

Dubai, UAE

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Introduction

Overview of Education System

The Emirate of Dubai presents a dynamic, complex, rapidly growing, and diverse educational environment, offering a complete education system from kindergarten through to higher education. Public schools are regulated, administered, and evaluated by the United Arab Emirates (UAE) Ministry of Education, which is also responsible for the design and implementation of the UAE curriculum.¹ The public school curriculum is described in further detail in the [United Arab Emirates \(UAE\) chapter](#) of the *TIMSS 2019 Encyclopedia*. Although education is provided free of charge for UAE nationals through public schools, colleges, and universities, most students, including the majority of UAE nationals, attend private education institutions. Private schools are regulated and evaluated by the Knowledge and Human Development Authority (KHDA).²

Dubai's private education sector accounts for 90 percent of the student population. The number of students in Dubai's private schools has expanded from 176,473 in 2009 to 289,195 in 2019.^{3,4} Of Dubai's current students, 88 percent are expatriates, and 58 percent of UAE national students opt for private school education. The KHDA is a regulatory authority that oversees the operation of 209 private schools offering 17 different curricula. The KHDA's aim is to ensure that all students in Dubai have access to diverse, high quality education that promotes happiness and well-being as much as academic achievement. The KHDA holds every school accountable for the quality of education and student outcomes through annual school inspections carried out by the Dubai Schools Inspection Bureau (DSIB).⁵

DSIB school inspections have been driven by key questions about student achievement, the quality of education, the extent to which schools are inclusive, the alignment of schools' goals with the National Agenda requirements of the UAE, and the effectiveness with which they are governed, led, and managed.

Inspection data indicates that the KHDA's policy of oversight and accountability is having a significantly positive impact on the quality of educational provision. Seventy percent of students attending Dubai private schools in 2018–2019 attended schools that the DSIB rated as "good" or better. This finding shows a significant improvement over 2008–2009 (when DSIB inspections first

started), when only 30 percent of students attended schools rated "good" or better. A 2014 World Bank report indicated that the KHDA's governance approach of transparency, accountability, and strong stakeholder participation has not only brought attention to the importance of school quality, it has resulted in higher expectations among education consumers and providers.⁶

Use and Impact of TIMSS

Dubai first participated in TIMSS in 2007 as a benchmarking participant. The assessment was administered at the same time that the DSIB began conducting qualitative evaluation of schools. The TIMSS results were shared with schools at a TIMSS conference designed for school principals and teachers. In addition, the KHDA website and various publications made the outcomes for Dubai available to the public.^{7,8}

Participation in international assessments indicated that there was a need for all schools to engage in regular international benchmarking, and that all schools needed to be made aware of student achievement shortcomings in the areas of learning that TIMSS assesses. The DSIB Inspection Handbook, used as the framework for school evaluation across all curricula (public and private), was amended to include references to international standards. In this way, schools were required to check student achievement and progress not only against the schools' own curriculum standards, but also against international benchmarks.

The Mathematics Curriculum in Primary and Lower Secondary Grades

Mathematics instruction in public schools follows the national model provided by the UAE Ministry of Education. Because a large proportion of students in Dubai attend private schools, summaries of the most widely used private school mathematics curricula in Dubai are provided below.

In schools that follow the National Curriculum in England, students in Grade 4 (Year 5), learn to use number systems more confidently; move from counting reliably to calculating fluently with all four arithmetic number operations (addition, subtraction, multiplication, and division); try to tackle problems with mental methods before using other approaches; explore features of shapes and spaces and develop measuring skills in a range of contexts; discuss and present their methods and reasoning using mathematical language, diagrams, and charts; and use and apply mathematics throughout the program of study. A number of key concepts from Grade 8 (Year 9) are designed to deepen and broaden students' knowledge, skills, and understanding. Students explore competence, creativity, applications and implications of mathematics, and critical understanding. Students also are required to master four key processes—(1) representing, (2) analyzing, (3) interpreting and evaluating, and (4) communicating and reflecting.⁹

In schools offering the International Baccalaureate, students taking the TIMSS 2019 assessment are in the Primary Years Program (Grade 4) and Middle Years Program (Grade 8). In the Primary Years Program, mathematics is taught partly through an interdisciplinary program with science, and partly as a discrete subject. At Grade 8, students study mathematics and usually

a combined science course. Inquiry, problem solving, and the application of mathematics are strongly emphasized, as is the acquisition of mathematical knowledge.

Schools offering a U.S. curriculum in Dubai adopt the standards of the state curriculum they follow. These standards define content expectations relating to concepts and skills, and schools tend to incorporate into the mathematics curriculum processes such as communication, reasoning, representation, connections, and particularly, problem solving. Students in these schools benefit from a connected, coherent body of mathematical knowledge and way of thinking.

Schools offering the Indian curriculum follow the Central Board of Secondary Education (CBSE) or the Indian Certificate of Secondary Education (ICSE).^{10,11} In primary classes, mathematical facts often are taught through rote learning. This method is expected to build a strong base for the effective formation of higher concepts. Developing rapid mental calculation skills is emphasized from an early age. From the eighth grade, students follow a course structure that includes number, algebra, geometry, and statistics. Although eighth grade courses include examples to give students an opportunity to practice mathematical knowledge and skills in context, most schools are promoting problem solving in real-life contexts.

The Science Curriculum in Primary and Lower Secondary Grades

Science instruction in public schools also follows the national model provided by the UAE Ministry of Education. Summaries of the most widely used science curricula in private schools in Dubai are as follows.

In schools that follow the National Curriculum in England, students in Grade 4 (Year 5) learn about a range of living things, materials, and phenomena; begin to make connections among ideas and to explain things using simple models and themes; apply their knowledge and understanding of scientific ideas to familiar phenomena, everyday things, and personal health; conduct investigations working alone and with others; and begin to use a range of reference sources in their work. Students at the secondary level (Key Stage 3), which includes Grade 8 (Year 9), are engaged at many levels, linking direct practical experience with scientific ideas. Experimentation and modeling are used to develop and evaluate explanations, encouraging critical and creative thought. Students learn to question and discuss issues that may affect their own lives, the direction of society, and the future of the world.¹²

In schools offering the International Baccalaureate, students taking the TIMSS assessment are in the Primary Years Program (Grade 4) and Middle Years Program (Grade 8). In the Primary Years Program, science is taught in an interdisciplinary program with mathematics, not as a separate subject. Eighth grade students usually take a combined science and mathematics course. Inquiry, problem solving, and the application of science are strongly emphasized, as well as the acquisition of scientific knowledge. The International Baccalaureate program expects that students will have opportunities to act as scientists rather than learn about science.¹³ As a consequence, students may be less familiar with a large body of factual content knowledge but skilled in the process of scientific inquiry.

Similar to the mathematics context, most U.S. schools in Dubai adopt a set of curriculum standards for science relevant to a specific state, and adapt these standards to meet their students' needs.

In Indian curriculum schools (CBSE and ICSE), science plays an important role and is seen as developing students' cognitive, affective, and psychomotor abilities. Emphasis is placed on cultivating a spirit of inquiry, creativity, objectivity, and aesthetic sensibility. In the upper primary stage, students engage with the processes of science to develop such skills as observing, recording, drawing, tabulating, and plotting graphs. By Grade 8, abstraction and quantitative reasoning occupy a more central place in the teaching and learning of science. At this stage, while science is still an integrated subject for all students, the separate disciplines of physics, chemistry, and biology begin to emerge. Also, formative and summative assessments include a practical element.

Professional Development Requirements and Programs

Graduates of education colleges complete significant periods of practical experience as a fundamental part of their studies. At some colleges, students devote several weeks each semester to training in schools through a student teacher program, while other colleges allocate the final semester for this purpose. Graduates do not receive any further subject-based training once placed in a teaching position. Nearly all teachers in Dubai's private schools received their qualifications from overseas educational institutions.

Monitoring Student Progress in Mathematics and Science

Public schools follow the UAE's national system of assessment, which includes midyear and end of year examinations in Grades 1 to 12. The end of year assessments are integrated across each educational zone, and all of them are linked to Ministry of Education objectives. Most of these examinations are in written form, and only a few require performance assessments.

Private schools throughout Dubai adopt the monitoring and assessment procedures related to their specific curricula. Many schools adapt the national assessment procedures of their country to suit the needs of their student population. For example, most U.K. schools adopt the English National Curriculum assessment processes. U.K., U.S., International Baccalaureate, and Indian schools participate in external national or international examinations relevant to the curricula offered. Some of the U.S. schools participate in international benchmark tests in the upper grades relevant to further and higher education placement.

Special Initiatives in Mathematics and Science Education

In 2012, the KHDA introduced the "What Works" initiative to bring all schools together in a collaborative platform. What Works is designed by schools to benefit schools. More than 15,000 teachers have attended 500 workshops at 18 What Works events including events focusing on mathematics and science.

Suggested Reading

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- ¹³ International Baccalaureate Organization. (2019). *The IB primary years programme*. Retrieved from <http://www.ibo.org/en/programmes/primary-years-programme/>