL IN READING BY CURRICULUM - PISA 2009



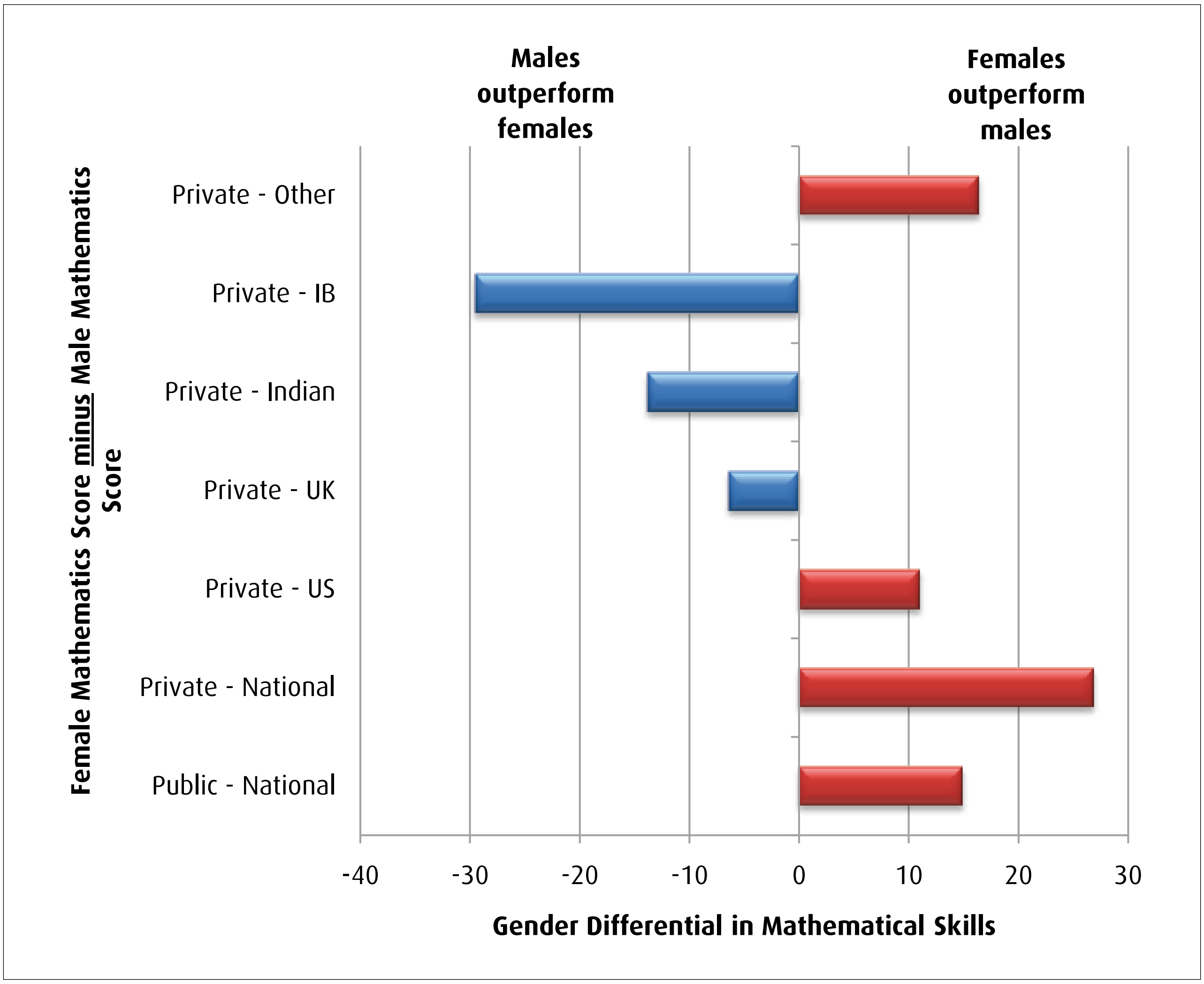
That the three largest performance differentials were found in single-gender schools may be indicative of cohort effects in Dubai. Indeed, the gender variation in curricula with single-gender schools only was found to be at least 40% higher than the differential elsewhere. If the cohort effects theory holds, females outperform males in general leading to recognition by males in the same classes of the need to exert additional effort. This consequently results in a narrowing of the gender gap and may explain the larger variation in scores in single-gender curricula schools. This could hold especially true in Reading, a domain that research has found to be more resistant to rote learning than the others and is largely driven by individual initiative.

FIGURE 17: GENDER SKILL DIFFERENTIAL IN SCIENCE BY CURRICULUM - PISA 2009



In Figure 17, analysis of scientific proficiency shows that a smaller gender gap than that observed for Reading is evident in each curriculum. The largest gender differential is observed in public MoE schools while males at private MoE schools appear to halve the gap observed in Reading. No significant gender gap was found for students in IB schools.

FIGURE 18: GENDER SKILL DIFFERENTIAL IN MATHEMATICS BY CURRICULUM - PISA 2009



The reversal of the gender divide in Mathematics was found in Figure 18 to be largely driven by inverted trends at IB, Indian and UK schools. Male students of these curricula, who had otherwise trailed their female counterparts, surpassed them in Mathematics by as much as 30 points in IB schools and 14 points in schools teaching the Indian curriculum. The advantage for females remains in the single-gender public and MoE private schools as well as the US and other curricula schools.

SKILLS AND STUDENT BACKGROUND

The importance of PISA in education decision-making worldwide arises from its supplementary questionnaires that accompany the skills assessments. Students are asked to provide information about their families, homes and schools to capture the range of variables that may influence student outcomes. Given Dubai's diverse population, the background of students in Dubai varies widely and is likely to have varying influence on attainment.

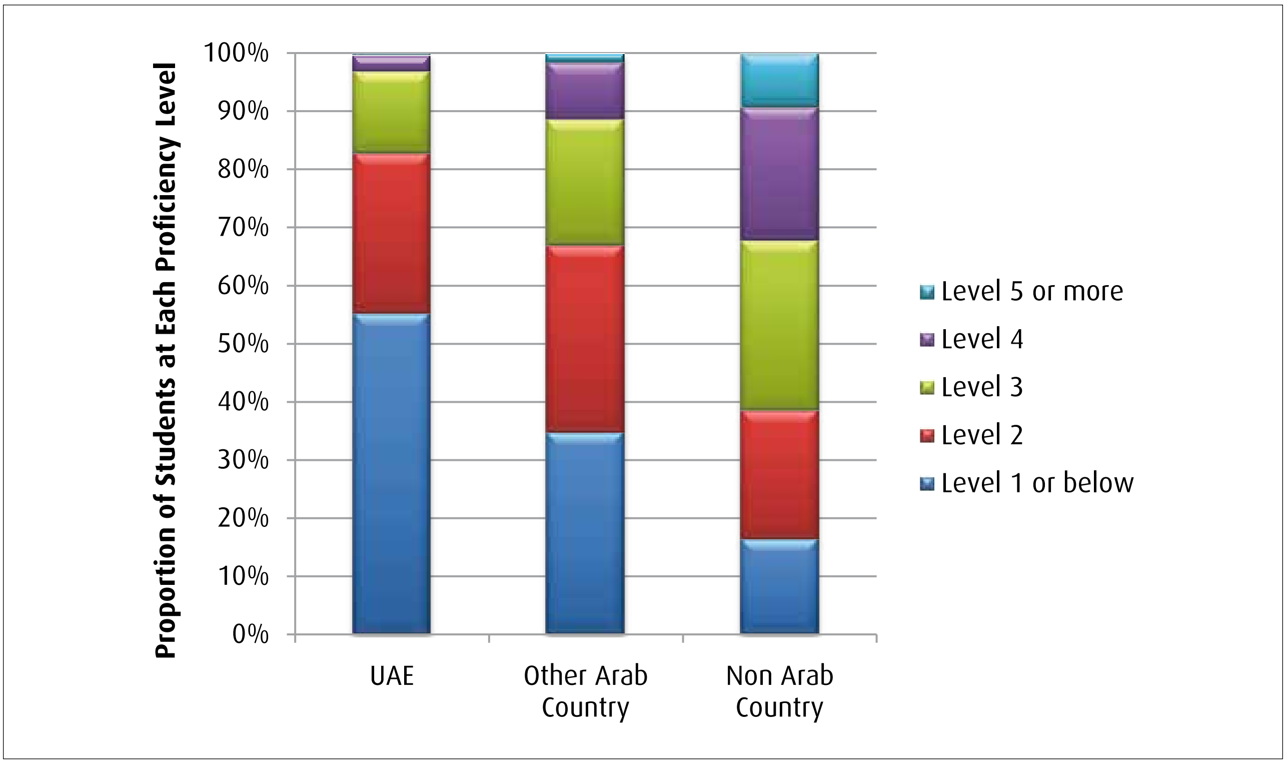
NATIONALITY

Emirati females were found to have below-average proficiency levels compared to all other nationality groupings of females in Dubai. This ranges from a 29-point gap in Reading and Science to a 58-point gap in Mathematics – the weakest skill domain observed for females in Dubai. The shortfall is also observed amongst Arab expatriate females who are less than 10 points below the Dubai mean in Reading and Science but nearly 15 points lower in Mathematics. Thus, it appears that the lower attainment of mathematical proficiency by female 15-year-olds in Dubai is driven by significant underperformance amongst Arab expatriates and Emiratis.

Similar trends are observed in general amongst males, but with increased magnitude. Emirati males are further below the male average proficiency in each domain than their female counterparts. A difference of 96 points, or nearly one full standard deviation, separates Emirati males from the Dubai Science average, while the differential is 108 points in Reading. The Mathematics deficit is smaller but remains substantial at 78 points. Arab males lag behind the average in smaller magnitudes of approximately 20 to 40 points. The overall nationality differential is summarised in Figure 19.

Distributional differences are highlighted in the below figure outlining proficiency levels in Reading by each nationality grouping. 55% of Emirati students, 35% of Arab students and 16% of Non-Arab students were found to have proficiency levels at level 1 or below.

FIGURE 19: READING PROFICIENCY LEVELS BY NATIONALITY - PISA 2009



That over one-third of all Arab expatriates, and over half of Emirati 15-year-old students, would be considered at-risk is a reminder of the ongoing need for continued support and education reform in Dubai. The OECD-recommended minimum of level 3 is achieved by 61% of non-Arab expatriates, 32% of Arab expatriates and 17% of Emiratis. Less than 0.5% of Emiratis attained high Reading skills compared to 1.5% of Arab students and 9.4% of non-Arab expatriates. Similar distributions were observed for the other two domains.

While this analysis implies a substantive disadvantage in proficiency faced by Emiratis in Dubai, confounding factors may mitigate this shortfall since Emiratis are more likely to be enrolled in underperforming curricula. Initial analysis suggests the perseverance of a nationality effect even after controlling for curriculum. Further research will be undertaken into the full contextual determinants, at home and in the classroom, of the Emirati skills deficit at age 15.

PARENTS' EDUCATION

In addition to the curriculum effect, differences in parents' education contribute to the observed skill gap between nationalities. Demographic analysis of Dubai's student population at age 15 finds 22% of mothers of Emirati students had failed to complete high school, while 30% completed a tertiary qualification. Fathers of Emirati students were found to have higher levels of education than mothers, with a similar proportion of early school leavers, but a higher university-completion rate of 37%.

For non-Emiratis, 11% of Arab parents and 5% of non-Arab parents left school prior to completion. This is likely to explain part of the current performance variation amongst 15-year-olds of different nationalities. These data emphasise the importance of parents' education and other socioeconomic variables on student performance.

CONCLUDING REMARKS - FROM MEASUREMENT TO PROGRESS

The first insight into student skills in Dubai finds its 15-year-olds better prepared to use their skills in life than their MENA counterparts, but below the OECD-recommended minimum level. Substantial variation between curricula was found with students at particular schools attaining levels comparable to leading education systems worldwide. However, at least 30% of students in each domain are at risk of not having the skills necessary for basic operations in a knowledge economy.

MEASUREMENT

A decade of PISA has shown that several of today's successful education systems began at the same point as Dubai. The evidence shows that these were the ones that combined research with decision-making, reform with goal-setting and progress with measurement. Using comparative data on students, teaching practices, schools and the home environment, robust analysis can now help inform policy.

Research accompanying the analysis of the Dubai data found notable examples of best practice from education systems worldwide. Investigative analysis of how and why systems were able to boost students' skills is an ongoing KHDA project. Common to all success stories is a commitment to genuine reform and an understanding of the gradual nature of its impact. One prominent example for all those involved in education reform in Dubai is the experience of Poland. Praised today for its progress, Poland's PISA Reading score in 2000 of 479 was below the country's aspirations. A complete overhaul of its education system ensued so that in PISA 2009, Poland is heralded as a sign of exemplary enhancement of the quality of education for the 21-point increase in its average Reading score.

Other education systems may have improved by tens of points but, as educators and policymakers alike are aware, it is considerably more challenging to do so at higher levels of performance. Those involved in rational goal-setting for education reform in Dubai would be aware that a 21-point rise in PISA scores over a decade is a significant milestone, when coupled with reform and evidence-based decision making in education. In line with Dubai's ever-ambitious spirit, higher targets can be set with the realisation that greater efforts by all stakeholders will be required to achieve them.

PROGRESS

The dearth of detailed data and evidence that once characterised education in the UAE, and the region in general, is gradually being filled through qualitative research such as school inspections and quantitative analysis such as that derived from PISA data. Through PISA, policymakers and educators can replace hitherto rare glimpses with detailed, systematic examination of the intricate world of education in Dubai.

The relevance of the knowledge and skills measured by PISA has been confirmed by recent studies tracking young people in the years after they have been assessed. Research in Australia, Canada and Denmark has identified a strong association between the performance in Reading on PISA at age 15 and the likelihood of a student completing secondary school, of carrying on with post-secondary studies at age 19 and of improved job prospects when entering the labour market.

By participating in PISA, Dubai is now part of an international league of countries assessing the competencies of their students at the verge of entering the workforce. Dubai joins a select few countries around the world that participate in both TIMSS and PISA. With this commitment to transparency comes a responsibility for a rational understanding and analysis of the implications of the data by all education stakeholders. Reliable comparisons can now be made to other educational systems and within Dubai itself, enabling Dubai to continue on its pathway to further improving the quality of its unique and diverse education system.

Appendices

APPENDIX 1 - SKILLS AT AGE 15: A GLOBAL OVERVIEW

	Country	Reading	Mathematics	Science	Proportion of Students at Reading Proficiency	
					Level 1 or below	Level 5 or above
1	Shanghai-China	556	600	575	4%	19%
2	Korea	539	546	538	6%	13%
3	Finland	536	541	554	8%	15%
4	Hong Kong-China	533	555	549	8%	12%
5	Singapore	526	562	542	12%	16%
6	Canada	524	527	529	10%	13%
7	New Zealand	521	519	532	14%	16%
8	Japan	520	529	539	14%	13%
9	Australia	515	514	527	14%	13%
10	Netherlands	508	526	522	14%	10%
11	Belgium	506	515	507	18%	11%
12	Norway	503	498	500	15%	8%
13	Estonia	501	512	528	13%	6%
14	Switzerland	501	534	517	17%	8%
15	Poland	500	495	508	15%	7%
16	Iceland	500	507	496	18%	5%
17	United States	500	487	502	18%	10%
18	Liechtenstein	499	536	520	16%	5%
19	Sweden	497	494	495	17%	9%
20	Germany	497	513	520	18%	8%
21	Ireland	496	487	508	17%	7%
22	France	496	497	498	20%	10%
23	Chinese Taipei	495	543	520	16%	5%
24	Denmark	495	503	499	15%	5%
25	United Kingdom	494	492	514	18%	8%
26	Hungary	494	490	503	18%	6%
27	Portugal	489	487	493	18%	5%
28	Macao-China	487	525	511	15%	3%
29	Italy	486	483	489	21%	6%
30	Latvia	484	482	494	18%	3%
31	Slovenia	483	501	512	21%	5

32	Greece	483	466	470	21%	6%
33	Spain	481	483	488	20%	3%
34	Czech Republic	478	493	500	23%	5%
35	Slovak Republic	477	497	490	22%	4%
36	Croatia	476	460	486	22%	3%
37		474	447	455	27%	7%
38	Luxembourg	472	489	484	26%	6%
39	Austria	470	496	494	28%	5%
40	Lithuania	468	477	491	24%	3%
41	Turkey	464	445	454	25%	2%
42	Dubai (UAE)	459	453	466	31%	5%
43	Russian Federation	459	468	478	27%	3%
44	Chile	449	421	447	31%	1%
45	Serbia	442	442	443	33%	1%
46	Bulgaria	429	428	439	41%	3%
47	Uruguay	426	427	427	42%	2%
48	Mexico	425	419	416	40%	0.4%
49	Romania	424	427	428	40%	1%
50	Thailand	421	419	425	43%	0.3%
51	Trinidad and Tobago	416	414	410	45%	2%
52	Colombia	413	381	402	47%	1%
53	Brazil	412	386	405	50%	1%
54	Montenegro	408	403	401	50%	1%
55	Jordan	405	387	415	48%	0.2%
56	Tunisia	404	371	401	50%	0.2%
57	Indonesia	402	371	383	53%	0.02%
58	Argentina	398	388	401	52%	1%
59	Kazakhstan	390	405	400	59%	0.4%
60	Albania	385	377	391	57%	0.2%
61	Qatar	372	368	379	63%	2%
62	Panama	371	360	376	65%	1%
63	Peru	370	365	369	65%	0.5%
64	Azerbaijan	362	431	373	73%	0.01%
65	Kyrgyzstan	314	331	330	83%	0.1%

Participants ranked in descending order by the Reading score on PISA 2009

APPENDIX 2 – 20 MAIN FINDINGS FROM PISA 2009 IN DUBAI

FINDINGS FACTSHEET

1	Of 65 participants, Dubai ranked 42nd for Reading proficiency, with a mean score of 459. Dubai led fellow MENA participants, Jordan, Tunisia and Qatar. Sub-domain scores closely tracked the combined reading score for Dubai.
2	Relative to the rest of participants in PISA 2009, Dubai performed comparatively better in Mathematics, moving one position up to 41st among the 65 participants.
3	Dubai's scientific proficiency score of 466 was marginally lower than the average of all participants at 471. It is the closest of the three domains to the OECD scaled average of 500 – the long-term target set by most developing education systems
4	Females outperformed males in Reading proficiency in every participating country in PISA 2009. The 50 point differential in favour of females in Dubai is the 11th highest amongst all 65 participants.
5	While males were found to have higher scientific skills on average worldwide, the reverse was observed in MENA countries. Following Jordan in first place, Dubai had the third highest disparity between students of opposing genders with females outperforming males by 27 points on average. Females in Dubai thus drove Dubai's improved Science score, ranking 39th in world Science proficiency, while males were three spots behind in 42nd.
6	No statistically significant difference was found between males and females in mathematical proficiency in Dubai. This result was similarly found in the leading education systems.
7	The biggest disadvantage faced by males in all domains lies in the bottom half of the distribution. Females still display higher skills in the upper percentiles of Reading and Science, but this is less than half the margin seen at the lower end.
8	A strong correlation was found between the curriculum and the magnitude of the gender divide. At public MoE schools, the gender differential in Reading is 80 points while it is even higher at 85 points in private MoE schools.
9	In each of Reading, Mathematics and Science, students at International Baccalaureate schools were found to have the highest proficiency. The mean score amongst these students is well in excess of the OECD scaled average, with average Reading skills nearly 30 points above 500.
10	Students at Indian curriculum schools performed strongly with scores surpassing the Dubai average and marginally under the OECD scaled average in all three domains.

11	Nearly 80% of those at public MoE schools were found to have reading skills below the student of the same age in the lowest 25% of the distribution at private UK and IB schools. This is only marginally better for private MoE students, 70% of whom cannot attain the same Reading level reached by over two-thirds of students in schools with the US, Indian, IB, UK or other curriculum.
12	IB schools have the highest mean and median scores with the lowest interquartile ranges.
13	The least variation within and across curricula can be seen in mathematical proficiency, with the underperforming curricula closest in mean and distribution to the Dubai average.
14	Nearly 75% of IB students exceed the OECD scaled average in mathematical skills and over 80% of students are above the Dubai mean.
15	At least 12% of IB students have Reading and Science skills that would designate them as high achievers, while over 20% have the highest achievement levels in Mathematics – an equivalent proportion to that in Shanghai, Korea and Finland. Excellence is still seen in other curricula where at least 5% of students at Indian schools and 3% at US schools are high achievers.
16	5% of students in Dubai are in the highest levels of achievement at levels 5 and 6 in each of Reading, Mathematics and Science. This compares favourably with the OECD average of 7.6%.
17	Over 54% of the student population at age 15 failed to reach level 3 in each of the skill domains - described as the minimum level required to successfully function in the knowledge economy today. Of particular concern would be the 31% of students who are at level 1 or below in Reading and Science, while this is nearly 40% for Mathematics.
18	A 29-point gap in Reading and Science and a 58-point deficiency in Mathematics separate Emirati females from the female average for Dubai. A difference of 96 points, or nearly one full standard deviation, separates Emirati males from the Dubai Science average, while the differential is greater than 108 points in Reading.
19	The minimum level 3 attainment is achieved by 61% of non-Arab expatriates, 32% of Arab expatriates and 17% of Emiratis.
20	For each of Science, Reading and Mathematics, having a higher educated parent was associated with improved proficiency levels.

APPENDIX 3 – PROFICIENCY LEVELS DESCRIPTION

READING

Level 6 708	Tasks at this level typically require the reader to make multiple inferences, comparisons and contrasts that are both detailed and precise. They require demonstration of a full and detailed understanding of one or more texts and may involve integrating information from more than one text. Tasks may require the reader to deal with unfamiliar ideas, in the presence of prominent competing information, and to generate abstract categories for interpretations.
Level 5 626	Tasks at this level that involve retrieving information require the reader to locate and organise several pieces of deeply embedded information, inferring which information in the text is relevant. Reflective tasks require critical evaluation or hypothesis, drawing on specialised knowledge. Both interpretative and reflective tasks require a full and detailed understanding of a text whose content or form is unfamiliar. For all aspects of Reading, tasks at this level typically involve dealing with concepts that are contrary to expectations.
Level 4 553	Tasks at this level that involve retrieving information require the reader to locate and organise several pieces of embedded information. Some tasks at this level require interpreting the meaning of nuances of language in a section of text by taking into account the text as a whole. Other interpretative tasks require understanding and applying categories in an unfamiliar context. Reflective tasks at this level require readers to use formal or public knowledge to hypothesise about or critically evaluate a text. Readers must demonstrate an accurate understanding of long or complex texts whose content or form may be unfamiliar.
Level 3 480	Tasks at this level require the reader to locate and, in some cases, recognise the relationship between several pieces of information that must meet multiple conditions. Interpretative tasks at this level require the reader to integrate several parts of a text in order to identify a main idea, understand a relationship or construe the meaning of a word or phrase. They need to take into account many features in comparing, contrasting or categorising. Often the required information is not prominent or there is much competing information; or there are other text obstacles, such as ideas that are contrary to expectation or negatively worded.
Level 2 407	Some tasks at this level require the reader to locate one or more pieces of information which may need to be inferred and may need to meet several conditions. Others require recognising the main idea in a text, understanding relationships or construing meaning within a limited part of the text when the information is not prominent and the reader must make low-level inferences. Tasks at this level may involve comparisons or contrasts based on a single feature in the text..
Level 1a 335	Tasks at this level require the reader to locate one or more independent pieces of explicitly stated information; to recognise the main theme or author's purpose in a text about a familiar topic, or to make a simple connection between information in the text and common, everyday knowledge. Typically the required information in the text is prominent and there is little, if any, competing information. The reader is explicitly directed to consider relevant factors in the task and in the text.
Level 1b 262	Tasks at this level require the reader to locate a single piece of explicitly stated information in a prominent position in a short, syntactically simple text with a familiar context and text type, such as a narrative or a simple list. The text typically provides support to the reader, such as repetition of information, pictures or familiar symbols. There is minimal competing information. In tasks requiring interpretation, the reader may need to make simple connections between adjacent pieces of information.

MATHEMATICS

Level 6 669	At level 6 students can conceptualise, generalise and utilise information based on their investigations and modelling of complex problem situations. They can link different information sources and representations and flexibly translate among them.. These students can apply this insight and understanding along with a mastery of symbolic and formal mathematical operations and relationships to develop new approaches and strategies for attacking novel situations. Students at this level can formulate and precisely communicate their actions and reflections regarding their findings, interpretations, arguments and the appropriateness of these to the original situations.
Level 5 607	At level 5 students can develop and work with models for complex situations, identifying constraints and specifying assumptions. They can select, compare and evaluate appropriate problem-solving strategies for dealing with complex problems related to these models. Students at this level can work strategically using broad, well-developed thinking and reasoning skills, appropriate linked representations, symbolic and formal characterisations and insight pertaining to these situations. They can reflect on their actions and formulate and communicate their interpretations and reasoning.
Level 4 545	At level 4 students can work effectively with explicit models for complex concrete situations that may involve constraints or call for making assumptions. They can select and integrate different representations, including symbolic ones, linking them directly to aspects of real-world situations. Students at this level can utilise well-developed skills and reason flexibly, with some insight, in these contexts. They can construct and communicate explanations and arguments based on their interpretations, arguments and actions.
Level 3 482	At level 3 students can execute clearly described procedures, including those that require sequential decisions. They can select and apply simple problem-solving strategies. Students at this level can interpret and use representations based on different information sources and reason directly from them. They can develop short communications reporting their interpretations, results and reasoning.
Level 2 420	At level 2 students can interpret and recognise situations in contexts that require no more than direct inference. They can extract relevant information from a single source and make use of a single representational mode. Students at this level can employ basic algorithms, formulae, procedures or conventions. They are capable of direct reasoning and making literal interpretations of the results.
Level 1 358	At level 1 students can answer questions involving familiar contexts where all relevant information is present and the questions are clearly defined. They are able to identify information and to carry out routine procedures according to direct instructions in explicit situations. They can perform actions that are obvious and follow immediately from the given stimuli.

SCIENCE

Level 6 708	At level 6, students can consistently identify, explain and apply scientific knowledge and knowledge about Science in a variety of complex life situations. They can link different information sources and explanations and use evidence from those sources to justify decisions. They clearly and consistently demonstrate advanced scientific thinking and reasoning, and they use their scientific understanding in support of solutions to unfamiliar scientific and technological situations. Students at this level can use scientific knowledge and develop arguments in support of recommendations and decisions that centre on personal, social or global situations.
Level 5 633	At level 5, students can identify the scientific components of many complex life situations; apply both scientific concepts and knowledge about science to these situations and can compare, select and evaluate appropriate scientific evidence for responding to life situations. Students at this level can use well-developed inquiry abilities, link knowledge appropriately and bring critical insights to situations. They can construct explanations based on evidence and arguments based on their critical analysis.
Level 4 559	At level 4, students can work effectively with situations and issues that may involve explicit phenomena requiring them to make inferences about the role of Science or technology. They can select and integrate explanations from different disciplines of Science or technology and link those explanations directly to aspects of life situations. Students at this level can reflect on their actions and they can communicate decisions using scientific knowledge and evidence.
Level 3 484	At level 3, students can identify clearly described scientific issues in a range of contexts. They can select facts and knowledge to explain phenomena and apply simple models or inquiry strategies. Students at this level can interpret and use scientific concepts from different disciplines and can apply them directly. They can develop short statements using facts and make decisions based on scientific knowledge.
Level 2 409	At level 2, students have adequate scientific knowledge to provide possible explanations in familiar contexts or draw conclusions based on simple investigations. They are capable of direct reasoning and making literal interpretations of the results of scientific inquiry or technological problem solving.
Level 1 335	At level 1, students have such a limited scientific knowledge that it can only be applied to a few, familiar situations. They can present scientific explanations that are obvious and follow explicitly from given evidence.