Preface

The following paper is a part of an engagement between the Saudi Arabia Ministry of Education (MoE) and Evidence for Policy Design (EPoD) at the Harvard Kennedy School (HKS). The outcomes of the first year of the MoE–EPoD engagement have included: 1) a briefing session in Riyadh, where EPoD and MoE counterparts identified key themes and mutual areas for policy research collaboration, as laid out in this paper; 2) an evidence-based policy workshop at Harvard Kennedy School, which provided MoE leaders and education practitioners with a high-quality and substantive overview of evidence-based approaches to decision making and policy design; and 3) an education policy symposium, held at HKS, which brought together key stakeholders in education reform, including senior policymakers from MoE and leading researchers with an interest in pursuing new projects in Saudi Arabia. The first phase of this engagement has served as a baseline discovery, agenda-setting, and team-building stage for the Harvard and MoE teams to develop a mutual vision and objectives for a more intensive second phase and a long-term partnership.

The purpose of this white paper is to provide an analytical overview of the Saudi education landscape along four key themes identified by the MoE, to present the relevant academic literature in these areas, and to determine the scope for collaboration between policymakers and researchers to enable evidence-driven education reform in Saudi Arabia.

About Evidence for Policy Design

The EPoD program at HKS leverages leading researchers at Harvard University and other prominent U.S. and international universities to partner with governments around the world in using theory and empirical evidence to design, implement, test, and refine high-potential policy interventions. EPoD envisions a world where evidence drives continuous improvement in states, systems, and societies for better lives. The faculty, research fellows, staff, and students who make up EPoD believe the best way to foster economic and social transformation is to work directly with those who make decisions and implement policy. We engage with policy actors through:

Rigorous, on-the-ground embedded research
EPoD is engaged in deep, multi-year engagements with policymakers and practitioners to design, evaluate, and re-design policy to better serve citizens. We utilize a process of joint identification of policy issues with counterparts – this way, our research speaks specifically to current priorities. Through large-scale field experiments and other rigorous methods, we offer concrete insights to improve policy.

Innovative, evidence-driven capacity building
We equip policymakers and practitioners with the skills and knowledge to incorporate evidence into policy design and implementation. We do this through classroom and online instruction, policy dialogues, direct collaboration on policy research, and capacity building through ‘learning by doing’. EPoD is becoming a hub of innovative pedagogy, using data-driven methods to deliver the tools and insights of economic research to a new generation of leaders.

EPoD’s Policy Research Engagement with the Ministry of Education, Kingdom of Saudi Arabia

Saudi Arabia has committed to an ambitious agenda of improvements in educational quality and human capital development that can support a diverse and vibrant economy. There is much to be done, but there is also reason for optimism: the government has shown tremendous commitment to addressing the increasing demand for education by allocating nearly a quarter of its annual budget to improving education delivery and
quality. These investments span the entire education ecosystem, including primary and secondary schools, universities, and vocational training providers. The MoE is leading this transformation in education and fostering the Kingdom’s transition to a knowledge-based economy. The collaboration between EPoD and MoE seeks to bolster the reform agenda by engaging with the world’s leading experts on education policy while building local Saudi capacity for empirical policy research. This is a long-term collaboration to unleash the full potential of Saudi human capital. Phase I of this engagement has focused on background analysis and agenda setting to ensure program deliverables are aligned with the Kingdom’s reform agenda. In Phase II, we propose to implement the agenda established in Phase I, not only through direct policy research collaborations and capacity building, but also through exchange and dissemination activities.
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<tr>
<th>Abbreviation</th>
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<tr>
<td>AAP</td>
<td>American Academy of Pediatrics</td>
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<tr>
<td>CBT</td>
<td>Computer Based Test</td>
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<tr>
<td>CCDBG</td>
<td>Child Care Development Block Grants</td>
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<td>CED</td>
<td>Career Educational Development</td>
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<tr>
<td>CoE</td>
<td>College of Education</td>
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<tr>
<td>DEC</td>
<td>Division for Early Childhood</td>
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<tr>
<td>EACEA</td>
<td>Education, Audiovisual and Culture Executive Agency</td>
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<tr>
<td>ECE</td>
<td>Early Childhood Education</td>
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<tr>
<td>ECERS</td>
<td>Early Childhood Environment Rating Scale</td>
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<td>ETEC</td>
<td>Education and Training Evaluation Commission</td>
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<td>EPF</td>
<td>Education Production Function</td>
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<td>EPoD</td>
<td>Evidence for Policy Design</td>
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<td>FAC</td>
<td>Family Affairs Council</td>
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<td>GaStat</td>
<td>General Authority for Statistics</td>
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<td>GAT</td>
<td>General Aptitude Test</td>
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<td>GCC</td>
<td>Gulf Cooperation Council</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>GPA</td>
<td>Grade Point Average</td>
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<td>HKS</td>
<td>Harvard Kennedy School</td>
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<td>HRDF</td>
<td>Human Resources Development Fund</td>
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<td>ITCs</td>
<td>International Technical Colleges</td>
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<td>ITEX</td>
<td>International Invention, Innovation, and Technology Exhibition</td>
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<tr>
<td>KASP</td>
<td>King Abdullah Scholarship Program</td>
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<tr>
<td>MENA</td>
<td>Middle East and North Africa</td>
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<td>MLSD</td>
<td>Ministry of Labor and Social Development</td>
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<td>MoE</td>
<td>Ministry of Education</td>
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<tr>
<td>MSALT</td>
<td>Michigan Study of Adolescent Life Transition Study</td>
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<td>NAEYC</td>
<td>National Association for the Education of Young Children</td>
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<td>NCEPD</td>
<td>National Centre for Educational Professional Development</td>
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<tr>
<td>NCES</td>
<td>National Center for Education Statistics</td>
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<tr>
<td>NLSY</td>
<td>National Longitudinal Survey of Youth</td>
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<td>NTP2020</td>
<td>National Transformation Program 2020</td>
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<tr>
<td>OECD</td>
<td>Organization for Economic Cooperation and Development</td>
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<td>PIRLS</td>
<td>Progress in International Reading Literacy Study</td>
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<td>PISA</td>
<td>Programme for International Student Assessment</td>
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<td>PPP</td>
<td>Public-Private Partnership</td>
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<td>PPT</td>
<td>Paper and Pencil Test</td>
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<td>SAGIA</td>
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<td>SAT</td>
<td>Scholastic Aptitude Test</td>
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<td>SDGs</td>
<td>The United Nations Sustainable Development Goals</td>
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**Notes:**
- SEAS: School Emphasis on Academic Success
- SSS: Saudi Skills Standards
- STEM: Science, Technology, Engineering, and Mathematics
- TCT: Teacher Competency Test
- TIMSS: Trends in International Mathematics and Science Study
- TIMSF: Taiwan International Science Fair
- TVET: Technical and Vocational Education and Training
- TVTC: Training and Vocational Training Corporation
- UAE: United Arab Emirates
- UNESCO: United Nations Educational, Scientific and Cultural Organization
Executive Summary

Education is a fundamental building block for the economic growth and development of a nation. It promotes a prosperous society and impacts the very fabric of a nation’s values and aspirations, as well as its economic potential. Yet, world over, education policy is also one of the most challenging areas of reform. Saudi Arabia’s Vision 2030 aims to address this challenge head on, promising that “we will not rest until our nation is a leader in providing opportunities for all through education and training” and highlighting the critical importance of “an education system aligned with market needs and creating economic opportunities.” Although effective education policymaking is indeed challenging, education is also an area where the use of advanced analytical tools and rigorous data collection has been powerful and highly beneficial. In countries like the United States, a vast body of education research has helped inform the design of effective education policies and practices to improve access to quality education. Critical to this effort has been the realization that simply adopting ‘best practices’ does not work. Instead, effective policies and programs must be tailored to the local context and continuously evaluated and improved through rigorous analysis. This paper aims to do exactly this, by combining contextual perspectives and research insights to present an agenda for refocusing policy and research efforts on achieving true impact on the ground, as an ongoing effort.

Navigating this white paper

The purpose of this paper is to provide researchers and policymakers with a blueprint through which they can work together to design research and policy that is both highly effective and far-reaching. This paper dedicates one chapter to each of the following four important themes in the educational landscape of Saudi Arabia, all of which were identified by MoE counterparts mindful of the Vision 2030 priorities: Early Childhood Education, Quality Education for All, Teachers in Saudi Arabia, and Tertiary Education Pathways and Skills in a Changing Economy. Each of these chapters can be read independently, or all four can be read together to create a fairly comprehensive picture of the state of education reform in Saudi Arabia today.

The insights in the paper are based on analysis of existing data, rigorous research, and discussions between the EPoD team and education stakeholders in Saudi Arabia. While the research team underwent extensive efforts to ensure thoroughness of the information collected and validity of data, in some instances, more extensive analysis was limited by unavailable or incomplete data. It is valuable for policymakers and researchers to know what programs are underway in Saudi Arabia and what data exists to conduct thorough analysis for enabling evidence-based education reform. To do so, all education stakeholders in Saudi Arabia should adopt a transparent and systematic data-sharing mechanism. The appendices to this paper include a comprehensive and meticulously curated list of initiatives, programs,
and data relevant to education in Saudi Arabia. The list of references used throughout the paper can also be found in the appendix, and may serve as a useful reference for the Saudi education context and associated education research.

Each chapter of this paper opens with an introduction, including a brief background on the theme; the primary challenge that the chapter addresses; the economic theory that is used to address the primary challenge; the key actors within the theme; and finally, a description of how to navigate the individual chapter. The bulk of the chapter examines the theme within the Saudi context, and then moves to extracting relevant lessons from academic research and literature. The advantage of this structure is that researchers unfamiliar with the Saudi landscape are able to learn about the context, and policymakers new to this type of academic literature can gain some useful insights from research. The final part of each chapter critically examines what topics within the theme are most promising for future policy research collaborations.

Each of the four themes is briefly presented below.

**Early Childhood Education**

Despite government efforts to ensure that most children in Saudi Arabia have access to nurseries and kindergartens, enrollment in early childhood education remains low. The main question we explore in this chapter is: why does enrollment remain low despite the policy push for near-universal access to kindergarten? We take the perspective of parents considering Early Childhood Education options for their children to answer this question.

Research evidence has found that the highest rate of return to Early Childhood Education (ECE) comes from investing as early as possible in a child’s life, especially in the case of at-risk children. ECE has immediate effects in terms of gains in cognitive and non-cognitive skills, as well as indirectly in terms of greater academic and employment success later in life. In general, ECE services must meet minimum quality standards in order to achieve positive developmental effects.

At about 17 percent, current kindergarten enrollment in Saudi Arabia falls below the international average of 49 percent (World Bank 2016). The policy agenda for kindergarten in Saudi Arabia is moving in the right direction, as the National Transformation Program (NTP) aims to raise kindergarten enrollment to 30 percent by 2020, and 1,500 new kindergarten schools and nurseries are expected to be opened to meet this target.
In Saudi Arabia, kindergarten is largely female-led; not only are all kindergarten teachers and staff women, but mothers often provide the impetus for their children’s enrollment in kindergarten. As shown in the figure below, the increase in female labor force participation is supporting increased kindergarten enrollment, as mothers seek childcare options.\(^1\) Going forward, there should be a focus on provision and measurement of quality kindergarten, involvement of parents in kindergarten policy and practice, and development of effective Public Private Partnership (PPP) arrangements, with an awareness of local societal and cultural values.

The success of ECE policies and interventions in improving child outcomes depends largely on understanding the constraints, requirements, and perceptions of parents. Based on this, our analytical framework for this chapter comprises of two parts. In the first part, we discuss the options for quality kindergarten schooling available to parents across Saudi Arabia. In the second part, we discuss the demand-side factors that influence Saudi parents’ decisions to enroll their children in kindergarten.

I. What options do parents currently have to enroll their children in kindergarten?

At present, there are limited options for parents who wish to enroll their children in kindergarten. Public kindergartens have long waiting lists and accept students on a first-come, first-served basis. While private schools abound, they are not an affordable option for many low-income households. Some initiatives can help increase kindergarten enrollment for those who might have difficulty accessing it, such as the existing voucher system, ‘Qurrah’, run by the Ministry of Labor and Social Development. The program covers up to $213 (SAR 800) in childcare services for working mothers.

Disadvantaged children, in particular, benefit from quality education, which can help them narrow academic achievement gaps later in life. Kindergarten provision is particularly low in

\(^1\) The figure provides pre-primary education gross enrollment ratios as provided by the World Bank - World Development Indicator estimates. The estimates provided differ from the figures estimated by the Ministry of Education. In the report, we rely on the Ministry of Education enrollment rates; however, to allow for analysis of trends over time, we used World Bank estimates in this figure, as Ministry of Education pre-primary enrollment data was only available for one year.
some regions of Saudi Arabia, especially in rural areas. Research indicates that early investments in education have much larger benefits for children from disadvantaged backgrounds than their richer peers. While the goal of achieving near-universal enrollment in kindergarten is significant, the importance of ensuring that children from all socioeconomic backgrounds and abilities have access to education must also be taken into account.

Providing high-quality kindergarten can only be achieved if ‘high quality’ is clearly defined and measured. There are no national level assessments of kindergarten schools or students, which makes it difficult to determine the effect of kindergarten on aspects like school readiness. The recent adoption of the Early Childhood Environment Rating Scale (ECERS) standards to evaluate the quality of schools is a promising step in this direction. Academic literature has formalized a few different kinds of quality, such as structural quality (based on school and teacher inputs), process quality (based on classroom interactions), and quality in terms of outcomes (based on cognitive achievement, socioemotional learning, and child health), which can guide the process of defining and measuring quality provision of kindergarten services.

II. How do parents decide whether or not to enroll their children in kindergarten?

The rate of enrollment in kindergarten is affected as much by parental factors and societal perceptions towards ECE as it is affected by the availability of kindergarten. Parental socioeconomic status varies across the Kingdom; it can influence parents’ beliefs regarding the value of kindergarten, informing their eventual decision whether to enroll their children. Some parents may not be inclined to enroll their eligible children in preschool due to cultural traditions or community pressures, which favor keeping children with the stay-at-home mother. It is possible that more disadvantaged families are not only the ones who choose against sending their children to kindergarten, but also the ones unable to provide learning resources for them at home, leading to poor academic outcomes and higher educational inequality.

Low enrollment may also be due to a lack of awareness among parents of the benefits of kindergarten enrollment. Historically, kindergarten has been viewed as a childcare option, rather than as a way of building children’s skills (consequently, as female participation in the labor force increased, so did kindergarten provision and enrollment). If parents are un convinced about the value of kindergarten, they might not demand good quality kindergartens and instead choose to leave their children at daycare facilities or with nannies. The Family Affairs Council (FAC) and the MoE’s ‘Irtiqaa’ program are both working on motivating Saudi families to send children to kindergartens, as well as increasing awareness on the long-term importance of kindergarten.
On the other hand, even if parents do recognize the importance of kindergarten in child development, they may not have adequate information about the quality of the options available to them. This is especially true for families from low-income backgrounds, or those who do not have strong social networks to garner relevant information on kindergartens. Research finds that providing parents with better and more thorough information makes it easier for them to compare education providers. The MoE’s new accreditation process for kindergartens may help signal kindergarten quality to parents. Economists have worked extensively with information interventions, and research indicates that providing clear evidence to parents on quality of services or educational outcomes can be further effective in addressing such information asymmetries.

III. What are the potential areas for policy research collaboration?

Future policy research collaborations should focus on developing the tools and knowledge necessary for ensuring that kindergarten quality develops in parallel with the planned increases in the quantity of kindergartens. A preliminary list of topics meant to inspire future policy research collaborations is provided below.

**Expanding inclusive ECE supply:** Policymakers and researchers should explore the supply-side barriers to kindergarten enrollment for disadvantaged and special children. For example, one idea is to jointly design and test targeted services for at-risk children and families who have additional needs that go beyond the universal services. As the MoE advances with private sector expansion in kindergarten provision, researchers can design experiments to determine appropriate PPP contracts and cost-efficient incentives for private players. Future collaborations can also determine parent willingness-to-pay for kindergarten by evaluating the voucher system, or the ‘Qurrah’ program, to eventually design solutions that incentivize enrollment by removing fixed costs and access barriers for low-income families, while maximizing program spending efficiency.

**Ensuring ECE quality:** A potential starting point would be to collect and analyze data on the ECERS assessment across Saudi Arabia to explore regional variations in quality, inform the design of robust mechanisms for continuous monitoring of quality kindergarten services, and test ways to improve coordination between kindergarten stakeholders. Future collaborations should identify ways for measuring and improving school readiness and for tracking the cognitive and socioemotional skill development of all children.

**Promoting parental engagement and demand:** Finally, future policy research partnerships should identify factors that influence parental perceptions and decisions, in order to identify
the most effective avenues for generating awareness and participation in kindergarten. Creating inclusive school environments, involving both parents (not just the mothers), and building meaningful partnerships with families through school management committees, are all potential policy options. Researchers could take well-established findings from across the globe on parental factors that influence early childhood development, and then customize and test them in the Saudi Arabian context to inform educational reform.

Quality Education for All: Defining Quality, Testing, and Reforms

Returns to education depend not only on how much education an individual receives, but how good that education is. Any discourse on quality education necessitates incorporating a child’s perspective and addressing their social, emotional, mental, cognitive, and non-cognitive development. Such a perspective allows policymakers and schools to align, integrate fully, and work collaboratively with children, parents, and communities. The main question we explore in this chapter is: How can the education system in Saudi Arabia provide high-quality education for all children, regardless of their differences?

Forty percent of the population in Saudi Arabia is under the age of 20. The accomplishment of the Kingdom’s Vision 2030 objectives relies on the educational success of this future workforce. The notion of quality education has traditionally been synonymous with high test scores and excellent academic performance. As shown in the figure below, Saudi Arabia has fared lower than international averages on Trends in International Mathematics and Science Study (TIMSS) and Progress in International Reading Literacy Study (PIRLS) tests, and had the second lowest scores amongst Gulf Cooperation Council (GCC) nations. It is imperative to define and identify the exact factors that influence student development in the Kingdom.

First, what definition of educational quality can be established to take into account the factors that enable a child to become a successful and well-rounded citizen? Second, how can national measurement systems track a variety of student outcomes and educational quality? Students arrive in school from a variety of backgrounds, have distinct school and classroom experiences, and attend school in different regions, which affects their test scores and overall development – so finally, how can these factors be incorporated in the discourse of quality education? Our analytical framework for this chapter explores these three questions.
I. How do policymakers define and measure quality of education in Saudi Arabia?

In the lack of a contextualized, canonical definition for quality education, the present understanding of quality is often limited to levels of measurable educational outcomes in Saudi Arabia. Results of both international level tests, TIMSS and PIRLS, depict a grim picture of Saudi Arabia’s education quality. Strong national level testing can assist policymakers to determine the reasons for good or bad performance on international tests. Unfortunately, while students in the Kingdom participate in school-level assessments, these tests are not standardized and vary across schools. Moreover, the average scores attained in these tests are usually very high (for instance, 8th graders who have their numerical scores reported in the educational data system ‘Noor’ scored 82.5 percent on an average each year from 2013 to 2017). In the lack of robust supporting data, these trends do not illustrate heterogeneities and are unable to provide a correct and consistent picture of student learning levels across the country.

Variation in the General Aptitude Test (GAT), a university admission exam, indicates varying performances based on gender and region. While the GAT is not compulsorily taken by all students, it still provides some insights into the inferential and inductional ability and competency levels of school-leavers. GAT results show variations in scores across gender (as seen in the figure), region, and school, reflecting the need for tailoring education policy to fit the unique needs of different groups. The MoE has a program that is looking into the gap between the outcomes of secondary-level students and the results of the GAT, which can be a promising effort for comparing results across education levels.

International tests are useful as a benchmark for quality, but an over-reliance on them may lead to policy bias towards select subject domains. Saudi Arabia’s performance below international averages has motivated calls for improving education quality. However, such tests usually emphasize Science, Technology, Engineering, and Mathematics (STEM), reading, or writing skills. While development in such subjects is an important target, following the focus of international tests too closely may have led to a bias in the field composition of national-level enrichment programs. For example, while there is programmatic focus on STEM
teaching alongside competitions like Olympiads for science and math, there is relatively lesser focus on improving student achievements in social sciences, arts, or humanities - which are crucial areas for the development of a 21st century knowledge economy that relies more on the intellectual capital of its workers rather than natural resources for economic growth.

There is a need for developing multidimensional measures for non-cognitive outcomes to improve the quality of education in Saudi Arabia. Academic research shows that in addition to test scores, non-cognitive skills and socioemotional competencies must be taken into consideration when exploring the effects of quality education on producing successful and well-rounded citizens. Development of soft skills like persistence, leadership, interpersonal skills, teamwork, work ethic, and self-awareness is usually relegated to extracurricular activities and is missing from curricular content or testing practices in Saudi Arabia. While the government has made efforts to include initiatives that foster non-cognitive skills, such as the Activity Hour, the present education system lacks ways to measure such skills, which is critical in understanding the efficacy of the existing initiatives.

II. What national assessment systems are used for testing education quality in schools in Saudi Arabia?

The lack of standardized national tests at the school level makes it difficult to track the progress of students as they move through school. Public schools in Saudi Arabia rely on teacher-designed examinations across all education levels. Such tests are generally not considered a reliable way of comparing performance, as they vary by teacher and may be subject to the resources available to them within the school. The validity of such tests is also likely to be low and to mainly reflect rote-memorization, especially due to the lack of adequate accountability measures—many teachers may ‘teach to the test’ in order to minimize the effort of designing strong tests. Setting up centralized tests (2017) is a promising effort by the Department of Education (Boys) to facilitate improvements in the assessment system of Saudi Arabia.

The problem is further exacerbated in the lack of a robust and comprehensive educational database. The current data systems in Saudi Arabia are unable to measure and track important cognitive and non-cognitive student outcomes. This makes it difficult to determine true educational quality and student progress across years or levels of schooling—from early childhood, up to 12th grade, and beyond to tertiary education. This leads to poor accountability through the existing testing system. Education and testing experts emphasize the need to rethink the current test-based accountability system design by emphasizing student growth, rewarding schools that are growing and improving over time, and downplaying school rankings.
Academic research on the ‘5 Cs’ of test design and validation can provide an answer to questions about whether school-level tests are a good measure of skills. In Saudi Arabia, there is a lack of robust standards for design and evaluation of school level tests, testing practices, and effective test use. It cautions to keep in mind the content, cognition, coherence, correlation, and consequences with regards to school-level tests in order to ensure that they accurately reflect students’ skills in the Kingdom.

III. What are the factors that influence quality education for all in Saudi Arabia?

The economic literature on the Education Production Function emphasizes the importance of accounting for inputs when determining the effectiveness of the educational process in affecting student outcomes. These inputs include both parental- and school-level factors.

*The background characteristics of parents, as well as the environment that parents foster for their child at home, play a large role in student learning.* Wealthier parents might have access to more schooling options, be able to afford private tutoring, and provide learning support to their children. Parents with higher education levels may be able to push their children to achieve more academically, help them with their schoolwork, and teach them how to navigate the educational system. Data on regional variations in Saudi Arabia indicates that the less populous regions tend to have lower parental education levels, thus requiring greater educational policy attention.

*Saudi Arabian families assess a boy’s ability and talent quite differently than they do a girl’s.* Parental perceptions of a child’s ability and talent, alongside their aspirations for the child, also affect student outcomes. Students move through the schooling system with the constant influence of family expectations. Heads of households surveyed in the Saudi Arabia Education and Training Survey (2017) overwhelmingly reported believing that boys and men are good at sports, whereas girls and women are good at fine arts. These parental perceptions can, in turn, influence student self-perceptions, and consequently their future career choices.

*School environment and safety are important for high education quality and high achievement.* Academic research shows that school-level factors, such as environment, play a role in determining the quality of education. Students thrive in a safe and nurturing environment, and the MoE’s training program to improve the personal safety of children is a step in the right direction. School safety varies across region and gender in Saudi Arabia, but the extent to which this affects student performance is understudied.
Extensive use of Information and Communications Technology (ICT) at home makes it a promising tool for educational dissemination. Data shows that most Saudi households use educational tools at home, as shown in the figure. Extensive use of ICTs is found across all regions of the country. Given the familiarity of students with ICT, it is a potentially powerful educational tool for schools to use for mass dissemination of quality educational services for all. Blending ICT within the educational system offers the advantages of both classroom and online learning: it reinforces and encourages autonomy and self-learning, while reducing learning costs and facilities.

IV. What are the potential areas for policy research collaboration?

Collaborations between researchers and policymakers should include defining what high-quality education means, designing ways to measure and benchmark student performance, and determining the drivers of education quality and student performance. A preliminary list of topics, meant to inspire future policy research collaborations, is provided below.

Defining quality education: Overall, the discourse on quality measurement should shift from mainly addressing students’ cognitive outcomes to fostering holistic child development, so children grow to become well-rounded, responsible, and successful citizens. This would involve identification and measurement of a variety of skills, from basic socioemotional competencies to 21st century skills. What are the soft skills that should be considered when measuring student progress? What are the constructs and instruments that can be used to measure such skills (like the Big 5 personality inventory or the Reading the Mind in the Eyes Test - RMET), and are they valid and effective for robustly measuring non-cognitive skill development of Saudi students? Once quality education is defined, researchers can help to design a school evaluation system that tracks school performance based on established quality metrics. These are some other questions that could be jointly addressed.

Measuring and tracking student performance: Setting up a robust data infrastructure and measurement systems is one of the most critical areas for future policy-research engagements. Future collaborations can also look into the reliability and validity of the existing tests in Saudi Arabia. One idea is for researchers to work with education practitioners
to determine ways of linking the Saudi school test score distributions, or the GAT score distributions, to a common scale using psychometric analysis, alongside designing more sophisticated instruments and integrated databases. Looking at the existing guidelines and tools for student assessments and contributing to the further development of testing procedures is important for enabling evidence-based policymaking in Saudi Arabia.

**Identifying and assessing drivers of quality and performance:** Collaborations can shed light on the extent to which parent and school characteristics affect the academic performance of a child in Saudi Arabia. For example, one idea is to explore the reasons for the gender gap in student performance in Saudi Arabia across different academic and extracurricular fields. This may include evaluating students’ talent perceptions and motivation levels. Finally, policy research partnerships can also venture into the use of educational technology, for mass outreach of quality services alongside evaluating the costs and benefits of such innovations, to ensure that efforts are sustainable.

**Teachers in Saudi Arabia**

Teachers constitute a considerable part of the workforce in Saudi Arabia. They are responsible for educating the large, predominantly young student population in the Kingdom, and improving student performance to meet or exceed international averages. Research shows that a good quality teacher can inspire students, instill confidence, and improve learning. The government recognizes this, and Saudi Arabian teachers are educated, well-paid, and respected. The main question we explore in this chapter is: Do teacher quality and effectiveness meet the levels that are needed in Saudi Arabia to foster its transition into a knowledge economy? We take the perspective of a K–12 teacher to understand and answer this question.

To ensure high-quality teaching and learning, Saudi Arabia needs high-quality teachers. Academic research indicates that job performance is best predicted by a combination of teacher ability and effort. Simply put, a teacher’s quality could be determined through three channels: a candidate’s ‘innate ability’, which is internal, largely fixed, and uncontrollable; learned competencies, or ‘teachability’, for skills valued by the teacher labor market (e.g. technical knowledge and non-cognitive skills such as work ethic); and ‘personal effort’, which is internal, changeable, and controllable. These quality attributes play different roles as a teaching candidate makes career choices and moves through the profession.

Based on this, our analytical framework for this chapter comprises three parts. The first part is an exploration of the reasons why a potential candidate would want to choose the teaching profession as a career and go through the selection process. The second part discusses how to exploit the teachability of a candidate through on-the-job training. The third part explores how to keep teachers motivated and push them into exerting high effort to perform well while on the job.
I. What are the factors that determine teacher selection in Saudi Arabia?

Teaching is a prestigious and well-paying profession in Saudi Arabia, but high-quality candidates may not be drawn to it. The public sector in Saudi Arabia provides the dominant form of employment for teachers and offers both attractive pecuniary and non-pecuniary benefits. Research confirms that although teaching offers high wages and job security, the lack of a competitive hiring process could still lead to a large pool of low-quality workers. Low performance in the teacher qualification test, Kifaiyat—in which only 23 percent of the candidates who applied between 2012 and 2017 received a ‘high’ score² of 70 percent or above—is indicative of low candidature quality.

The ‘consecutive system’ of teacher training and preparation has the potential to improve teacher quality. The current supply of candidates into the teaching profession consists mainly of recent graduates of Colleges of Education (CoEs) and university graduates. Opening the profession to university graduates in addition to CoEs is a new policy move under the ‘consecutive system’ of teacher training and preparation. The previous ‘concurrent system’ restricted the new teacher pool to graduates of CoEs. While this remains to be tested and refined, the move to the new consecutive system could prove to be an important step towards raising the quality of candidates who choose the teaching profession by introducing both more flexibility and competition.

II. What are the opportunities for on-the-job training and development for teachers?

There has been an increase in the opportunities for teacher training, but evidence of their efficacy is unclear. The MoE has been investing to improve on-the-job training through creating opportunities for teachers to engage in apprenticeships and online training programs to improve their subject-area knowledge. However, research evidence on the efficacy of

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² Analysis of the Kifaiyat test scores is based on data received from ETEC, while information on threshold for ‘high’ score is based on discussions with Ministry of Education officials. For further details, please see Footnote 29.
training on changing teacher behavior is ambiguous, and depends upon the training context and pedagogy. Monitoring and evaluation of teacher training programs is required to assess the impacts of these programs on teacher performance, in order to determine which programs should be scaled and how they can be improved.

**There is a need for collaborative capacity building that trains teachers on the effective usage of ICT for classroom teaching and learning.** Although the use of ICT should not be the only strategy in improving classroom learning, there are several ICT expansion initiatives underway throughout the education system, such as Future Gate and the practice of giving out iPads in schools. However, a lack of adequate support in using technology was cited by nearly half of teachers in TIMSS (2015) as a moderate or serious problem in their schools. ICT expansion policies should include supplementary teacher training on how to best leverage such tools for enhanced learning. Here, research shows that collaborative, interactive, and goal-oriented training pedagogies could be most effective.

### III. What are on-the-job incentives offered to teachers, and what makes them stay in the profession?

**Saudi teachers require incentives that provide motivation and enhance accountability.** Regardless of the teacher quality that is inducted and trained, it is imperative to create an incentive structure that keeps all teachers motivated to exert ‘high personal effort’. These incentives must accomplish two things: establish credible consequences for low-performing teachers, and introduce clear and transparent rewards and recognition for high-performing teachers. The MoE has taken a first step by recognizing the need for programs that motivate teachers through the introduction of programs like the Excellence Award, which rewards exceptional achievements in the field of education. However, implementation of these programs is not an end result. There is a need for robust evaluation to ensure that the programs meet the objective of positively incentivizing teachers. Moreover, work by Saudi researchers show that teachers often lack enthusiasm and desire for teaching and participating in supervisory processes (Altayar 2003; Almudarra 2017). Because teaching is a steady public-sector job with high job security, some incentives could actually deter high effort in Saudi Arabia. A lack of monitoring and accountability systems makes it difficult to identify ‘what works’ in the Saudi context to incentivize better teaching and learning.
Effective incentives could range from individual to group-oriented rewards, covering a mix of pecuniary and non-pecuniary benefits. Economic theory shows that positive incentives and robustly defined teacher contracts encourage teachers to continue to put effort into excelling at their job. Internationally evaluated reward systems include in-kind rewards, merit-based pay, individual vs. group prizes, and flexible work hours, as well as disincentives, such as penalties and the threat of dismissal. Recent academic work in this area finds that effect sizes of the various types of teacher incentives are highly sensitive to program design and study context. Research on the impact of teacher rewards is limited in Saudi Arabia; hence, there is a need to create opportunities to design and study what systems can help incentivize teachers in the Kingdom.

IV. What are the potential areas for policy research collaboration?

Potential policy research collaborations should aim to determine ways to select and retain a high-quality teaching workforce – with high ability, ‘teachability’, and motivation to exert high effort. High-quality teachers today not only have the potential to improve the outcomes of current students, but also feed into encouraging a pool of high-quality teachers in the future. A preliminary list of topics meant to inspire future policy research collaborations is provided below.

**Screening high-ability teaching candidates:** Factors such as teacher education and certification procedures under the new consecutive system play a role in the supply decisions of potential teachers. Economists, education researchers, behavioral scientists, and psychometricians can help to design, test, and refine locally relevant solutions to enhance teacher screening procedures. For example, future collaborations could undertake a detailed study of the Kifaiyat data to evaluate hiring outcomes or measure impacts and refine the licensure policy for hiring teachers.

**Training teachers effectively:** In terms of on-the-job capacity building, collaborations can be set up to design rigorous impact evaluation studies of existing in-service professional development programs to determine the factors that lead to heterogeneous training impacts. For example, one potential avenue would be to identify the effectiveness of innovative interventions like the Khuburat program. Another idea could be to undertake need assessments, using data from teaching staff surveys, to identify areas of professional learning that are most needed and desired by teachers and school leaders, especially in light of present transitions in Saudi Arabia given the Vision 2030 goals. One idea is to target teachers with effective professional development programs to enhance their skills in using ICTs, as well as in conducting measurement and evaluation of students’ learning outcomes.
Creating incentives for high-quality teaching: Collaborations should first establish which incentives work in Saudi Arabia. For example, one idea is to examine pecuniary and non-pecuniary design structures to test what specific form of each reward system (such as individual vs. group incentives, or objective vs. subjective structures) would work best in the Saudi context. Here, the one-size-fits-all approach may not necessarily work. Such research would require careful experimentation and iteration to identify the incentive mechanisms that work best in different contexts (type of school, level taught, or region), and to understand how these mechanisms need be tailored to suit each specific context.

Tertiary Education Pathways and Skills in a Changing Economy

Graduates of tertiary-level education face the highest unemployment rates in Saudi Arabia’s growing economy. This chapter seeks to answer: why do tertiary education pathways not lead to a higher probability of employment in the Kingdom, as expected? We consider this question from the perspective of fresh graduates of university and technical colleges, as well as from the perspective of the Ministry of Education.

Saudi Arabia has a young and growing population. The Kingdom is at a unique stage of transition and opportunity, where efficient skilling systems and a well-trained workforce can enable and enhance economic growth. Labor market inefficiencies, however—in terms of skill gaps and mismatches between job-seeker’s expectations and employer needs—presently exist alongside a persisting high rate of unemployment. Unemployment is especially prevalent for high-skilled workers. According to data from the General Authority for Statistics, among Saudi citizens aged 15+ in 2018, 13.4 percent of tertiary graduates were unemployed, compared to 5.5 percent of secondary school graduates and only 1.8 percent of people with below an upper secondary school education.

Based on this, our analytical framework for this chapter comprises two parts. The first part addresses the nuances of supply and demand of labor in a changing economy. This includes a discussion of the enrollment and skills obtained by graduates and the distinction between technical colleges and universities. The second part of our framework examines the characteristics of the labor market as it currently stands. It explores the possibility of gaps in skills and information in the labor market equilibrium, when graduates are seeking first-time employment.
I. What constitutes labor demand and supply in a changing Saudi economy?

*Labor demand in Saudi Arabia is characterized by rapidly changing skill requirements, which presents a challenge for universities and technical colleges to adequately prepare their graduates.* Nearly 1.3 million additional jobs are projected to be created by 2020 as per the Saudi Arabian General Investment Authority (2012). The economy’s move away from a reliance on oil and massive urbanization plans have led to growth in core sectors such as transport, construction, and utilities. There is also an increased focus on digitization, automation, and consumer-focused industries. As a result, firms are creating a mix of low-, medium-, and high-skill intensity jobs. Academic research shows that in changing economies, candidates with skills applicable to a wide variety of jobs—including soft skills, such as problem solving, critical thinking, and communication—are at an advantage. The MoE’s ‘Maharati’ program, which aims to train primary, intermediate, and secondary students on life skills, can help to develop stronger student skill sets for the labor market.

*Technical and vocational education facilitates labor market entry through apprenticeship programs, which make young people ‘insiders’ rather than ‘outsiders’ in the labor market.* Trend comparisons show variations in the enrollment and skill levels of graduates of general education and technical colleges. Although job opportunities and avenues for practical training are available for graduates of technical colleges, enrollment is low. The figure below shows that although enrollment in TVTC gradually increased for both males and females between 2006 and 2016, females still made up a significantly smaller portion of TVTC students. In contrast, women make up over half of Bachelor’s students. They may be dissuaded from TVTC enrollment because of a social stigma around females attending technical college, fewer job prospects in technical and vocational fields, lower TVTC admission rates, or fewer available TVTC institutions.

*There is a lack of an integrated database on skills obtained by graduates of tertiary education.* Without a robust data infrastructure, it is hard to determine the skill sets that students bring from schools to tertiary education institutions and then to the job market. The persistent unemployment rate indicates that students are not adequately prepared, but without more
information about the skills acquired at different levels of education, it is challenging to enhance the skill preparation of the labor supply in the Kingdom.

II. What are the attributes of labor market equilibrium in Saudi Arabia?

*Universities are unable to coordinate adequately with firms.* Unemployment has persisted in the Kingdom despite several policy attempts to address it, including the nationalization of the workforce through the ‘Nitaqat’ program. This could be due to a lack of a robust data infrastructure and coordination mechanisms between the labor market players. Universities teach the theoretical skills for success on the job, but private sector employers want to see evidence of success in the workplace before employment. At present, there is no robust large-scale assessment of the skill sets of the candidates who graduate from universities and enter the labor market in Saudi Arabia.

Some studies show a skill gap, especially in the area of soft skills, as depicted in the figure. Newly introduced matching platforms like TAQAT could alleviate a part of this problem; however, university-level measurement systems could also be enhanced to support this change.

*In the lack of complete information, graduates often rely on their social network for jobs, which puts lower-income candidates at a disadvantage.* Economists show that the presence of imperfect information also accounts for mismatches in the labor market. Local surveys indicate that young Saudi nationals turn to their network of family and friends for career advice and information about jobs. This loops back to the need for career preparedness of graduates and the role of universities to motivate more informed student choice.

*Students largely rely on academic credentials to ‘signal’ their ability to employers; however, this could contribute to the large pool of educated unemployed job-seekers.* During the hiring process, employers must make their decisions for first-time labor-market entrants based only on readily available information about the job candidate, which mainly includes their academic credentials, lack of extensive experience in a formal work environment, and little information about their soft skills.
In this situation, employees face the challenge of communicating their unobservable qualities to employers. Researchers show that in times of high unemployment, people seek higher levels of education in order to stand out to employers. As more people attain this high level of education, the power of this signal diminishes, and people seek an even higher level of education to stand out once more. The cycle continues, leaving a large pool of educated unemployed workers. This seems to be what is happening in Saudi Arabia today. As seen in the figure, unemployment levels are highest for Bachelor’s degree holders, at 14 percent.

III. What are the potential areas for policy research collaboration?

Understanding the role that university graduates and technical college graduates have in the labor market, and how to ensure that those graduates master the constantly changing skill set demanded by the labor market, will greatly serve the educated population. A preliminary list of topics meant to inspire future policy research collaborations is provided below.

*Identifying and tracking job-seekers’ skill sets:* Policy research collaborations would be most beneficial in the areas of identifying and measuring the skills that graduates of universities and technical colleges bring to the job market. Here, the role of scholarships, like the King Abdullah Scholarship Program (KASP) program, on the level of skill acquisition of students could also be analyzed based on varying choices (such as fields of study or educational institution attended). A potential area of collaboration could involve tracking the career trajectories and labor market outcomes of graduates from different tertiary education pathways across different academic fields. Research could also compare variations in educational outcomes, employment rates, and returns for social science graduates compared to those of graduates in STEM subjects.

*Providing job-focused information and support to students:* Mechanisms should also be designed for students to receive adequate counseling, motivation, and mentoring support to make suitable career choices, based on their own talent, aspirations, and job market requirements. The design and impact of internships, summer jobs, and other programs could also be undertaken through strategic partnership of educational institutions and firms. As technical and vocational education facilitates labor market entry through apprenticeship
programs, it is advantageous for skilling students for the job market. Students’ enrollment decisions, especially women job-seekers’ perceptions that influence enrollment into technical and vocational education, can also be studied in this context.

**Coordinating and matching employer needs:** Policy research collaborations should focus on creating a feedback loop between firms and educational institutions. This requires extensive skill-mapping surveys, establishment of a robust data infrastructure, and use of online job-matching portals that are updated regularly. Joint policy research partnerships should also focus on ensuring that both job-seekers and employers are timely informed, so that they can reap the benefits of the Kingdom’s economic and demographic transition. For example, one idea could be to harness the data gathered by online talent or match-making platforms like Doroob or TAQAT to produce insights on skills valued by employers, and trace the career outcomes associated with specific educational degrees and programs.
Chapter I: Early Childhood Education

**Background:** In Saudi Arabia, close to 3 million children are under 5 years of age. This constitutes 10 percent of the Kingdom’s total population (“UNICEF” 2012). As per national figures, however, the overall enrollment in kindergarten is only about 17 percent of the eligible population of three-to-six-year-olds in the Kingdom.

**Primary Challenge:** In this chapter, we ask the question: why does enrollment remain low in kindergarten despite the government push for universal access to kindergarten? Barriers to kindergarten enrollment and development could be due to supply-side or demand-side factors. By supply-side, we mean the options for quality kindergarten schooling available to parents in Saudi Arabia. By demand-side, we mean how parents decide whether or not to enroll their child in kindergarten.

**Economic Theory:** Early childhood provides the underpinnings for physical, cognitive, and emotional development of a child. ECE not only pays off directly by helping children build relevant skills, but also indirectly, because it increases the return of later investments, such as better school facilities and increased teacher quality. ECE is also positively associated with subsequent life outcomes like skill development, educational attainment, and labor market success (Currie 2001, Chetty et al. 2010, Duncan et al. 2007, Heckman 2000, and Carneiro and Heckman 2003). As a result, there are positive returns to investing in ECE (Heckman 2002; Cunha and Heckman 2007; Doyle et al. 2009, 2013).

Let us think about human capital as we would physical capital. A new building needs a solid foundation. Building a solid foundation in the early years of a child’s life will help them reach their full potential. The human capital a child develops in their early years is the foundation upon which they build additional human capital as they grow older. The inputs that determine human capital accumulation in early childhood include the time that parents spend with children, the human capital of the parents themselves, the time that other individuals (such as childcare providers or teachers) devote to these children, the human capital of these other individuals, material goods (such as food or books), and service inputs (which might include
healthcare, English tutoring, or transportation to school). Increasing each of these inputs should raise the amount of human capital accumulated.

**Key Actors:** Considering the needs of a child is pivotal for successfully designing ECE policies and interventions. The child’s ability and motivation are shaped by parental inputs and decisions. Parents’ socioeconomic status, requirements, and constraints play an important role in the human capital production process of the child and ECE policy development. Heckman and Masterov (2007) find that early investments in the lives of children from low-income, at-risk families is more productive than remediation measures for disadvantages later in the life cycle. Thus, successful engagement of parents in ECE has significant implications for a growing child’s well-being and success. In this chapter, we take the perspective of parents considering kindergarten options for their children.  

**Chapter Navigation:** The first section is comprised of two parts. In the first part, we discuss the options for quality kindergarten schooling available to the parents across Saudi Arabia. This includes discussing what constitutes quality provision in terms of inputs and outcomes of kindergarten programs. We also explore the present research literature on the supply and expansion of kindergartens and what this research means for short-term and long-term student achievement. In the second part, we discuss the demand-side factors that influence parental perceptions towards ECE. This includes looking at present participation trends, cultural and social norms, information asymmetries, and other factors. We then explore the present research on parental incentives and the role of information for participation in kindergarten. In the second section of the chapter, we discuss the areas of potential policy research collaborations.

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3 Many other potential actors can contribute to child development. These include family members, community organizations (including faith-based), and other resources ranging from libraries to parks. We recognize the value that these other people and community resources can add to child development, but because the focus of this paper is on early childhood programs set by the government, which typically target parents and children, we have omitted them from the discussion for simplicity. In this paper, we are considering children of preschool age (36-71 months), not infants (0-11 months) or toddlers (12-35 months).
Part I: What options do parents currently have to enroll their children in kindergarten in Saudi Arabia?

Main Insights

Kindergarten has the potential to provide positive returns throughout life, and it can close achievement gaps between low- and high-income children: Research indicates that investing heavily in a child’s learning early in life leads to a large return for that child later in life, and has much larger benefits for children from disadvantaged backgrounds than their richer peers.

Kindergarten supply is limited, especially for low-income, rural households: The Vision 2030 goal for near-universal enrollment in kindergarten necessitates creating strategies to provide high-quality education for children, including partial ‘targeting’ through educational and enrichment programs for children with special needs, those from low-income families, those living in rural areas, and other at-risk children.

Providing high-quality kindergarten can only be achieved if ‘high quality’ is clearly defined: Academics have formalized a few types of quality: structural quality (based on school and teacher inputs), process quality (based on classroom interactions), and quality in terms of outcomes (based on cognitive achievement, socioemotional learning, and child health). All three types should be considered when thinking about how to provide high-quality early childhood education.

Saudi Context

Supervision and management of kindergartens in the Kingdom of Saudi Arabia is handled by a combination of the Ministry of Education (MoE) and the private sector (Abduljawad et al. 2008). The MoE controls the majority of management and is the seat of reform and policy for kindergarten. The private sector—including educational management and investments by companies, private individuals, and non-governmental or charitable organizations—also plays a significant role in kindergarten provision across the country.

ECE is offered through nurseries (for 1–3 year olds) and kindergartens (3–6 year olds). Students begin grade 1 at 6 years of age, or 5 years and 9 months if the school year is about to start and they will reach age 6 within 3 months, or 5 years and 6 months if they previously enrolled in kindergarten and present a ‘development standards’ form. In this chapter, our focus is on kindergartens. What distinguishes the kindergarten system in KSA from other levels of education is that all the centers are administered and supervised by women. All teachers and caregivers in ECE are women, but both boys and girls are in attendance. After
kindergarten, when children start elementary school, boys and girls attend separate public schools. There has been a new decree by MoE to integrate primary grade one and two students into kindergarten levels, with the aim of drawing greater prominence to kindergarten, among other objectives. Primary grade one and two curricula would be slightly adjusted for improved alignment with kindergarten curricula. Since primary school facilities are separated by gender, but kindergarten programs are not, there is an open debate about how to accommodate students of both genders in single-gender facilities. The proposed solution is to bring boys ages 6–8 to girls’ schools for kindergarten, which necessitates that girls’ primary schools meet the challenge of nearly doubling their enrollment. Since policies to integrate grades 1 and 2 with kindergarten have not yet been implemented, this chapter focuses on the needs of students aged 3–6.

Limited access to kindergarten schools
On the supply side, there are not enough public kindergartens to serve the growing population of three-to-six year olds in the Kingdom. The existing public kindergartens accept students on a first-come, first-served basis, but certain groups receive preference for enrollment. A recent study revealed that there is a waitlist of 80,000 students—six percent of the out-of-preschool population—for public kindergartens (“Ta’leem” 2018). The kindergarten enrollment target for KSA is 30 percent by 2020, and 1,500 new kindergarten schools and nurseries are expected to be opened. The Vision 2030 emphasizes the need to expand quality ECE and has assigned around $533 million (SAR 2 billion) for investments in ECE to meet their targets (“Ta’leem” 2018).

Currently, the enrollment levels in kindergarten are low in Saudi Arabia. The overall enrollment in kindergarten is only about 17 percent of the eligible population of three-to-six-year olds in the Kingdom. Limited access to kindergartens is a key factor leading to low enrollment. In 2017, the MoE commissioned a survey on a small sample of 1,247 parents, finding that among parents who did not send their child to kindergarten, the absence of close facilities, the high cost, un-compulsory nature, and the low quality of kindergartens were cited as top reasons for not sending their children (Ministry of Education 2018b).

Kindergarten enrollment is equally low for both boys and girls in Saudi Arabia. TIMSS (2015) data show that less than half of the student sample (45 percent) attended a pre-primary education program before joining primary school. Out of these, the majority reported to be
in the ECE programs for a maximum of one year, out of the three possible years of kindergarten. The 17 percent enrollment estimates are far lower than expected, given the Kingdom’s vision to achieve close to universal kindergarten enrollment of 80 percent by 2030. There also seem to be some regional disparities in enrollment, which may act as a barrier to universal access. Sub-markets with particular characteristics deserve further study, especially difficult-to-reach areas and rural communities that have significantly fewer kindergartens, as shown in the figure below. Additionally, many farming communities in the Kingdom have very few preschool options (Abduljawad et al. 2008; Al-Otaibi 1997). Many preschools in these areas also report having ill-equipped facilities (Abdel-Aal, Ahmed, and Alkadhia 2012). In a survey of 1,247 parents across the Kingdom conducted by the Ministry of Education in 2018, 33 percent cited “There are no kindergartens nearby/conveniently located” as their reason for not sending their child to kindergarten (Ministry of Education 2018b). These parents want to send their children to kindergarten, but regional variations in supply present a substantial challenge.

Private schools are a prevalent option in the urban areas (rate of private enrollment is highest in kindergarten compared to grades 1–12 schooling in Saudi Arabia) but are unaffordable for many low-income households and also less common in peri-urban and rural places ("HKS-

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4 Please note that this figure does not provide a complete picture of kindergarten supply across regions, since the total number of schools is not normalized by the population of 3–6 year olds across the regions, as this data is not readily available for Saudi Arabia.
MoE Workshop and Symposium” 2018).\textsuperscript{5} The government is working on helping Saudi parents meet the expense of sending their children to private kindergarten schools to promote early education of Saudi children. Presently, the Human Resources Development Fund (HRDF) covers a portion of the registration fee—up to a maximum of $213 (SAR 800) per month per child—through annual childcare subsidies under the ‘Qurrah’ program. Since this is applicable for children up to four years of age, it includes funding for the first year of kindergarten, as well. The MoE also provides kindergarten-enrollment assistance to disadvantaged children. It provides vouchers to special education students to enroll in 40 different schools across Saudi Arabia, the value of which varies depending on the type of disability; the MoE also provides enrollment help to children on social security assistance. The MoE is considering expanding their assistance programs to address the prohibitive cost of private kindergarten by buying vouchers for seats from private kindergartens and distributing them free of charge among Saudi parents who cannot find seats in public kindergartens. It is not yet clear, however, if the distribution of vouchers would be targeted to low-income families or to particular regions, or would be based on the wait lists for public kindergarten. It is also likely that the vouchers will be provided to Saudi parents and not to non-Saudi parents. As a result, non-Saudi parents may be priced out of high-quality, private kindergartens for their children. Current plans of collaborating with the private sector also include mechanisms to offer easy loans to investors, as well as facilitating procedures for licensing and establishment of private kindergartens in inert, difficult to reach, or rural areas. Overall, the engagement of the private sector and development of Public Private Partnerships (PPP) for kindergarten expansion is one of the key policy priorities in the Kingdom (“HKS-MoE Workshop and Symposium” 2018).

Quality variations in kindergarten provision
The magnitude of child development benefits of early childhood services is tied to the quality of those services (“Center on the Developing Child at Harvard University” 2017). ECE services must meet minimum quality standards in order to achieve positive developmental effects. Recent initiatives undertaken by MoE, such as setting learning standards, updating curricula for learning, establishing accreditation procedures, and capacity building of teachers and staff, are steps towards developing a quality focus in kindergarten teaching and learning practices. The Vision 2030 also emphasizes holistic learning and overall child development. However, there has been limited evaluation on the existing quality levels of kindergarten schools in ECE.

\textsuperscript{5} As shared during discussions at the Harvard Kennedy School – Ministry of Education Workshop and Symposium (held March 2018, in Cambridge, Massachusetts) when participants were asked to share their opinions on the Saudi education sector, including the themes covered in this paper.
**Structural quality:** One way of looking at quality measures is by identifying indicators of structural and process quality (Shonkoff and Phillips 2000). Structural quality could be indicated by input-based factors like child-to-teacher ratios, caregiver/teacher’s education levels, and on-the-job training provided to kindergarten teachers. There are some existing data around these measures. We discuss the child-to-teacher ratio in kindergarten here, and reserve the discussion of teachers to Chapter III of this report. The MoE Organizational Manual for kindergartens outlines standards for class size and child-to-teacher ratios by kindergarten level: for kindergarten 1, a class size of 20 and child-to-teacher ratio of 10:1; and for kindergartens 2 and 3, a class size of 24 and child-to-teacher ratio of 12:1. Presently, the average class size in Saudi Arabian kindergartens is 17 (“Noor System” 2018), whereas the child-to-teacher ratio is around 11:1, although this ratio varies by region, with ratios in some regions as high as 16:1 (“OECD Statistics” 2015; Al-Hejaily 2018). The average ratio is also higher than the recommended standards by the American Academy of Pediatrics (AAP) and the National Association for the Education of Young Children (NAEYC), which range from 6:1 to 10:1, depending on the class size and the kindergarten year.6

**Process quality:** Process quality includes qualitative features such as the nature of caregiver/teacher interactions, the ways in which the classroom or group is managed, and approaches for supporting learning and healthy development. The Deputyship of Education (Girls) has recently adopted the Early Childhood Environment Rating Scale (ECERS) standards to evaluate the quality of the existing kindergarten schools across the Kingdom. Schools across all educational directorates in Saudi Arabia were randomly selected for a pilot study that used ECERS standards to evaluate kindergarten quality (administered in January 2018). The MoE trained 910 evaluators, who conducted the evaluation across three randomly selected classrooms in each kindergarten. The first seven sub-scales were taken from the American version of the ECERS, followed by four sub-scales taken from the British extension ECERS; the last four sub-scales were specifically created as a Saudi extension of ECERS, adjusted to the current language use and context in preschool centers in Saudi Arabia (Gahwaji 2005). Preliminary results from an ECERS evaluation study conducted across 45 kindergartens throughout the Kingdom are presented through the figure below, which depicts the rating (between 0–7, 7 being the highest quality) received on each of the key indicators.7

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6 The recommended class size for kindergartens by the National Association for the Education of Young Children (NAEYC) and American Academy of Pediatrics (AAP) ranges from 10 to 20 (depending on the age group and child-teacher ratio), with recommended student-teacher ratios of 6–9:1 for children three years of age, and 8–10:1 for children 4 and 5 years of age by NAEYC [source: Perlman et al. (2017)].

7 The scoring used is consistent with the standard Early Childhood Environment Rating Scale (ECERS) methodology. For more details, please see: https://ers.fpg.unc.edu/early-childhood-environment-rating-scale-ecers-r.
On average, the kindergartens seemed to perform similarly across the indicators, with a score of 4 out of 7. Based on the ECERS methodology, a score of 4 usually stands for ‘average quality’, leaving much scope for improvement. The selected sample scored lower for the indicators of cognitive development such as literacy skills and concept knowledge, in comparison to other indicators related to class environment, interactions, and diversity. While class sizes are reasonably small in the Kingdom, there is a need to develop and test measures of process quality in Saudi kindergarten classrooms.

The ECERS quality scores also vary across administrative regions and across kindergartens within each region. The figure below uses a boxplot to show the distribution of ECERS percentage scores for each region. Among regions with more than one school selected in the sample, Riyadh, Madinah, Makkah, and Asir show the largest range and dispersion in ECERS percentage scores.

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The scores could be dependent on how the kindergartens were selected, testing procedures, and training of the evaluators, apart from quality itself. Thus, quality assessment needs to be supported by a robust monitoring process to ensure that the measures are reliable.

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8 The scores could be dependent on how the kindergartens were selected, testing procedures, and training of the evaluators, apart from quality itself. Thus, quality assessment needs to be supported by a robust monitoring process to ensure that the measures are reliable.
In particular, of the four schools randomly selected from the region of Madinah in the sample, one performed very poorly (ECERS percentage score of 24.76). This school is based in Mahd adh Dhahab, which has an inert mining region in Madinah with low outreach of educational services in general, and kindergarten in particular. The educational needs of regions such as these must be considered to achieve inclusive access to quality kindergarten in the Kingdom.

Process quality also refers to the nature of the pedagogical interactions between children and kindergarten teachers, staff, and their environment. Positive interactions and experiences include age-appropriate behavior towards children and domain- or subject-specific stimulation in important early development areas such as pre-reading literacy and early numeracy. As discussed above, ECERS sheds some light on the quality of classroom interactions between teachers and children. The MoE has also recently established Early Learning Standards through a comprehensive and collaborative process, involving numerous stakeholders and resources. The National Association for the Education of Young Children (NAEYC) supported the development of these standards by providing a framework for the drafting process and by acting as the resource for collecting evidence. The standards focus on (i) approaches to learning (curiosity and initiative; attention, engagement, and persistence; logic, reasoning, and problem-solving); (ii) social-emotional development (self and relationships); (iii) language and early literacy development (listening, speaking, reading, writing); (iv) cognition and general knowledge (mathematics, science, creative arts, technology); (v) patriotism and social studies (sense of community, history, geography, economics); (vi) Islamic Education (Islamic knowledge, Islamic behavior); and (vii) health and physical development.
There could be variations in the way standards are implemented across schools and how learning is transferred through different pedagogies. The kindergarten pedagogy in Saudi Arabia is largely guided and play-based, as outlined in the Saudi Early Learning Standards (2015, p 18–20). Guided play-based pedagogy poses a challenge to implementing standards across schools because it relies heavily on the acumen of the teachers and quality of materials available in the kindergarten (Friendly and Prentice 2009; Gououch 2010; Hewes 2006; Langford 2010). At present, there is limited or no evaluation evidence on how the standards are being implemented or the impact of play-based pedagogies across different schools in Saudi Arabia.

**Quality in terms of student outcomes:** Quality should also be measured in terms of outcomes. The main direct outcomes for preschoolers include cognitive achievement (general measures of school readiness, e.g., literacy, math, IQ) and socioemotional learning (e.g., social skills, internalizing behaviors). No national assessments are currently conducted to determine the performance of kindergarten children on these outcomes. There are also no robust assessments on the impact of kindergarten enrollment and attendance on socioemotional learning or child health outcomes conducted in Saudi Arabia.

Trends in International Mathematics and Science Study (TIMSS), through their background questionnaires administered to a select sample of Saudi parents and children, shed some light on school readiness. TIMSS (2015) asked parents of fourth graders to recall how well their children could complete eleven literacy and numeracy tasks when they began primary school. Parents for 21 percent of the students in the TIMSS sample reported poor school readiness (their child could not do simple addition and subtraction and did other related tasks very poorly). Nearly 54 percent of parents reported that their child was only moderately ready for school, and 25 percent reported that their child was very well prepared for school. The majority (67 percent) of the TIMSS (2015) sample of fourth grade students in Saudi Arabia recalled not being able to measure lengths or heights when they started primary school.9

The TIMSS (2015) data also shows the correlation between the number of years of attending ECE programs and average achievement of fourth graders. The figure below re-emphasizes that a very small proportion of the TIMSS sample in Saudi Arabia actually attended preschool for the full duration of three years. The overall TIMSS average achievement score for fourth graders was found to be highest for those who attended ECE for the full duration, and it

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9 This measure is based on the recall of parents, and it is a weak indicator of school readiness. There are no current measures of school readiness that are collected in Saudi Arabia.
reduced as the number of years of ECE attendance reduced.\textsuperscript{10} The average achievement scores were lowest for those who did not attend ECE at all. Of course, there could be various socioeconomic factors that differ between those who attend ECE and those who do not, any of which could also lead to the difference in achievement.

Figure 4: Comparison of average achievement scores for fourth graders based on varying ECE attendance [Source: Trends in International Mathematics and Science Study, 2015]

The lack of data or rigorous assessments makes it difficult to determine the effect of ECE on school preparedness of students in Saudi Arabia. Defining and measuring good quality kindergarten programs becomes increasingly important as Saudi Arabia moves to achieve its kindergarten enrollment target for 2030.

\textbf{Research Insights}

What do researchers say about the options available for parents to enroll their children in kindergarten in Saudi Arabia? A large body of research examines the role of early childhood programs in child development and explores ways to improve access and quality of these programs.

\textbf{Limited access to kindergarten schools}

There is limited access to kindergarten in Saudi Arabia. As a result, the Kingdom is aiming for 80 percent kindergarten coverage by 2030.

\textsuperscript{10} Students were scored according to their parents’ frequency of doing the sixteen activities on the Early Literacy and Numeracy Activities scale.
Exploring universal and targeted programs: The trade-off between adopting a near-universal program with relatively low spending levels per child and targeting more expensive, intensive programs to smaller numbers of children needs to be considered alongside the expansion of kindergarten enrollment. Even with an objective of universal coverage, partial targeting through educational and enrichment programs may be one way to keep at-risk children on an upward learning trajectory. These target populations may include parents with a low income, families at risk for child maltreatment, parents with low education levels, young mothers, parents with mental illness, children with special educational needs, minority ethnicity families, or families where the home language is different from the language of instruction at school, among others.

Well-off parents generally find multiple ways to make do when they are unable to access high-quality government preschools (for example, they can pay for private schools, hire home tutors, and invest in educational resources). However, poor families have fewer options, and so ECE policy should be mindful of poor families’ needs, since leaving at-risk kids behind early in life proves extremely costly over the years (Heckman and Masterov 2007). Present research evidence indicates that the most disadvantaged children gain the largest benefit from ECE, in part because it exposes those children to a learning environment, and to resources conducive to learning, that they may not have at home (García et al. 2016).

Publicly funded free ECE services across the world usually target low-income parents and are set up in remote and at-risk areas to reach out to such populations. For example, the United States targets low-income families, particularly in its publicly funded ECE services, through programs such as Child Care Development Block Grants (CCDBG), Head Start, and Early Head Start, as well as some state-run preschool programs. Other types of ECE programs include: community kindergartens (community-run ECE settings in contract with the government), subsidized private schools (private schools that receive public funding through vouchers per pupil), preschool classes in primary schools (intended primarily to provide compulsory preschool places for children, before entry to primary school for a smoother transition), and other free integrated services (play spaces/playgrounds for children, centers for children and families where children are hosted with their parents or other accompanying adults, and home visitations and interventions within the family home environment for children run by qualified and certified ECE teachers).

Recent evidence from the United States finds that a move to near-universal kindergarten programs improves average test-score performance in later grades but also worsens ethnic and racial achievement gaps (Gibbs 2018). To close such gaps, a wide range of context-specific policy choices should be developed for targeted ECE expansion that supplements child-
rearing resources, reduces inequality, and raises productivity (European Commission, EACEA, Eurydice 2014; OECD 2013).

Developing inclusive kindergarten policies for children with special needs: It has long been thought that children affected by various disabilities, diseases, deficiencies, and physical or mental disorders should be cared for in specialized institutions. Over the years, however, there has been a radical shift away from this approach of social segregation. Today, early education policy aims to integrate ‘special needs’ children with mainstream childcare structures. Research indicates the need for ethical and psychological considerations and pedagogies for ECE programs to make them inclusive to children with special needs. These include: removing the idea of isolating groups of children with special needs; offering stronger partnerships between parents, children, and teachers; and learning with other children and developing solidarity towards others. Concurrently, efforts at integration should still afford special needs children with the specialized support required for their proper care and development. Integrative measures also hinge on economic considerations (specialized structures are extremely costly) (National Association for the Education of Young Children (NAEYC) and Division for Early Childhood (DEC) 2009).

Improving access to kindergarten necessitates creating pathways for children of all socioeconomic backgrounds, regions, and abilities. Research shows that when moving towards universal kindergarten programs, it is imperative to provide connections to these programs for poor families and provisions for differently abled children.

Setting funding strategies and Public-Private Partnerships (PPPs)

Funding strategies employed globally for kindergartens can be divided into two basic approaches: supply-side and demand-side funding. Supply-side funding refers to funding made available by the state or other public body to a supplier or provider of kindergarten to increase or improve their provision. Supply-side funds, for example, may take the form of direct grants for building kindergarten facilities and resources, or grants to supplement teacher wages or to increase quality through teacher training. The government can also fund private providers through subsidies for seats offered to children from disadvantaged families. Demand-side funding refers to funding provided by the government directly to parents, so parents can be consumers and choose where to enroll their children. Such funding may take the form of parent grants or reduced fees, parent vouchers or credit authorization for ECE child care, or general child or family allowances where parents receive weekly or monthly funds from the state to support their child’s upbringing.

Financing schemes for private schools encourage a flexible operating environment (on the supply side) and reduce access barriers to families (on the demand side). They can also be
used as mechanisms to improve the quality of services for low-income families and to encourage competition among schools. Public funding systems should be similar for public and private schools; they should also be based on per-capita measures rather than inputs to schooling, and should be clear and transparent (Barrera-Osorio, Guaqueta, and Patrinos 2012).

A meta-analysis of 115 ECE programs in the United States (including programs funded through various stakeholders, and those targeting different age groups of children and outcomes) found that 102 programs had a favorable effect on at least one child outcome (Cannon et al. 2017). Domains such as cognitive achievement and developmental delay saw larger shares of positive outcomes than the other domains like child health. These results show that most programs likely have a positive impact on children. However, it is unclear to what degree and through what channel this impact is felt.

Increasing the private sector’s role in education may have several potential advantages over traditional public delivery of education. The benefits of PPP rely on the engagement design, regulatory frameworks, and accountability measures set up to oversee the private sector partnerships. When implemented well, the private sector can increase efficiency and choice, and expand access to education services, particularly for households that tend to be poorly served by traditional delivery methods (Barrera-Osorio, Guaqueta, and Patrinos 2012).

There was a boom in the creation of private schools in Pakistan between 2000 and 2005, with 15,000 new private schools being set up. Private schools were three times more likely to emerge in villages with government girls’ secondary schools. Here, public schools contributed to an increase in the supply of skilled women as competent but affordable private school teachers. The child enrollment rate in private schools increased for the poorest households in rural areas (Andrabi, Das, and Khwaja 2013, 2006). In this way, private provision increased enrollment in rural areas and among low-income households at a very low cost. These examples show that public-private partnerships and pure private school expansion, when implemented thoughtfully with right incentives in place for private investors, can help countries to satisfy unmet demand for schooling. However, if appropriate accountability measures are not established at the onset, there is also a risk of expanding services with low-quality provision of kindergarten. The benefits and costs of private sector involvement in kindergarten are critical in determining eventual impacts.11

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11 The policy note presents a synopsis of relevant policy and research literature on the effectiveness of voucher systems. For more details, see: Hsieh and Urquiola (2006); Sapelli (2003).
The benefits and costs of different public-private partnership arrangements: Public Private Partnerships (PPPs) allow governments to take advantage of the specialized skills offered by certain private organizations and to overcome operating restrictions, such as inflexible salary scales and work rules, that may prevail in the public sector. The goal for developing PPPs is to expand equitable access to schooling, especially in far-reaching areas and for disadvantaged groups. Contracts that enable poorer families to access private schools can be used to hold all partners accountable and are designed to produce measurable improvements in education outcomes. Different types of contracts can help meet these two objectives in different socio-economic and political contexts. Social impact bonds and other pay-for-performance mechanisms are increasingly being used to attract private financing for early childhood programs (OECD 2013).

The theoretical literature on the topic suggests four ways in which the private provision of public services positively affects educational outcomes (see Epple and Romano 1998; Patrinos 2006; Nechyba 2000). First, PPP contracts give schools flexibility for managing and providing education services. Second, since private providers in PPP contracts are selected competitively based on quality and cost criteria, it helps to keep the quality high and the costs low. Furthermore, contractors are often required to produce certain outcomes, such as increases in test scores, in order to maintain funding. Thus, by itself, the contracting process and the resulting contract can yield a higher quality of education. Lastly, PPPs can also generate competition in the provision of kindergarten services, which also drives quality up.

Policy Note: Effectiveness of voucher systems

There is mixed evidence on the impact of vouchers in education across the globe. Most studies around vouchers have been conducted around school education and not ECE specifically. In many countries, governments allow parents to send their children to the school of their choice, fund private and religious schools from the public budget, and allocate resources to schools based on enrollment. Some of these arrangements were set up decades ago (such as those in Denmark and the Netherlands), while others are more recent (such as those in Chile and Sweden). Colombia’s targeted voucher program has been subject to extensive analysis because of its randomized design. The evidence from Chile’s voucher program is mixed. Some studies have found that it has had several positive outcomes, but other studies have challenged this, arguing that the original studies had problems of selection and a lack of adequate instruments. More recently, there have been some rapid increases in test scores and an ongoing revision of the school financing formula as an attempt to reduce equity concerns. In Europe, universal school choice (where all parents in a country can choose their children’s schools by means of a voucher) has led to a more competitive market for schools. In most cases, this competition yields better outcomes overall, as would be predicted by theory. Nevertheless, more policy research can improve understanding about the effect of about school choice and vouchers, specifically in the kindergarten context.
A certain body of literature argues that there are caveats to keep in mind when associating with the private provision of public services (Ladd 2002; Ladd and Fiske 2003). PPPs could increase socioeconomic segregation if better-prepared students self-select into high-quality schools, and further improve their outcomes. At the same time, poorer students can get behind in the poor-quality schools, often given a lack of support of more educated parents. Incentives and expectations of some groups, like kindergarten teachers, need to be taken into consideration. Finally, PPPs could end up being very expensive in the long run if vouchers and supplementary monetary incentives must be provided to parents from poor backgrounds for a long term. A cost-benefit analysis of the different PPP models based on the context is an important exercise in this case.

Although more rigorous evidence is needed, PPPs, contracting, and subsidy arrangements have the potential to rapidly expand access to education and increase quality, especially if coupled with rigorous quality assurance mechanisms. Quality assurance mechanisms are required to ensure that private schools meet the expected outcomes and quality standards. They should also clearly define sanctions for poor performance and rewards for success (Barrera-Osorio, Guaqueta, and Patrinos 2012; Barrera-Osorio and Raju 2017).

Quality variations in kindergarten provision
As discussed in the previous section, there is emphasis on providing good quality kindergarten in Saudi Arabia. However, there is much to do in terms of development and measurement of process quality, especially pedagogy. In the following section, we discuss what current research has to say about quality in kindergarten with focus on the specific needs of the Saudi context.

Evaluating different pedagogical practices: An educational approach to kindergarten reform provides theoretical perspectives to plan and implement one or more pedagogical practices or techniques for improved teaching and learning. Research shows that it is important to identify the roles of the staff, the materials and space, the appropriate practices, and in some cases, the learning objectives. Kindergarten pedagogies could be of various types, including child-centric, teacher-directed, or a mix of both. Since public Saudi kindergartens tend to focus on play-based learning that involves a mix of all these types, we focus on policy and research findings on their features and limitations.

Exploring teacher-directed and child-centric instruction: Marcon (2002) investigated the effects of different pedagogical preschool models—child-centered, teacher-centered, and mixed—on school readiness and later school success. He found that teacher-initiated practices alone do not have a beneficial impact, and should be implemented in combination
with child-initiated practices. De Haan, Elbers, and Leseman (2014) observed kindergarten children in the Netherlands and investigated the effects of teacher-managed and child-managed academic activities. They observed that teacher-initiated practices have a larger impact on mathematics skills, while child-initiated practices affect pre-reading abilities. Child-initiated practices, such as picture book reading and copying words with stamps, were found to have positive effects on emergent literacy skills. By contrast, child-centered pre-mathematics practices were not found to impact children’s early mathematics skills. This study indicates that academic content in early childhood programs is important for school-readiness, and that both teacher-initiated and child-initiated practices can benefit children’s early literacy and mathematics development.

Exploring guided and unguided play: The value of play in promoting child learning is universally recognized (Blom 2015). However, research by Sylva (1984) demonstrates that some activities are more engaging and stimulating for children (e.g. art, puzzles and games, constructional materials) than others (e.g. dough, sand, dressing up). In addition to the type of play, the extent to which play is guided by a teacher can also vary. Guided play opportunities are characterized by child-parent-teacher interactions. High-quality verbal interactions between children and adults are deemed critical by Sammons et al. (2008). Highly structured play can comprise child agency and competence, essential skills for child development (Wood 2014).

Free play activities that are initiated and freely chosen by the child and sustained without adult interference are traditionally perceived as the purest form of play and are most highly valued by practitioners, especially in ECE systems with socio-pedagogic traditions (Walsh et al. 2010). Unguided free play is found to be far less effective in stimulating early learning than guided free play. Plowman and Stephen (2005) found varied patterns of engagement in unguided free play in the context of children interacting freely with Information and Communication Technology. Children were either highly engaged, tried different games at random, or wandered off and became frustrated, highlighting the limitations of unguided free play. A recent study by Slot et al. (2015) on a sample of Dutch preschoolers also found that unguided free play does not benefit process quality or children’s language development. ECE practitioners have been found to have a crucial role in ensuring that play has beneficial effects (Sylva 1984). However, unguided play provides teachers with an opportunity to better assess a child’s needs and learning patterns, based on observing children’s method of play, and provide individualized support accordingly (Wood 2014).

Using scaffolding as a practice: Scaffolding is gaining relevance in the current pedagogical literature as a useful process in which the child is seen as a learner, rather than a passive entity, and the adult acts respectfully, allowing the child to enter a high concentrated play. Play partners, as well as sensitive adults who help children reflect in play situations and
question and understand what they have learned, are deemed important in this task (Cabell, Tortorelli, and Gerde 2013; Winsler et al. 2002).

**Quality in terms of student outcomes**

The three main direct outcomes for preschoolers include cognitive achievement (general measures of school readiness, e.g., literacy, math, IQ), socioemotional learning (e.g., social skills, internalizing behaviors), and child health (e.g., birth outcomes, body-mass index, access to health care, nutrition). At present, there is a lack of data on these outcomes in Saudi Arabia. Research in the ECE context can help to understand the type and value of outcomes that should be measured.

**Cognitive achievements:** Early childhood is a unique and critical stage of development and learning. During these early years, children establish essential skills that set the foundation for learning in years to come. Shonkoff and Phillips (2000) show that regulation and executive function are important theoretical drivers of the pattern of impacts. Specifically, strong early experiences help form the brain’s command and control center, so that children can control behavior, regulate mental processes, and translate intentions into actions (Benton and Cook 1991; Grattan and Eslinger 1992). Early experiences help determine whether a person’s brain architecture develops in ways that promote better IQ levels, future learning, behavior, and health. Neuroscience research also validates these findings. Brain architecture and skills are built in a hierarchical ‘bottom-up’ sequence such that the foundations are important. Higher level circuits that process complex information are built on lower level circuits that process basic information. The plasticity of the brain decreases over time, and its circuits stabilize; therefore, it is much harder to alter the brain during later stages of life.

Language and cognitive abilities of preschool children usually help to determine their ‘school-readiness’. School readiness is a multi-faceted phenomenon that includes child development in terms of physical, health, social, and emotional domains, as well as language acquisition, literacy, and cognition (Pitcl and Provance 2006). Important policy research questions in terms of school-readiness include: Are kindergarten programs effective in preparing children for school? Does the quality of preschool programs contribute to children’s school readiness? Are some pedagogical approaches, like play-oriented learning, more effective than the others, like direct instruction?

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12 Executive function is an umbrella term used to refer to a variety of interdependent skills necessary for purposeful, goal-directed activity, such as learning to hold a crayon and scribble on paper, to string beads, or hand a cup of juice to a friend without spilling (e.g., Luria 1980; Shallice 1982). To engage in these sorts of behaviors, the child must be able to deploy a series of relatively complex skills.
High-quality, intensive center-based programs have shown the strongest and most consistent effects (Chetty et al. 2010). Randomized controlled trials of high-quality programs have yielded significant benefits for children, often extending through adolescence and into young adulthood (Campbell 1994). Whitehurst and Lonigan (1998) show that early, intensive language and literacy instruction that focuses on both expressive and receptive vocabulary, literacy, and numeracy are found to have large effects on student preparedness. However, it appears that no single kindergarten model or philosophy could be termed as the most successful, and further policy research is needed on this topic.

Since few studies evaluate long-term impacts of kindergarten programs, it is hard to know exactly when early investments translate into long-term gains. Heckman et al. (2010) noted that due to dynamic complementarity, or synergy, early investments must be followed by later investments if maximum value is to be realized. The benefits of early investments are undermined by low-quality investments later, with some evidence of fade-out of learning gains. The Perry Preschool program that translated to sizeable adult outcomes had impacts on measured intelligence during the program and a year or two after, but it did not have sustainable effects on subsequent measures (Schweinhart et al. 2005). It is possible, then, that some gains will fade, but later gains may still appear, perhaps operating through socioemotional skills rather than cognitive ability.

It is important that the transition between kindergarten and primary schooling be smooth and seamless in order to contain the learning loss across educational levels. One approach suggested in recent policy research (OECD, 2001) is to think about developing an education system that enables provision of learning support from birth. For example, partnership between kindergarten and primary school provision could help bring diverse perspectives and methods of both kindergartens and schools together, and also benefit children’s developmental progress as they move through the care and education systems. An integrated system could also potentially reduce the search costs of parents. Stephen (2006) outlined a number of ways that a kindergarten setting may work with primary schools to help the transition, such as visits to familiarize children with the building, staff, and other pupils. He also suggested setting orientation meetings for parents. Developing effective ways of passing information from kindergarten settings to schools may also improve transitions.

**Non-cognitive development:** Competencies such as emotional regulation, attention and persistence, and problem solving are strongly associated with greater academic performance in primary school across academic disciplines. Social and emotional growth, healthy approaches to learning, language building, and other skills that children learn during their early years are some of the greatest predictors of both future academic success and the development of important personal attributes like self-regulation, happiness, and empathy.
Relevant work by Heckman (2002) shows that ability is not static in early years, and children develop their social and emotional skills, such as the ability to recognize, express, understand, and manage a wide range of feelings. Recent research in neurobiology also shows that the brain is changed by experiences, and the quality of the relationships a young child has with caregivers programs her social-emotional function. Adversity has a negative impact on brain development.

Parent-child, teacher-child, and parent-teacher-child relationships can be viewed as interactive systems that influence early child development. Enhancements of family environments improve child outcomes and affect both cognitive and non-cognitive skills. Verbal interaction with parents and kindergarten teachers, in addition to adequate nutrition and health care, lead to cognitive and socioemotional stimulation early in life. Creating and maintaining children’s feelings of safety, calm, and optimism is also vital. For this to happen, children require repeated experiences of having their needs met by a responsive and caring adult. Recent findings also show that attachment and scaffolding are major determinants of child learning.13 Neurological research suggests that the plasticity of the systems underlying the development of non-cognitive and social skills is particularly high in early childhood and decreases with age (Knudsen et al. 2006); While we want children to be ready for school, we must also foster their non-cognitive skills. Moreover, research shows that these skills exhibit clear variations by wealth (wealth gradients), which we shall discuss further in the next part of this chapter.

Overall, kindergarten is an important building block for children’s development and academic success. The positive effects of kindergarten are realized in the short and long term. Children are born ‘ready to learn’, but we must also attend to their social and emotional development. Kindergarten should not be viewed within a narrow stance of preparing children for school; rather, it should be seen more clearly and broadly as a critical stage preparing them for life. The second part of this section explores the context and academic literature around the demand-side factors that influence Saudi parents’ decisions on whether to enroll their children in kindergarten. Considering supply-side factors, as discussed in Part I above, without understanding parental perceptions and requirements, is inadequate to increase access to, and improve the provision of, kindergartens.

13 As outlined in the Research Insights section, scaffolding is an adaptive interactive strategy that recognizes the current capacities of the child (trainee) and guides him or her to further learning without frustrating the child. Activities are tailored to the individual child’s ability, so they are neither too hard nor too easy, in order to keep the child in the ‘zone of proximal development’ (level of difficulty at which the child can learn the most).
Part II: How do parents decide whether or not to enroll their children in kindergarten?

Main Insights

**Traditional gender roles affect a family’s decision to send their child to kindergarten:** Traditionally, child care is performed by the stay-at-home mother. As more women choose to work outside the home, there is an increasing demand for kindergartens.

**Parents may not understand the full potential returns to Early Childhood Education:** Research confirms that ‘skills beget skills’, and investing heavily in a child’s learning early in life leads to a large return for that child later on. Some parents may not be aware of the short-term and long-term benefits of enrolling their child in kindergarten or the difference between kindergarten and child care.

**Low enrollment in kindergarten may be due to information gaps in kindergarten quality and availability:** Even when parents do make the decision to enroll their children in kindergarten, they may still lack information to determine the availability and quality of kindergarten programs available to them, and how to demand better services.

**Saudi Context**

Given the proven positive effects of kindergarten, it is crucial to find out which children attend kindergarten and what factors influence their parents’ decisions to enroll them. Weber (2011) provides a comprehensive overview of the theories behind parental choice of child care. He shows that on the demand side, parental preferences are formed when family values and beliefs interact with parental employment levels, social norms, networks, and the information about kindergarten programs available to them. This section provides a discussion of each of these factors and how they may affect the parental choices for kindergarten.

**Socioeconomic status of parents**

The overall unemployment rate was 5.7 percent in 2017 (“General Authority for Statistics” 2018). There are variations in income and wealth gradients across the 13 districts of the Kingdom, with Riyadh being one of the most affluent regions, and areas like Jazan and Northern Borders Region the poorest (“General Authority for Statistics” 2016). The socioeconomic status of parents varies across these regions and influences the parental standard of living, education levels, number of children in the household, and parental beliefs and choices regarding the value of education for their children. While the average age of Saudi mothers when they bear their first child is 23, the number varies by socioeconomic status.
across regions and is below 20 years in some regions (“General Authority for Statistics” 2016). This could influence the child’s educational outcomes given that parent education levels are positively associated with child learning outcomes, as discussed in the Research Insights section later. Moreover, the average number of children’s books and digital learning devices at home vary based on the parent’s socioeconomic backgrounds (e.g. highest level of parents’ education, employment status, etc.) (“TIMSS” 2015). It is likely that the more disadvantaged parents may be the ones who do not send their children to kindergarten, and who also may not be able to provide the required learning resources to children at home, which leads to poor learning outcomes for the child. In addition to compromised opportunities for development at home, the high price of private kindergartens can restrict enrollment options of children from low-income families to public facilities.

The NOOR database, the MoE’s primary education management information system, contains details on children and their area of residence, but does not record details on many socioeconomic characteristics of parents. This is one of the biggest shortcomings of the present system, because it restricts the general understanding of how parental socioeconomic factors lead to variations in educational choices and the performance of children on national and international tests.

Maternal employment and child-minding needs: Research shows that parental childcare decisions take into account all of the possible arrangements that parents might make in order to leave their child at a secure place when they go for work. This could include babysitters, extended family, daycare centers, and preschools. Historically, ECE provision in the Kingdom has been viewed more as a daycare or child-minding avenue rather than as human capital investment (Al-Otaibi 1997). This emphasis has favored providing free kindergarten education for as many children as possible as their mothers enter the workforce. The figure below shows how the enrollment in kindergarten has increased alongside the participation of women in the Saudi labor force over the years.¹⁴ The correlation between the female labor force participation rate (as a percentage of total female population, aged 15+ years) and the gross enrollment rate in pre-primary education is particularly high in Saudi Arabia (correlation coefficient = 0.88). The magnitude of this correlation supports the notion that kindergarten provides an appealing childcare option for women who want to enter the labor force. The figure also shows a sharp rise in the enrollment rate since 2015, which is likely due to an increased demand and policy push for kindergarten in recent years.

¹⁴ The figure provides pre-primary education gross enrollment ratios as provided by the World Bank World Development Indicator estimates. The estimates provided differ from the figures estimated by the Ministry of Education. In the report, we rely on the Ministry of Education enrollment rates; however, to allow for analysis of trends over time, we used World Bank estimates in this figure, as Ministry of Education pre-primary enrollment data was only available for one year.
Information asymmetries

There are potentially two types of information gaps for parents. First, a portion of Saudi parents may be unconvinced about the value of kindergarten as anything more than child-minding, and the long-term benefits of kindergarten may not be salient to them (“HKS-MoE Workshop and Symposium” 2018). This may tempt them to choose home care, daycare facilities, or kindergartens interchangeably, since they may not be aware of the additional benefits of high-quality kindergarten. The second potential information gap is that even if the parents feel that kindergarten is important, they may not be able to make decisions based on quality, due to the lack of information and resources (Vandell and Wolfe 2000). This may lead to a ‘market failure’ in the childcare system given the information barriers and difficulty in correctly identifying quality levels (Burchinal et al. 2002 as cited in Grogan 2011).

Parents unconvinced about value of kindergarten: Parents’ myopic understanding of the value of kindergarten in encouraging child development may minimize demand for good quality kindergarten. There could be two types of information gaps. First, the parents who do send their children to kindergarten are often aware of some benefits of kindergarten, if not all long-term advantages. For instance, the MoE survey, commissioned on a small sample of 1,247 parents in 2017, found that 91 percent of parents surveyed who sent their children to kindergarten identified enhancement of skills as a reason for sending them; for 71 percent of the parents, this was the primary motivating reason. Even among parents who send their children, they may not provide adequate support or may not send the child for the full duration of three years if they lack information on the full range of kindergarten benefits, and how they correlate with parental support and number of years of kindergarten attended.
Second, some parents may be completely unaware of kindergarten benefits and may not even enroll their children in kindergarten at all. Abduljawad et al. (2008) report that some Saudi parents leave preschool-aged children with an unprepared nanny instead of investing in qualified preschool education.

Recently, the Family Affairs Council (FAC) has been set up to address the potentially low demand for kindergarten in many parts of the Kingdom. The FAC aims to motivate Saudi families to send children to nurseries and kindergarten. The Council also aims to increase awareness on the long-term importance of kindergarten and is working in coordination with the MoE on strategies towards this goal. Further, under the ‘Irtiqaa’ program, the MoE has organized awareness campaigns, comprised of 1,700 discussion groups within education departments across the KSA, engaging more than 100,000 parents. These efforts include developing training packages for parents on how to communicate with kindergartens to make them more accountable. The MoE has also initiated ECE programs that provide educational support to mothers to increase awareness of children’s requirements in early years, and others that develop a television channel for three-to-six year olds to support early childhood learning.

**Parents have little information about quality of kindergarten:** There is a disconnect between what parents say and what parents do in situations where they have to make school choices. While most parents cite educational quality as their highest priority, they often select lower-quality schools based on lack of information about quality. Therefore, even if parents value kindergarten, due to little information on academic quality or a lack of effort to find it, they may still end up choosing based on factors such as the location of the schools and social perceptions, using these as proxy indicators for quality (Betts and Loveless 2005). Maddaus writes that families in low-income neighborhoods tend to be more isolated and have fewer sources of information on child rearing than families in more affluent neighborhoods (Maddaus 1990). The newly established accreditation process for kindergartens is expected to signal kindergarten quality for parents. It remains to be seen whether it would be able to do so, and how this information would be communicated to parents.

**Cultural, social, and gender norms**

Some parents may not be inclined to enroll their eligible children in preschool due to cultural traditions or community pressures, some of which may favor keeping children at home or with extended family. Anecdotally, it seems that there is low willingness to enroll children in kindergarten in Saudi Arabia, especially in rural areas (Family Affairs Council 2018). This is deeply connected with the ideological constructs that define the role of a mother in the Saudi society and constrains female labor force participation. According to more traditional cultural beliefs in the Kingdom, a woman’s priority should be her home and children. Also, extended
family networks are strong, so many women rely on grandparents or other extended family to care for their children.

In general, there are three types of cultural and attitudinal factors that are applicable (Al-Khateeb 1987). The first is related to women’s perceptions of themselves. Women often tend to locate themselves within the dominant culture, which is patriarchal in Saudi Arabia. Secondly, people’s attitudes towards women’s responsibilities as a mother and role at work affect a woman’s choice to enter the labor force. Finally, there is the issue of husbands’ support for their working wives, which is also influenced by societal perceptions. These factors work together to influence a woman’s decision to stay at home to provide child care rather than enrolling her children in kindergarten.

The MoE is undertaking efforts to better understand the motives and barriers to kindergarten enrollment and enhance quality of kindergarten services. Further policy research into the kindergarten market, its functioning, and equilibrium analysis is imperative to achieve long-term policy targets in the area.

**Research Insights**

**Socioeconomic status of parents**

Early childhood education is a channel through which children from low socioeconomic backgrounds can access the same education opportunities as their richer peers.

**Bridging the gaps:** Ability gaps between the advantaged and disadvantaged open up early. Research shows that children from low-income families are less likely to be breast-fed, be fully immunized, receive proper child care, or have regular and consistent access to health services. On the other hand, they are more likely to have low birth weight, developmental delays, frequent hospitalizations, and behavioral disorders (Case, Lubotsky, and Paxson 2002). The returns to early childhood programs are the highest for disadvantaged children, who do not receive substantial amounts of parental investment in the early years. In the U.S., high-quality preschool programs have been found to have a relatively larger effect on school readiness, not only for black and Hispanic children, but also for children from low-income families (Ahmad and Hamm 2013; Yoshikawa et al. 2013; Deming 2009). Meyers and Gornick (2003) found that the cost of formal, market-based forms of early childhood education prices keeps many lower-income families out of programs, but that public programs are capable of offsetting this problem for eligible families. Magnuson, Meyers, and Waldfogel (2007) confirm this finding. They show that during the 1990s, public programs such as Head Start were responsible for between 8 and 11 percentage points of the increase in low-income preschool
enrollment. The availability of these free programs expanded parental options formerly constrained by lack of financial resources.

Moreover, the quality of home environments by family type is highly predictive of a child’s skills. Thus, early disadvantage could be experienced in terms of the quality of environment, which can be considered an important scarce resource. Kindergartens could be helpful in bridging these socioeconomic disparities in resources as well as family environments.

**Information asymmetries**

Information asymmetries relate to the lack of common knowledge on the long-term benefits of kindergarten or the quality of preschools in the Kingdom. Having full information enables parents to make informed rational choices for their children.

**Explaining the range of benefits from ECE:** ECE and child care are not synonymous. Investment in ECE has shown long-term effects in a range of correlational studies. Research in the United States finds that participating in high-quality preschools had a positive effect on cognitive development and school readiness for all children (Ahmad and Hamm 2013; Yoshikawa et al. 2013). Children attending preschools were also more likely to have higher rates of high school graduation (Reynolds and Temple 2006), more likely to attend college, be employed, and earn higher wages (García et al. 2016; Doyle et al. 2009; Reynolds and Temple 2006; Deming 2009), and they were found less likely to be arrested in adulthood. One additional feature of early interventions, stressed in Cunha and Heckman (2007) and Heckman and Masterov (2007), is that the traditional equity-efficiency trade-off that plagues most policies is absent. Early interventions promote economic efficiency and reduce lifetime inequality. Finally, as discussed earlier in this chapter, investing in ECE helps in preventing achievement gaps, improves health outcomes, and boosts future earnings, especially for disadvantaged children (García et al. 2016; Duncan and Sojourner 2013).

**Distinguishing kindergarten quality:** It is a widely held belief that providing information to citizens is a powerful tool for improving public services. This view is particularly prevalent in the education sector, where advocates claim that informing parents about school performance is key to improving school quality (Hoxby 2003). However, the empirical evidence on the impact of information provision on quality is mixed. The impact of information can range from zero to highly positive depending on the setting, the extent to which the information was bundled with other accountability measures, and the type of response that was studied. Worryingly, high stakes information can also create incentives for manipulation through the selection of more desirable consumers (Dranove et al. 2002) or through cheating and direct manipulation (Jacob and Levitt 2003; Figlio and Getzler 2002).
Andrabi, Das, and Khwaja (2017) study the impact of providing school report cards with test scores on subsequent test scores, prices, and enrollment in markets with multiple public and private providers. They found that information provision facilitates better comparisons across providers; it also improves market efficiency and child welfare through higher test scores, higher enrollment, and lower fees. Given the present kindergarten market in Saudi Arabia and the mix of private and public schools with varying quality, such research is valuable, as it provides insights into how and to what extent information on quality—whether it is related to recent accreditation rankings or outcome-focused report cards—can be used for informing parents.

Cultural, social, and gender norms
It is important to consider the cultural and social landscape of Saudi Arabia to contextualize parents’ decision to send their child to kindergarten.

Integrating cultural diversity in Saudi based research: In designing any early childhood program, while it is important to improve the cognitive and socioemotional skills of children, it is also important to respect the sanctity of early family life and to respect cultural diversity. The goal of early childhood programs is to create a base of productive skills and traits for disadvantaged children living in culturally diverse settings. By engaging private industry and other social groups that draw in private resources, create community support, and represent diverse points of view, effective and culturally sensitive programs can be created. Researchers familiar with the Saudi context explain how it is important to adopt proven ideas from early childhood research across the globe with consideration of the Islamic-based culture, the nuances of Middle Eastern life, and the particular needs of the Kingdom (Al-Otaibi 1997). The present learning standards reflect an education system embedded in Islam; however, the same needs to be considered while designing research studies and developing educational policies for the Kingdom. Saudi kindergartens must value comparative international education while aligning with the religious and cultural values of its own society (Al-Otaibi 1997).

Developing inclusive strategies for both parents in ECE: While parents are increasingly becoming involved in kindergarten council meetings across the globe, they have little role to play in kindergarten policy choices. The inclusion of both parents in policymaking is a means of bringing about a lasting improvement in children’s hygiene and health (prevention of infectious diseases, tuberculosis) and in the education and literacy levels of girls (EFA Global Monitoring 2005). In general, the predominance of women among teachers and kindergarten staff has effects on relationships between parents and children. It could be hypothesized that female teachers may feel that they are first and foremost maternal substitutes, so there could
be systematic differences in the treatment of both parents, where female teachers and ECE caretakers may prefer to interact with the mother. The differences could also just be attributed to the gender segregation of schools—only females are allowed in female schools, so the female teachers employed in kindergartens mainly get to interact with the mothers, and fathers are left out on the discussion of their child’s progress. In any case, the dialogue on a child’s progress remains polarized and does not get full family engagement in ECE.

In the next section of this chapter, we assimilate these learnings and provide a synopsis of the avenues of potential collaborations where researchers can engage with policymakers to shape educational policies and practices.
Potential areas of collaboration

This chapter addresses two important questions: what options do parents currently have to enroll their children in early childhood education, and how do parents make the decision to enroll their child in kindergarten? Throughout the chapter, it is clear that early childhood policy wears two hats—one for child-minding facilities that supports the participation of mothers in the labor force, and one for holistic child development through the provision of quality services—and these two goals could be approximated by ‘quantity’ and ‘quality’. Future collaborations should focus on developing tools and gathering knowledge to help early childhood education balance these two goals.

Future policy research should explore the supply-side barriers, which prevent children from being enrolled in kindergarten. Increasing access to high-quality kindergartens for children from low-income families and those from rural areas can narrow academic achievement gaps later in life. Disadvantaged children, who are more likely to start school behind and stay behind, are also the least likely to attend high-quality kindergartens. Policymakers and academics should work to design and test new targeted early childhood education services for at-risk children and families who have additional needs that go beyond the universal services. Researchers can determine parent willingness-to-pay for kindergarten by evaluating the voucher system, or the ‘Qurrah’ program, and testing different subsidy levels to determine the appropriate amount that incentivizes enrollment while maximizing program spending efficiency.

Early childhood inclusion represents the policies and practices that support the right of every child and their family, regardless of ability, to participate in a broad range of activities and contexts. Creating inclusive school environments, supporting children with special needs, involving both parents (not just the mothers), and building meaningful partnerships with families through school management committees are all potential policy options. Researchers could take well-established findings and accumulated evidence from across the globe on these topics, then customize and test them in the Saudi Arabian context to objectively inform educational policy.

Saudi Arabia’s kindergarten system serves less than one-fifth of eligible three-to-six-year-olds and currently does not reward higher-quality providers. Potential collaborations should focus on the following tasks: allocating existing resources more efficiently; improving the economic returns from investing in ECE programs; determining how subsidies or vouchers could expand access; supporting the construction of public-private partnership models; and helping to set up robust data infrastructure for determining quality in the future. As the MoE advances in their private sector expansion strategy, researchers can design experiments to determine...
appropriate and cost-efficient incentives for private sector investment. Further expansion in the collection and analysis of the Early Childhood Environment Rating Scale (ECERS) data across different regional contexts within the Kingdom can help to go a long way in this direction. Researchers can use ECERS data to determine which school factors are associated with higher ECERS ratings.

Comprehensive research relies on clearly defined outcomes and measurement tools. Here, national and international academics can contribute massively, given the present scarcity of evidence in the Kingdom. Researchers should engage with policymakers to establish definitions and empirical instruments for evaluating cognitive development and socioemotional learning. Formalizing these definitions will enable policymakers to link outcomes to educational pedagogy and practices. It will then become possible to answer questions such as: how do educational practices such as guided play or use of learning tools in the classroom affect a child’s learning experience and achievement?

It is also important to determine what influences parents to demand high-quality ECE services. Practitioners, administrators, policymakers, and researchers should work jointly with parents to hear their opinions, understand their beliefs, provide more information, and update their expectations. Changing mindsets and existing perceptions on ECE’s role in child development (that it is beyond child care and has important consequences for overall child development) is an important short-term objective. Exploration and design of research-supported information interventions that can change established perceptions and have lasting impacts on child and adult outcomes is a desirable long-term objective. In order to fulfill both short- and long-term goals, an embedded, self-correcting process must be adopted that produces and integrates evidence as it develops and implements new policies. This would mean conducting several household-level field studies, collecting large-scale data, and developing a strong sustainable research base for Saudi Arabia.

In sum, collaborations for exploring the effect of existing programs on the quality of kindergarten provision, formalizing measurement outcomes, and understanding parental perceptions and challenges to enrolling their child in kindergarten will provide the Kingdom with the tools to design effective policy. The Noor system (specifically the student, teacher, and school level datasets) and the Early Childhood Environmental Rating Scale (ECERS) data can provide valuable data support to future policy research collaborations. Further details on these datasets are provided in Appendix II.
Chapter II: Quality Education for All – Defining Quality, Testing, and Reforms

**Background:** Forty percent of Saudis are under the age of 20 (“General Authority for Statistics” 2017). 11.8 percent of the population is of elementary school age, 5.3 percent is middle school age, and 5.6 percent is high school age. The accomplishment of the Kingdom’s Vision 2030’s objectives relies on the educational success of every member of this future workforce.

**Primary Challenge:** The notion of quality of education has traditionally been synonymous with high test scores and excellent academic performance. But students arrive in school from a variety of backgrounds, have distinct school and classroom experiences, and attend school in different regions, all factors that affect their test scores. How then, should quality education be defined, and can the education system provide high-quality education for all children, regardless of their differences?

**Economic Theory:** It is becoming increasingly clear that not only the quantity, but also the quality, of schooling is important to determine the benefits that individuals receive from investing in education. The traditional economic approach towards modeling the effect of educational inputs on student benefits and achievement involves estimating an Education Production Function (EPF). The EPF shows that student achievement outcomes (such as test scores) depend on a number of inputs—for example, individual characteristics (such as innate ability), family background (such as parents’ education and income), and neighborhood, school, and district effects (such as class size, teacher’s experience, school leadership, school-level expenditure per pupil, district-level funding, and district education administration). We use the concept of the EPF to discuss the relationship between educational outcomes and inputs in the Kingdom.

It must be noted, however, that traditional economic approaches mostly focus on resources spent and improvements in cognitive outcomes for students, as measured by test scores. This chapter focuses on identifying and evaluating the full range of benefits that children derive from experiences in different quality schools. Such benefits could range beyond cognitive gains to include increased knowledge, changed attitudes, and honed soft skills like teamwork and motivation. These non-cognitive skills are important to consider—especially for students who belong to disadvantaged families—when understanding what quality is, and how quality...
educational provision can mitigate socioeconomic gaps and foster holistic skill development in schools.

**Key Actors:** This chapter focuses on incorporating a child’s perspective in the discourse of quality education. Hereafter, the role of a child is envisaged as an active learner and not just a passive recipient of educational services. This involves imagining a child’s requirements to become a successful and well-rounded citizen. We focus our discussion in this chapter on children who are eligible for general education (ages 6–17).

**Chapter Navigation:** The first section of this chapter is divided into three parts. Each part begins by conveying the Saudi context and ends with lessons from academic literature. The first part is a discussion of what tools and information policymakers currently have to define and measure the quality of education. The second is an overview of what national assessment systems exist in the Kingdom and how they are structured. And the third examines the role of parental and school input factors on student learning. The chapter concludes with a section about potential areas of collaboration between researchers and policymakers.
Part I: How do policymakers define and measure quality of education in Saudi Arabia?

Main Insights

There is a lack of a clear definition of what ‘quality’ education means in Saudi Arabia: In the absence of a contextualized, canonical definition and distinguishing factors for low and high-quality education, the present understanding of quality is often limited to levels of measurable educational outcomes.

Emphasis only on STEM, reading, and writing skills in international testing may lead to policy bias: Reliance on STEM and reading/writing focused international tests as an indicator of education quality has led to a policy emphasis on these subjects and a move away from social sciences and humanities.

There is a need to develop multidimensional measures for non-cognitive outcomes: There is a push by the government to include programs to bolster non-cognitive skills, but measurement of these skills is imperative to understand the efficacy of these programs.

Variation in the General Aptitude Test indicates highly varying education quality: Varying mean test scores by gender, region, and school necessitates tailoring education policy to fit the unique needs of different groups.

Saudi Context

How is high ‘quality education for all’ defined? Presently, there is no unique definition of this in the Saudi context. In the absence of a contextualized, canonical definition and distinguishing factors for low and high quality, the present understanding of quality is often limited to levels of measurable educational outcomes. This section describes the current state of educational quality in Saudi Arabia based on this understanding. It first seeks to explore what an average child is able to learn as a result of the current schooling process. Traditionally, these educational outcomes have been associated with directly measurable attributes—such as cognitive abilities using test scores. However, policy attention has shifted recently to a larger range of outcomes that are produced or enhanced in schools. These additional non-cognitive outcomes, which also determine the quality of educational delivery, are explored in the second half of the discussion.
Cognitive outcomes

Cognitive outcomes, as listed in Hanushek (1986), are comprised of basic skills like comprehension and reading capacity, and performance measures like test scores that evaluate curriculum content and knowledge. National and international tests are used in Saudi Arabia to develop an understanding of quality education based on cognitive outcomes. The majority of these variables are directly quantifiable. In this chapter, we include not only the results from tests conducted in school each year, but also the results from international assessments that help to compare Saudi Arabia’s performance to other countries across the globe.

Quality based on performance in school-level tests: Saudi Arabia has school-level assessments without standardization at the regional or national levels (the GAT is standardized, but not taken by all graduates, so is not nationally representative). Thus, the tests vary from school to school. Testing standards are in place, however, to assist teachers to develop such tests. The Noor database for students records the total grades scored by every student in each class. At present, the Noor system does not capture student grades by subject, attendance levels, or tasks completed by students like homework. It also lacks details on the socioeconomic status of the student, information that could help link test scores to other background characteristics. A lack of standardization or statistical measures to link the scores makes it difficult to objectively assess the quality variations across the different schools and regions of the Kingdom.

The Noor student database provides perspective on the number of students who pass and fail. This should ideally help to identify the proportion of students who are falling behind in the current education system such that practitioners can provide them with individualized and special attention as needed. In 2017, almost all students (of 5,382,529 students in the general education category) passed across grades 1–9. The same trends were found across years.

In addition, an assessment of the numerical scores of students in grades 4 and 8 could be used to understand how students progressed over the years, as most international tests are conducted for these grades, so a strong national level testing can assist policymakers in determining the reasons for good or bad performance on international tests. The Noor system does not have numerical scores reported for students in grade 4, because primary level students do not sit for final exams; rather, their progress is monitored using a continuous skill-

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15 The data is mostly categorical with some numeric values. For the numeric values, all students who received a number grade of 50 percent and above were considered to have ‘passed’.
based assessment. For grade 8, numerical scores are reported for only a subset of students.\textsuperscript{16} Not only do all students pass in grade 8 over the years (receive a score of 50 percent or above), but they also have a high average score of 82.5 percent, with girls performing slightly better than boys.

\textit{Figure 6: Average final numerical score for grade 8 students over the past five years [Source: Noor student dataset, 2013-2017]}

The overall picture of quality of education based on the grades on national tests appears to be reasonably good. However, these trends do not illustrate heterogeneities and factors that lead to dispersions in test scores, like variations in region, school, subject, or socio-economic status variations. Additionally, the lower performance in international tests, such as TIMSS, indicate that national tests may need to capture more varied measures of performance in line with international standards. In the absence of a complete data infrastructure, the current picture of the state of educational quality in the Kingdom based on national test results is incomplete.

\textbf{Quality based on performance in school-level international tests:} Presently, Saudi Arabia participates in Trends in International Mathematics and Science Study (TIMSS), which is collected from students at grades 4 and 8 and is conducted once every four years (the last round was in 2015). The Kingdom also participates in The Progress in International Reading Literacy Study (PIRLS), conducted for students in grade 4 once every five years (the last round was in 2016). Results of both international-level tests depict a disheartening picture of Saudi Arabia’s education quality.

\textsuperscript{16} One average, in 2013 – 2016: 45 percent of the total sample of 5.2 million students each year had their number grades reported in the Noor system. In 2017, only 6 percent of the students had their numerical scores reported.
Around two-thirds of students in all TIMSS and PIRLS participating countries score between 400 and 600 points. In the last round of these tests, Saudi Arabia had the second-lowest scores amongst Gulf Cooperation Council (GCC) nations, as seen in the figure below. Fourth grade Saudi students scored an average of 383 on the mathematics test and 390 on science. The reading ability in Saudi Arabia was found to be notably stronger (average score of 430) than the ability in mathematics and science.

Figure 7: Grade 4 performance in mathematics, science, and reading across Gulf Cooperation Council (GCC) countries
(Source: Trends in International Mathematics and Science Study 2015 and Progress in International Reading Literacy Study (2016) and Progress in International Reading Literacy Study (2016))

The trend performances on these tests over the last two rounds is depicted in the figure below. Each of the GCC countries saw a significant change in 2015 compared with their 2011 scores. Saudi Arabia and Kuwait saw a significant drop in their average attainment scores in grade 4 mathematics and science, unlike their GCC counterparts—Bahrain, Oman, Qatar, and UAE—which had a significant improvement in their average attainment score. The reading scores improved for all countries where data was available for both years, with the exception of Saudi Arabia, which reported no change.17

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17 PIRLS 2016 was the first cycle in which Bahrain and Kuwait participated, so no trend information is available.
In terms of grade 8 mathematics results, Saudi Arabia was one of the three TIMSS countries (in addition to Chinese Taipei and Jordan) that witnessed a lower average achievement between 2011 and 2015. TIMSS data has also consistently shown that girls significantly outperform boys in mathematics and science across all GCC countries. Saudi Arabia is no exception, where the achievement gap by gender widened between 2011 and 2015.

Quality based on performance in university entrance test: The General Aptitude Test (GAT), conducted by the Education and Training Evaluation Commission, is taken by students in Saudi Arabia before graduating secondary school. It is a high-stakes examination, since exam scores are required for admissions in Saudi-based universities or frequently used by potential employers upon school exit. Examinees are expected to have acquired these skills throughout their education and life experiences. Although the test (by virtue of being an aptitude test, not an achievement test) does not provide a holistic measure of educational quality, it is a useful indicator of how students fare on aptitude levels. In the lack of standardized testing at the high-school level, GAT scores can be used to compare variations in student performance on the test based on important factors (like gender or region). Nevertheless, GAT scores should be viewed in conjunction with school-level assessments and the Standardized
Achievement Admission Test (SAAT) scores to make a more informed evaluation of student performance and educational quality.18

The GAT is a norm-referenced test and uses questions on language and mathematics to measure a students’ inferential and inductive abilities, including reading comprehension, logical reasoning, and problem-solving behavior. The GAT test is offered in Arabic and English (for non-native Arabic speakers) and has verbal and quantitative sections. The verbal section assesses reading comprehension, sentence completion, and verbal analogy, while the quantitative section covers arithmetic, geometry, algebra, and interpretation of graphs and charts. This latter section is supposed to test basic knowledge that should have been covered during general secondary school. All questions in the GAT test are multiple choice, and the answer sheets are machine scored. The GAT is scored from a 100-point test, with no cut-off for pass/fail. Knowledge about the psychometric features of GAT is of critical importance to evaluating the validity of decisions based on the GAT scores of the examinees.

Close to one million students take the GAT test each year (National Center for Assessment and Education and Training Evaluation Commission, 2016). However, students who take the exam do not form a representative sample of secondary school graduates. There is a selection issue, since students self-select to take the GAT examination. Those applying to foreign universities (who are likely above-average performers) are not required to take the test, and those who drop out or choose not to take the exam may be below-average performers.

Variations by gender: Data over the years (2012–2017) consistently finds that girls outperform boys in the GAT, as depicted by the distribution of the scale scores in the figure below. For example, in 2017, the mean score on the GAT test was 66 out of 100 for girls compared to 64 out of 100 for boys.19 This difference in means indicates that the reverse gender gap may persist from lower grades and continues through to the post-secondary level of schooling.

18 The psychometric literature on testing and limitation of GAT is presented in the Research Insights section.

19 The GAT analysis used throughout this paper is based on invaluable information received from the Education and Training Evaluation Commission (ETEC). Two versions of the same dataset were received: the first version in April 2018, and the second in August 2018. The first version did not specify the time period for the data, and the second updated version included the year variable. The second dataset has information for about 350,000 students per year, spanning from 2012–2017. Since close to one million students are expected to take the GAT test each year (National Center for Assessment and Education and Training Evaluation Commission 2016), there is a possibility that the dataset received is a subset of all GAT takers. As a result, for high level analysis in this report, we have used the unadjusted pooled data over years from the first dataset (received in April 2018; N=2,242,612) and have not factored for time- or year-wise variations in our calculations. We have also assumed that the test scores are linked and equated over the years. This should be considered a caveat while interpreting the results, and future collaborations could investigate the data and analysis in further details.
Variations by region: ETEC collects data that makes further exploration at the region-level possible. The map of Saudi Arabia produced by ETEC indicates the distribution of students and average grades in GAT (scientific test) by region for 2015 (Qiyas 2015). The administrative regions are colored based on the average GAT score, with a higher average score represented by a darker color.

The General Aptitude Test (GAT) is divided into two parts: a verbal part and a quantitative part. The quantitative part includes mathematical questions, and these are different based on whether the student’s track in secondary school (grade 11 and 12) was natural sciences or humanities. Here, ‘theoretical’ refers to the humanities, and ‘scientific’ refers to natural sciences.

The 2015 GAT score regional rankings were found to hold for the 2016 and 2017 data subsets received by EPoD from ETEC.
The Eastern Province reports the highest GAT (scientific) score of 68.2 percent, followed by Riyadh (66.3 percent), Baha (66.4 percent), and Makkah (66.1 percent). The region of Jawf reports the lowest GAT (scientific) score of 59.9 percent. The regional variations remain the same for GAT (theoretical test) as well, as seen in the second map.

**Variations by school:** The GAT scores also vary across schools. Between the periods 2012–2017, 10 percent of the schools (539 out of 5,387 schools) scored an average scale score below 59 out of 100. On the other hand, in the top 10 percent of the schools, the average scale score was above 73 percent, with some schools achieving an average scale score of as high as 95 out of 100.
There could be many other reasons for variation in GAT score performance based on gender, type of school, and the region where the school is located. The schools are gender-segregated in the Kingdom, and there may be variations in inputs and quality across girls’ and boys’ schools. Furthermore, there could be differences in the student and parental inputs for girls and boys, or differences in non-cognitive aspects like academic ambitions, motivation levels, and perceptions of the returns to education. Some of these input factors are discussed in the second part of this chapter.

Nevertheless, quality is seen as a direct reflection of test scores and outcomes; the international tests seem to have a strong influence on educational policy-making, especially given the lack of robust national testing procedures and data infrastructure. As a result, there is a strong policy emphasis on subjects tested in international assessments, such as Science, Technology, Engineering, and Mathematics (STEM) areas, as well as reading, writing, and literature. Other areas, like social sciences, arts, and humanities, receive less prominence in Saudi schools.

Consequential policy emphasis on STEM: General education programs in cognitive skill development have recently adopted a strong emphasis on STEM. Focus areas in sciences and technology range from computer and mobile applications to the environment. The Globe Environmental Program, for instance, targets elementary, middle, and high school students, involving 162 male schools and 77 female schools. The program includes a game design competition at the local level. Some of these programs, while a notable effort in the development of STEM skills, show a lack of gender inclusion. The national computer and mobile application Olympiad, for example, is a Boys Educational Agency initiative.

Mawhiba, the national program to recognize gifted students at the third, sixth, and ninth grades in public schools, is an engine of STEM skill development in the Kingdom. Mawhiba’s School Partnership initiative provides gifted students with scholarships to study in five distinguished schools with an advanced curriculum in STEM. In addition, 14 dedicated Mawhiba STEM centers host students every Saturday. These are in Riyadh, Jeddah, Dammam, Khobar, Al Ahsa, and Mecca. Mawhiba holds local enrichment programs during the summertime in partnership with schools, universities, hospitals, and research centers, with a focus on the fields of chemistry, energy and the environment, biological and medical sciences, mathematics and information technology, and physics and engineering. Scientific content makes up 70 percent of Mawhiba’s local enrichment programs, while soft skills make up the remaining 30 percent (Mawhiba n.d.).

Enhancing student participation in regional and international educational competitions is a strategic educational objective in Vision 2030. Mawhiba also sponsors the National Olympiad
for Scientific Creativity, or ‘Ibdaa’. This competition for seven to twelfth grade students is a gateway for international competition. The MoE has set the ambitious goal of having all educational directorates participate in the international Olympiad in science, math, physics, and chemistry by 2020. Nineteen of the national Olympiad categories fall into STEM, while a single category is dedicated to social and behavioral sciences.

Overall, the STEM skill development programs enable practical learning, and there is simultaneously an increasing focus on applied learning reflected in teacher training as well as in testing design. At the teacher preparation level, programs such as the MoE’s strategies for ‘active learning for mathematics’ emphasize active learning applications in teacher training. As for assessment, the MoE is developing a new guide to practical exams for computer science as well as a guide to practical skills in teaching science for high schools.

Consequential policy effects on social sciences, arts, and humanities: An emerging point of concern in the Kingdom is the negligence of teaching social sciences in secondary school and training teachers in social sciences. Only two programs in the MoE’s operational plan focus on the social sciences: a program to design the professional career development track for social and national education teachers, and a program to complete a procedural guide of field studies applications. Thus, while STEM and language development is an important target, following the focus of international competitions and tests too closely may have led to a bias in the field composition of national-level enrichment programs. In addition, despite the emphasis on core curriculum subjects, student performance on international assessments remains low.

Recognizing the need for more well-rounded students and the importance of 21st century skills, the MoE introduced an Activity Hour in all schools beginning in the 2017/18 academic year. The aim of the initiative was to foster student critical thinking skills, promote social skills, and equip students with job-relevant skills. The Activity Hour added an additional hour to the school day for all students, Sunday through Wednesday, for an addition of four hours to the school week. Schools were provided with a menu of possible activities to be delivered, ranging from cultural, art, physical education, business, and STEM projects.

The Activity Hour, as well as other initiatives, provide many opportunities for development of knowledge and skills in the arts and humanities at the K–12 level. The MoE’s initiatives in these areas include the school theater program, which targets middle and high school students and has drawn the participation of 1,510 male and female students from all educational directorates (Ministry of Education 2018). The cultural festival involves student theater performances from 16 general education directorates. The Arabic calligraphy, drawing, photography, language, scientific creativity, and Islamic Art Olympiads, which are
open to all K–12 students, prepare students for participation in international competitions. The program to develop artistic skills, which targets K–12 students, enables art productions by male and female students who reach a qualifying stage at the national level.

In addition to the cognitive outcomes outlined above, non-cognitive outcomes also determine the quality of education delivery in Saudi Arabia. The next section discusses these non-cognitive student outcomes.

Non-cognitive outcomes
Historically, the education instruction system in Saudi Arabia has been focused on rote-memorization with limited participation in group-work, interactive activities, and in-class discussions. Non-cognitive skills, including socioemotional competencies like initiative-taking, persistence, leadership, social skills, cultural knowledge, and self-awareness, have been mostly emphasized through extracurricular activities. Such skills have remained missing from curricular content or testing practices. Prior to the introduction of the Activity Hour in 2017/18, only 15.5 percent of all school-age children in Saudi Arabia participated in extracurricular activities in 2016 (Ministry of Education - Vision Realization Office, 2018). An inflexible class schedule previously made it difficult for students to engage in their favorite activities (Alnahdi 2014).

Quality based on non-cognitive skill development: The performance of students in terms of non-cognitive outcomes does not feature into the measurement of quality. Testing of soft skills is limited to self-selected tests. Qiyas has extended the scope of testing beyond traditional topics to target a few socioemotional skills. Under its Social Responsibility Initiative, which started in 2015, Qiyas has developed free online tests that assess youth growth, life satisfaction, preparedness for family life, and adherence to social standards. However, there is no integration of such tests with the standard testing practices for K–12 cognitive outcome measurement.

While non-cognitive skills have received policy attention, the efforts to include them in education policy are very recent. Moreover, a system for tracking student progress on such skills and publishing a range of educational outcomes at regular intervals has not yet been included in the development of any of these new initiatives. Details of current initiatives are provided below.

Non-cognitive skill development through school-level activities: In 2016, the Vision 2030 stressed non-cognitive skill development of children. Under the NTP 2020, the MoE has incorporated soft skills development into its programs. It has launched an initiative to “develop a comprehensive matrix of personal skills that lead to success in general and
professional life and introduce this matrix in curricular and extracurricular activities.” This initiative has led to the creation of several noteworthy programs at the high school level.

The MoE has since recognized the role that extracurricular activities play in fulfilling the strategic objective of “Enhancing Students’ Main Values and Skills”, motivating the introduction of the Activity Hour. The percentage of students involved in extracurricular activities and the percentage of students utilizing community club services are included as a Key Performance Indicator in the NTP 2020. Dialogue tournaments have also been initiated to encourage debating and communication skills, and they aim to target 30 percent of all male and female high school students. The MoE has also started the third phase of the ‘Sufaraa Al-Azm’ program, which presently targets students in the southern border areas and encourages participation in community clubs. The program aims to have students across Saudi Arabia enrolled by 2020. In addition, the matrix of personal skills involves behavioral measures and outcomes. For example, the MoE has initiated a program to increase school discipline among students. The present agenda also focuses on ensuring that at least 90 percent of physical education teachers are proficient in drafting behavioral objectives.

Non-cognitive skill development through corporate partnerships: Partnerships between the MoE and private firms provide opportunities for non-cognitive skill development. For example, Aramco’s environmental education initiative sponsors ‘Friends of the Environment’ clubs for children in elementary school, fostering values of conservation and stewardship. Participants include more than 1,800 schools Kingdom-wide. The program also awards scholarships to students who submit ideas for environmental projects (Ministry of Education 2018). The Entrepreneurship Program, targeting all high school students across the Kingdom, is a collaboration between MoE and King Salman Youth Center, the National Entrepreneurship Institute, and the Human Resource and Development Fund, among others. In the past year, the program provided training to 22,500 male students, with the aim to have 60 entrepreneurship projects (including projects from at least 20 percent of schools in each girls’ educational directorate) participate in the department’s competition.

Based on this contextual understanding, we now turn to a discussion of academic literature on the topics of quality and educational outcomes in Saudi Arabia.

Research Insights

Defining ‘quality education’ has been a long-time subject of pedagogical and semantic debate. The attainment of basic skills like literacy and numeracy is necessary but not sufficient to reach the threshold of quality, as recognised by the United Nations Sustainable Development
Goals (SDGs). Education is not simply about delivering content; rather, it is a system designed to enable students to reach their full potential and become productive citizens in society.

Adopting a child-centric approach makes it clear that quality education is one that focuses on the whole child, including the social, mental, emotional, physical, cognitive, and non-cognitive aspects. Quality education also focuses on the development of each child regardless of gender, ethnicity, nationality, socioeconomic status, or geographic location. A quality education ensures that students have the necessary tools to prosper. It allows policymakers and schools to align fully and work collaboratively with children, parents, and communities.

Research shows that people need cognitive skills, interpersonal skills, and intra-personal skills to develop economically and socially. Development in cognitive skills is a priority for the Saudi education sector (Hanushek 2018). Students in the Kingdom must also learn to work with others, reflect, and set personal goals. Skills such as work ethic, sociability, and dynamism make a difference in the educational and financial outcomes of students (Lleras 2008).

**Cognitive outcomes**

**Definition:** Cognitive skills are the formal, tangible goal of the educational process. Gintis (1971) describes cognitive skills as the individual capacities to “logically combine, analyze, interpret, and apply informational symbols”. These capacities are stimulated throughout the learning process. They are channeled in school and influenced by teaching, curricula, and institutions. Cognitive skills include literacy, numeracy, and problem-solving skills (Riddell and Green 2009). They are usually divided into two types: fluid intelligence and crystallized intelligence (Dahmann 2017). Fluid intelligence is innate and includes reasoning, comprehension, and information processing abilities. Crystallized intelligence refers to knowledge and behavior that is acquired, either explicitly or implicitly, such as specific facts and the ability to read or perform calculations (Dahmann 2017). Unlike fluid intelligence, crystallized intelligence is influenced and determined through environmental factors like education.

**Measurement:** Cognitive skills are traditionally represented by educational attainment and test scores. Test scores evaluate subject knowledge and have been used as the gold standard for understanding educational performance and schooling quality. Cognitive variables and educational outcomes also include comprehension, reading speed, school attainment, and graduation or dropout rates (Hanushek 1986). Most of these variables are directly quantifiable, and those that are not can be measured through proxies.
Non-cognitive outcomes

In addition to its role in the transmission of knowledge and formal conceptual understanding, the school also plays a primary part in the socialization of individuals. Socialized individuals possess traits not directly represented by cognitive skills. These skills are generally referred to as non-cognitive skills.

Definition: Defining and measuring personality or non-cognitive traits is relatively challenging when compared to defining cognitive educational outcomes. This is partly due to the difficulty of identifying non-cognitive skills and separating them from cognitive skills, and partly because of the difficulty of measuring non-cognitive skills even when they can be identified. According to Cunha, Heckman, and Schennach (2010) or Borghans et al. (2008), personality, social, and emotional traits are non-cognitive skills that are embedded in individuals. Levin (2012) refers to non-cognitive skills as “those that are generally viewed as attitudes, behaviors and values that contribute to adult competencies” (p. 4). Borghans et al. (2008) define personality traits as “patterns of thought, feelings and behavior”. The most common classification used to summarize non-cognitive skills is the ‘Big Five’ constructs of personality. This construct posits that there are five independent personality traits common to all individuals—openness, conscientiousness, extraversion, agreeableness, and neuroticism. However, this model has been criticized for a few reasons. In the context of schooling, the most important critique is the absence of motivation as a personality trait.

Measurement: The discussion on quality of education has repeatedly referred to the testing procedures in Saudi Arabia. Current tests illustrate, at best, one part of the story. Research shows that traditional tests worldwide fail to measure important attributes like personality traits (Heckman and Kautz 2013). Achievement tests are failing to capture, reliably and wholly, non-cognitive skills, partly because of a lack of definitional clarity. Self-assessments are problematic because of reference bias, and behavioral measures are not exogenous. Elements outside of the student’s control may affect behavior inside the classroom (Deming 2018). Using multiple measures increases the validity of inferences based on observed gains in achievement. A standard strategy to providing metrics of personality variables and defining factors of personality is the use of factor analysis techniques that rely on the combination of different items such as surveys and inventories to create factor scores. Factor analysis techniques lead to the measurement of underlying or latent factors representing non-cognitive skills or distributions of them (Almlund et al. 2011; Basilevsky 2009; Kim and Mueller 1978; Hamilton 2006).
In the following part, we briefly explore the existing assessment systems in the Kingdom alongside emerging research literature on the design principles for test-based accountability.
Part II: What are the national assessment systems used for testing education quality in schools in Saudi Arabia?

Main Insights

The current data systems are unable to track progress in terms of important cognitive and non-cognitive student outcomes: Not having a robust and comprehensive educational database makes it difficult to monitor student progress across years or levels of schooling, from early childhood, up to 12th grade, and beyond to tertiary education.

No standardized national testing at the school-level makes it challenging to monitor outcomes: Although the university entrance exam (General Admission Test) is standardized, it is not completed by all students; there is a missed opportunity to have national-level testing systems inform student development or enhance the understanding of teachers and policymakers on how Saudi students’ performance on international education averages can be improved.

The ‘5 C’s’ of designing and validating tests provide an answer to questions about whether school-level tests are a good measure of skills: Keeping in mind content, cognition, coherence, correlation, and consequences while designing tests can increase relevance of test performance as an indicator of student skills.

Saudi Context

School-level national testing system

Saudi public schools have local, teacher-designed examinations in all school disciplines. Each school year has two terms, and an internal exam is taken by students at the end of every term. The results are used to assess progression to the next grade by combining 50 percent of each term’s grade as the final grade (Al-Sadan 2000). The approach to student examination is identical across both the intermediate and secondary levels. While there are national testing standards available, teachers usually have no direct guidance on designing (such as materials on how to develop, scale, and grade tests) and conducting these examinations (how to monitor students and administer tests). Thus, many doubts arise regarding the reliability of such tests (Sadaawi 2010). The tests vary by teacher and are potentially impacted by the resource constraints available to them within their school. The grading system for

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23 If a testing procedure produces consistent results across different individuals or groups, it is considered reliable. Reliability of tests is discussed in further detail in the Research Insights section of this Part.
intermediate- and secondary-level assessments under the new course-based system in Saudi Arabia includes the following categories: Excellent (90 and above); High Very Good (85 to below 90); Very Good (80 to below 85); High Good (75 to below 80); Good (70 to below 75); High Fair (60 to below 70); Fair (50 to below 60); Fail (below 50). Students take individual paper-based tests to answer written questions, which include multiple choice questions, true/false questions, and essays. At the primary level, teachers use a continuous, skill-based assessment method to measure student progress.

As discussed in the previous section of this chapter, this testing system does not provide a true reflection of student performance. Further, inadequate evaluation and recording of the test results also lead to low accountability for schools and teachers. Such traditional tests are also only able to assess a limited number of cognitive skills and focus on the ability of students to remember information. TIMSS teacher questionnaires show that rote memorization is widespread in Saudi Arabia—almost all fourth and eighth grade students are encouraged by their teachers to memorize facts, procedures, and rules in mathematics and sciences. ‘Teaching to the test’ is a common practice in Saudi schools (Alhareth, Dighrir, and Alhareth 2015). Teachers focus on teaching test techniques as an end in itself, which enables students to achieve high grades with very little effort (Siddiek 2012).

As a result of these factors, the validity of the existing tests is low. They likely reflect rote-memorization ability, and are not reflective of students’ understanding of the material. Such a testing system also limits student potential to develop skills at a lower level and distorts the curriculum.

There is increasing interest in measuring cognitive and non-cognitive skills. The government is beginning to develop subject-specific initiatives targeted at testing. This includes setting guidelines in the development of exam questions for unconventional subjects like family education or Islamic education. While this is useful, the steps taken to ensure the reliability, validity, and robustness of procedures for existing tests are still few and far between.

The administration of assessments and data gathering is also fraught with insufficient professionalism (Al-Sadan 2000). This leads to poor accountability through the existing testing system. The MoE has a program in place to encourage assessment specialists and heads of school leadership departments to use quantitative and qualitative indicators of school performance to make decisions. Experts emphasize the need to rethink the current test-based

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24 The MoE announced that the semester-based system will gradually be replaced with the course-based system in all schools across KSA as of 2018/2019. We therefore did not include the grading scale for the semester-based system in this report.
accountability system design by focusing on school improvement and downplaying school rankings. This means monitoring school quality by rewarding those growing and improving over time, and by emphasizing student growth and proficiency (Linn and Chiu 2011). Evidence on such measures related to testing accountability is not readily available in the Kingdom.

University entrance examination

The Saudi secondary school leavers do not sit for one national standardized achievement test at the end of their secondary school education (“HKS-MoE Workshop and Symposium” 2018). There is no integrated and formatted exam administered at the national level. Further, school-level grades and consistency of performance across years in school are given very little consideration for university admission. Universities in Saudi Arabia predominantly consider the results on the General Aptitude Test (GAT), Scholastic Achievement Admission Test (SAAT), and other similar tests administered by Qiyas, which was established in 2000 when the Ministry of General Education and the Ministry of Higher Education were still separate entities, to provide assessments to be used for university admission. Until recently, Qiyas was an independent organization, but it now falls under the umbrella of the Education and Training Evaluation Commission (ETEC). Generally, universities give school grades and school-level secondary school examinations 30 percent weight (Alhareth, Dighrir, and Alhareth 2015). The weight given to the GAT in the admission decision is determined by the universities. It can vary from university to university, but is often between 30 percent and 40 percent, and similar weightage is given to the SAAT.

There is debate among stakeholders about the weight put on the GAT and the value given to grades and secondary school tests during the university admissions process. The heart of the debate lies in whether to give more weight to a proficiency test or to school grades, used as a proxy for the effort exerted by learners studying their school curriculum. The idea that GAT and other proficiency tests lack content validity and should be better integrated with the Saudi school level assessment systems needs further consideration.

In an effort to ensure that GAT test design is always backed by scientific evidence, Qiyas has conducted several studies, some in cooperation with outside researchers, to determine the psychometric characteristics of the test. These studies have also determined correlations between the test characteristics and the educational, demographic, or other characteristics of test-takers. One example of these efforts includes a study investigating and comparing the dimensionality and factor structure of the GAT test data on two modes of assessment (Paper and Pencil Test (PPT) and Computer Based Test (CBT)), and examining student performance on the GAT and their GPA profiles at scientific colleges in Saudi Arabia (Qiyas 2016). Other researchers have found positive predictive ability of the GAT in determining university
graduation (more so than high school GPA), but limited predictive ability in determining university GPA (Alnahdi 2015).

Research efforts to improve the understanding, accuracy, and relevance of student assessments among Qiyas and other education institutions are notable. Further policy research to improve student assessments in meeting their objectives of assessing student performance should be undertaken at all education levels.

Based on this contextual understanding, we now turn to a discussion of academic literature that can provide insights on designing and implementing educational assessment systems.

**Research Insights**

In the design and validation of tests, content, cognition, coherence, correlation, and consequences matter. To validate the correlation aspect of testing, for example, we must ensure that test results correlate with what we care about externally (Ho 2018).

**School-level national testing system**

In Saudi Arabia, it is critical to establish standards for design and evaluation of tests, testing practices, and effective test use. As the Kingdom transitions towards a knowledge economy (which relies less on natural resources for economic growth, and more on the intellectual capital of workers), the appropriateness of a test or a measurement system should be contextualized to the curricula, learning nuances, and the emerging needs of the Saudi youth. The Standards for Educational and Psychological Testing provides a long list of standards that should be considered when designing and using national assessments, which we use as a basis for our discussion below. Some of the relevant factors for consideration in defining the testing standards and protocols in the Saudi context are also discussed below.

**Test development and updating procedures:** According to the Standards for Educational and Psychological Testing, test development is the process of producing a measure of some aspect of a student’s cognitive and non-cognitive outcomes, including "knowledge, skill, ability,
interests, and attitudes, or other characteristics” (2014). Designing items and combining them to form a test according to a specified plan is a scientific process.

These procedures should be accompanied by standards and specifications of the test’s purpose, administration protocols, scoring procedures, and score reporting mechanisms. Even if tests are designed by individual teachers as in the Saudi case, robust training and direct measures of ensuring a holistic understanding and development of tests based on such standards is critical. For instance, carrying out pilots to ensure national representativeness of tests is one way of ensuring the testing design is robust. Moreover, decisions about placing varying weights on different tests should not be taken on an ad hoc basis, but instead should be directed by empirical evidence. When a test score is derived from the differential weighting of items, the rationale and process used to develop, review, and assign item weights should also be considered.

The purpose of a test should be well articulated and understood by test takers. Formative assessments, such as the ones conducted for primary level students in Saudi Arabia, can be a useful diagnostic tool for teachers to assess their teaching and adapt their instruction methods accordingly (Bennett 2011). Feedback from low-stakes assessments can also help students self-evaluate and become aware of the gaps that exist between the grades they want to achieve and their current knowledge, understanding, or skillset (Nicol and Macfarlane-Dick 2006). However, for such assessments to achieve their goal, it is important for students to understand the learning objectives and assessment criteria and have opportunities to reflect on their work (Frederikson & White, 1997). When students do not fully understand why they are taking these assessment tests, the lack of consequences for performance may prevent them from giving their best effort, and the assessment test scores may therefore fail to serve as valid measures of their knowledge and ability. Wise and DeMars (2010) warn that the traditional psychometric theories, which guide assessment practitioners and assume that students try to do their best on assessment tests, may be of limited usefulness in low-stakes testing contexts. The authors state that it is therefore “essential that assessment practitioners keep in mind models of achievement motivation when planning, implementing, and interpreting the data from low-stakes assessment programs”. A mix of both formative and summative assessments could be useful for maximizing student learning while also measuring the right outcomes.

Test validity: Validity is the “degree to which evidence and theory support the interpretations of test scores entailed by proposed uses of tests” (American Psychological Association, National Council on Measurement in Education, and American Educational Research Association 2014). It is the primary consideration throughout test development and evaluation. For example, if a test is used in a way that has not been validated, it is incumbent
on the user to justify the new use by collecting new evidence if necessary. The Standards outline that validity evidence should be based on “test content, response processes, internal structure, relations to other variables such as convergent and discriminant evidence, test criterion relationships, validity generalization, and the consequences of testing.”

**Test reliability:** If a testing procedure produces consistent results across different individuals or groups, it is considered reliable. However, in some instances, because of subjectivity in the scoring process, a small measurement error will produce slight differences in an individual’s score and the average score of a group. Although small, knowledge of the measurement error is crucial for evaluating a test instrument. The standard error of measurement is typically more relevant once a measurement procedure has been adopted and the test scores must be interpreted. Given their importance, according to standard 2.1 of the Standards for Educational and Psychological Testing, “for each total score, sub-score, or combination of scores that is to be interpreted, estimates of relevant reliabilities and standard errors and standard errors of measurement or test information functions should be reported.” This is of critical importance in the Saudi context, where such reporting is currently missing.

**Scaling, norming, and scale comparison:** Scaling scores helps in the interpretation of scores by indicating how a given score compares to those of other test takers and across other tests. Norm-referenced tests report whether test takers performed better or worse than a hypothetical average student, information that is determined by comparing scores against the performance results of a statistically selected group of test takers, typically of the same age or grade level, who have already taken the exam. In order for the norm-referenced interpretations to be valid, an appropriate reference group must be used for test score comparison. Norms should be based on a “technically sound, representative, scientific sample of sufficient size.” (American Psychological Association, National Council on Measurement in Education, and American Educational Research Association 2014). Scaling or norm-referencing to link test scores across schools or regions is not clearly identified in the Saudi context.

**Fairness:** Standards for fairness are important to ensure professional administration of tests. Fairness ensures that the tests are free from bias, help in equitable testing, and provide an equal opportunity for students to learn and transition through the education system. Fairness could be ensured through robust measures for administering tests, test security, and basic rights when irregularities in testing are contested. In the Saudi context, fairness in assessment also pertains to the use of language and accommodation of varying linguistic backgrounds. Language background and proficiency in different parts of the Kingdom should be considered when developing, selecting, administering, and interpreting test performance. The concept of fairness in assessment also entails accommodating for technical and professional issues
regarding the testing of individuals with disabilities. At present, the Noor system in Saudi Arabia does not contain enough information for distinguishing and assessing the fairness of testing procedures and interpretations.

University entrance examination

Standardized tests are high-stake examinations used to measure participant abilities and skills. They are so named because their administration, format, content, language, and scoring procedures are the same for all participants, where these features have been 'standardized'. The process of standardization permeates all aspects of testing: construction, administration, scoring, reporting, and interpretation of results. Standardization is key in monitoring the success of new delivery targets for all children in the Kingdom. Standardization allows for reliable and consistent measurement across all regions and schools. Since Saudi Arabia does not have a standardized test for school leavers, there is no measure of the skill sets with which students exit school, leading to an ambiguity on the success of national-level teaching and learning procedures.

Principles of testing accountability can be utilized to address this. Linn and Chiu (2011) explain that where outcomes are critical for policymaking (such as school leavers assessments), there should be multiple measures to ensure robustness. Such tests should encourage inclusion, emphasize school improvement, and downplay school rankings. Budgeting for responses to unintended consequences, setting realistic and achievable targets, and promoting inclusion should also be fundamental to testing.

The General Aptitude Test (GAT) scores have been found to be predictive of future academic performance, especially when considered in conjunction with the high school GPA (Sulphey, AlKahtani, and Syed 2018). The test is critiqued on grounds of content validity, nevertheless. A test is said to have content validity if its content constitutes a representative sample of the skills, and reflects the extent to which students are actually reaching the desired objectives of teaching (Hughes 2003). Tests need content validity for teachers to secure and track the specific educational objectives in the textbooks, and for learners to focus on learning by studying their textbooks. Research reflects that proficiency tests are not able to reflect links between school-level practices and student outcomes, even though they do demonstrate the overall academic prowess of the candidates. Thus, while using and interpreting assessment results, their limitations should be recognized.

The discussion so far in this chapter has focused on how quality is defined and measured. We have so far determined educational quality by looking at the outcomes of the schooling process. The Education Production Function (EPF) literature in economic theory shows that
unless inputs are controlled for, these measures say little about the effectiveness of the educational process or the role of education in determining the outcome. The next part of the chapter discusses the parental and school-level factors that influence student outcomes. Parental factors include their background characteristics, home environment, and their perceptions about a child’s talent. School-level factors, on the other hand, include a discussion on budgets and factors of the school environment that foster child learning.
Part III: What are the factors that influence quality education for all in Saudi Arabia?

Main Insights

Saudi education expenditures have not translated to high student performance: As a ratio of GDP, Saudi expenditures on education are at par with spending in high income countries. Yet, Saudi pupils have ranked lower than those with similar spending levels in terms of international education performance averages.

Home environment affects school performance: When providing high-quality education for all students, schools must consider that the number and types of educational resources at home, the time that parents spend with a child, and parental perceptions of their child’s ability inform how that child performs in school.

Self-perceptions can lead a child to high achievement: Research shows that changing what a child envisions for their own future affects their motivation and their decision-making process throughout their school progression. Identifying and nurturing children’s talents is important to enable holistic development through the schooling system.

Using Information and Communications Technology (ICT) as a tool for mass learning and catalyst for innovation is a promising avenue to support Saudi children in schools: Data shows that most Saudi households use ICT as educational tools at home. Given the familiarity of students with ICT, it is a potentially powerful educational tool for schools to use for mass dissemination of quality educational services.

Saudi Context

Parental and environmental factors
Students’ learning is affected by their environment at home and characteristics of their parents and family. When determining how to provide good quality education for every student, it is important for policymakers and schools to consider the variation in types of students in terms of parental attributes, parental perceptions of talent, and the home environment offered to the children.

Parent background characteristics: The education and income level of parents have an effect on their child’s schooling outcomes. Parents with a higher education level may push their kids harder in school; they might also excel at helping with schoolwork, or possess the acumen to navigate the school and higher education system that parents who did not go to university...
may not have. Families with a higher income may be able to afford tutoring for their child, buy supplementary learning materials for home, and have access to more schooling options.

At present, the Noor student database collects limited data on parents’ demographic and socioeconomic characteristics, which makes it difficult to measure their influence on student outcomes. For instance, data on parents’ age and income levels are not available. These are necessary pieces of the puzzle to understand the educational landscape in Saudi Arabia. Currently, two important variables collected in the Noor students’ system are parents’ geographic location and education levels. Only 11 percent of the total students in the Noor student dataset (i.e. 578,150 of the 5,382,529 students) had their parents’ geographic location and education level reported in 2017. Considering this limited data, the figure below shows that the majority of the parents (parents of 416,268 students, i.e. 72 percent of the sample available) attained a secondary level education or below, and mothers report lower education levels compared to fathers.

![Figure 13: Percentage of parents with different levels of educational attainment, segregated by gender [Source: Noor student dataset, 2017]](image)

Parental education level varies significantly across regions. Overall, more populated regions have a lower number of illiterate mothers and fathers than smaller regions. The figure below displays the percentage of mothers and fathers who report being illiterate, across regions. The size of each bubble represents the total male and female population in the region; a bigger bubble represents a larger region based on population, and a higher plot represents a higher number of illiterate parents. Interestingly, while more than 20 percent of mothers in the lowest-populated regions (such as Jizan and Najran) report being illiterate, this number
drops to below 5 percent in the moderately densely populated region of Eastern Province. Similar trends across regions can be seen for father’s education level, as well, while illiteracy in general seems to be lower for fathers than mothers. Student’s performance in school and the educational attainment of their parents are also positively correlated. While this may not be a representative picture (given the large percentage of missing values in the Noor system), it reflects several things. First, while parental education plays an important role in student learning, regional variations indicate that the smaller regions, which tend to have lower parental education levels, require greater policy attention. Second, highly educated parents are likely to be moderately associated with high-achieving students, and by the same token, parents with little education are likely to be moderately associated with lower-achieving students. Third, the gaps in the present data infrastructure should be addressed in Saudi Arabia, such that existing data can provide valid estimates, and new data can be created to enable a better understanding of the current context.

Figure 14: Percentage of parents who report to be illiterate, segregated by region [Source: Noor student dataset (2017) and Population Characteristics Survey, General Authority for Statistics (2017)]

Family perceptions of a child’s ability: Students move through the schooling system with the constant influence of family expectations. It is reasonable to think that, especially when a child is young, their family’s perceptions of them affect how they choose to spend their time. Examination of the Education and Training Survey from 2017 shows that family perceptions of a child’s ability are markedly different between genders. That is, heads of household overwhelmingly believe that boys and men are good at sports, whereas girls and women are good at fine arts. The survey question is not a direct measure of how parents view the ability of their own children, but it indicates how adults view the abilities of each gender. This can provide an insight into the views that students absorb in the home that may influence their
curricular and extracurricular choices. The figure below shows that household heads believe that female talent is mainly concentrated in the humanities: 52 percent of reported talent is in the fine arts, 10 percent in languages. Meanwhile, reported perceived female talent in mathematics is limited at 10 percent.  

*Figure 15: Household heads’ perceptions of female and male talent (ages 3-30) by field of talent [Source: Education and Training Survey, General Authority for Statistics, 2017]*

In contrast to the reported talent for girls, reported talent for boys is mainly concentrated in sports, followed by technical skills (14 percent). This perception may be informed by, or may inform, the fact that only 7.3 percent of girls aged 15 and older practice sports. The perceptions vary less starkly for other areas. For instance, there is a perception that boys are usually more talented in technical sciences, while girls are more proficient in languages; however, the gap in perceptions is much smaller for these subjects. In areas like mathematics or innovation, both boys and girls are perceived to be similarly talented.

Programs restricted to boys include sports tournaments and the Scouts program, which aims to support the development of active and responsible citizens. Only male students represent Saudi Arabia in the International Invention, Innovation, and Technology Exhibition (ITEX), and the Taiwan International Science Fair (TISF), to exhibit scientific projects. In this context, the recent policy emphasis on physical education for girls is a step in the right direction.

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25 Talented students are those who display unusual abilities, or perform distinctly from the rest of their peers, in one or more areas of society’s esteem, especially in the areas of mental excellence, creativity, academic achievement, and special skills and abilities (“General Authority for Statistics” 2018).
The highly visible involvement of boys in programs related to technical skills and sports perpetuates the stereotype that boys are talented in these fields, while girls may not be. These topics correspond to the areas where we see gender disparity in perception of talent. This is especially important given existing disparities in female and male access to educational opportunities. For every 100 male students, 92 female students enroll in high school. Family assistance is the third most important reason girls do not enroll in school generally, explaining 11.2 percent of non-enrollment (“General Authority for Statistics” 2018).

While it is plausible that family perceptions are associated with enrollment and selection into academic or sports related fields, the influence of talent perceptions on student achievement is difficult to pinpoint. Unfortunately, since the Noor dataset does not capture student test scores by subject, it is not possible to explore the relationship between parental perceptions of talent in a field and student achievement in that field. TIMSS data has consistently shown that girls outperform boys in STEM, as discussed in Part I of this chapter. In the lack of robust data and policy research in the Saudi context, it is unclear if, and to what extent, family perceptions affect school-level performance of students across all or specific academic fields.

Home environment and parent’s school involvement: While the income level of parents is not readily available, we can gain an understanding of their socio-economic status by examining the child’s home environment. A child’s home environment affects their performance in the classroom. If classroom lessons are being reinforced at home, or the home is a place where learning is valued, then a student carries those advantages into the classroom.

An important part of the home environment is the types of education tools that a child has access to in the home to supplement their classroom learning. The figure below shows the types of educational tools available in Saudi homes in 2017. Most Saudi households use mobile phones, TV, internet, and computers as educational aids. In contrast, print materials, such as newspapers and magazines, are not widely used in Saudi households. The fact that most Saudi children’s environments are heavily digital, and students may be more comfortable learning on electronic devices, has
implications for the type of learning that should be emphasized in Saudi classrooms, as well as the support and guidance necessary to use Information and Communications Technology (ICT).

Use of these educational tools varies widely across regions in Saudi Arabia. In the figure below, the left axis indicates the number of households that have educational tools at home. The y-axis on the right side of the figure shows the percentage of elementary students who also receive direct learning support from parents at home. On average, only 29 percent of kids enrolled in primary school experience parental participation in school preparation and educational activities.

Figure 17: Use of educational tools in Saudi households and learning support available at home, by region [Source: General Authority for Statistics, Education and Training Survey, 2017]

Parental support at home varies by region; where support is low, it can be supplemented through outreach leveraging the high access to internet and technology available in most households across all regions. Where books and other traditional resources are not readily available, they are not necessarily great tools for outreach. For example, in some regions like Riyadh, where parental support is low, a high penetration of educational tools and ICT can help to supplement student learning at home. On the other hand, in places like Madinah, where both educational tools and direct parental support are at relatively low levels, better school level inputs, in the form of teaching and technological use, can help address the gaps in the home environment.
School input factors

A variety of general education schools have flourished in Saudi Arabia—publicly funded, private, and international—as the government tries to keep up with the rising demand for schooling. School level budgets and overall school environment may vary across these school types and can influence student learning in different ways.

School type: As per the Noor school database, in 2017, the number of K–12 schools in the Kingdom was 30,753, with 26,233 public schools (86 percent) and 4,385 private schools (14 percent). Of these, 56 percent were girls’ schools and 44 percent were boys’ schools. Private schools follow a variety of curricula—national, foreign, and religious. Private schools are concentrated in urban areas, with Riyadh and Eastern Region reporting the most number of private schools (PwC 2017; “Noor System” 2018). This is depicted in the figure below.

![Figure 18: Percentage of school type – public, private, and other, by region [Source: Noor school dataset, 2017]](image_url)

As seen in the figure above, more developed and predominantly urban regions of Riyadh and Eastern Province have higher proportions of private schools. In some regions like Al Baha, the penetration of private schools is much lower. Private schools are market driven— they thrive on parental demand, and in general offer better quality services than public schools. They are mostly present in regions where parents can pay for better options.

According to a study in 2016 of 135 Jeddah middle schools, private middle schools serve more advantaged pupils and display higher quality than government-run schools. The author used three measures of school quality: length of instructional time; the principal’s focus on instructional rigor; and organizational cohesion among teachers. Private schools were
found to perform better than public schools, even while controlling for pupil attributes, enrollment size, and the adequacy of material inputs (Aburizaizah, Kim, and Fuller 2016).

The widening diversity of schools across regions prompts questions over class differences of families served, and whether educational quality varies in consequential ways across type of schools.

School budgets and educational spending: In Saudi Arabia, 5.1 percent of the Gross Domestic Product (GDP) is spent on education, with a total of $51.18 billion (SAR 192 billion) allotted for education in the 2017 annual budget (Ministry of Education 2018). Saudi Arabia spends a little over $10,000 (SAR 37,505) per elementary and middle-level student annually, exactly on par with the OECD average (Abed and Zhang 2018). Education in all public schools, at all levels for both boys and girls, is free of charge. There are more than 500,000 people working in the field of education as teachers, administrators, technicians, guards, and others who consume about half of the budget. As a result, the Kingdom boasts a favorable average class size of 18 students across all levels of education (“Noor System” 2018) compared to the average class size of 22 for primary and lower secondary levels across OECD nations (“OECD” 2018).

There is no publicly available data on the spending in each public school. A lack of this information over the years makes it difficult to determine the accurate rate of return on investment in school education across regions in Saudi Arabia.

Saudi families pay large amounts of money as out-of-pocket expenditures for their children’s education, despite the fact that the Kingdom spends the most on education in the Arab world. Saudi families spend about $5.8 billion (SAR 21.8 billion) on education every year, which can be estimated at around $821.05 (SAR 3,079) per student.26 In particular, parents in Saudi Arabia pay about $2 billion (SAR 7.6 billion) as educational fees to private and international schools. In addition, Saudis pay about $200 million (SAR 752 million) annually for private lessons to their children at home. Finally, Saudis were found to spend about $533 million (SAR 2 billion) on school transport (“General Authority for Statistics” 2018). Consequently, the cost of education can be a burden for low-income families. There is limited policy research and insights on the reasons for high personal spending on education and the ways in which the public spending can be utilized more efficiently.

26 This was calculated by dividing the total expenditure of Saudi households on education, SAR 21.8 billion (GaStat Education and Training Survey 2017) by the total number of students in general education, 5.4 million (Noor Student Dataset 2017) added with the total number of students in tertiary education, 1.68 million (Saudi Arabian Monetary Agency 2017).
School environment: The character and quality of school life, which reflects values, structure, interpersonal relationships, and perceptions of safety, can either promote or hinder a student’s education and future success.

There is evidence that students’ perceived school safety can adversely affect academic performance (Milam, Furr-Holden, and Leaf 2010). TIMSS 2011 developed the ‘Safe and Orderly School’ scale in order to provide information on the extent to which school safety might be affecting mathematics achievement. Teachers in both the fourth and eighth grade assessments were asked the degree to which they agreed or disagreed with five statements: (1) this school is located in a safe neighborhood; (2) I feel safe at this school; (3) this school’s security policies and practices are sufficient; (4) the students behave in an orderly manner; and (5) the students are respectful of the teachers. In Saudi Arabia, teachers for 62 percent of the students reported that they found the schools safe and orderly; 36 percent reported that they somewhat found the schools to be safe; and teachers for 2 percent of the students reported that they did not find the schools safe.

School safety can vary based on region and gender in Saudi Arabia. In particular, the capital has a concentration of funds and an emphasis on school safety, and the Eastern Province—where there are large oil companies—has a large expatriate community with high expectations for safety in schools (Alolah et al., 2013; Basu, 1992; Dyson and Moore, 1983; Jejeebhoy, 2000). Several studies have reported that safety in girls’ schools was greater than that of boys’ schools (Baldry, 2003; Bosworth, Espelage, and Simon, 1999; Chen and Astor, 2008; Kumpulainen et al., 1998; Nansel et al., 2001; Rigby, 2005). On the contrary, Alolah et al. (2013) show that male schools had a higher level of overall safety performance compared to that of female schools. The study also showed that secondary schools had the highest safety performance among primary, elementary, and secondary schools. This could be because older students are more likely to follow safety procedures; more policy research is needed, however, to understand why these trends exist.

Other characteristics of the school environment that impact educational outcomes could include quality of school facilities and the physical learning environments, effective school discipline policies, and inclusive teaching and learning without discrimination. Presently, there is no robust information on these characteristics or how they vary across schools and regions of Saudi Arabia. In addition, there is the question of how teacher quality contributes to better school environments, which is discussed in more detail in Chapter III of this paper. Based on this contextual understanding, we now examine what academic research has to contribute about the role of educational inputs on student performance.
Our definition of ‘quality education for all’ entails that each child is actively engaged in learning and is connected to the school and broader community; has access to effective learning opportunities and is supported by qualified, caring adults; learns in an environment that is physically and emotionally safe; and is intellectually stimulated and prepared for success in tertiary education and for employment in a knowledge-based economy. Successful public school reform experiments across the globe have invested in students’ self-perceptions and strength of their connection with the school (Akerlof and Kranton 2002). A quality school would recognize the potential of each Saudi child, and ultimately reduce the existing disparities in self-, parental, and societal perceptions of child talent and potential.

Parental and environmental factors

The literature surrounding the role of parent and home environment factors in a student’s educational attainment can be split into a few subcategories: parental socioeconomic status and the home environment, parent and student perceptions, and parental engagement with schools.

Parental socioeconomic status and home environment: As discussed in the earlier section, not all Saudi parents provide learning support to children at homes. Family involvement with the child at home can impact the child’s academic and social well-being. In the Programme for International Student Assessment (PISA) 2012 survey (OECD 2013), parents of 15-year-olds were asked to report how often they, or someone else in their home, engaged with their child in different activities. The activities listed were: “discussing how the child is doing at school; eating the main meal with the child around a table; spending time talking to their child; obtaining mathematics materials for the child; and discussing with the child how mathematics can be applied to everyday life” (OECD 2013). The data shows that the activities in which parents speak, and spend time, with their child have a positive association with their child’s mathematics performance. Parents’ involvement in the activities listed above was also found to be positively associated with their child’s school attendance and sense of belonging at school. Moreover, the number of parents reporting that they engaged in these activities dropped as the socioeconomic status of the family dropped.

In most countries, students whose parents reported eating the main meal around the table with them at least once or twice a week were less likely to report that they arrived late for school or skipped classes or days of school, and more likely to report having a strong sense of belonging, than students whose parents reported eating with them less often. OECD (2013) shows that the magnitude of this association is sizeable. For instance, students in Portugal,
whose parents joined them regularly for meals, were 14 percentage points less likely to report having arrived late for school at least once in the two weeks before the PISA test than students whose parents reported this activity less than once or twice a week. In the Flemish community of Belgium, this difference was ten percentage points, and eight percentage points in Italy and Hong Kong–China.

**Parent and student perceptions:** Saudi parents’ perception of talent are gendered. A research study of German elementary schools found that parents hold gender stereotypes that predict the parent’s belief about their child’s ability. Parents’ beliefs about their child also correlate with the child’s own self-perceptions of her ability in mathematics (Tiedemann 2000). The Michigan Study of Adolescent Life Transition Study (MSALT) found gender-role-congruent differences in parents’ perceptions of children’s ability in English and sports (Jacobs and Eccles 1992).

There is also some evidence around what parents aspire for their children and how that manifests into varying student achievements. Research suggests that parental aspirations for their child’s academics are positively correlated with student outcomes and emotional engagement. Programs that target parental aspirations for students may therefore result in better academic achievement and behavior. In a recent study (Wang and Sheikh-Khalil 2014), parental expectations were measured using a scale of how often parents communicated educational goals, values, and future plans to their children. The association between parental communication and student achievement was found to be stronger for low socioeconomic status families than high socioeconomic status families.

**Economic and sociological literature validates** that factors such as socioeconomic background, gender, cultural norms, and surrounding role models influence parental beliefs. For example, students from richer families are more likely to envisage themselves earning a graduate degree. Similarly, students’ cultural and ethnic backgrounds affect how they imagine their future possibilities (Segal et al. 2001) and how motivated they are. Research also shows that this imagined possible self can have an impact on decision-making in school life, from effort made in class to skill acquisition and extracurricular involvement. While there is limited research in this area, the existing studies indicate that the gendered perceptions that Saudi parents may have about their child’s ability can alter their child’s self-perception, influence educational choices, and limit achievement.

**Parental engagement with schools:** In Saudi Arabia, parental involvement in school level activities, and overall management of teaching and learning, is limited. The Activity Hour is one initiative trying to encourage family engagement within schools by encouraging parents to volunteer in leading activities.
Research finds that parents and families are among the most important influences and determinants of children’s learning, healthy development, and success in school. Furthermore, parents and families are interested in becoming involved, and they desire to know about their child’s progress in school (Delgado-Gaitan 1992; Mapp 2003). A growing body of research suggests school practices are powerful influences on parent and family engagement and support (Eccles and Harold 1996; Epstein 2001; Henderson and Map 2002; Hoover-Dempsey and Sandler 1997).

Partnerships among families and schools are essential for two basic reasons. First, families heavily influence a child’s out-of-school time. Second, families largely determine children’s attitudes, learning, behavior, healthy development, and overall well-being (Epstein 2001). It is important to promote conditions conducive for mutually beneficial relationships between schools and families. Family engagement and support occur in schools (school-based) and in homes (home-based). Parents support schools by volunteering in classrooms, serving in decision-making/leadership roles, and attending parent-teacher conferences and other school events. Parents also provide home environments that are supportive of classroom instruction, encourage their children’s learning at school, and communicate regularly with teachers about what happens with their child. Parental engagement is a way for parents to impact their child’s education by using their voice to advocate for social and material resources within the school (Barton et al. 2004).

In summary, parents can influence their child’s engagement with school, and foster positive motivation and beliefs about their own ability, by being role models. It is important for schools to keep family structure and parental characteristics in mind when thinking about how best to serve their diverse student population. On this note, we turn to what research tells us about the school-level factors that influence student outcomes.

**School input factors**

A large body of literature on the economics of education has focused on resources such as school infrastructure, class size, and teacher quality as determinants of the quality of education (Hanushek 1996; Card and Krueger 1992). These have been considered standard inputs in the Education Production Function (EPF) and have been discussed extensively by researchers across the globe.

As a ratio of GDP, Saudi expenditures on education are higher than most nations. Despite large investments, the ranking of 4th and 8th graders in Saudi schools on science and mathematics in 2015 was at the bottom of the group of 47 developed and developing
countries where the tests were conducted (TIMSS, 2015). Saudi pupils also ranked lower than those in the five other GCC countries. It is useful to supplement this information with what researchers say about educational spending and student outcomes.

**Educational spending and administration:** There is an active and longstanding debate about the effect of school quality on student achievement. The Coleman Report, a national study in 1966, concluded that characteristics of schools are not significantly related to the achievement of students (Coleman 1966). Hanushek’s findings supported this conclusion in his review of 38 quantitative studies that assessed the impact of the teacher/pupil ratio, teacher related factors, expenditures per pupil, administrative inputs, and facilities on student achievement (Hanushek 1986). In a study from 2007, Hanushek finds that “there is very weak support for the notion that simply providing greater overall spending will lead to improved student performance” (Hanushek and Woessman 2007).

There is also a body of research that disagrees with the findings of the Coleman Report. Hedges, Laine, and Greenwald found a “positive relationship between dollars spent on education and output” that “is large enough to be of practical importance” (Hedges, Laine, and Greenwald 1994). Generally, review of the research indicates that factors closer to the students’ actual learning process have the strongest impact on student achievement. Characteristics of the education system at the national level do not have as much of an impact as school factors (Wang, Haertel, and Walberg 1993). Some researchers argue that variables at the classroom level have the strongest impact (Scheerens 2000; OECD 2005). According to a report by the National Center for Education Statistics (NCES), school quality depends on multiple, interdependent elements. The report points out that that poor measures of school quality, and excluding certain elements essential to quality, are the main reasons that some studies have failed to identify why schools differ in their effectiveness (NCES 2001). Identification and robust measurement of the attributes of school quality is critical.

**Class sizes:** A vast body of evidence indicates that class size is an important input in the EPF. In Saudi Arabia, maintaining congenial class sizes seems to be less of an issue at present. Given the plans for educational access in Saudi Arabia, an important question is whether larger class sizes hurt the quality of education. Little Saudi-specific research has been conducted on this topic. International educators and researchers from diverse philosophical perspectives have debated the relationship between class size and student learning at length.

While many studies have found a relationship (e.g., Willms 2000), class size has not consistently been linked to student achievement (Rutter et al. 1980, as cited Pennycuick 1993). Lazear (2001) suggests that class size is vital because it directly affects the atmosphere in the classroom and is likely effective for improving outcomes for disadvantaged students. A
small class size allows a teacher to give individualized attention to students and make sure that children are not only keeping up with material, but also feeling supported and nurtured. This attention may be particularly helpful to students who are more likely to leave school—such as minority or low-income students (Blatchford and Mortimore 1994; Cooper 1989; Finn 1998). There is also evidence that teachers do not change their methods according to the size of the class (Shapson et al. 1980). Even if this is the case, research suggests that smaller class sizes lead to positive peer effects and higher student morale, depending upon the context and other resources available to students.

School environment and climate: Despite high educational spending, Saudi schools do not seem to be fully equipped and up-to-date with infrastructural and safety norms. The school’s role in creating an environment in which students can excel academically and socially is integral to the success of student learning outcomes. It is more challenging to quantify the effect of school-level characteristics than those at the teacher or classroom level for a few reasons. School-level characteristics are more difficult to define and measure; they are also likely to affect students through teachers and classrooms, which makes it hard to disentangle the effect of schools from that of teachers and classrooms (NCES 2001).

School climate is a multi-dimensional term that refers to the academic, social, and developmental environment of the school. This includes developing an understanding of the physical infrastructure at schools (e.g. quality of school building, facilities available), safety for pupils, behavior of teachers and school leaders, and inclusive learning environments. Hoy, and Tarter (2006) define academic climate as a concept that encompasses the trust of school faculty in teachers and parents, efficacy of the school as a whole, and the extent that academics are emphasized. Researchers agree that academic climate refers to the learning environment at school, but they have not formalized a specific conceptualization of the term. In TIMSS 2011, academic climate is measured by the School Emphasis on Academic Success (SEAS) scale. SEAS indicates the shared beliefs, capabilities, and trust among students, parents, teachers, and school leaders (Hoy, Tarter, and Hoy 2006; Nilsen and Gustafsson 2014). Although there are a few definitions of the term, the positive relationship between a strong academic climate and student learning is well-accepted in academic communities (Kyriakides, Kythreotis, and Pashiardis 2010; Martin et al. 2013; McGuigan and Hoy 2006; Nilsen and Gustafsson 2014). In fact, Shindler et al. (2016) assert that a high-quality school climate is the “single most predictive factor in any school’s capacity to promote student achievement”.

Moreover, aspects like introducing extracurricular activities in schools have been hailed as a way to inculcate strong non-cognitive skills like teamwork and communication in Saudi schools. The Activity Hour and community clubs are some examples of present initiatives.
Similarly, the research that surrounds introducing ICT into the classroom seems particularly useful, since data has also shown that most Saudi children have technological educational tools in their households. Some of the relevant literature and academic debates are presented below.

**Extracurricular activities:** Extracurricular activities can help the educational system cater to students’ different personalities. Research shows that activities outside of the classroom give students a space where they can envision their future selves. In an extracurricular space, students can develop the capacities towards their “employability-attuned” selves (Stevenson and Clegg 2013). Another way these activities mitigate present bias is by creating usages for skills developed in these spaces, both for the student and for others. Given the positive externalities of these skills on society (encouraging civic responsibility and engagement), creating usages will be a highly scalable process. Other private sector and non-governmental organizations will have an incentive to ensure the continuity of these spaces. A global effort towards corporate social responsibility in the private sector has led to a rise in hackathons for social good, private business-sponsored volunteer activities, and other public-private partnerships that equip students with teamwork skills and an enhanced sense of community belonging.

**Use of ICT:** Innovative ways to deliver hard skills have, at their core, creativity and application. The teacher training and development chapter (Chapter III of this paper) presents evidence for how training teachers in engaging, application-oriented teaching methods can lead to better learning outcomes for children. Blended learning, for example, designates the range of possibilities presented by combining online delivery of educational content with face-to-face instruction in traditional brick-and-mortar facilities (Bonk and Graham 2012). Blending ICT within the educational system has been found to enhance the learning experience by accompanying and complementing traditional learning, rather than replacing it (López-Pérez, Pérez-López, and Rodríguez-Ariza 2011). Blended learning offers the advantages of both classroom and online learning. It reinforces and encourages autonomy and self-learning, while reducing learning costs and facilities (Sharma and Barrett 2007; López-Pérez, Pérez-López, and Rodríguez-Ariza 2011). In the context of Saudi Arabia, Alqarni (2015) finds that the main obstacles hindering the full implementation of education technologies in schools are related to infrastructure, policies, and teachers. Saudi children have extensive access to ICT, such as internet, but the processes to leverage these tools for student learning should be examined.

In the next section, we assimilate the findings from this chapter and provide a synopsis of the avenues of potential collaborations where researchers can engage with policymakers to shape educational policies and practices.
Potential areas of collaboration

This chapter addresses the important question of how to provide high-quality education for all children, regardless of their background. Traditional approaches have focused on improving performance on international tests and keeping pace with international standards, but those tests do not present a comprehensive picture of the education landscape in Saudi Arabia. Research can help define high-quality education and refine measurement systems. When thinking about education provision for all children, research and policymakers can examine the role of regional, school-level, and household-level variations on a child’s school performance to help create policy that supports every child.

There are two parts to the research agenda for quality in education. First, practitioners, administrators, policymakers, and researchers should work jointly to identify how to expand the contours of defining and measuring quality in schools. This includes developing a robust system for measuring school performance, examining the quality of current school systems in the Kingdom, evaluating the reliability and validity of the existing measurement systems, and designing ways to compare scores across the nation. Currently, classroom learning is based on rote memorization and retention of facts. Researchers and policymakers can face the challenge of designing and implementing tests that evaluate a child’s ability to analyze information, predict trends, and communicate that information effectively. For instance, well-established international testing standards can help economists and psychometricians to develop useful testing standards for Saudi Arabia. Given the existing measurement systems, researchers can work with education practitioners to determine ways of linking the Saudi school test score distributions to a common scale using psychometric analysis, and design more sophisticated instruments and integrated databases. Looking at the existing guidelines and tools for student assessments and contributing to the further development of testing procedures is important for enabling evidence-based policymaking in Saudi Arabia.

In addition to addressing students’ cognitive outcomes, this discourse should also feature a discussion of how to foster the holistic development of children so that they grow to become well-rounded, responsible, and successful citizens. Many studies have found that non-cognitive skills are important predictors of student and adult outcomes. Some studies also associate gains in long-run outcomes with gains in soft skills. Yet the study of such skills is restricted by poor measurement and lack of definitional clarity. While no measure is perfect, cognitive skills are much better measured than non-cognitive skills in terms of both validity and reliability. Psychologists — and the testing industry — have spent several decades and millions of dollars systematically improving and refining the measurement of cognitive skills. Economists, educationists, and psychometricians can work with policymakers to identify and
meet the adaptive challenges in the development of these skills in the Saudi context. Some of the main areas of policy research collaboration includes: (i) identifying the cognitive and non-cognitive skills necessary to thrive (this would involve ascertaining the soft skills like interpersonal skills, teamwork, responsibility, positive attitude, and work ethic) that should be considered when measuring student progress; (ii) discerning the impact of broad social trends on such skills; (iii) identifying valid instruments for measurement (like the Big 5 personality inventory or the Reading the Mind in the Eyes Test—RMET, to name a few) or creating new ones; and finally, (iv) putting in place robust data infrastructure and feedback mechanisms such that the learning of what constitutes quality is looped back into the process of educational delivery.

The second part of a policy research agenda on education quality involves gaining a better understanding of how, and to what extent, student, parent, and school-level factors influence the level of student achievement, and how education provision can be adapted to cater to students with varying home environments. An exploration of the impact of specific factors—whether it is the learning resources available at home or the quality of school infrastructure—is needed to inform education policy in service of all children. In pursuit of this goal, efforts should focus on maintaining a current, well-organized data set of household characteristics that can be linked with student outcomes, teacher characteristics, and school-level variables. Research that examines the relationship between all of these variables will help policymakers understand which children are impacted by their policy, and which children need additional support.

In addition to creating data infrastructure, researchers should also work closely with communities, children, and parents to determine their set of beliefs about the future of girls and boys and explore how existing perceptions of talent and capability can affect students’ educational path and choices. Other potential areas of collaboration include evaluating the impact of current extracurricular programming like the Activity Hour initiative or the ‘community clubs initiative’, and quantifying the effect of using Information and Communication Technology (ICT) and digital media in the classroom to unravel its potential in expanding educational access for Saudi children.

Research efforts that focus on examining the role of testing in Saudi Arabia, as well as exploring the connection between inputs and student achievement, will enable policymakers to move closer to providing high-quality education for every child. At present, some sources of valuable data can help policymakers and researchers answer questions related to the quality of education in Saudi Arabia; these include the Noor System’s student, teacher, and school level datasets; Qiyas’s Student Assessment (GAT) scores; and the TIMSS and PIRLS international databases. Further details about these and other datasets are provided in Appendix II.
In addition to these datasets, a robust data infrastructure should be created such that students’ progress is tracked and used to update policy. A deep understanding of the connection between region-level, school-level, classroom-level, and household-level characteristics with student performance in school will provide the sensitivity that policymakers need to understand why students perform the way they do, whether national-level tests validate or contradict findings from international level tests, or how educational policy can be designed to be more effective and far-reaching.
Chapter III: Teachers in Saudi Arabia

**Background:** The size of the K–12 teacher labor market is considerable in Saudi Arabia. The education sector employs 10.3 percent of the total employed workforce in the Kingdom (General Authority for Statistics 2016). The average age of a school teacher is 39 years, and all teachers employed in public schools are Saudi nationals, by mandate. The majority have at least a Bachelor’s degree—76 percent of primary school teachers, 98 percent of intermediate school teachers, and 100 percent of secondary school teachers (“Noor System” 2018). The importance of teachers and their contribution to substantial gains in student achievement levels has been widely confirmed by researchers (Hanushek (2005), Murnane (1996), Rockoff (2004), Rivkin (2005)). The role of teachers is particularly important given the concerns about significant student achievement gaps in terms of national and international standards, as discussed in Chapter II. The task of educating this large, presently underperforming student body falls to teachers.

**Primary Challenge:** The teaching workforce in Saudi Arabia is educated, well-paid, and respected. The majority of teachers are employed in the public sector, where both pecuniary and non-pecuniary benefits are high. The central question is: **Do teacher quality and effectiveness meet the levels that are needed in Saudi Arabia to foster its transition into a knowledge economy?**

**Economic Theory:** This prompts the question of what makes a high-quality teaching candidate. Extensive research in personnel economics indicates that job performance is best predicted by a combination of ability and effort.

Simply put, a teacher’s quality could be determined through three components: a candidate’s ‘innate ability’, which is internal, largely fixed, and uncontrollable; their ‘learned competency’, which is ‘teachable’ for skills that are valued by...
the teacher labor market (e.g. technical knowledge and non-cognitive skills such as work ethic); and the ‘personal effort’ that the teacher is motivated to invest in the teaching job, which is internal, changeable, and, to some extent, controllable. Throughout this chapter, we revisit these teacher attributes to determine how educational policy can influence teacher quality.

**Key Actors:** In this chapter, we discuss the quality attributes and take the perspective of a potential K–12 teacher. We follow the teacher as she makes the career choices that enable her to join the teaching profession and retain her job. While keeping in mind this teacher-centric approach, we consider the implications of current policy on high-ability and low-ability candidates who are attracted to the teaching profession, on how teachable these candidates are, and on the effort levels exerted by them in the teaching profession.

**Chapter Navigation:** The first section of this chapter is organized into three parts. The first part is an exploration of the reasons why a potential candidate would want to choose the teaching profession as a career and go through the selection process. The second part discusses how to exploit the teachability of a candidate through on-the-job training. This also includes a discussion about the present status of professional development and school leadership that helps teachers develop individually and with their peers. The third part explores how to keep teachers motivated and push them into exerting high effort to perform well. Across the three parts, we share the issues and policies related to teacher training and development in the Kingdom and emerging research on topics of interest given the Saudi context. The concluding section of this chapter presents the potential opportunities for policy research collaboration with the objective of meeting the targets set in the Vision 2030.
Part I: What are the factors that determine teacher selection in Saudi Arabia?

Main Insights

The teaching profession is prestigious and pays well, but high-quality candidates are not drawn to it: Although the teaching profession is seen as socially prestigious, and it pays well, research shows that teachers simply having salaries may not guarantee that high-quality candidates choose to enter the profession—other factors, like the screening process and structural factors of the teacher labor market, may deter quality candidates.

Teacher quality is not uniform across the Kingdom: The variations in teacher quality across gender and regions signal limited effectiveness of teaching standards and monitoring systems for teacher performance.

The recent move to ‘consecutive system’ of teacher training and preparation has the potential to improve teacher quality: Opening the teaching profession to graduates of universities besides Colleges of Education (which have been reported to have poor levels of teacher training) may raise candidate quality by making the teaching profession more competitive.

Saudi Context

The supply of candidates into the teaching profession comes from four sources in Saudi Arabia. First are recent graduates of Colleges of Education (CoEs). There are 77 universities and colleges in Saudi Arabia, 33 of which have CoEs. CoEs are specialized centers within higher education institutions set up to train teachers. The second source consists of individuals who obtain a university degree, but not within a CoE. These are university graduates who have specialized in a subject, such as mathematics or information technology, where there is not a sufficient supply of CoE graduates specializing in the fields. However they must still pass the Kifaiyat teacher competency test. A third group consists of the reserve pool of candidates, composed of experienced former teachers and past graduates of Colleges of Education who did not enter teaching when they graduated but want to begin a teaching career. The last group of candidates could also include teachers employed in an existing public or private school who want to switch or migrate to a different teaching job or location.

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27 Prior to 2007, there were also Teacher’s Colleges which offered 2-year degrees in education and whose graduates were mainly qualified to teach at the elementary level. In 2007 the teacher’s colleges were all merged into the CoEs of nearby universities, effectively ending the 2-year model.
This part of the chapter moves through the series of decisions involved in the supply behavior of teaching candidates, focusing on fresh graduates from CoEs or universities. These decisions include: (a) whether to choose the teaching profession as a career; (b) how to train to become a teacher; and (c) how to qualify and get hired as a teacher.

A. Choosing the teaching profession as a career

Evidence on the career decisions of potential teachers shows that they respond to salaries and opportunity costs. Anecdotally, perceptions of the teaching profession and social status are also important at the onset. The main question that we explore in this section is whether the teaching profession is attractive enough for high-quality candidates to choose and apply for. Here, the innate abilities of the candidates, including their raw cognitive ability and IQ levels, are likely to determine their responsiveness to factors like salaries or status in choosing the teaching profession.

Teacher salaries and opportunity costs: Teacher salaries are often considered a policy means of attracting talented teachers in the school system (Murnane and Olsen 1990; Dolton and van der Klaauw 1999). Saudi teachers in public schools usually start with a fairly high entry-level wage and hold a permanent position with fixed, annual wage increases. Anecdotally, it appears that the teachers in public schools are well-paid throughout their career (“HKS-MoE Workshop and Symposium” 2018). The figure below sheds some light on the existing disparities in salaries across sectors.

*Figure 19: Industry breakdown of average monthly wage in Saudi Arabia in H1 2016, by citizenship (in thousand Saudi Riyals). [Source: General Authority for Statistics, 2016]*
The figure corresponds to the entire education sector (not just K–12 teachers), but it does present a general idea of the opportunity cost of entering the education industry. While select industries like mining and quarrying, water management, financial services, health, and information technology offer better salaries, the education sector has comparable or higher salaries than many other important industries (e.g. utilities, transportation, and manufacturing). In the public education sector, just like all other public sectors, Saudi nationals are paid more on average than non-Saudis.

**Societal perceptions of teaching as a profession:** Overall, a candidate’s pre-entry perceptions of the relative pecuniary and non-pecuniary benefits of joining the teaching profession are important. In general, Saudi nationals strongly prefer to join the public sector as opposed to the private, which has more foreign workers who earn much lower salaries. A public-sector job in Saudi Arabia is known to come with higher salaries and non-pecuniary benefits like prestige, consistent bonuses, and clear career progression.

Sim (2016) examined educational aspirations of Saudi youth through an online survey that was administered to a small sample of 322 respondents, as depicted in the figure below. The author presents social status ratings of 17 different occupations (occupational prestige) from 1 (low) to 10 (high), with responses disaggregated by gender. Overall, respondents reported the profession of ‘professor’ to be the most prestigious, followed by minister, doctor and dentist, engineer, and Chief Executive Officer (CEO), with ratings ranging from 8.02 to 8.64. School teachers featured sixth in the range of occupations in terms of social prestige, with a rating of 6.58 out of 10.

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28 Given the methodology and small sample size of this study, the findings have limited internal and external validity. However, the research question is pertinent as an early exploration of the area in the Saudi context.
The author found a significant gap between the prestige score of the top five occupations and the next twelve. The high-scoring occupations generally require higher educational attainment than the low-scoring occupations. The study also shows that male participants tend to give occupations with a high economic status a high prestige rating, whereas females have higher opinions of occupations that require more education. Perceived prestige of occupation correlates with respondents’ educational background regardless of gender, economic status, or parental education level. In addition, the author’s study population identified ‘elevating social status’ as the most important reason to take up tertiary education or in selecting work.

High salary levels and prestige associated with teaching, especially in the public sector, indicates that the teaching profession should attract high-ability, well-educated, and high-quality candidates when they make career choices. The following sections explore the specific barriers that candidates face when participating in the teacher training and hiring process, which ultimately may deter high-quality candidates from going further in the teaching selection process.

B. Training to become a teacher
The main question that we explore in this section is whether high-quality teachers, who may be attracted to the teaching profession, would also choose to go through the training process of becoming a teacher. This decision is particularly sensitive to the existing educational pathways for teacher training. The Ministry of Education has made increasing efforts to improve teacher quality, and consequently improve student academic achievement. Two
such efforts involve beginning to replace the ‘concurrent system’ for training teachers with the ‘consecutive system’ in early 2018, and evaluating existing teacher education programs to identify areas for enhancement. These systems, in addition to a third ‘connected’ system, are described below.

The concurrent system: Historically, the preparation and supply of teachers in Saudi Arabia has followed a ‘concurrent’ track. In order to become trained and qualified, teachers were required to obtain a four-year Bachelor’s degree in a ‘teaching major’ from a College of Education (CoE) that included courses in educational theory and methods. Degrees could be in subjects like Math, Physics, Biology, English, English and Arabic, or Islamic studies, but could only be completed in the CoEs.

This system had quite a few problems. CoEs have an easier entry requirement, low cut-off scores for admission, and a large number of seats. This could lead to a substantial fraction of lower-quality candidates getting admission at CoEs and training as teachers. In a world with imperfect information, the problem could be exacerbated in the following way: a lower-quality pool of students in CoEs would obtain poorer outcomes and less lucrative job opportunities; this would send a bad signal to high-quality candidates, who are potential entrants in the next round and who may, in fact, self-select out of teacher training at the point-of-entry. This would lead to a low-quality pool of students entering Colleges of Education, and the cycle would continue.

The CoEs originally relied on an outdated curriculum that focused on theoretical knowledge and lacked application-based learning (Alhammed 2004; Algarfi 2005). CoEs have increased efforts to provide more application-based learning, recognizing the negative consequences of low quality teachers. Poor quality training would deter high-quality candidates (especially those with higher innate and raw cognitive abilities). Given knowledge of low cut-offs and previously popular perceptions of poor training in CoEs, higher-quality candidates would likely opt for university degrees outside of CoEs that have a stronger reputation and better prospects.

Second, the teacher education programs are set up with the aim of exploiting the ‘teachability’ of the candidates to create pedagogical awareness and guide the professional transformation from a student to a teacher (Bird et al. 1993; Graber 1996; Tabacbnick and Zeichner 1984; Tom 1997; Stooksberry 2002; Korthagen 2004; Zeichner 1999). Such systems have the potential of training candidates with lower innate abilities to be more productive. Teacher training colleges under the concurrent system could miss this opportunity by not being able to provide teaching candidates with adequate skills.
The connected system: The concurrent system is similar to the concurrent system, except that students focus on developing their subject matter and content knowledge for the first two years of their education, and then spend the following two years developing pedagogical knowledge. One example of a university implementing this system is Taiba University.

The consecutive system: The recent push to adopt a ‘consecutive’ system—where graduates majoring in any subject through the usual university track can apply to be a teacher after completing an additional two-year higher diploma or Master’s degree—is a natural policy move by the MoE to attract high-quality candidates (“HKS-MoE Workshop and Symposium” 2018). This means that the hiring system is no longer restricted to those who have a degree from CoEs. This is a fairly new policy and is still in process of finalization and approval, and so there is limited evidence as to whether it will succeed. In any case, this new system is promising, because it is expected to provide more flexibility to candidates and increase competition in the teacher training and hiring process. We discuss details of the teacher hiring process in the next section.

C. Qualifying and getting hired as a teacher

Once a teaching candidate completes tertiary education, they enter the teacher labor market. The stock of teachers entering the labor market constitutes the total teacher supply. The demand for teachers is given by the number and quality of teachers needed for educational systems to respond to the learning needs of the school-age population. Teacher demand and supply interact in the labor market to determine who gets hired and the quality distribution of the resulting teaching workforce. The main question that we explore in this section is whether the labor market outcomes from previous hiring cycles validate our understanding of low-quality hiring under the concurrent system. How is the consecutive system expected to influence the hiring process and quality selection?

We first discuss the distinct features and imperfections of the Saudi teacher labor market, which influences teacher hiring. Next, we explore the nuances of teacher labor market equilibrium under the concurrent and consecutive systems. Here, we include the screening mechanisms and resulting quality distribution of the teachers applying for and getting hired through the labor market.

Features of the Saudi teacher labor market: First, the supply and demand for teachers in Saudi Arabia is dominated by the public sector, like in most countries. The Ministry of Education has the dominant role in the education sector as a provider and regulator, since more than 80 percent of students are enrolled in public schools in the Kingdom (“Noor System” 2018). This considerably reduces market competition and makes the government a near-monopolistic supplier of schooling. It is also a near-monopolistic buyer of teachers’ services, where the
majority are hired in public schools.\textsuperscript{29} The profile of Saudi public school teachers is provided in the table below, including the teacher demographic characteristics, background education level, and years of experience. The issues will be discussed in more detail in the sections that follow.

| Table: Profile of current public school teachers in Saudi Arabia [Source: Noor teacher dataset, 2017]\textsuperscript{30} |
|---|---|---|---|---|---|
| **Number of teachers** | Kindergarten | Primary | Intermediate | Secondary | Primary-Grade 12 |
| 13,486 | 208,147 | 108,131 | 98,262 | 414,540 |
| **Demographic characteristics** | | | | | |
| Female (%) | 99 (.009) | 54 (.499) | 53 (.499) | 56 (.496) | 56 (.497) |
| Age | 36.94 (7.046) | 39.64 (6.771) | 38.34 (6.877) | 37.57 (6.715) | 38.75 (6.856) |
| Saudi (%) | 99 (.009) | 99 (.012) | 99 (.017) | 99 (.019) | 99 (.015) |
| **Education Level** | | | | | |
| Bachelor’s or higher (%) | 81.72 | 76.37 | 97.55 | 99.56 | 87.22 |
| Less than Bachelor’s – Higher Secondary or Diploma (%) | 18.28 | 23.63 | 2.45 | 0.44 | 12.78 |
| **Experience** | | | | | |
| Years of work experience once hired by MoE | 8.75 (8.082) | 14.04 (8.136) | 11.74 (7.426) | 10.77 (7.180) | 12.56 (7.900) |

*Means and standard deviation (in brackets, wherever applicable) have been reported using the data available in the Noor system for teachers \textsuperscript{4}178 missing values out 428,073 \textsuperscript{5}385 missing values out 428,073 for the teacher joining date variable, which was adjusted with the current year to determine years of experience.

Second, the Saudi teacher labor market has also remained highly segmented. The concurrent system, in which teachers were required to obtain a teaching major, made it difficult for graduates from CoEs to find a job outside of the teaching profession. The recent move to the consecutive system, where graduates majoring in any subject track can apply to be a teacher, is an attempt by MoE to address this segmentation.

Moreover, the MoE has also introduced ‘teaching licenses’, which are required for applying to teaching positions. The licensing is a fairly new intervention, and it is not yet clear how it would restrict the number of individuals in the teacher labor market. High licensing standards may further segregate and stratify the teacher supply. However, they may also help to regulate quality, given that available research does generally find that a license is associated with higher teacher effectiveness (Hawk, Coble, and Swanson 1985). Further policy research can help to shed light on the design and effectiveness of the licensure policy.

\textsuperscript{29} A monopsony is a market situation where there is only one predominant buyer.

\textsuperscript{30} Table 1 provides an overview of only the public school teaching workforce in Saudi Arabia, based on a subset of the Noor teacher database. This data does not cover private and international teachers.
Third, efficiency in the teacher labor market is affected by information gaps. Since there is a common application process, the teaching candidates may not have precise information on the schools to which they are applying for jobs, the job conditions to which they would be subjected, and the overall range of opportunities that could be presented to them (for example, teachers may select a preferred school region, but not a specific school).

Employers also do not have perfect information on the quality of the candidates who apply for teaching positions. Hence, the MoE has put screening mechanisms into place. For instance, teaching candidates are required to demonstrate education levels as set by the MoE. In order to qualify for a teaching position, candidates are also required to sit for a Teacher Competency Test (TCT), called the ‘Kifaiyat’ test, which is administered by Qiyas, under the Education and Training Evaluation Commission. The Kifaiyat is a proficiency test that consists of two basic sub-tests: a specialized test that evaluates subject-matter knowledge, and a general test that measures skills and personality characteristics related to planning, interest in promoting learning activities, motivation to support learning enhancement, and sense of professional responsibility. 31 Details of the Kifaiyat test and how it helps to determine teacher quality in equilibrium are discussed below.

Equilibrium analysis for the Saudi teacher labor market: The market equilibrium in the teacher labor market determines the total number of teachers hired and whether there is any residual demand or supply. The equilibrium outcomes and quality distributions of teachers hired is likely to vary between the concurrent and consecutive systems, as discussed below.

**Hired quality under the concurrent system (pre–2018):** Historically, there has been an oversupply of teachers under the concurrent system in Saudi Arabia. The number of teachers has gradually increased over the five past years for primary through secondary education, as shown in the figure below.

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31 Analysis of the Kifaiyat test scores of the candidates who applied in the year 2017 shows a high correlation between the general and specialization test scores (correlation coefficient = 0.7).
However, as a rough estimate, only one out of ten qualified teachers in the Kingdom’s labor supply pool would find employment under the concurrent system (“HKS-MoE Workshop and Symposium” 2018). This is paradoxical, as the employers (especially MoE) have also consistently expressed that there is a shortage of candidates who could be hired as teachers and contribute to higher student achievement. In this context, it is important to recognize that shortages are more of a quality than a quantity issue. The implications of teacher shortages can be understood by looking at the way educational systems respond to a situation where demand exceeds the available supply of teachers. In the short run, it is likely that the government relaxes the qualification requirements (or Kifaiyat test cut-offs) during hiring.\textsuperscript{32} If a qualified applicant is not available to fill an open teaching position, a less-qualified applicant will typically be hired. This potentially leads to a shortfall in the quality of the teaching workforce—a major consideration in Saudi Arabia’s aspirations to attain an educational system of high quality.

While the Kifaiyat test is only used to test candidates’ eligibility to be teachers, looking closely at the distribution of the available data for 10 cohorts of Kifaiyat test takers (2008–2017) sheds some light on the potential quality of candidates who pass out of CoEs in the Kingdom and the cut-offs that determine the quality of candidates who were finally hired. Candidates are usually considered eligible to be teachers if they score 50 or higher in both the general and special exams; however, this cut-off may vary depending upon demand for teachers.

\textsuperscript{32} In a meeting between EPoD and Deputyship of School Affairs (April, 2018), it was discussed that in order to hire more teachers, the cut-off has occasionally been made 50 percent in teacher selection tests, and in general, a score of 70 percent or above could be considered a benchmark for high quality.
**Evidence of low-quality teacher supply:** The figure below shows the distributions for the two sub-tests in the Kifaiyat data available for 2008–2017. Following Sideridis, Tsoulos, and Alharbi (2015), if the Kifaiyat score is considered a reasonable proxy for candidate quality, then the distribution shows that across both sub-tests, while most candidates scored above the 50 percent cut-off, only 23 percent of the candidates who applied to qualify received a ‘high’ score, i.e. a 70 percent or above. This is indicative of medium quality selection in terms of the score distribution.\(^{33}\)

The teacher database also reports the Grade Point Average (GPA) scored by teachers in CoEs before getting hired. The teachers hired in 2017 had received an average GPA of 71.5 out of 100 ("Noor System" 2018). There are small variations across regions; Makkah scored relatively poorly, with an average GPA of 69, whereas Najran teachers report the highest average GPA of 74.5 on 100. Given that the Kingdom generally reports very high scores on national tests

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\(^{33}\) The Kifaiyat analysis throughout this paper is based on invaluable information received from the Education and Training Evaluation Commission (ETEC). Two versions of the same dataset were received; the first version was received in April 2018, and the second in August 2018. The first version did not specify the time period for the data, and the second updated version included the year variable (2008–2017). Given the possibility that the data received is a subset of the full dataset or is not complete, for high level analysis in this report, we have used the unadjusted pooled data over years from the first dataset received (in April 2018; N=86,995) and have not factored for time- or year-wise variations in our calculations. We have also assumed that the scale scores are linked and equated over the years. This should be considered a caveat while interpreting the results, and future collaborations could investigate the data and analysis in further details.
(as discussed in Chapter II of this paper), an average GPA of 71.5 percent, although technically passing, is also reflective of medium-quality hiring, at best.

**Variations in teacher quality by gender:** The figure below shows the distribution of the percentage scores for the Kifaiyat general exam by the gender of the candidates. The mean score for female candidates is 67.99, and the mean score for men is 61.54. Further, 44.59 percent of the women in the ETEC sample score above 70 percent in the Kifaiyat test, while only 17.31 percent of the men score above the ‘high’ quality cutoff. It is clear that on average, female candidates tend to signal better quality through their performance in the test.

![Figure 23: Distribution of the Kifaiyat total percentage score by gender of the teaching candidate](Source: Education and Training Evaluation Commission, 2008-2017)

**Age does not influence candidate quality:** Interestingly, there does not seem to be a significant relationship between the percentage scores for the Kifaiyat test (total for both sub-tests in the data for the period 2008–2017) and the age of teaching candidates. At best, the scores seem to decline very slightly (correlation coefficient = -0.1) for the more aged teachers. The concurrent system seemed to favor candidates who were older and experienced (“HKS-MoE Workshop and Symposium” 2018).
Given the Kifaiyat data available, it does not seem that hiring older candidates would necessarily lead to better quality teachers.\textsuperscript{34}

\textit{Variations in teacher quality by training colleges:} Anecdotally, there also appears to be variations in quality of candidates from different teacher colleges across the Kingdom. The variation in education background of teachers provides some insight into differences in teacher quality across regions; the Eastern Province region has the highest proportion of teachers with a Bachelor’s degree or higher (92 percent), and Najran has the lowest (80 percent). Results from the Kifaiyat test, administered to kindergarten teachers from across 20 teacher training colleges across the Kingdom, further illustrates this gap. The average scores for these teachers were reported to be 59 percent, where the two lowest-ranked colleges (under the Al-Jawf University and Northern-Border University) had an average score of less than 50 percent, and the two highest colleges (under King Faisal University and King Saud University) reported an average of 75 percent. (Qiyas 2015).

\textsuperscript{34} Age and experience of the teachers, though correlated, are two separate attributes. We discuss experience of the teachers in Table 1 of this chapter.
Hiring quality under the new consecutive system (January 2018–present): The consecutive system is a very recent policy initiative. Analysis of the Kifaiyat test outcomes can be used to reflect the teacher quality levels under the consecutive system in the upcoming years. Theoretically, the consecutive system may lead to the hiring of higher-quality teachers. This is because without robust reforms in CoE teaching and learning practices, the improvement of a candidate’s teachable skills should be larger for candidates with a non-education university degree than candidates from a CoE. Will removing access barriers for non-teaching graduates to enter the teaching profession necessarily increase the pool of high-quality candidates? What are the critical factors to make the consecutive program successful? These questions remain unanswered at present.

Based on this contextual understanding, we now turn to a discussion of academic literature on the topics of teacher decision-making, selection, and quality in Saudi Arabia.

Research Insights

A. Choosing the teaching profession as a career

Who chooses the teaching profession? There are relatively few studies of what determines entrance into teacher training. We present discussions on the key factors that enable candidates to enter the teaching profession. In several studies in the USA, Hanushek and Pace (1995) examine the decision of college students whether or not to enter teacher
training. They use the National Longitudinal Survey of Youth (NLSY) High School and Beyond survey from 1980–1986. The authors find that potential teachers perform lower on tests than other graduates, and teacher training completion is lowered by state requirements for courses and teacher tests. They suggest that would-be teachers are less likely to complete their qualification if the state imposes a pre-specified cutoff on a standardized test. They also show that students are less likely to complete their training in states that require their trainee teachers to complete a large number of education-related courses.

The authors suggest that teacher salaries do not necessarily have an important influence on student choices. Although the relative earnings of teachers compared to all college graduates varies considerably across different states in the US, they do not have a significant impact on the decision to enter teacher training. This is debatable, as others like Dolton (1990) investigate the relevance of relative earnings and personal non-pecuniary factors. The author models the decision to enter the teaching profession using a large cross-sectional data set of United Kingdom graduates. The results suggest that relative earnings and growth in earnings of teaching and non-teaching occupations have a marked effect on graduates’ occupation choice. In particular, the lower the relative wage or wage growth in teaching, the less likely a graduate will choose that career. The evidence varies across countries, and it is important to conduct such studies to understand the role of incentives for entry into the Saudi labor market.

B. Educational pathways to becoming a teacher

The concurrent versus the consecutive system for teacher training and qualification: The most often emphasized advantage of the consecutive teacher training is that teachers are prepared in a shorter period of time, teacher training is facilitated, and the teacher shortage problem is solved faster (Consuegra, Engels, and Struyven 2014). In addition, providing short full-time studies or longer part-time training of pedagogical studies to prospective teachers is potentially cheaper than designing teaching training courses at the undergraduate level.

On the other hand, the following advantages of the concurrent model of teacher training are distinguished in the scientific literature: professional interests are developed, the student discovers problems that are specific to teaching and learning, and there is a better integration of academic and professional studies (Sederevičiūtė-Pačiauskienė 2015). Such a system gives students an opportunity to acquire the practical skills necessary for teaching.

The academic literature does not make a determination of whether the concurrent or consecutive system is better. Some countries, like Germany, Slovakia, Iceland, and Turkey, use the concurrent model across all levels of education. In countries like France and Portugal,
however, only the consecutive model is applied. Interestingly, in the United Kingdom, Ireland, and Poland, either model can be chosen for teacher training and hiring. It is important to determine the changing role of the CoE in Saudi Arabia, and the level of flexibility between the two systems, based on their theoretical underpinnings and the global experiences of what works in this area, as well as empirically evaluating the impact of these programs.

C. Qualifying and getting hired as a teacher

Under the concurrent system in Saudi Arabia, the fraction of high-quality applicants in the applicant pool is low, and wages have been consistently high (“HKS-MoE Workshop and Symposium” 2018). Ballou and Podgursky (1997) have shown that higher pay without reforms to attract higher-quality candidates could somewhat paradoxically even lower average teacher quality. Their argument starts with the observation that increasing pay reduces the number of job openings (because fewer teachers will quit or retire) and increases the number of new applicants (because the salary is more attractive). This necessarily lowers the chance that any given teaching applicant will receive a job offer and could discourage potential applicants from investing time and money for obtaining teaching certification. Thus, only having a high teacher pay could increase the size of the applicant pool but lower its quality at the same time. Given a combination of such factors, it appears that the Kingdom has experienced outcomes similar to the separating equilibrium, where mostly low-quality teachers were being hired but at a much higher wage. At this stage, however, there is limited local research evidence to support this hypothesis.

It is important to understand the distinction between ‘knowing what to teach’ and ‘knowing how to teach’. While the new consecutive system focuses on the former, appropriate measures for fostering procedural knowledge are needed as an important supplement in a changing economy.

Competition in the teacher labor market: In recent work, Merrifield (1999) tests, for the particular case of the state of Texas in the United States, the hypothesis that teachers’ salaries are affected by the competition within their regional labor market. The author explains that as teachers’ salaries were not determined by collective bargaining between district officials and teacher unions, his study context enabled disentangling of monopsony effects from other labor forces. The results from the study suggested that teachers tend to be paid less in less-competitive markets. He emphasizes two important points. First, the problem of lack of competition is aggravated by the fact that most teachers cannot easily change careers, since the skills of most teachers are often worth little in non-teaching jobs. Second, because the employers of teachers are school districts and not individual schools, the consequences of the lack of competition are exacerbated. Reduced salary competition has significant policy implications, since the attractiveness of the profession depends greatly on salary levels.
In this context, research suggests that making schools the employers might have a great impact on the level of competition in the markets for teachers. This is the issue explored by Vedder and Hall (2000). They argue that competition in the market for educational services also introduces labor market competition. They hypothesize that, by introducing viable private school alternatives, there should be greater salary competition between educational providers in order to lure better teachers, leading to higher salaries in public schools. Using detailed data on over 600 Ohio school districts, the authors find that increased private school competition does indeed lead to higher salaries for public school teachers.

Another important aspect of the consequences of the progressive introduction of market mechanisms is whether teacher productivity is increased and, if so, whether that is related to an improvement of the quality of teachers drawn into the profession. Research by Hoxby (2003) addresses this issue. She first emphasizes the importance of the productivity issue, since the school choice impact on productivity potentially determines whether choice will benefit all children as opposed to specific subsets of children. The author presents evidence on three recent choice reforms in the United States: vouchers in Milwaukee, charter schools in Michigan, and charter schools in Arizona. In each case, she finds that regular public schools boosted their productivity when exposed to competition. Most importantly, she notes that one of the channels through which productivity increases is a different reward system that draws better individuals into teaching.

This finding brings us back to thinking about the quality of the candidates who choose the teaching job. While the selection process focuses on hiring candidates with high ability, a teacher’s quality can also be enhanced while she is on the job. If the candidates are teachable, they can be trained, and their overall quality levels can be enhanced. This leads us to the topic of training and development of teachers in Saudi schools.
Part II: What are the opportunities for on-the-job training and development for teachers?

Main Insights

**Poor measures make it difficult to quantify the performance of teachers on the job:** Most teachers receive high scores on supervisor-conducted performance evaluations, which makes it challenging to identify differences in teacher quality on the job.

**Overall, the impact evidence of training in changing behaviors has been mixed at best:** Despite the mixed impacts of training, few interventions are actually able to change (much less improve) teaching behaviors and performance in classrooms; heterogeneous effects of training suggest the importance of targeting to match content with recipients.

**Collaborative and supportive teacher training is proven to be most effective:** Research shows that teacher training programs that focus on content knowledge through collaboration and involve ongoing support and guidance are the most effective.

**Involving teachers in school leadership can serve as a supplement to existing professional development programs in Saudi Arabia:** Experts have shown that holding school leadership roles and working with peers helps teachers expand their skill set while on the job.

Saudi Context

The process of being trained in the teaching profession is referred to as teacher development (Burden 1990; Gilles, Cramer, and Hwang 2001). Teacher development is one of the most important policy domains in education in Saudi Arabia. The quality of being teachable, with the ability to acquire skills on the job, can be useful for educational policymaking. This hypothesizes that even if teachers with low innate ability are hired, they can be trained to teach more effectively. In this section, we explore: (i) the current performance levels of teachers in public schools and the on-the-job training, and the professional development opportunities available to them; and (ii) other factors, such as school leadership, that can help in the capacity building of teachers.

**On-the-job teacher performance and training**

At present, there are no robust measures of on-the-job teacher performance. The Noor system provides details of scores given to teachers by school supervisors. On average, teachers across all regions are likely to receive full marks on their performance (“Noor System” 2018). This current measure of teacher performance is problematic, since most
teachers are scored very highly by their supervisors, making it difficult to distinguish good teachers from bad. This leads to poor evaluation outcomes and a lack of information to induce change in teacher performance through specialized capacity building.

Teachers in Saudi Arabia exhibit poor lesson-planning skills and classroom management and often lack of enthusiasm and desire for teaching and participating in supervisory processes (Altayar 2003; Almudarra 2017). Interestingly, a study for Riyadh-based teachers found that teachers are fairly satisfied with their jobs; it identified staff development as the only factor that could lead to teacher dissatisfaction (Al Tayyar 2014). On the other hand, TIMSS (2015) shows that Saudi teachers agree that many factors can lead to poor performance in schools, including not enough time to prepare for class, too many teaching hours, pressure from parents, and other administrative burdens. A lack of adequate support in using ICT was cited by nearly half of teachers in the Trends in International Mathematics and Science Study (TIMSS) sample as a problem in their schools.

Figure 26: Extent to which adequate support for using technology is a moderate or serious problem for teachers [Source: Trends in International Mathematics and Science Study, 2015]

As seen in the figure above, the problem of low support for technology use is higher on average in Saudi Arabia than other international TIMSS participants. The main factors that seem to prevent teachers from using educational ICT in the classroom are a lack of reliable internet connectivity, lack of effective training, inadequate devices for both teachers and students, and lack of time dedicated to integrating ICT in the classroom (Oyaid 2009). A study about the King Abdullah bin Abdul-Aziz Project for Public Education Development (Tatweer) program, which sought to change several schools in Saudi Arabia from traditional schools to ‘smart learning’ schools, also found that some older teachers lacked the motivation for learning how to use technology in their classroom (Alyami 2014). The Ministry of Education recently introduced a new initiative called Future Gate as a part of NTP 2020 to promote digital and technology-enabled teaching and learning in schools and to increase teachers’ skills with digital learning tools. As part of the initiative, the MoE has already handed out iPads
to students and teachers in 150 schools; it aims to expand to 1,500 schools and eventually to all schools across KSA. The initiative involves a digital literacy training for students and teachers on the program’s features.

As discussed in Chapter II, ICT penetration is high in many Saudi households. Student familiarity with ICT can ease MoE efforts to expand ICT use in the classroom, since students do not require extensive training on its use. However, when pursuing ICT expansion in schools, the MoE should ensure proper training of teachers on how to best leverage ICT for enhanced student learning. If the proper training and infrastructures are not in place, ICT in classrooms can become a liability rather than an asset, distracting students and expending valuable financial resources without improved student performance.

Historically, poor reviews on teaching have been accompanied by outdated in-service teacher professional development in the country. Several Saudi researchers have identified the ineffectiveness of the content, structure, and management of current in-service teacher training programs in Saudi schools (Aldkheel 1992; Almazro 2006; Alsounble et al. 2008). Sywelem and Witte (2013) examined the perceptions of elementary school teachers in Saudi Arabia concerning the facilitators and inhibitors of continuous professional development. They identified a need to connect professional development efforts with relevant classroom topics and strategies that can help teachers gain and recognize new knowledge and skills.

Recently, a variety of remedial policies and initiatives have been implemented or are being initiated by the MoE in an attempt to improve on-the-job teacher development. Under the ‘Khuburat’ program, select teachers are sent to foreign universities (across UK, US, Canada, Australia, Finland, and New Zealand) to study in English and learn by shadowing and through apprenticeship. There are also some programs to assist in the professional development of teachers focused on specific subjects, as well as online training for teachers in difficult-to-access areas, such as the Tatweer Project for teachers’ development of practical skills and theoretical knowledge (Alnahdi 2014). In this project, there are two domains of standards: generic standards, which identify aspects of knowledge and practice that apply to all teachers, regardless of what or whom they teach; and specific standards, which focus on 22 fields of specialization in teaching (e.g. Islamic Studies, computers, science). The project has been successful in producing well-accepted professional teacher standards that are planned to be used as a basis for constructing teacher licensure examinations (Alsadaawi and Alsaud 2014). Cengage, a Boston-based online training provider, has also partnered with Tatweer to deliver professional development to 1,000 of the country’s English-language teachers. Specifically, the National Centre for Educational Professional Development (NCEPD) is working in this area, and 180 centers for teacher training have been set up across the country. More details on the teacher training and development policies and initiatives are provided in the appendix.
However, the effectiveness of these initiatives, and how they link with teacher credits and career growth, remains unclear.

**School leadership and additional support to teachers in schools**

Common problems that face new Saudi teachers are a lack of appropriate professional support; lack of teaching aids, materials, and resources; and difficulties in lesson planning and choosing the right teaching methods (Musalam 2003; Sywelem and Witte 2013).

Involving teachers in school leadership provides them with a way to expand their skill set while on the job. The Ministry of Education sets general guidelines for selecting head teachers for K–12 schools. The selection of head teachers often includes requirements of a university qualification, a minimum amount of work experience in teaching, good recommendations, and passing an in-person interview. Kurdi (2011) shows that head teachers are mainly responsible for teacher professional development and rewards. Alhajeri (2004) revealed that many school leaders did not support teacher development activities at their schools, and they did not support teachers in attending professional development activities because of the difficulties in covering teacher absences. It can be argued that leadership should be shared among members of staff—such as deputies, senior teachers and administrators, and school management committees—to avoid concentration of power and to enable a more holistic teacher development (Southworth 1998). There is a lack of information on the effect of different school leadership structures on teacher development in Saudi Arabia, but it is an avenue worth exploring.

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**Research Insights**

**On-the-job teacher performance and training**

Measuring teacher performance to promote learning requires tools and data systems that capture simple metrics of student performance mapped to teachers. These metrics could range from teacher attendance to tests on content and pedagogical knowledge. The Teacher Value Added (TVA) method is an alternative that controls for many non-teacher factors that influence learning. TVA methods are generally based on standardized test scores and may not directly measure potential teacher contributions toward other student outcomes (NASSP n.d.).

There is a debate between the use of simple metrics and TVA. Simple metrics do not require advanced data infrastructure, so can be implemented more easily. However, they may not be fair to teachers, as they link performance without accommodating for many background factors. In contrast, TVA calculations incorporate many of the background factors that
influence student teaching, so are thought to provide a more comprehensive assessment of teacher performance. However, TVA calculations require a lot of data, and the more complicated formula for measuring performance means the scoring system is not as transparent for teachers. Statistically, the score is also most often a measure of correlation rather than causation.

TVA scores and rankings can change substantially when a different model or test is used, and a thorough analysis should be undertaken to evaluate the sensitivity of estimates to different models. Polikoff and Porter (2014) state that TVA methods for evaluating teachers are not always associated with conventional definitions of good teaching. The authors found that some teachers who were highly rated on student surveys and other indicators of quality often had students who scored poorly on tests. Darling-Hammond et al. (2012) point out that the use of test scores in the TVA method assumes “that student learning is measured by a given test, is influenced by the teacher alone, and is independent from the growth of classmates and other aspects of the classroom context. None of these assumptions is well supported by current evidence.” Andrabi et al. (2017) also point out key empirical challenges to such methods, including imperfect persistence, unobserved student heterogeneity, and measurement error. Despite its limitations, the evaluation of teachers based on the contribution they make to the learning of their students, in terms of their value-addition, is an increasingly popular education reform policy.

Research evidence on the effectiveness of training programs and impact of teacher professional development is mixed. There is a large policy and research literature in this area, especially for subjects like science and mathematics. This research body is summarized thoroughly by studies like the one by Blank and de las Alas (2009), who conducted a meta-analysis of more than 75 studies. They found that while some researchers have noted that professional development initiatives are ineffective, others show that specific features actually work in practice to enhance teachers’ practices and student learning. These nuances of training could include: focusing on content; employing active learning strategies; utilizing adult learning theory; incorporating collaborative techniques; aligning training with job-embedded contexts; involving coaching and expert support; creating opportunities for feedback; and reflecting on long-term learning goals and sustainable action. Effective programs can help teachers learn and refine the instructional strategies required to teach fundamental and complex skills. Policy research shows that methods of experienced and interactive teaching—such as deep mastery of challenging content, critical thinking, complex problem solving, effective communication and collaboration, and self-direction—is needed to develop student competencies.
School leadership and additional support to teachers in schools

Researchers have also found that willing teachers are sometimes unable to make use of existing professional development practices due to barriers that are out of their control. Factors include but are not limited to: inadequate resources; lack of curriculum materials; no shared vision about what high-quality instruction entails; excess workload on teachers; non-productive school cultures; and a lack of data collection and inability to track and assess the quality of professional development (Tearle 2003). This literature indicates that the development of theory-backed capacity building programs and simultaneous evaluation of existing teacher development systems across schools and regions of the Kingdom are critical.

High-quality colleagues and strong school leadership help teachers perform well on the job. Research shows that novice teachers improve their performances more rapidly when they have skilled grade-level teaching colleagues (Jackson and Bruegmann 2009) and when their school provides opportunities to learn from colleagues (Kraft and Papay 2014). In a study of school teachers in Riyadh, Altayar (2014) found that interpersonal relationships and peer interactions made the greatest contribution to teachers’ job satisfaction levels. Thus, a long-term goal for teacher development policy may be increasing collaboration among teachers to make instruction more coherent and consistent (Murnane et al. 1991). Pairing a teacher who is weak in a particular skill area with a mentor teacher who is strong in that skill area is one way of enhancing teacher performance (Papay et al. 2016). Measuring this performance through high-quality evaluations of teachers is paramount to tracking and improving teacher quality (Taylor and Tyler 2012).

Research also demonstrates that school leaders and principals are important to key teacher outcomes. Teacher turnover is lower in schools led by high-quality principals (Boyd et al. 2011; Branch, Hanushek, and Rivkin 2012; Grissom 2011; Ladd 2011). Identifying incentives that keep high-quality, motivated principals in schools could be an indirect method to secure teachers in their jobs. Some correlational research shows that principal preparation programs positively influence student-achievement gains (Osborne-Lampkin, Folsom, and Herrington 2015).

This finding brings us back to thinking about the quality of the candidates who choose the teaching job. While the selection process focuses on hiring candidates with high ability, a teacher’s quality can also be enhanced while they are on the job. If candidates are teachable, they can be trained, and their overall quality levels can be enhanced, to some extent. This leads us to the topic of training and development of teachers in Saudi schools.
By the time a teacher is hired and trained, their cumulative quality level is comprised of their innate ability and the skills developed through in-service professional development. Part I shows that high innate ability is largely a fixed attribute (and can be attracted through robust screening and selection procedures, rather than developed). The context and research in Part II finds that the ‘teachability’ of a candidate can be exploited through training, but not all trainings are effective. Hence, even if policymakers invest extensive resources into on-the-job capacity building, these inputs may not translate into desired outcomes without appropriate design features and links with teacher requirements. This brings us to the third component of teacher quality—the personal effort that the teachers exert. Existing poor levels of teacher performance hints at low effort levels in present-day Saudi classrooms. We discuss the incentives currently in place as well as those that can be used to motivate teachers to exert ‘high personal effort’.
Part III: What are on-the-job incentives offered to teachers and what makes them stay in the profession?

Main Insights

Incentives for attracting and retaining high-quality teachers are needed: Incentives must be put in place as soon as a teacher starts their career, since research indicates that good-quality teachers are likely to leave the profession early if presented with a lucrative alternative job.

Effective incentives provide motivation and enhance accountability: Introducing recognition and appropriate rewards for excellent teachers and consequences for poor teaching both motivates good teachers and discourages poor teaching.

Reward structures could range from individual to group-oriented programs, covering a mix of pecuniary and non-pecuniary benefits: Research shows that teachers are motivated by good working conditions, administrative support, and monetary incentives; these also have the potential to foster larger school-level improvements.

Saudi Context

Teachers as optimizing agents should respond to incentives such as relative salaries and alternative job opportunities, merit-based incentives, improved working conditions, potential for career progression, and teacher professionalism. The academic and policy literature identifies these pecuniary and non-pecuniary factors as important influences in the decision for teachers to exert high levels of effort and remain in the profession.

Pecuniary incentives

Teaching in public schools in Saudi Arabia comes with a reasonably high salary level and regular standard increments for all teachers (“Ministry of Civil Service” 2017). There is no systematic structure to provide teachers who are performing well with enough pecuniary incentives in the Kingdom. A major reason for this is the problem in identification—there are not enough testing procedures and data infrastructure to track teacher attendance and in-service performance.

At present, the MoE’s new strategy, which ties 80 percent of the weight of teachers’ evaluations to student performance on standardized tests (Almadina Newspaper, May 29), is an example of rewarding good performance. However, while this strategy may indeed motivate teachers to put in more effort, it faces some problems, including the issue of moral
hazard, which is elaborated in the Research Insights section. This is especially true because of a lack of strict follow-up and implementation procedures. The MoE also has a few other initiatives in place that can act as monetary incentives to motivate teachers. In 2018, the Ministry awarded luxury cars to select teachers for exemplary performance. While this reflects that MoE is cognizant of the need for incentivizing teachers, the selection and impact of such initiatives remains unclear.

Non-pecuniary incentives
Teaching in Saudi Arabia is an attractive choice for those seeking a public-sector job. Some people choose to be teachers because it gives them lifetime job security, since there is no danger of losing a government job. However, the relative security of the job may attract people who do not have the intrinsic motivation necessary to exert sufficient effort to be a strong teacher. It may encourage the entry of people who are not interested in a career in education or are not well-versed with the subject they are teaching. The job security and lack of monitoring and accountability systems may also act as a disincentive for high-ability teachers, who would leave for more lucrative opportunities, but encourage the low-ability teachers to stay for a longer period, since they have fewer outside options and lower opportunity costs. We cannot confirm this in the case of Saudi Arabia, because there is a lack of robust information on teacher turnover and attrition rates, reasons for leaving or switching jobs, and how this varies by school level and academic field.

Recognition can also be an especially powerful incentive for teachers and others working in the public sector. One such example is the MoE’s Education Excellence Award, which was founded in 2009 to promote outstanding educational practices and highlight exceptional achievements in the field of education (by students, teachers, administrators, and schools). Anecdotally, public school teachers also get some advantages in the educational system, such as priority in the waiting lists for admitting their children in public kindergartens.

There are some variations in terms of pecuniary and non-pecuniary benefits across different sections of the teaching workforce. For instance, in the public sector, kindergarten teachers are paid much less than their counterparts. Similarly, special education teachers work with students who demand extra time and attention. Both these vital groups of teachers face difficult tasks, and yet it seems there are not enough additional incentives to help retain them, keep their morale high, and ensure high-quality care under their supervision. Additional types of non-pecuniary benefits that could be explored in this context include housing allowances, transportation subsidies, medical insurance, shortened working hours, and extended summer leave. It should be acknowledged that professional development, peer networks, and use of ICT—as discussed in the previous sections—can also act as valuable non-pecuniary incentives for Saudi teachers.
In summary, there is a need to provide more effective incentives for teachers in Saudi Arabia. The missing links between the appraisal of teachers’ performance and the rewards and recognition that they receive is also a factor for consideration. We discuss relevant research literature on these topics below.

**Research Insights**

After a student’s socioeconomic background, teacher quality is the most critical factor in determining variability in student attainment (Hanushek 2005). Two problems can get in the way of teachers’ performance in classrooms: they may not be adequately trained to teach, or even when they are trained, they may not be motivated to do their best. Creating an incentive structure that fosters motivation and high effort levels among teachers is an important way that schools can ensure teacher quality remains high. In this section, we begin with an overview of the theory behind the problem that schools face when trying to design this incentive structure. We then turn to a brief discussion about the patterns of teacher attrition and retention across the career cycle.

**Principal-agent theory**

Teacher motivation can be explored through principal-agent theory. A principal-agent relationship describes a situation where a person or organization (principal) contracts another (agent) to perform services or supply goods. In this context, the principal is the employing school district, and the agent is a teacher. Principal-agent theory argues that the optimal contract between principal and agent depends on several factors: the agent’s motivation; moral hazard; information asymmetry; and whether the agent performs multiple tasks or has several principals. Since moral hazard and information asymmetry feature in the Saudi context, we focus on those topics below.

Moral hazard arises when there is some uncertainty regarding the relationship between the agent’s effort and his output. In the context of education, the teacher (or agent) has an incentive to exert less effort if the school (principal) cannot distinguish between low student outcomes due to a lack of teacher effort and low outcomes due to low student quality (which is a random variable). Teacher effort is difficult to observe, since random differences in student ability and behavior lead to random differences in outcomes. Moral hazard poses a problem for school administration, because they do not know to what extent the teacher’s output is due to their effort and should be rewarded, and to what extent it is due to forces outside the teacher’s control (Dixit 2002).
In the education context, the information asymmetry problem is exacerbated, because a teacher’s work involves multiple kinds of output (Levačić 2009). Since classroom activity is largely unobserved by anyone other than students, a teacher’s effort is difficult to measure. Watching teachers in the classroom would require costly observation by senior teachers or inspectors. Absenteeism has been used as a proxy measure of effort in some studies, but it is typically an unreliable indicator when data are self-reported. Self-interest and possible collusion among teachers and other school actors leads to an underestimate of absence rates (Dang and King 2016). Verifying teachers’ contribution to student outcomes is therefore costly and often beyond the capacity of most schools.

Principal-agent theory rests on the assumption that the interests of principals and agents are frequently not aligned (Vegas 2005). While principals (schools) want high productivity and efficiency, agents (teachers) want high compensation for little effort. As a result, schools must design schemes to motivate their teachers to increase their effort. These schemes involve incentives that reward or sanction specific behaviors (Prendergast 1999). The extent to which the agent will change their behavior depends on the desirability of the reward or her aversion to the sanction (Baker 2002). We explore possible incentive structures below.

**Pecuniary incentives**

Research suggests that financial incentives may be more effective than other types of inputs. Chapman, Snyder, and Burchfield (1993) discussed how incentives can be increased so that teachers believe their extra effort is being rewarded. Duflo, Hanna, and Ryan (2012) conducted a randomized experiment and a structural model in India to test whether monitoring and financial incentives can reduce teacher absence and increase learning. In treatment schools, teachers’ attendance was monitored daily using cameras, and their salaries were made a nonlinear function of attendance. The study found that teacher absenteeism in the treatment group fell by 21 percentage points relative to the control group, and the children’s test scores increased by 0.17 standard deviations. Glewwe, Ilias, and Kremer (2010) also evaluated a program that rewarded Kenyan primary school teachers based on student test scores, with penalties for students not taking the exams. Scores increased after the implementation of the program to reward teachers, and students scored higher on the exams linked to teacher incentives.

Another way to motivate teachers to exert effort is to make employment contracts subject to periodic renewal, with contracts not being renewed for underperforming teachers. There is evidence from a few high-quality studies on the impact of contract-teachers on students’ test scores. Muralidharan and Sundararaman (2013) conducted a randomized controlled trial to evaluate a program that provided an extra contract teacher to randomly chosen government-run rural primary schools in India. At the end of two years, students in schools with an extra
contract teacher performed significantly better in math and language tests than those in comparison schools. The researchers also found that contract teachers were significantly less likely to be absent from school than civil-service teachers (16 percent vs. 27 percent). Positive effects of contract teachers were also found by Duflo, Dupas, and Kremer (2015).

There is a debate on how merit-based pay, employment contracts, and other pecuniary benefits should be structured in the teaching profession. Hatry, Greiner, and Ashford (1994) and Murnane and Cohen (1986) argue that teaching is not an activity that satisfies the conditions under which performance-based pay is an efficient method of compensating workers. Their theoretical argument is that information asymmetry between schools and teachers is difficult to address because of a variety of factors that are challenging to overcome. These include: identifying effective teachers; measuring a teacher’s value-added contribution; eliminating preferential treatment during the teacher evaluation process; and standardizing assessment systems across schools. There is a measurement issue, as well. A teachers’ work is multidimensional and cannot be reliably measured using student test scores. Using test scores as a measure of teacher performance could result in counterproductive behaviors, including the shifting of instructional resources, cheating, and “teaching to the test”, to the detriment of other subjects and skills (Koretz 2002; Jacob and Levitt 2003). Although test scores may improve, the actual educational improvements that the measure is supposed to proxy—such as increased learning and better teaching—often do not improve and may even decline (Vegas 2005).

This has led some researchers to conclude that incentives should be altered to reward particular teacher performance, skills, or behavior (Rockoff 2004; Kelley and Protsik 1997; Hanushek 2005). Rather than select outcomes, incentives should be designed in such a way that they reward teachers who develop competencies in context-relevant skills or who participate effectively in individual or peer activities. Kelley and Protsik (1997) reason that such incentives can broaden teachers’ skill sets, experiences, and capacity, all factors that they believe increase teacher interest and motivation.

More recently, a meta-analysis of 44 primary studies on the topic found that the presence of a merit pay program is associated with a modest, statistically significant, positive effect on student test scores (0.052 standard deviations) (Pham, Nguyen, and Springer 2017). The authors also find that effect sizes are highly sensitive to program design and study context, which suggests that some merit pay programs have a higher impact on student test scores than others. The authors find evidence that group incentives result in larger positive effects, on average, than incentives given to individuals. Other features, like incentives accompanied by school-wide public announcements (Glewwe, Ilias, and Kremer 2010), those that exploit loss aversion (Fryer et al. 2012), and those that are awarded based on sophisticated
composite evaluative criteria (Dee and Wyckoff 2015), have also been found to have positive effects. Such programs and incentives need to be evaluated in the Saudi context to understand what works to induce better teacher performance.

**Non-Pecuniary incentives**

Non-pecuniary incentives have gained significant importance in recent years. Research suggests that nonmonetary and implicit incentives, such as improved work conditions and peer pressure, are effective in increasing teacher effort on the job (Dang and King 2016). These incentives have an intrinsic motivational impact on the workers—they provide a strong sense of job security and stability (Heyman and Ariely 2004). For teachers who are intrinsically motivated and just need support and resources from schools, linking their performance to pay can actually reduce their performance (Dixit 2002; Le Grand 1997).

Nonmonetary rewards for teachers include the autonomy to choose their own teaching methods and materials (Vegas 2005), the honor of receiving recognition, opportunities for training and development, and flexibility of working hours (Casson 2007). Nonpecuniary punishments also play a part in increasing teacher effort: Levačić (2009) finds that teachers are more likely to start tutoring, or tutor additional students, in schools where the school principal has dismissal authority. On the other hand, there could be both advantages and disadvantages to having job security. Vegas and Umansky (2005) discuss that the threat of losing one’s job can act as a powerful incentive, although this threat is virtually absent from the teaching profession in Saudi Arabia. On the flip side, job stability may attract potential teachers to the profession. The value and impact of such incentives depends greatly on the contextual needs and the policy environment.

An important consideration for the best type of teacher contract is a mix of extrinsic pecuniary rewards and intrinsic professional and personal job satisfaction. However, while teacher incentives are a promising option to increase teacher effort, they do not operate in a vacuum but are part of a broader system. Teacher incentives may be more effective in raising student learning when other parts of the broader system affecting teaching and learning are in place (Vegas 2005). For example, tying salary increases to teacher performance may be effective only in raising student achievement when teachers have clarity about what knowledge and pedagogical skills are needed to improve student learning. The evidence leads the important conclusion that neither pecuniary or nonpecuniary incentives have homogenous effects across countries, schools, population groups, or time (Vegas 2005). Effective incentives are therefore a necessary, but not sufficient, condition for ensuring teaching quality and student achievement.
Factors that influence teacher attrition

Over the past two decades, substantial empirical research has focused on determining which kinds of teachers are more prone to leave teaching and why (for example, Grissmer and Kirby 1987; Murnane et al. 1991; Murnane, Singer, and Willett 1988). This research shows that teacher turnover is strongly correlated with the individual characteristics of teachers. Among the most important findings is that teacher turnover is strongly affected by academic field. Although the data have been inconsistent at times, special education, mathematics, and science are typically found to be the fields of highest turnover, especially in the United States (Ingersoll 2001).

Teacher attrition rates seem to follow a U-shaped distribution (Grissmer and Kirby 1987; Stinebrickner 2002). Young, inexperienced teachers tend to have high attrition rates. The probability that a teacher leaves the profession declines with experience before it begins to climb again as teachers approach retirement age. It has also been suggested that attrition depends on the academic ability of individuals. Murnane and Olsen (1990) and Stinebrickner (2001) show that individuals with higher academic ability, as measured by scores on entrance screening exams, teach for a fewer number of years than those with lower academic ability.

Patterns identified by research support the hypothesis that decisions to return to teaching are sensitive to opportunity costs. There is also evidence on the decision of whether to return to teaching after a career interruption. According to Murnane (1996), in the U.S., approximately one in four teachers who leave the classroom return within five years. Beaudin (1993) finds that the teachers most likely to return are those with subject-area specialties that provide limited opportunities for better paying employment outside of public schools, those who have more than two years of experience coupled with a Master’s degree, and those who interrupted their careers at an older, rather than a younger, age.

In the next section of this chapter, we assimilate these learnings and provide a synopsis of the avenues of potential collaborations where researchers can engage with policymakers to shape educational policies and practices.
Potential areas of collaboration

This chapter outlines three basic determinants of a teacher’s quality: innate ability, learned competencies or ‘teachability’, and the amount of effort they are willing to put into the job. Examining the role of each of these channels through the teacher selection, training, and retention processes is integral to moving policy forward to raise the quality of the teaching workforce. As a result, future research-policy collaborations should focus on: testing what policies have the potential to attract high-quality candidates to the profession; exploring how best to support and incentivize teachers when they are on the job; and establishing a data infrastructure to ensure that policy is supported by robust evidence.

The recruitment of high-quality teachers is key to the improvement of school systems. Evidence on the career decisions of potential teachers shows that salaries and opportunity costs influence who goes into teaching, who stays in teaching, and who returns to teaching after a career interruption. Two types of research investigations can be useful here. First, researchers should engage with policy-makers, as well as with potential and existing teachers, to establish which factors work in the Saudi context, so as to encourage high-quality candidates to apply for teaching. Second, while teaching is considered to be a reputed profession, there may be information gaps in terms of understanding the career structure, professional growth, and benefits of being a teacher. Future research should explore the level of information asymmetries and other barriers that prevent high-quality candidates from joining the profession and test ways of addressing them.

Teacher training and certification procedures also play an important role in the quality of the supply of teachers. Since the Kingdom has recently transitioned to the consecutive system, practitioners, administrators, policymakers, and researchers should work jointly to develop and test the new systems of recruitment and licensure. Potential collaborations should also focus on determining the robustness of present screening mechanisms, checking whether they are effective in selecting candidates with the appropriate skills to succeed on the job. This would mean involving economists, educationists, and psychometricians to measure the impact of present selection criteria and develop new ways of addressing information gaps in the hiring processes.

When building the capacity of teachers, researchers should examine well-established findings from across the globe, then customize and test them in the Saudi Arabian context. Important avenues for research-policy collaboration include thinking about deeper issues that lead to heterogeneous training impact: How much does the duration and type of teachers’ professional development vary across regions in Saudi Arabia? Why are teachers’ current professional developmental needs not being fully met? How best should unsatisfied demand
for professional development be addressed? How are teachers’ personal characteristics, their teaching beliefs, their chosen teaching practices, and pedagogies related to their participation in different forms of professional development? Lastly, educationists should critically evaluate the present curriculum for teacher training in the Kingdom to determine models of effective practices. Here, researchers and policymakers should jointly work on conducting a needs assessment, developing standards for professional development to guide the design, evaluation, and funding of professional learning. The set of decisions facing an on-the-job teacher, use of time, and school schedules to increase opportunities for professional learning, peer coaching, mentoring, and collaborative planning are some aspects that should be explored in further detail across the different schools and regions of the Kingdom. In order to equip teachers for a knowledge-based Saudi economy, future policy researchers should explore particular areas—everything from technology facilitation, student evaluation, and other emerging skill sets such as the power to enhance 21st century abilities of students.

Collaborations should also establish which incentives work in the Saudi context, so as to encourage teachers of all quality types to exert high personal effort in the teaching job. Teaching in Saudi Arabia is an attractive choice for those seeking a public-sector job. However, the relative security of the job may attract people who lack the motivation necessary to exert sufficient effort to be a strong teacher. In order to overcome this problem, it is necessary to ensure that good incentive structures are in place in the education sector. Researchers could evaluate the types of actions that can operate as incentives in retaining teachers, or in encouraging more effective teaching. These should include aspects like intrinsic motivation, recognition and prestige, salary differentials, job stability, pension and benefits, professional growth, adequate infrastructure and teaching materials, and peer networks. Researchers could also examine pecuniary and non-pecuniary design structures to test what specific form of each reward system (such as individual vs. group incentives, or objective vs. subjective structures) would work best in the Saudi context. Here, the one-size-fits-all approach may not necessarily work. Such research would require careful experimentation and iteration to identify the incentive mechanisms that work best in different contexts (type of school, level taught, or region), and to understand how these mechanisms should be tailored to suit each specific context.

At present, the Noor System’s teacher level dataset, alongside linkages with the student and school level datasets, Education and Training Evaluation Commission’s Kifaiyat data, and the supplementary questionnaires in TIMSS and PIRLS international databases, could help provide baseline information on some aspects of teacher selection, training, evaluation, and eventual associations with student outcomes. Further details about these and other datasets are provided in Appendix II.
All potential collaborations need the government to function as learning organizations, working with robust data and feedback mechanisms. Our present analysis identifies several data gaps. First, little or no data are available on flows in and out of the profession. Data elements such as attrition/retention rates, characteristics of leavers, reasons for leaving/entering/re-entering the profession, reasons for dissatisfaction, potential supply of new graduates, potential supply of returnees, or percentage of newly certified teachers who enter the profession are not readily available. Furthermore, little data is available on the outcomes of teacher recruitment processes. Such data would, for instance, consist of the number of difficult-to-fill vacancies or proportion of non-specialization or out-of-expertise assignments. Other important data gaps include information on teacher training, teacher certification, existence of market mechanisms, teacher recruitment practices, organizational structure of schools, professional development activities, teaching and learning practices, standards and assessment practices, and partnership. Here, academics can contribute massively by setting up data requirements, conducting existing data health-checks, and developing surveys and instruments for more robust data collection and collation in the near future. An integrated data infrastructure linking various teacher, student, and school level outcomes can help inform the teaching process on educating the large, predominantly young student population in the Kingdom. It can also improve student performance to meet, or in fact exceed, international averages.
Chapter IV: Tertiary Education Pathways and Skills in a Changing Economy

Background: Saudi Arabia faces a persistent unemployment problem, particularly among youth and women. The Kingdom has a large group of highly qualified, unemployed adults. Tertiary level graduates have the highest unemployment rates in Saudi Arabia. According to data from the General Authority for Statistics, among Saudi citizens aged 15+ in 2018, 13.4 percent of tertiary graduates were unemployed, compared to 5.5 percent of secondary school graduates and only 1.8 percent for people with below an upper secondary school education.

Primary Challenge: Given that Saudi Arabia has an educated workforce and a growing economy, it is paradoxical that unemployment persists among the highly educated. Why do tertiary education pathways not lead to a higher probability of employment in the Kingdom, as expected? This is a critical question to answer to equip new labor market entrants with the right skills and capabilities as Saudi Arabia transitions towards becoming a knowledge economy.

Economic Theory: The labor market tests the education and training of potential workers as they exit educational institutions. The existence of unemployment for these graduates is a result of a gap between the supply of, and demand for, labor and skills. In this chapter, we use the supply and demand of labor framework to explore possible reasons why this gap persists in the presence of a highly educated workforce. We describe and consider the following possibilities guided by the labor market economics literature: information asymmetries, skills mismatch, and poor signaling.

Key Actors: We explore the pathways to prepare for the workforce from the perspective of Saudi young adults (ages 17+) as they face the labor market, as well as from the perspective of Vision 2030.
of the Ministry of Education as they work to prepare their graduates for employment. We focus on those among the population who are facing the labor market for the first time and do not have the benefit of years of work experience or strong professional networks. Recent tertiary education graduates are split into vocational education or university graduates. Each of these groups learns a distinct set of skills while in tertiary education and, as a result, they are qualified for different types of jobs.

Chapter Navigation: The first section of this chapter is comprised of two parts, each beginning with an overview of the Saudi context and then moving to lessons that can be learned from research. Part I addresses the supply and demand of labor. We begin by considering the implications of a changing economy on the types of jobs and skills demanded by firms. We then move to a discussion on labor supply, covering the enrollment and skills obtained by graduates from technical colleges and universities. Part II examines the characteristics of the current labor market, analyzes what happens in labor market equilibrium when graduates are seeking first-time employment, and then describes policies that Saudi Arabia has implemented to combat its persistent unemployment. The chapter concludes by identifying potential areas of policy collaborations between researchers and policymakers.
Part I: What constitutes labor demand and supply in a changing Saudi economy?

Main Insights

Rapidly changing skill requirements present a challenge for universities and technical colleges to adequately prepare their graduates: Government programs to create published skill standards may quickly become outdated as skill requirements change, making it hard for educational institutions to update their curricula and programming.

Lack of an integrated database for tracking student progress through schooling to tertiary education makes it difficult to connect school outcomes with career choices: Despite the emphasis on STEM subjects in primary and secondary school, less than 20 percent of university students specialize in these areas. More robust data infrastructure is needed to understand and facilitate transitions between education levels and pathways.

Technical and vocational education facilitates labor market entry through apprenticeship programs, which make young people ‘insiders’ rather than ‘outsiders’ in the labor market. Social stigma around these programs may explain why enrollment still remains low: Research shows that students may view technical and vocational education as less desirable, which may help explain why although enrollment has gradually increased, it remains low relative to other education pathways.

Saudi Context

Saudi Arabia’s population was more than 30 million people in 2018, compared with just 7 million in 1975 and 20 million in 2000. Although the population has been growing rapidly in the past few decades, growth rates are projected to slow as fertility rates decrease.

Saudi Arabia is the world’s twentieth-largest economy based on Gross Domestic Product (GDP), representing 1.2 percent of the global economy. The oil industry remains the largest and most productive segment of the economy, generating 43 percent of real GDP (Ministry of Labor and Social Development 2016). However, the Kingdom recognizes the importance of diversifying its economy away from its historic reliance on oil. Any major economic transformation brings with it an increased demand for labor. Saudi Arabia is at a unique stage of transition and opportunity, where efficient systems and an adequately trained workforce can enable and enhance economic growth.
Labor demand in a changing economy

Change is accelerating in Saudi Arabia, with several major reforms through the unveiling of the Vision 2030 in 2016. Saudi Arabia is in the process of building four new cities. Each has a focus on heavy industry, technology, freight, and/or commerce, and together, all four are expected to accommodate five million people, according to the Saudi Arabian General Investment Authority (SAGIA) (2012). The Kingdom also plans to create Neom, a city from scratch that is expected to have more robots than humans. All services and processes in Neom are expected to be 100 percent fully automated, with the goal of becoming “the most efficient destination in the world.” The project will be backed by $500 billion (SAR 1,875 billion) from the Saudi government and its investment fund, as well as by local and international investors.

Alongside these futuristic plans, Saudi Arabia is also gradually changing its social policies and breaking age-old norms. The Kingdom has recently ended the driving ban for women (July 2018), and is likely to begin issuing tourist visas to foreign travelers and allow cinema halls to open. These progressive reforms will not only lead to social integration, but will also bring more Saudi women into the economic fold; the reforms are expected to cause trickle-down effects for sectors of the economy like the tourism, automobile, retail consumption, and entertainment sectors. It is thus unsurprising that the 2018 budget focused on non-oil expansion—reflected in the form of higher capital allocations for non-oil sectors such as transport, construction, and utilities. The economy is also marching towards further privatization, as the government announced several reforms to lure private players, including a $19.2 billion (SAR 72 billion) stimulus with a focus on housing, exports, and manufacturing. Among its aims, the NTP 2020 also emphasizes boosting partnerships with the private sector and investing in digital transformation.

Jobs created: This extensive policy impetus will strongly impact the demand for labor and benefits from employment. At present, the demand for labor consists of public and private sector jobs. Over the past 10 years, the Saudi economy has added about 433,000 jobs a year on average across both sectors. The Kingdom now expects to create more than 350,000 new jobs in the short term (“General Authority for Statistics” 2018). Of these jobs, 140,000 are likely to go to Saudis, while the rest (210,000 jobs) are expected to be occupied by expatriate workers. Moreover, 1.3 million additional jobs are projected to be created by 2020 (“Saudi Arabian General Investment Authority (SAGIA)” 2012).
Skills demanded: Historically, the Saudi economy has been focused on oil and natural resource industries with low diversification, and until a few years ago, the Kingdom’s labor market demonstrated a high demand for employees in low-skilled positions in these industries (EPoD-HRDF, 2016). With the surge of policies to enhance demand in non-oil sectors, however, the skill requirements are expected to change rapidly. Ideally, the transition to a knowledge-based economy—with a larger young population and expanding cities—will require a mix of low-, medium-, and high-skill intensity jobs.

What are the skills expected now and for the upcoming years in view of Vision 2030, and how do firms and the government communicate these skills to students and educational institutions? A large gap exists in the present data infrastructure, with a lack of dissemination of the knowledge on skills requirements across sectors and regions of the country. Recognizing this, Vision 2030 announced the establishment of sector councils that will precisely determine the skills and knowledge required by each socioeconomic sector. One such program, the Saudi Skills Standards (SSS), was established to communicate skill requirements for different occupations to students and reduce informational constraints. It will standardize credentialing so that students can better assess their own strengths and weaknesses, and subsequent educational institutions can better evaluate their applicants’ past performance. The Career Educational Development (CED) program represents another attempt to improve information completeness. It educates young people about their career alternatives and matches them with training programs to best complement their career goals. The newly formed national labor gateway called TAQAT can also serve as a useful online platform to disseminate skill requirements and related information. Whether these programmatic initiatives are useful and enough to accommodate the ambitious job creation goals in the country is yet to be determined.

Overall, to achieve its demanded goals, the Kingdom requires an efficient and cost-effective workforce across industries, as well as a consistent pipeline of productive workers equipped with the right skills and capabilities. On this note, we turn to discussing the supply of labor in Saudi Arabia—discussing the pathways of tertiary education through which graduates enter the labor market.

Channels of labor supply
The total number of Saudi job-seekers in the fourth quarter of 2017 was 1,086,561, of whom 175,313 were men and 911,248 were women (“General Authority for Statistics” 2018). Half of Saudi job-seekers were university graduates, less than ten percent were technical and vocational training graduates, and the rest were adults who were unemployed but not recent graduates.
The supply of workers comes from two prominent channels in tertiary education: graduates from universities, and those from technical and vocational colleges. The pathways to education are presented in the figure below. After successfully completing the secondary and intermediate levels of schooling, a Saudi student’s choice of whether to enter university or a technical institute has a strong bearing on the types of jobs for which they are qualified post-graduation. Upon successfully completing intermediate education and receiving an intermediate education certificate, students may either pursue general secondary education, or industrial, agricultural, or commercial technical education.

In 2014, 3,235,009 students were enrolled in secondary education, and 5.13 percent of secondary school enrollment was in technical school (“UNESCO” 2017). At the tertiary level (ages 17+), students can choose between education at a university or a technical institute. Students enrolled in public education colleges and universities receive a monthly stipend for the first four years of their enrollment.

In this section, we discuss the enrollment and the skill sets of youth who are university graduates or are in tertiary-level technical and vocational education. The discussion also highlights the changing policy conditions and gender-related social norms and implications in the Kingdom.
University graduates: Higher educational attainment is rapidly growing in Saudi Arabia, particularly for women, and the number of colleges and universities available to accommodate this trend is growing in response.

Enrollment levels: For the academic year beginning in 2010, Saudi Arabia’s 68 colleges, universities, and academic institutions had a total enrollment of 757,770 Saudi students (414,433 females and 343,337 males), with 33,273 (16,441 females and 16,832 males) enrolled in private colleges. By 2012, the figure had increased to 1.2 million ("Saudi Arabia Monetary Agency (SAMA)“ 2013). In that year, 141,200 students graduated from higher education, with women constituting more than half of the total (72,100). The figure below shows that since 1997, more women than men have consistently enrolled in Bachelor’s degree programs. This indicates that universities are producing a sizeable population of skilled potential female workers every year.

Figure 28: Number of students enrolled in a Bachelor’s program from 1995-2016 [Source: Saudi Arabia Monetary Agency, 2017]

There is a high concentration of Saudi Bachelor’s candidates in fields such as commerce and business management, humanities, social sciences, Islamic studies, and health, as demonstrated in the figure below. The most popular major among both male and female Bachelor’s students is commerce and business management, with over one-fourth (26 percent) of male students and one-fifth (21 percent) of female students enrolled. Enrollment in the STEM areas is generally low, at 15 percent of the male and female student enrollment on average. This is noteworthy, given the policy attention toward STEM in secondary and high school levels, as discussed in Chapter II of this paper. There appears to be a gap between STEM training in school and its linkages with university selection and training. The capabilities
of high-school STEM graduates and universities’ expectations of such students require robust matching to enable consistent development of STEM skills of students, and to ensure supply of workers with appropriate skills in the area. This seems to be missing at present.

The choice of student specialization has also been rapidly changing over the years. For instance, data from five years prior (MoE, 2010–11) shows that Islamic studies and education (including teacher training) were the most popular Bachelor’s level courses, with a much higher proportion of men and women enrolled in comparison to the currently popular business management and humanities related specializations.

**Figure 29: Number of students enrolled in Saudi university Bachelor-level programs, by area of specialization and gender**

(Source: Ministry of Education, 2016/17)

Different subject specialization at the university level implies different types of training and skill sets of the graduates of those subjects. The latter is discussed in the next section.

**Skill levels:** The first, and perhaps most critical, step towards a successful entry into the labor market is acquiring relevant and employable skills. This includes a mix of cognitive skills (like IQ) and non-cognitive skills (like work ethic), which are developed over the course of many years and experiences in a student’s education lifecycle. The previous chapters of this paper highlight the skills gained by students in school and how (if at all) they are measured at different stages. The cumulative stock of skills gained by the end of tertiary education is most important, as that helps a new labor market entrant demonstrate and ‘signal’ their ability to
their prospective employers.\footnote{A thorough discussion of signaling is detailed in the Research Insights section.} Identification and measurement of the level of skills gained by Saudi graduates is also important for policymakers to evaluate the quality of tertiary education alongside its ability to cater to the labor market needs.

At present, there is no robust large-scale assessment of the skill sets of the candidates who graduate from universities and enter the labor market in Saudi Arabia. Some sectors have their own assessments, such as the Saudi Council of Engineers Exam, administered by Qiyas, which any engineer who practices engineering in the Kingdom is required to pass. However, in the absence of national-level direct evidence of skills gained, through exit tests or surveys for students graduating from universities, we rely on indirect evidence from stand-alone exploratory studies with small sample sizes. These studies usually ask students about the quality and relevance of the learning from their tertiary education, and also inquire if employers feel that colleges are doing a good job of producing a skilled workforce.

For instance, according to a small 2015 survey conducted by Ernst and Young Advisory Services, only 54 percent of university students in Saudi Arabia felt that their education was preparing them well for a job. This figure doesn’t vary much across gender and university type. Nearly 53 percent of private university students felt this way, compared to 55 percent of public university students. The sentiment was stronger among women (66 percent) than men (43 percent). Internships and volunteer work are common avenues through which students gain applied work experience, however such opportunities are limited in Saudi Arabia. Further, according to a recent EPoD-HRDF funded survey, employers reported that they find skills like work ethic, interpersonal skills, and leadership to be scarce. For example, only 3.7 percent of employers reported that they could easily find female job-seekers who possessed skills related to work ethics. This indicates the possibility of poor skill levels and heterogeneity across gender and specialization areas. However, the implications that can be drawn are limited in the lack of systematic data collection and testing procedures on skill acquisition of university graduates.

Soft skills may be missing from many recent graduates seeking employment, but research suggests that tertiary education institutions can compensate for these shortages by teaching
students these skills. A research experiment delivered a blended online and in-class 12-week course focused on work-ethic and interpersonal skills to technical and vocational college students in Saudi Arabia. The study found improvements in female students’ work ethic and organizational skills (Kugler and Ayyoub 2018).

We now explore the other major tertiary education pathway of vocational education and training, through which a portion of students in Saudi Arabia get trained for entry into the workforce.

**Technical and vocational education:** At age 17, Saudi students choose between enrolling in university and entering a technical college. The Technical and Vocational Training Corporation (TVTC), which recently merged with the MoE, oversees programs in this area. TVTC works closely with employers to provide training programs that reflect the current needs of employers. In particular, the National System for Joint Training combines classroom learning with hands-on practice, and also includes English fluency and computer skills. This program produces graduates whose occupations include: web developers, auto mechanics, customer relations workers, cashiers, executive secretaries, receptionists, and jewelry sales workers. Technical colleges prepare students in some of the following areas: electrical, mechanical, chemical, administration, computers, electronic, hotel and tourism technology, information, and environmental and food processing technologies. Students study for three trimesters, and usually spend their fourth (and last) trimester in an industry placement (“UNESCO-UNEVOC World TVET” 2018).

**Enrollment levels:** In 2017, there were 60 technical colleges—23 for women and 37 for men—across the Kingdom. Although the number of applicants and attendees remained flat (and even decreased among female applicants) between 2010 and 2014, technical and vocation education gained significant popularity between 2016 and 2017 (“Saudi Arabia Monetary Agency (SAMA)” 2018). The number of applicants grew by over 30 percent for males, and almost 75 percent for females, between 2016 and 2017, as seen in the figure below (Technical and Vocational Training Corporation 2018).

*Figure 31: Applicants and acceptances in technical colleges for men and women. [Source: Technical and Vocational Training Corporation, 2017]*
The figure above also indicates that the admission rate (ratio of those admitted to all who applied) for females applying to technical colleges was significantly lower than for males. Females have a smaller pool of technical colleges to apply to, and if they do apply, they have a lower chance of acceptance. Low acceptance rates may discourage females who may have considered applying to technical colleges from doing so.

Women enrollment in technical education slowly but gradually increased between 2006 and 2016, and men’s enrollment also increased. The figure below shows the stark contrast between male and female enrollment in technical college.

Apart from lower admission rates, another possible explanation for low female enrollment in technical colleges is that technical education does not provide sufficient returns to women in the labor market, so they are choosing alternate education pathways instead. Part of this may

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36 For technical and vocational training enrollment figures, we rely on statistics from SAMA, as they provide a long-run enrollment trend. TVTC enrollment estimates for 2016 are 421,253 (25 percent female); for 2017, they are 428,229 (30 percent female).
also be due to the preferences of female students in education, and due to the structure of technical and vocational training in Saudi Arabia. The low availability of technical and vocational jobs for women after completing their training, as well as the stature of women in Saudi society, could also be a part of the reason. Overall, a perceived low status of vocational education compounded by the Kingdom’s cultural belief that type of work, sector of employment, and social interactions determine the social status of a person could be important factors (Al-Waqfi and Forstenlechner 2010).

This trend in enrollment is interesting, as between 2006 and 2016, the number of technical colleges for men remained fairly constant (between 34 and 37), while for women, the number increased (from 4 to 23) (“Saudi Arabia Monetary Agency (SAMA)” 2018; Technical and Vocational Training Corporation 2018).

**Skill levels:** The content of technical and vocational courses partly focuses on basic skills, materials, work ethic, computer skills, and English language (which constitutes 25 percent of the curricula), while practical training (which constitutes 75 percent of the curricula) depends on the occupation or trade (“UNESCO-UNEVOC World TVET” 2013). The duration of training varies from a couple of months to two years and involves first-hand employer-driven work experience. For example, TVTC has adopted an international academies program that offers male and female graduate courses in internationally recognized technology platforms, such as Cisco, Oracle, Microsoft, Juniper, Huawei, and SAP. However, it is difficult to understand the extent to which the required technical and soft skills are being transferred to students of technical colleges.

At present, just like the universities, there is no evidence of the large-scale impact on the skill sets of the candidates who graduate from technical and vocational colleges in Saudi Arabia. There are also no comparable assessments at higher levels of education and training (tertiary and technical and vocational education and training). Some surveys show that graduates of technical colleges do not possess adequate levels of work ethic, specialized knowledge, or general skills (Baqadir, Patrick, and Burns 2011; Al-Dosary, Rahman, and Aina 2006). Analysis of the student data showed they did not find the vocational education curriculum relevant to job-market expectations (Baqadir, Patrick, and Burns 2011). Given the vocational education and training systems should ideally operate closely with the private sector, these previous studies reflected that partnerships were poorly institutionalized and operationalized. However, following the announcement of Vision 2030 in 2016, there have been many policies and programs to encourage more aligned skill development in these institutions. Public-Private Partnerships (PPPs), providing equipment, training trainers, and developing online

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37 Twenty private sector employers and 286 students were randomly selected and interviewed in this study.
portals (such as ‘Atqin’), have been undertaken for better linkages. The extent of impact of these interventions, however, has not been robustly investigated.

**Research Insights**

What do researchers say about the skills demanded in a changing economy and the ways the tertiary education system can cater to these requirements? There is a limited yet significant body of research that examines these questions, and few in the MENA context. We discuss some research insights below, based on the main topics identified in the section above.

**Labor demand in a changing economy**

The Saudi economy is rapidly changing. Research shows that a growing economy witnesses a continuous change in the goods that it produces and consumes. This continuous change forces sectors to diversify and jobs to move from traditional to modern sectors (Zeira and Zoabi 2015).

In recent decades, the world economy has been characterized by greater economic integration, as well as a more rapid pace of technological change. These two forces, among others, have helped increase the demand for a more skilled workforce, particularly in more advanced economies (Karoly and Panis 2003). The increased demand for skill is driven by the nature of the technologies themselves. In some cases, the new technologies are replacing human labor, thereby shifting the mix of occupations, as some jobs become obsolete while other jobs gain importance (Autor, Levy, and Murnane 2001). In other cases, occupations continue to be in demand, but the skills required for the job change, as workers need a higher degree of skill to integrate the technologies into their work.

Saudi Arabia is also striving for technology-driven economic growth. Our world’s rapid technological change means that application of knowledge is valued more than deeply understanding one subject. The value of coordination, learning, and re-learning becomes pertinent. Skills that can be applied to a number of subjects, such as problem solving, critical thinking, teamwork, and communication, are expected to become increasingly important. Digital literacy and the ability to analyze and synthesize vast amounts of information are also skills that became imperative for job market success (The Brookings Institution 2001). Research shows that worldwide, labor market returns to cognitive achievement have been declining modestly over the years (Castex and Kogan Dechter 2014). Simultaneously, acquiring soft skills has become crucial to becoming a well-rounded worker. With economic transition, the education system’s capacity to develop a breadth of skills matters more than developing a few specializations.
Labor market entrants need a breadth of skills that range from the basics that schooling often covers (such as literacy, numeracy, and content knowledge in academic subjects) as well as information literacy, flexibility, and problem solving. In the age of information, such skills can complement technology. The new digital economy requires an ability to filter, analyze, and synthesize the vast amounts of information available online. Skills like complex reasoning and creative thinking can empower individuals to take full advantage of opportunities in the digital world. Multiple literacies (beyond fundamental skills of reading and writing) become essential as societies continue to digitize. The Mozilla Foundation’s map of web literacy outlines what digital literacy entails, from navigating and exploring, to building content or coding, to collaborating with others and participating in online communities (Mozilla, 2015).

A focus on breadth of skills also means educating for a mastery of a wide range of competencies to help mitigate the challenges posed by our changing world context. Some competencies could be developed through the general education system from fairly early ages (like problem solving or critical thinking), while others (like work ethic) could be developed even through technical and vocational education. The roles of both types of educational provision vary in different countries, and it is important to identify their strengths and weaknesses to make the best use of both systems of tertiary education.

Channels of labor supply
As Saudi Arabia transitions towards becoming a knowledge economy, education plays an increasingly important role in preparing new labor market entrants for the workforce. Here, tertiary education pathways are critical in preparing graduates.

University education: Participation in higher education is growing at an unprecedented rate in the Kingdom. In fact, this has been the global trend; during the past twenty years, the number of university students and fresh graduates has increased exponentially. This is partly because it is believed that on average, the private returns to university education are generally higher than primary education. By private returns, economists mean thinking about significant wage returns to individuals associated with their investments in obtaining higher levels of education.

However, increasing returns to education may not be reflective of the labor market in Saudi Arabia. Returns from an additional year of education are lowest in the Middle East and North Africa (MENA) region (7.3 percent) compared to the global average (9.7 percent). The returns vary by level of education. There are high returns to primary schooling in MENA (16 percent vis-a-vis an average of 11.5 percent across all economies), and the returns are especially high for females; by contrast, the returns to tertiary education are low in the MENA region [10.5
percent vis-a-vis an average of 14.6 percent across all economies (Montenegro and Patrinos 2014]).

Rigid labor market regulations often curb the rate of return from tertiary education, as is happening in parts of the Middle East and potentially in Saudi Arabia. Research studies on returns to education in the Saudi context are presently missing, which restricts understanding on where the gaps are and how firm-level demand for workers with different levels of education influences the educational choices of students.

In addition to private returns, for a society’s well-being, educationists point to the ‘social rates’ of return, which include benefits accruing to the country beyond the individual’s wages, corrected for the substantial public cost of providing education. Typically, social rates of return to higher education are much lower (as a result of high public costs), and the returns to primary are higher (given lower public costs). Society needs higher education graduates, even if the rate of return is low, like in the MENA region. As Saudi Arabia transitions to a knowledge-based economy, higher education can cater to growing numbers of students and respond more effectively to wider developments in education systems, notably through Research and Development (R&D). Here, higher education and university funding should consider the incentives for the efficient and equitable use of allocated funds. For instance, user-selective fees near the social cost of higher education could propel efficiency, whereas sustainable schemes for funding students through loans or other financing options can ensure efficiency.

In addition to the rate of return to university education, it is important to consider other factors that determine enrollment. Educationists have found that the choice to attain higher education is not just rooted in high expected wage (Trow 1973; Schofer and Meyer 2005). Some evidence shows that social prestige of a worker’s occupation is a powerful motivator for the decision to go to university (Triventi 2013; Thomsen et al. 2013; Zhao 2012; Roksa 2005). In fact, Marginson (2016) argues that increasing enrollment in university is driven primarily by families’ desire to maintain or advance their social position, especially in the case of females. As the social demand for university education increases, enrollment continues to rise, and attainment of university education becomes ubiquitous. Saudi Arabia has high female enrollment in universities, and the social prestige associated with higher education could be an important factor driving this demand.

**Technical and vocational education:** Bilateral aid agencies, the World Bank, and the United Nations Educational, Scientific and Cultural Organization (UNESCO) all regard technical and vocational education as a particularly suitable tool to promote economic growth and increase competitiveness in developing countries (Comyn and Barnaart 2010). The purpose of
vocational education is to provide people with skills readily applicable to the workplace, and these skills can have direct and immediate effects on productivity and thus promote economic growth (Nilsson, 2010). This follows from human capital theory—investments in vocational education supposedly increase labor productivity, thus leading to economic growth. This presupposes, however, a functioning labor market.

Technical and vocational education has also been put forward as a way to address youth unemployment. Vocational education can offer more possibilities to gain access to the labor market. It increases skills and competencies, which gives recipients a competitive advantage in the market (Nilsson 2010). Technical and vocational education can also facilitate labor market entry through apprenticeship programs that make young people ‘insiders’ rather than ‘outsiders’.

There are relatively few studies on the returns to technical and vocational education. Most studies only refer to returns to various levels of general education (Nilsson 2010). To some extent, this can be attributed to a lack of data, but the principal reason is conceptual ambiguity between general and vocational education—hence the difficulty of distinguishing their contributions, in addition to a range of vocational qualification frameworks implemented across nations. Despite the difficulties, some research into returns to vocational education has been made. For instance, multiple studies in the United Kingdom demonstrate that returns to technical and vocational education differ widely based on the level of learning, delivery format, qualification type, subject, age, or gender (Psacharopoulos and Patrinos 2004). Regarding vocational qualifications in the United Kingdom, positive wage returns have been found specifically for vocational qualifications and apprenticeships at upper-secondary education and above (Level 3 and above, according to the International Standard Classification and Education (ISCED) system).

By contrast, the recent evidence has triggered an academic debate on the impact and effectiveness of qualifications at Level 2 (lower-secondary education) and below. While earlier evidence like Sianese (2003) suggests that Level 1 (primary education) and 2 qualifications have very little or no returns, Buscha and Urwin (2013) have found that achievers of Full Level 2 qualifications earn premiums as high as 22.2 percent in the 16 to 18 age group. The returns are positive but lower for short cycle Level 2 and below Level 2 qualifications. Also, for most qualifications, the acquired skills tend to depreciate over time. Another example in the literature is a study conducted in Botswana, which used a neoclassical standard growth model to examine enrollment in university and vocational technical institutions, respectively, as variables for labor with different quantities of human capital. The results indicated that vocational education contributes far more to the country’s fast growth
than university education (Mupimpila and Narayana 2009). Thus, the returns and impacts of the different tertiary education types and levels are heavily dependent on the context.

Comparison of tertiary education pathways in terms of skill development: Vocational training and general education are the two predominant forms of secondary schooling around the world. But there is remarkable diversity in the emphasis on general versus vocational education across different countries and a long-standing debate about the relative benefits in terms of skill development. Most studies that compare the effect of vocational and general education on labor market outcomes in the cross-section suffer from selection bias, since less-able students are more likely to enroll in vocational programs (Malamud and Pop-Eleches 2010). On the other hand, strong vocational training systems can increase early career employment (Hanushek et al. 2016).

Policy debates about the balance of vocational and general education programs focus on the school-to-work transition (Hanushek, Woessmann, and Zhang 2011) and are often framed by contrasting the American and European systems of education. Whereas the United States emphasizes formal general education in secondary schools, much of Europe relies on vocational training and apprenticeships to prepare its workforce for the labor market. Goldin (2001) notes the essential trade-off between these different approaches: “Formal, school-based education enabled American youths to change occupations over their lifetimes and to respond rapidly to technological change. Apprenticeships and highly specific training were more cost effective for individuals who expected to spend their lives in the same place and in the same industry and occupation.”

The rate of technological change is therefore an essential factor in determining the dominance of one form of education over another. To a significant degree, technological progress is what makes the difference between fast-growing developing economies and slow-growing ones. Historically, the rate of technological progress has been much lower in the Middle East, compared to countries in East Asia, North America, South Asia, Europe, and Central Asia (World Bank 2008). There has also been a shortage of low-skilled Saudi workers in specialized trades (Evidence for Policy Design (EPoD), Harvard Kennedy School 2015). In this context, the role of vocational education has been salient. This is changing, however, and as the Kingdom transitions towards a technology driven knowledge economy, the role of university education becomes increasingly important for preparing graduates with appropriate skills. Here, lessons from other developed countries can be useful.

Vocational education has largely been eliminated as a separate track in secondary education in the United States. The reasoning behind this is that specific skills can quickly become obsolete; what people need instead is the ability to adapt to new technologies. On the other
hand, many European and developing countries, led by Germany’s ‘dual system’, provide extensive vocational education and training at the secondary level, sometimes with direct involvement of industry through apprenticeships. The underlying rationale is that by concentrating on specific vocational skills, it is possible to improve the entry of workers into the economy and to make them productive at an earlier point. This divergence in perspectives suggests that there may be a trade-off between the short- and long-term advantages and disadvantages for both individuals and society. The skills generated by vocational education help ease the transition into the labor market; however, they may later become obsolete at a faster rate, in a fast-changing context.

A study by Hanushek, Woessmann, and Zhang (2011) finds that vocational education graduates have an initial labor market advantage, as they have a more hands-on preparation for jobs; however, this advantage decreases with age and normalizes to similar levels as workers have lower adaptability to technological change. The long-term benefits to university and vocational education in the Saudi Arabian context needs further investigation. Overall, the debate between the trade-offs across these tertiary education pathways is ongoing, and further research in the Saudi context can be useful to provide a more context-specific comparison.

In summary, to create graduates who are well-prepared for the workforce, the education system needs to adapt to the changing economy and technological progress in the Kingdom. The proper functioning of the labor market requires coordination, systematic exchange of information, and continuous updating for both demand and supply side stakeholders, including students, educational institutions, firms, and the government. The next part of this chapter explores these nuances of the Saudi labor market.
Part II: What are the attributes of labor market equilibrium in Saudi Arabia?

Main Insights

High unemployment among Bachelor’s degree holders indicates poor coordination between universities and firms: The large number of unemployed university graduates may be a result of universities not being aware of skill requirements or job needs from firms, or firms unaware of job-seekers’ skill sets.

More women have entered the labor force, but the female unemployment rate has remained high: As more women join the labor force for the first time due to changing social and educational policies, female job-seekers constitute more than 80 percent of job-seekers in Saudi Arabia. High levels of unemployment have also persisted: 34.5 percent of women aged 15 years or above are unemployed in Saudi Arabia, compared to 2 percent of men.

Saudi employment in the private sector is hampered by high wage requirements and mismatched career expectations: Private sector employment provides lower wages and less job security than the public sector. Consequently, some Saudi nationals choose unemployment as they wait to secure a public-sector job or look for high skilled, high status jobs.

University graduates may often rely on their social network for jobs, which puts lower-income students at a disadvantage: A student’s social network is partially dependent on socioeconomic status, so reliance on these networks for employment may cement wealth and income inequality.

Saudi Context

The overall unemployment rate in Saudi Arabia was 5.7 percent in 2017 (“General Authority for Statistics” 2018), compared to an average global unemployment rate of 5.52 percent (“World Bank” 2017). However, the unemployment rate of Saudi nationals has remained particularly high, at 12.8 percent in 2017 (“General Authority for Statistics” 2018). Overall, the Kingdom has a large reservoir of untapped human resources. Desirable (high-paying or formal) jobs, especially for Saudi nationals, are scarce. Private employment offers lower pecuniary and non-pecuniary benefits and is of lower added value than employment in the public sector. The region’s labor markets can be characterized as somewhat inequitable and locked in a low-productivity equilibrium (Gatti et al. 2013). In this section, we first discuss the case of Saudi Arabia’s persisting unemployment alongside policies such as nationalization of the workforce or ‘Nitaqat’, which has been a major policy attempt to remedy the situation.
Next, we link the unemployment condition to the need for skill development in the nation, which has direct consequences for education policy.

**Persisting unemployment in Saudi Arabia**

Unemployment in Saudi Arabia is not only high, but has been persistent over the years. The unemployment rate varies across the regions, gender, and nationality in the Kingdom.

**Unemployment by region:** The two most populous regions in Saudi Arabia, Makkah and Riyadh, had employment levels slightly below the national average in 2016. Asir, in the southwestern part of the country, has the lowest rate (8 percent) of unemployment, and the Northern Frontier and Al-Jawf, which is also in the north of the country, reports the highest rate of 23 percent (Ministry of Labor and Social Development 2016). Regional disparities in employment seem to be driven not by size, but rather by the job market maturity and available employment opportunities in each region.

![Figure 33: Unemployment rate of Saudi nationals by region, 2015](Source: Ministry of Labor and Social Development, 2016)

**Unemployment by gender:** About 2 percent of men in Saudi Arabia were unemployed in 2016 (“General Authority for Statistics” 2018). Men with a secondary degree made up the plurality of the unemployed in their gender, as seen in the figure below. It is also important to note that the fraction of unemployed males with a Bachelor’s degree steadily rose between 2012 and 2015 but began to flatten between 2015 and 2016. At the same time, men with diplomas, who are recipients of vocational education, have been dropping as a fraction of total unemployed men. This could reflect a national trend of lower enrollment in vocational education and decision to go to university over technical colleges, or it could indicate that
firms have increased the value they place on the skills gained in technical colleges. Data available on unemployment is only for the total pool of unemployed by education level, but not for new labor markets only. Thus, it is difficult to say what percent of new labor market entrants are actually unemployed.

Figure 34: Fraction of unemployed men (ages 15+) at each education level, 2012-2016 [Source: General Authority for Statistics, 2018]

During the same time period, unemployment has also persisted for women. At present, 34.5 percent of the women aged 15 years or above are unemployed in Saudi Arabia (“General Authority for Statistics” 2018). It should be factored that the labor force participation rate of women in Saudi Arabia has also sharply increased over the years as a result of a more inclusive policy environment. This is depicted in the figure below. In the past years, Saudi Arabia has also witnessed a growing number of women who have never worked before now facing, for the first time, the challenge of connecting with jobs. This pool of women is also likely to increase with the end of the driving ban (July 2018), a policy change that can enhance women’s working abilities by giving them not only more

38 When women do find jobs, more than 76 percent of the female Saudi workers leave their jobs after less than one year as per General Organization for Social Insurance (GOSI) data
geographical mobility, but also a monetary incentive, since they won’t have to pay for drivers or other forms of transportation to travel to work.

While women are able to enter the labor force more easily, job creation and labor demand has not kept up with the increasing supply of workers. As a result, there have been an increasing number of unemployed women. The proportion of Bachelor’s degree holders is roughly the same for both men and women, but unemployment rates by level of education vary significantly across genders. In particular, between 2012 and 2016, women with a Bachelor’s degree comprised at least 70 percent of all unemployed women, as shown in the figure below. During these five years, women with a higher education than a Bachelor’s did not experience the same mass unemployment—all women with doctoral degrees were employed, and only in 2016 did the percent of unemployed women with a Master’s degree climb into the single digits (1.2 percent in 2016).

Figure 36: Fraction of unemployed women (ages 15+) at each education level, 2012-2016 [Source: General Authority for Statistics, 2018]

Here, the high level of unemployment among female Bachelor’s degree holders warrants further exploration. Since college-educated men do not make up a similarly high fraction of the male unemployed, a possible explanation is that there are more jobs open to university-educated men than women. Moreover, as education at the university level is gender segregated, another possible explanation is that women’s colleges do not have the infrastructure or networks that men’s colleges do in order to help ensure that their graduates have a job. Skill mismatches also explain why unemployment is disproportionately higher among women. In Saudi Arabia, the type of technical skills acquired by men and women differ considerably, as women are much more likely to specialize in the humanities or education—degrees required for many public-sector jobs but not highly valued by the private sector.
Women also have lower occupational and geographical mobility in the Kingdom, further accentuating their unemployment.

Another factor contributing to high unemployment levels among Saudi females is the added upfront cost of hiring women. Firms must invest in special hiring processes for female employees, as well as work spaces that afford them suitable privacy from male colleagues. A study conducted by Peck, Miller and Seflek (2017) found that once firms invested in the upfront costs needed for hiring females (motivated by the Nitaqat program, discussed in more detail below), their rate of female hiring increased. After a firm hired its first female employee, their proportion of female employees increased to 30 percent, on average, after 5 years (Domash 2017).

One important insight is the different profile of unemployed males compared to females. Among males, most unemployed Saudis had a secondary degree, while among females, most had a Bachelor’s degree. Policies to reduce unemployment should consider these differences, recognizing the education level of unemployed job-seekers across genders to understand what type of jobs and programs can best reduce unemployment within each group.

Graduates from different tertiary pathways have varying unemployment rates based on their nationality. It is worth factoring for the strong emphasis on nationalization under the Nitaqat program (designed to increase the number of Saudi nationals employed by the private sector) in the discussion of unemployment in the Saudi Arabian labor market.

Unemployment by nationality: The public sector overwhelmingly hires nationals, and the private sector hires expatriates. According to the 2016 Saudi Arabia Labor Market Report by the Ministry of Labor and Social Development, non-Saudi workers made up the majority of private sector employees (93 percent), and Saudi nationals comprised the majority (67 percent) of public-sector employees in 2015. Anecdotally, Saudi university graduates may not possess the on-the-job skills or work experience necessary to make them attractive hires for private companies. Of course, this is in addition to Saudi nationals’ expected reservation wage being potentially higher than that offered by the private sector. Private sector wages are aimed at skilled labor from foreign countries, and Saudis prefer the comfortable working conditions of the public sector (Budhwar and Mellahi 2007).

In 2011, the government implemented the current iteration of Saudization, or Nitaqat, in order to increase employment opportunities for Saudi nationals. After considering a firm’s industry and size, this policy determines the number of Saudi nationals that a firm must employ. Firms are assigned a level (platinum, green, yellow, red) based on their success in meeting this employment goal. If they are successful (platinum, green), they are given market-
based rewards like expedited renewal of visas for foreign employees. If they do not achieve the employment goals (yellow, red), firms may not be able to renew the work permits of their current foreign employees. The policy sets up incentives that should reduce the unemployment rate for Saudi nationals, as well as increase their employment in the private sector. This reliance on Saudi labor necessitates the development of strong training pathways for nationals so that they can meet the skill demands of the private sector.

While there has long been a policy to replace expatriates with skilled nationals in the private sector, this has not been completely successful. Focusing on the issues related to the education sector, the ineffectiveness of Saudization could be due to the pace of development and contributing factors like inadequate attention to job-readiness factors in the education system and wage levels below the standard of living in the country. As part of Saudization, the government instituted a cooperative strategy with the private sector to train Saudi nationals and pay 50 percent of their private sector wages for the first two years. In 2000, the Human Resources Development Fund (2013) was established to assist the private sector in covering the cost of employing nationals. The Fund administers and funds all Saudization and Nitaqat programs (Alharbi 2014). However, policy evidence shows that the implementation of Saudization in the private sector has not been carried out as successfully as it has been in the public sector. To some extent, this may be due to a reluctance on the part of some private sector employers to hire Saudi workers, or it may be because of negative attitudes to some forms of vocational training and work among potential Saudi employees (Ramady 2013).

While there is some contextual research on the economic and labor sector issues related to Saudization, there is little evidence on the education sector challenges that should be mitigated to address the unemployment rate that has persisted in spite of such a strong hiring-quota policy in the Kingdom.

In summary, there could be multiple factors that lead to a high unemployment rate. Here, we discuss the relevant factors considering the perspective of the key actors in our analytical framework—the Saudi youth who make educational choices and are faced with looming unemployment—as well as the Ministry of Education, responsible for appropriately skilling the youth. In this respect, the most important factor is a potential skills gap and mismatch between the outputs of higher education and the requirements of the job market. This factor has also been explicitly discussed in the Vision 2030.

Unemployment by education level: The unemployment rate is highest for Saudi citizens with a Bachelor’s degree, with 14 percent of Bachelor’s degree holders unemployed in 2018. As seen in the figure below, the unemployment rate gradually decreases for Saudis with lower than a Bachelor’s degree, with 5 percent unemployment rate for secondary degree holders,
and 2 percent for those with an intermediate or primary degree. Unemployment rates for Master’s and PhD graduates are 2 percent and 1 percent, respectively. The high unemployment among Bachelor’s degree holders further points to the fact that unemployment is not driven by a lack of academic credentials among job-seekers, but rather, a lack of relevant skill sets required by employers.

**Skills gaps and mismatches**

As indicated by the high unemployment of Bachelor’s degree holders, the skills that graduates obtain in school and university do not seem to connect with the skills demanded by firms in Saudi Arabia (Al-Asmari 2008). Educational researchers have highlighted—and private sector employers have long complained about—the mismatch between labor force needs and the educational expectations of employers in Saudi Arabia (see Ramady 2013). Despite increased capacity for education and training within the Saudi education system, unemployment rates among Saudi nationals have increased, and the problem of perceived skills mismatch continues (Alsarhani 2005). The EPoD-HRDF background paper (2015) identifies the following factors as leading to this mismatch: (i) skill gaps due to a lack of cognitive skills and specialization, as well as soft skills like work ethic; and (ii) the private sector, as well as the educational and training sector, operate in isolation, so information and signaling failures occur on both sides.

**Skill gaps:** The relevance of graduates’ skills to the labor market is crucial for employability. The extent of skill mismatches, however, is hard to quantify, given the lack of data and limitations in measuring the skill content of demand, as discussed in Part I of this chapter. Skill mismatches in the Saudi case, therefore, can only be inferred rather than measured directly. Employer perceptions of skill mismatches seem to be stronger for vocational education and training than for university graduates, and somewhat higher for technical and cognitive (hard) skills than for soft skills (Gatti et al. 2013).
recent survey confirmed a large gap between the skills that employers demand and the skills that job-seekers possess. For example, employers report that while work ethic and interpersonal skills are among the most important skills in the workplace, they are also among the hardest to find in new hires (Domash 2017).

Saudi graduates of vocational training often refuse to take job offers in private sector manufacturing industries, preferring to try and find more highly paid work in other areas (Baqadir, Patrick, and Burns 2011). The reason behind this may be due to the fact that Saudi nationals often associate jobs in the manufacturing industry with heavy physical workload, low skill, little job security, and low pay (Baqadir, Patrick, and Burns 2011). On the other hand, the Kingdom is focusing on the retail sector, because it is labor-intensive and requires medium skills; it is also incentive-compatible with the private sector, given it is a high-demand sector. The government also plans to restrict employment in retail sub-sectors to Saudi nationals, including in furniture, car spare parts, watches, eyeglasses, and sweets shops. This may further exacerbate the skills mismatch if the retail sector jobs do not appeal to the Saudi nationals.

The Technical and Vocational Training Corporation (TVTC), the entity in Saudi Arabia that oversees all technical institutes, has been implementing programs to address labor market frictions for its graduates. In 2013, they sought to address the skills gap between technical colleges and employers through the introduction of Colleges of Excellence (CoE). CoE oversees 31 International Technical Colleges (ITCs), institutions in Saudi Arabia that create and implement their curriculum in partnership with foreign universities and companies. In 2014, there were 8,888 men and 10,826 women enrolled in ITCs (“TVTC Open Data Library” 2018). In addition, CoE also implemented two more models: the Strategic Partnership model and the Capability Building Contract model. The Strategic Partnership model creates specialized training institutes, where students sign a contract with an employer upon entering, and are later guaranteed employment when they graduate. The Capability Building Contracts employs contracts with foreign training providers to work with existing training institutes to improve their performance.

In general education, meritorious Saudi students are provided scholarships to pursue degrees at higher education institutes abroad through the King Abdullah Scholarship Program (KASP). The aim of the program is to provide students with the background and skills needed for work in the private sector. Since the program was introduced in 2005, more than 30 counties have hosted KASP students, with most attending programs in the United States, Canada, the United Kingdom, and Australia. The program sponsors Bachelor’s, Master’s, and doctoral degree students, and it provides medical fellowships. The program also funds students for one year of intensive English language proficiency training, with the option of undertaking a
postgraduate preparatory program relevant to their intended field of study prior to enrollment in the undergraduate or postgraduate degree program. It is expected that graduates who receive scholarships will enhance their skill acquisition at the tertiary level and return to the Kingdom to contribute to its growth and prosperity.

Finally, Saudi Arabia has also turned to entrepreneurship as a way to continue to grow the economy and expand job opportunities for its graduates. Saudi Arabia is already regionally ahead in terms of prominence of Small and Medium Enterprises (SMEs) in the economic sector. As seen in the figure below, SMEs constitute nearly 80 percent of total enterprises in the formal sector, compared to around 40 percent in the United Arab Emirates and nearly 20 percent in Bahrain. However, Saudi Arabia still falls below the international trends in terms of SME sector size, where internationally, SMEs constitute 95 percent of registered firms (Alibhai, Bell, and Conner 2017).

Figure 38: Small and Medium Enterprises (SMEs) as a proportion of the total enterprises (formal sector) [Source: Saudi Arabia Monetary Agency, 2017]

The high prominence of SMEs relative to regional averages signals a business environment that is supportive of small businesses, which could facilitate entrepreneurship. In 2017, the Kingdom started issuing licenses for foreign small businesses. In addition, The Riyadah Institute has entrepreneurship programs for women through TVTC, which offers an alternative to unemployment for college-educated women. If the labor market is, in fact, almost saturated, and unemployment is a result of a demand side stagnation, then entrepreneurship programs have the potential both to create jobs and ‘skill-up’ the participants of the program. These are all important measures from the MoE, in addition to a
series of other initiatives undertaken by the Ministry of Labor and others. The impacts and benefits of these programs across TVTC and the KASP needs to be further explored.

Information failure: As discussed in the first part of this chapter, educational and training systems lack the information to respond to the needs of the employers, whereas the firms lack the capacity or the interest in playing its role in a demand-driven skill development system. A report by Ernst and Young shows that 72 percent of young Saudi nationals turn to their network of family and friends for career advice and information about jobs (EY 2016). This means that graduates who do not have a well-connected network of family and friends are at a disadvantage when they enter the labor market, given the existing information asymmetries in the labor market. Policies and programs to address this mismatch are in the pipeline (mostly online platforms to provide more information to the graduates), and there are no short-term interventions to respond to immediate needs while building the credibility and capacity for the long term. The fast pace of change in the Saudi labor market can exacerbate students’ lack of information in this context.

Signaling failure: Even if a job-seeker has the right skills, they face the additional challenge of being able to ‘signal’ to their potential employer that they are a good match for the position. Firms are unable to effectively ‘screen’ job candidates when they do not have information about their qualifications. We describe ‘signaling’ and ‘screening’ models in the next section. Thus, to solve the matching issue in the labor market, two things must happen: 1) job-seekers must develop the skills that are most demanded in the workplace, and 2) employers must be able to credibly assess whether or not job-seekers have these skills. According to a survey of more than 500 Saudi employers in 2017, they screen candidates by CV-screening, by conducting competency-based interviews, and by checking qualifications. Currently, there is no information showing how universities collect feedback from employers about the quality of their graduates. Understanding the formal and informal feedback loops between firms and universities would illuminate the flaws in the communication that have led to the supply-demand mismatch.

Recognizing the increasing challenge faced by employers in deciphering student skills in an expanding education environment, the Education and Training Evaluation Commission recently led the establishment of the Saudi Arabia Qualifications Framework (SAQF). The SAQF provides a framework for standardizing qualifications across different academic and training institutions so employers can easily understand the skills developed by job applicants. The SAQF is a positive step toward streamlining student to employer transition by standardizing qualification, regardless of the institution or place where students received education and training, and communicating those qualifications to employers.
Persisting unemployment
For Saudis, the transition from education to employment is hampered by various factors, including the absence of a national system to signal graduate skill to potential employers, the limited alignment between skills taught in the education sector and demanded by employers, and unattractive private sector employment as a result of lower wages and lower security than public-sector jobs. These factors result in large levels of unemployment among some segments of the Saudi population, and a limited pool of skilled Saudi job-seekers available to employers. Policy researchers have sought to examine some of these issues, both in the Saudi context and in countries with similar challenges. The following section will discuss existing research in these areas.

High unemployment levels among highly educated youth exists across the Middle East and North Africa (Gatti et al. 2013). Primary and secondary education provides a larger probability of employment than tertiary level education. Although job attainment may be easier with a lower level of education, it is conceivable that job quality and security differ by the type of education required.

Saudization: All six GCC countries (Bahrain, Qatar, Kuwait, United Arab Emirates, Saudi Arabia, and Oman) have nationalization policies for their workforce. These six nations share a reliance on foreign labor, high levels of unemployment among citizens, developing educational systems, low private-sector employment of citizens, and gender imbalances in the workplace (Randeree 2012). Even though this policy is widely used, it remains understudied and not well-researched. Peck (2017) found that Nitaqat had high program compliance—96,000 Saudi nationals were hired in the sixteen months following the implementation of the program. The private sector cost was significant—11,000 firms were forced to shut down in this same time period, which Peck equates to a loss of 418,000 jobs from the labor market.

Skill gaps and mismatches
Inefficiencies in the labor market are often attributed to a lack of relevant skills among the pool of potential employees. In some instances, however, the issue is often not just a skills gap, but an information gap. The labor market contains imperfect and asymmetric information. Companies lack full information about the productive abilities of applicants, and it is impossible for them to exhaustively screen and negotiate with all applicants. Conversely, job-seekers tend to lack complete information about job characteristics, as well as awareness or knowledge about the skills demanded by employers, and as a result, they do not signal the relevant skills they possess.
Imperfect information: The presence of imperfect information and job-search costs helps account for mismatches in the labor market (Fitzgerald, Gottschalk, and Moffitt 1998; McCall 1970; Stigler 1962). While searching for work, applicants rarely have perfect information about the nature and characteristics of a particular job. Likewise, most recent graduates have limited networks and job-search experience, both of which increase the difficulty of finding the right job. When combined with the pressures of the costs of a prolonged search, these factors may lead an applicant to accept a job with tasks not directly commensurate to his/her actual skills and capabilities. The larger a job search costs, the less a worker will undertake searching. These costs will vary systematically with various characteristics of occupations (Stigler 1962).

During the hiring process, employers make their decisions based only on readily available information about the job candidate. Jenkins (1986) discusses the distinction between suitability of a candidate and acceptability. Suitability refers to whether the candidate has the qualifications and experience necessary to perform the job well. Acceptability is a bit harder to pin down. It refers to whether the candidate is a ‘good fit’ for the job. This may include social, cultural, familial, and individual characteristics. For example, a candidate unable to socialize with ease during an interview may be rejected from a job because they are not deemed acceptable for the company culture.

Signaling: Spence (1973) introduced the signaling model as a way to explain labor market inefficiencies. He posits that the job market is characterized by information asymmetries: the potential employee has the relevant information about his/her own skills and abilities, while the employer must infer this information from the observable characteristics.

Spence (1973) also assumes that potential employees are divided into two categories according to their productivity: low and high. It is not possible to know in advance which category an applicant falls under, and it will take some time before the employee’s true productive ability is revealed. Employers therefore rely on observable characteristics to determine employability. Some of these observable characteristics are under the applicant’s control (including education, how he presents himself, etc.) and are called signals; others cannot be controlled (such as sex, age, race, etc.) and are called indexes (Spence 1973).

Employees face the challenge of communicating their unobservable qualities to employers. The only way to do so is by using an observable characteristic under their control, i.e. a signal, while taking into account the cost of acquiring that particular signal and the employer’s required characteristics (as revealed by the wage schedule). The signaling costs of education, for example, include both direct costs such as tuition and living expenses, as well as the
opportunity cost of foregone employment. The aim of the applicant is to maximize the difference between signaling costs and offered wages (Spence 1973).

Education is seen as one of the most important ways in which applicants can signal that they are inherently more productive than others (Riley 1979). Desjardins & Rubenson (2011) show that signaling leads workers to overeducate themselves. Workers seek higher education as a positive signal to employers of their quality, but as more people attain the same level of education, the power of that signal diminishes. As a result, workers are driven to seek education at an even higher level, and the cycle continues. However, firms start to learn about employee abilities after employees join the labor market, so the signaling role of education becomes less important with the more labor market experience the employee gains (Altonji and Pierret 1997). This implies that the returns to education signaling are greater early on in an employee’s career.

As firms acquire private information about their own employees, promotion becomes a signal for other employers. Prospective employers can infer information about a worker’s ability by observing the current employer’s decision whether or not to promote the worker (Waldman 1984). Prospective employers, therefore, are prepared to bid more for a promoted employee, and conversely offer wage increases along with promotions in order to discourage promoted employees from taking up competing offers. Firms also promote fewer workers than is efficient, in order to reduce compensation costs.

**Screening:** Screening is the process through which employers decide which workers are more productive after they receive the signal (educational credentials) from that worker. Screening models describe what happens when educational institutions signal which workers are more productive (Stiglitz 1975).

The screening hypothesis offers a compelling explanation as to why job-seekers tend to overeducate themselves. Prospective employees take advantage of employers’ inability to determine an individual’s productivity before hiring them. Firms have no option but to choose individuals who are able to signal the highest level of skills. The screening hypothesis also suggests the possibility of over-qualified employees taking over conventionally low-skill jobs (crowding-out effect) (Stiglitz 1975).

**Online portals and the labor market:** The internet opens new channels for improved employee-employer communications and matches, and it provides a platform to supplement traditional job-search methods like personal referrals, employment agencies, professional registers, and newspaper advertisements. This includes internet job boards, online applications through corporate websites, and employer-initiated employee searches that
target promising (“passive”) candidates via their online profiles. Saudi Arabia, for instance, has started a number of online portals like Doroob, TAQAT, and Atqin, among others.

Online methods can have more advantages than their traditional counterparts in terms of the volume and timeliness of information, as well as ease of candidate and job screening. Online platforms can also take an active role in matching: rather than waiting on workers or firms to find one another, software can parse posted job listings and résumés to identify plausible matches and notify both parties (Autor, Levy, and Murnane 2001). Such initiatives that break the information barriers and propel efficient coordination among different stakeholders are valuable for transitioning to a knowledge economy.

In the next section of this chapter, we assimilate these learnings and provide a synopsis of the avenues of potential collaborations where researchers can engage with policymakers to shape educational policies and practices.
Potential areas of collaboration

Designing education policy to combat skilled unemployment falls into two major categories: gaining a thorough understanding of the tertiary education pathways and skills of the new entrants into the workforce; and exploring the stubborn gap between educated labor supply and demand in the market. Potential research-policy collaborations in these two categories are informed by the gaps identified in the first section of this chapter.

A thorough understanding of the tertiary education pathways and skills of the new entrants into the workforce is necessary to achieve the Vision 2030 aspirations. The first part of our analytical framework discussed the state of labor supply that enters the pool of workers from multiple tertiary education pathways. We identified a big gap in terms of data collection, measurement, and mapping of skills acquired by graduates and required by employers. As Saudi Arabia is fast transitioning to a knowledge economy, it is vital to build a robust database to help universities and technical colleges track students’ skills, and adequately prepare their graduates to meet the changing labor market demands. Further, for both universities and technical colleges, employers are dissatisfied with the soft skills of new graduates. What are the categories of skills required by different employers, and specifically, which soft skills are most important to have? Economists, education researchers, and psychometricians should work jointly with students and employers to develop surveys and evaluation measures, regularly assess and compare the quality of tertiary education, and provide feedback to constantly re-assess the value of education and skills training in terms of the labor market outcomes.

Analysis of variation in labor market outcomes for graduates from national universities across different academic fields should be undertaken. Moreover, the King Abdullah Scholarship Program (KASP) program is promising, and it should be supported by robust analysis of the data on student choices in terms of fields of study, skill acquisitions, and further skill requirements linking it to labor market needs. Establishment of standardized skill tests and the results feedback, as a basis for reform and as a way to empower students, should also be explored.

Low interest and status of vocational education and training also seems to be afflicting the successful transition from training to work. National and international researchers should conduct in-depth surveys and interviews with parents, students, teachers, and education practitioners to understand the value and status of different tertiary education pathways. Policies for qualifying and facilitating transitions between educational pathways to ensure that first-time graduates are adequately trained needs exploration. Here, mechanisms should
be designed for students to receive adequate counseling, motivation, and mentoring support to make suitable career choices, based on their own talent, aspirations, and job market requirements. The design and impact of internships, summer jobs, and other programs that can be developed through strategic partnership of educational institutions and firms could also be undertaken. Finally, a detailed collection and analysis of information on wages and other non-pecuniary benefits from different jobs should be launched in order to determine rigorous estimates of the ‘returns to education’—both for the university level and vocational education in Saudi Arabia.

The second part of our framework brings forth plausible reasons for a persisting and critical unemployment situation in the Kingdom. Just as researchers identify skills gaps in learning in order to close these gaps equitably and efficiently, they should also analyze the decisions surrounding labor market participation to assess the motives and barriers to participation. Renewed prospects and arrangements for public-private partnership in education and skill development should be explored with the hopes of incentivizing employers and educational institutions to work more collectively.

The reform agenda for educational and training systems needs to build on timely information about education and labor market outcomes. Such information is essential, not only to formulate policy, but also to guide young people’s decision making and realistically shape their expectations. Potential collaborations should focus on exploring the ways in which information can be disseminated in a regular and systematic manner. Researchers could take well-established findings from informational economics and conduct rigorous evaluations to determine the impact of online platforms like Doroob, TAQAT, and Atqin in matching and addressing coordination failures. Here, the role of socio-economic status, social networks, and perceptions of the stakeholders towards existing skill requirements should also be investigated for male and female job-seekers to understand the impacts on income inequality and transitions in the workforce.

In addition, what are the transparent intermediation and skills certification mechanisms needed to effectively match talent to opportunities in the private sector? Can active labor market programs be updated to provide second-chance options to the most vulnerable, who face challenges in successfully integrating into the labor market? Finally, what is the relative importance, impact, and cost benefit of options like diaspora networks, private universities, and venture capital funds that mitigate market failures like information asymmetries? Researchers and policymakers should explore these and further questions with aims to reduce existing mismatches and propel skills that matter in a changing economy. Numerous data sources are available for researchers interested in exploring education and the labor
market in Saudi Arabia, including the General Authority for Statistics’ Education and Training Survey, as well as the Saudi Arabian Monetary Agency’s annual statistics. The Technical and Vocational Training Corporation’s open data library also provides data and statistics on vocational education trainees and graduates. Please consult Appendix II for more information on these and other data sources.

In order to determine how education policy can most effectively address labor market frictions for graduates of education, policymakers must identify what skills graduates are missing when they enter the market, and how the attainment of those skills can be constantly integrated into tertiary education. Furthermore, identifying the tools that graduates currently use to find employment, and evaluating whether those tools are sufficient, are two additional and important parts of easing the transition from tertiary education to employment. Collaborations between researchers and policymakers can shed light on these topics and move the tertiary education system closer to meeting the needs of the labor market.
Appendix I: Policy Descriptions

The tables below provide an overview of the various programs and initiatives carried out by the Ministry of Education (MoE) and partner stakeholders along four main themes: early childhood education, quality education for all, teachers, and tertiary education pathways and skills in a changing economy. The information has been compiled by the Evidence for Policy Design (EPoD) research team, based on information received from MoE officials and other education stakeholders between October 2017 and July 2018. The information can be used by policymakers and researchers to develop a comprehensive picture of the landscape of education programs that exist in Saudi Arabia, to assess gaps as well as opportunities for reform, and to jointly identify areas for policy research collaboration along each priority theme.

Early Childhood Education

<table>
<thead>
<tr>
<th>Program/Project</th>
<th>Target Group</th>
<th>Details</th>
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<tbody>
<tr>
<td>Opening 1,500 kindergartens and nurseries by 2020</td>
<td>Educational regions and provinces across KSA</td>
<td>These initiatives focus on expanding kindergarten schools and nursery services, and aim to increase kindergarten enrollment rates across KSA.</td>
</tr>
<tr>
<td>Developing rules and regulations for nurseries and kindergartens</td>
<td>To be implemented across kindergarten schools and nurseries across KSA</td>
<td>This program aims to review the current rules and regulations for nurseries and kindergartens, updating them so as to facilitate kindergarten expansion. It also involves development of operational and procedural guides for the new kindergarten facilities across the country.</td>
</tr>
<tr>
<td>Mother and Child Education</td>
<td>Select mothers with children up to 5 years of age across KSA</td>
<td>The program involves approving 10,000 books that address knowledge skills of mothers; 6,576 educational stories for children.</td>
</tr>
<tr>
<td>Setting developmental learning standards for nurseries</td>
<td>Nurseries in educational regions and provinces across KSA</td>
<td>This program aims to collaborate with the National Association for the Education of Young Children in the United States to set developmental learning standards for children aged 0–3 years.</td>
</tr>
<tr>
<td>Developing curricula for nurseries and kindergartens</td>
<td>Nurseries in educational regions and provinces across KSA</td>
<td>This program aims to ensure that the developmental learning standards for kindergartens and nurseries are applied by developing their curricula and providing them with latest learning tools and expertise.</td>
</tr>
<tr>
<td>Program/Project</td>
<td>Target Group</td>
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<tr>
<td>Saudi standards and protocols guide</td>
<td>Nurseries in educational regions and provinces across KSA</td>
<td>This program aims to develop standards and protocols for assessing the quality of kindergarten and nursery services in collaboration with experts in the field of early childhood education.</td>
</tr>
<tr>
<td>Developing a TV Channel for Children</td>
<td>Targeted at children aged 4 to 12 years across KSA</td>
<td>Developing an educational TV channel for all aspects of childhood. This program aims to support the Ministry’s early childhood education projects and to provide the society with diversified educational and learning resources.</td>
</tr>
<tr>
<td>Family and Community Participation Program ‘Irtiqaa’</td>
<td>Teachers, students, parents, the local community</td>
<td>Outreach and training for parents and teachers to enhance family participation in the educational process. The program also focuses on the parental role in promoting national values and identity.</td>
</tr>
<tr>
<td>Assessment of children in nurseries and kindergartens</td>
<td>25 female trainees</td>
<td>This program prepares a solid training kit for the female trainees in assessing children at the nursery and kindergarten level.</td>
</tr>
<tr>
<td>Improving the educational environments in kindergartens</td>
<td>115 female trainees, 23 female supervisors, 230 female teachers</td>
<td>By 2020, the Ministry of Education aims to train 100% of the targeted women.</td>
</tr>
<tr>
<td>Personal safety of children</td>
<td>25 female trainees</td>
<td>This program prepares a solid training kit for the trainees to improve the personal safety of children. By 2020, the goal is to provide this training to 100% of the targeted women.</td>
</tr>
<tr>
<td>Tatweer’s Hodhon (Cuddle) program</td>
<td>Applicants for teaching positions in nurseries, and institutions and companies operating nurseries</td>
<td>A set of learning and training modules (50 hours of intensive training over 10 days) that prepare caregivers to nurture and educate children from birth until 3 years old.</td>
</tr>
<tr>
<td>Tatweer’s Juzoor program</td>
<td>Graduates of kindergarten education programs</td>
<td>Prepares teachers and supervisors for work with children aged 3–6 years old and involves both a theoretical component (using High Scope and Montessori curriculums) and a practical component.</td>
</tr>
<tr>
<td>HRDF’s Qurrah program</td>
<td>Current and prospective working mothers</td>
<td>Qurrah is a national initiative established by Human Resources Development Fund (HRDF) to support working mothers by subsidizing childcare services.</td>
</tr>
</tbody>
</table>
## Quality Education for All: Defining Quality, Testing, and Reforms

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<thead>
<tr>
<th>Program/Project</th>
<th>Target Group</th>
<th>Details</th>
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<tbody>
<tr>
<td>Investigating the gap between high school outcomes and student outcomes on Qiyas’s General Aptitude Test (GAT) and Scholastic Achievement Admission Test</td>
<td>Male and female teachers, twelfth graders (Boys/Girls) across KSA</td>
<td>The MoE will receive a report from the National Center of Measurement and Assessment (Qiyas) on skills in which students showed poor results in the GAT and Scholastic Aptitude Admission Test.</td>
</tr>
<tr>
<td>The statistical map of students’ results</td>
<td>Male and female teachers, ninth and twelfth graders (Boys/Girls) across KSA</td>
<td>Working towards including the map reports in Noor system (online system which provides a wide range of e-services for different kinds of users, as well as statistics, reports, and key performance indicators about education).</td>
</tr>
<tr>
<td>Improving exam and admission tasks</td>
<td>Exam and admission supervisors in education directorates across KSA</td>
<td>The goal is to issue a guide to exam and admission tasks.</td>
</tr>
<tr>
<td>Developing teaching competencies of physical education teachers in the light of the new curricula and guides standards</td>
<td>Physical education teachers</td>
<td>By 2020, the project aims to have at least 95% of participants applying the new competencies in teaching at the class.</td>
</tr>
<tr>
<td>Levels of proficiency in physical education in teacher’s guides</td>
<td>Physical education supervisors</td>
<td>The goal is to prepare a descriptive glossary of every distinguished proficiency level by 2020.</td>
</tr>
<tr>
<td>The national program to recognize gifted students</td>
<td>Gifted third, sixth, and ninth graders in public schools</td>
<td>The program aims to identify gifted students in terms of their achievements across the school grades, to provide them with enrichment programs and after-school support.</td>
</tr>
<tr>
<td>Developing guides for the gifted students’ center</td>
<td>Students (Boys/Girls)</td>
<td>Developing the procedural (regulatory and legal) guides to support the gifted students’ centers.</td>
</tr>
<tr>
<td>Female gifted students school sponsorship program</td>
<td>Fourth to tenth graders (Girls)</td>
<td>Developing the female gifted students’ school sponsorship program to support them to grow and enhance their academic and creative abilities.</td>
</tr>
<tr>
<td>Program/Project</td>
<td>Target Group</td>
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<tr>
<td>Mawhiba’s School Partnership Program</td>
<td>Gifted students</td>
<td>Mawhiba provides scholarships for gifted students to join select KSA schools and receive instruction in advanced STEM curricula.</td>
</tr>
<tr>
<td>New roles of physical education supervisors</td>
<td>Physical education supervisors</td>
<td>This program aims to get educational supervisors to use new roles twice in a semester.</td>
</tr>
<tr>
<td>Drafting the behavioral objectives in the physical education subject</td>
<td>Physical education teachers</td>
<td>The program seeks to have at least 90% of teachers becoming proficient in drafting various behavioral objectives.</td>
</tr>
<tr>
<td>Practical exams in computer courses in the high school (semester/courses)</td>
<td>Computer supervisors</td>
<td>Design the guide to practical exams in computer courses for high schools.</td>
</tr>
<tr>
<td>Practical skills in the science curriculum for the high school</td>
<td>Science supervisors and teachers</td>
<td>Design the guide to practical skills in teaching science for high schools.</td>
</tr>
<tr>
<td>Developing exam questions for the Islamic education subject</td>
<td>Islamic education supervisors</td>
<td>This program aims to get educational supervisors to use the guides to develop exam questions for the Islamic education subject.</td>
</tr>
<tr>
<td>Activating the role of behavioral sciences to confront deviant ideology and behavior</td>
<td>Behavioral sciences supervisors</td>
<td>This program aims to get supervisors to use the guides in behavioral sciences to confront deviant ideology and behavior and make decisions depending on the subjects addressed in the courses.</td>
</tr>
<tr>
<td>Applying effective assessment methods to the family education subject in the high school (semester/courses)</td>
<td>The family education supervisors</td>
<td>By 2020, this program aims to update 22% of the female students’ assessment forms for the family education subject in the high school (semester/courses) in 10 regions/provinces.</td>
</tr>
<tr>
<td>Education Trip for High Achievers</td>
<td>Female twelfth graders</td>
<td>Program for high school children to make education trips. Implements the trip’s activities and seeks to measure beneficiary satisfaction.</td>
</tr>
<tr>
<td>The science and math Olympiad (science, math, physics, chemistry)</td>
<td>All elementary, middle, and high school students</td>
<td>The goal by 2020 is to have 100% of education directorates take up the Olympiad to encourage a higher student participation.</td>
</tr>
<tr>
<td>Program/Project</td>
<td>Target Group</td>
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<tr>
<td>The national computer and mobile applications</td>
<td>Middle and high school students (Boys)</td>
<td>The goal by 2020 is to have 90% of the targeted male students participating, and to prepare the students for regional and international</td>
</tr>
<tr>
<td>Olympiad</td>
<td></td>
<td>competitions.</td>
</tr>
<tr>
<td>Globe environmental design competition</td>
<td>Middle and high school students (Boys and Girls)</td>
<td>The program involves each school participating with an environmental design work at the local levels.</td>
</tr>
<tr>
<td>‘My e-Book’ application</td>
<td>Elementary students (female)</td>
<td>This application is aimed at improving reading skills among female students.</td>
</tr>
<tr>
<td>The International Invention, Innovation, and Technology</td>
<td>Male students</td>
<td>The program involves international representation of KSA through exhibits of distinguished student projects.</td>
</tr>
<tr>
<td>Exhibition (ITEX)</td>
<td></td>
<td>Scholarship recipients are sent to foreign countries for spreading Arabic language awareness in local communities abroad.</td>
</tr>
<tr>
<td>Program to support Arabic Language in Foreign Countries</td>
<td>The local communities across 25 countries</td>
<td>The local communities across 25 countries.</td>
</tr>
<tr>
<td>schools</td>
<td>Students across KSA</td>
<td>Increase school discipline among students in public schools.</td>
</tr>
<tr>
<td>Program for discipline in schools</td>
<td>Guidance and counseling male and female supervisors, and male and female guides of students (Boys/Girls)</td>
<td>This program seeks to develop program guides and prepare training kits for the target group.</td>
</tr>
<tr>
<td>Program for providing guidance to students in times of crisis</td>
<td>Guidance and counseling male and female supervisors, and male and female guides of students (Boys/Girls)</td>
<td>This program seeks to develop program guides and prepare training kits for the target group.</td>
</tr>
<tr>
<td>Program for peer-to-peer guidance</td>
<td>Guidance and counseling male and female supervisors, and male and female guides of students (Boys/Girls)</td>
<td>This program seeks to develop program guides and prepare training kits for the target group.</td>
</tr>
<tr>
<td>Sufaraa Al-Azm program (phase 3)</td>
<td>General education male and female students in the northern border areas</td>
<td>By 2020, the goal is to have 100% of students enrolled in the Sufaraa Al-Azm program to participate in community clubs.</td>
</tr>
<tr>
<td>The prophetic literature program</td>
<td>Islamic awareness supervisors in MoE and education directorates (Boys/Girls)</td>
<td>The program involves organizing a prophetic literature and moral values exhibition for 46 education directorates. If also involves implementing a workshop on the biography of the Prophet.</td>
</tr>
<tr>
<td>The moral values program</td>
<td>Islamic awareness supervisors in MoE and education directorates (Boys/Girls)</td>
<td>The program involves organizing a workshop to review and develop a plan to spread moral values with methods to implement it. It also involves improving and developing the ‘values’ website and television channel.</td>
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<tr>
<td>Program/Project</td>
<td>Target Group</td>
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<tr>
<td>Qualifiers for the final round of the school theatre</td>
<td>Middle and high school students (Boys and Girls)</td>
<td>This involves the participation of at least 1,510 male and female students from each education directorate to produce 55 theatre performances.</td>
</tr>
<tr>
<td>Program to develop artistic skills</td>
<td>Middle and high school students (Boys and Girls)</td>
<td>This involves presenting the art production of male and female students who reach a qualifying stage at the national level.</td>
</tr>
<tr>
<td>The Arabic calligraphy, drawing, photography, language, scientific creativity, and Islamic art Olympiads</td>
<td>Elementary, middle, and high schools (Boys/Girls)</td>
<td>This involves preparing the students, works, and researchers for participation in national and international competitions.</td>
</tr>
<tr>
<td>The Scouts program: preparation, competition, and festivals</td>
<td>Cubs, boys, and leaders of scout units and commissions</td>
<td>Global scouts program to create an international community of active and responsible citizens.</td>
</tr>
<tr>
<td>Cultural Festival</td>
<td>Elementary schools (Boys/Girls)</td>
<td>Having 16 general education directorates participating in a cultural festival involving theatre performances by students.</td>
</tr>
<tr>
<td>The eleventh scientist conference led by students</td>
<td>Elementary, middle, and high school students (Boys)</td>
<td>This involves nominating 3 researchers from each education directorate to lead the conference for aspiring scientists.</td>
</tr>
<tr>
<td>Globe Environmental Program</td>
<td>Elementary, middle, and high school students (Boys)</td>
<td>162 schools participating in the implementation of Globe Environmental Program’s events.</td>
</tr>
<tr>
<td></td>
<td>Elementary, middle, and high school students (Girls)</td>
<td>77 schools participating in the implementation of Globe Environmental Program’s events.</td>
</tr>
<tr>
<td>Taiwan International Science Fair (TISF)</td>
<td>Male students</td>
<td>The program involves international representation of KSA through exhibits of scientific projects.</td>
</tr>
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# Teachers in Saudi Arabia

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<tr>
<th>Program/Project</th>
<th>Target Group</th>
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<tbody>
<tr>
<td>School-based professional development program</td>
<td>Male and female teachers across KSA</td>
<td>This program aims to expand professional training and development of teachers Kingdom-wide.</td>
</tr>
<tr>
<td>Professional development of special school staff</td>
<td>Male and female teachers in special and general education across KSA</td>
<td>The program aims to implement 60 programs for 500 trainees and 18 training hours for 30% of the completing target group.</td>
</tr>
<tr>
<td>Online (distance) professional development</td>
<td>Central male and female trainers and teachers across KSA</td>
<td>The program aims to provide training to 90% of central trainers and 30% of educational staff in the targeted areas.</td>
</tr>
<tr>
<td>Khuburat project</td>
<td>1,000 male and female teachers and supervisors sent abroad each year</td>
<td>The program involves sending teachers to capacity building programs hosted by universities in the UK, US, Canada, Australia, Finland, and New Zealand.</td>
</tr>
<tr>
<td>Internal scholarships</td>
<td>All educational staff</td>
<td>The current goal is to fill 85% of the seats available in the plan of the current fiscal year.</td>
</tr>
<tr>
<td>External scholarships</td>
<td>All educational staff</td>
<td>The current goal is to fill 85% of the seats available in the plan of the current fiscal year.</td>
</tr>
<tr>
<td>IEN System for Teacher Services</td>
<td>Education employees</td>
<td>IEN is an e-platform that provides services to teachers and administrators across KSA.</td>
</tr>
<tr>
<td>Ethraa programs</td>
<td>All the male and female supervisors in all education directorates</td>
<td>The Ministry of Education seeks to implement 90% of the proposed programs by 2020.</td>
</tr>
<tr>
<td>Professional development of English language supervisors and teachers</td>
<td>Central trainers Male and female supervisors Male and female teachers</td>
<td>This program prepares a solid training kit for the target groups. By 2020, the goal is to provide this training to 80% of the central trainers.</td>
</tr>
<tr>
<td>Professional development of nursery schools’ female teachers</td>
<td>Central female teachers specialized in the KG and nursery field</td>
<td>This program prepares a solid training kit for the target groups. By 2020, the goal is to provide this training to 90% of the female central trainers.</td>
</tr>
<tr>
<td>Professional development of teachers of gifted students’ classes</td>
<td>Central male and female trainers from the gifted trainers’ department</td>
<td>This program prepares a solid training kit for the target groups. By 2020, the goal is to provide this training to 90% of the central trainers.</td>
</tr>
<tr>
<td>Development of the educational leadership</td>
<td>Central male and female trainers</td>
<td>This program is working towards preparing an approved project document and solid training kit. It hopes to provide training to 80% of the target group by 2020.</td>
</tr>
<tr>
<td>Program/Project</td>
<td>Target Group</td>
<td>Details</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Educational assessment skills and applications</td>
<td>Central male and female trainers</td>
<td>This program is working towards preparing a solid training kit, and hopes to provide training to 85% of the target group by 2020.</td>
</tr>
<tr>
<td>Professional development of laboratory specialists</td>
<td>Central male and female trainers</td>
<td>To further the professional development of lab specialists, the Ministry of Education has a goal of designing 5 scientific experiments, and providing training to 85% of central trainers by 2020.</td>
</tr>
<tr>
<td>Professional development of educational staff in the Hasanah project</td>
<td>Educational staff</td>
<td>This program is working towards preparing a solid training kit, and hopes to provide training to 80% of the central trainers by 2020.</td>
</tr>
<tr>
<td>Partnerships with local universities for the professional development of supervisors, school leaders, and teachers</td>
<td>Educational supervisors, school leaders, and teachers</td>
<td>The goal is for 80% of the target group pass the program during the fiscal year.</td>
</tr>
<tr>
<td>Professional development of higher, middle, and executive leaders</td>
<td>Educational higher and middle leaders</td>
<td>The goal is for 95% of the target group to pass the program.</td>
</tr>
<tr>
<td>Distinguished school leadership supervisor’s standards</td>
<td>School leadership supervisors</td>
<td>Designing distinguished school leadership supervisor’s standards guide.</td>
</tr>
<tr>
<td>Guide to prepare educational supervisors before they start their occupation</td>
<td>Teachers nominated for educational supervision</td>
<td>The program is working on incentivizing teachers to use the program guide to make decisions.</td>
</tr>
<tr>
<td>Developing the performance of supervision directors and new offices</td>
<td>Supervision directors and new offices</td>
<td>The goal is for the target group to master 80% of the educational leadership skills by 2020.</td>
</tr>
<tr>
<td>The vocational development of overseas Saudi Arabian school staff (distance training)</td>
<td>Male and female teachers and educational leaders (director) (undersecretary)</td>
<td>By 2020, the program hopes to enroll at least 75% of male and female teachers in training programs and provide training to 80% of school leaders.</td>
</tr>
<tr>
<td>Building the language learning resources unit, including a specialized database, in every department</td>
<td>Educational supervisors Teachers</td>
<td>Establish the language learning resources unit of the Arabic Language Division in every education directorate.</td>
</tr>
<tr>
<td>Program/Project</td>
<td>Target Group</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Heads of departments’ supervisory indicators (quantitative, qualitative)</td>
<td>Heads of departments in supervision departments and divisions</td>
<td>Build quantitative and qualitative indicators of the heads of departments.</td>
</tr>
<tr>
<td>School performance indicators</td>
<td>Assessment specialists and Heads of the departments of school leadership</td>
<td>Use the quantitative and qualitative indicators of school performance to make decisions.</td>
</tr>
<tr>
<td>Promising leaders (the second phase)</td>
<td>Educational supervisors and School leaders</td>
<td>Use the program’s guide to make decisions.</td>
</tr>
<tr>
<td>‘Drafting questions’ for elementary classes’ teachers</td>
<td>Male and female supervisors of elementary classes</td>
<td>By 2020, the elementary stages of the education directorates should implement at least 1 program to support the drafting of class questions and exam questions.</td>
</tr>
<tr>
<td>Language competencies of elementary classes teachers</td>
<td>Male and female supervisors of elementary classes</td>
<td>The goal of this program is to issue the document on the development of language competencies of elementary class teachers by 2020.</td>
</tr>
<tr>
<td>Strategies of active learning for mathematics</td>
<td>Mathematics male and female supervisors</td>
<td>Professionalize supervisors to transfer 30% of experience in active learning applications to teachers.</td>
</tr>
<tr>
<td>Developing supervisory practices in Arabic language divisions based on the qualitative performance standards</td>
<td>Arabic language supervisors in KSA</td>
<td>Make high language achievements among students in the middle and high school.</td>
</tr>
<tr>
<td>Improving teaching and learning results in the Arabic language divisions</td>
<td>Arabic teachers</td>
<td>Prepare a descriptive glossary of the specifications of the targeted language income in each study unit and build appropriate acquisition forms.</td>
</tr>
<tr>
<td>Developing the school environment in the elementary stage</td>
<td>Elementary classes supervisors</td>
<td>Issue a procedural guide to teachers to develop the school environment in the elementary stage.</td>
</tr>
<tr>
<td>Building the procedural guide of field studies applications in social sciences</td>
<td>Educational supervisors and Teachers</td>
<td>By 2020, the Ministry of Education seeks to complete the procedural guide and publish it on MoE’s e-gate.</td>
</tr>
<tr>
<td>Functional competencies of female teachers</td>
<td>Central female trainers</td>
<td>By 2020, the Ministry of Education seeks to train 87% of the central female trainers on the first phase of the project.</td>
</tr>
<tr>
<td>Mixed professional training in science and math teaching</td>
<td>Science and math male and female teachers</td>
<td>Implement 44 programs for 1,100 male and female teachers in the pilot phase.</td>
</tr>
<tr>
<td>Training teachers on the semester courses system</td>
<td>Central male and female trainers specialized in Islamic education, social</td>
<td>This program is working towards preparing a solid training kit, and hopes</td>
</tr>
<tr>
<td>Program/Project</td>
<td>Target Group</td>
<td>Details</td>
</tr>
<tr>
<td>----------------</td>
<td>--------------</td>
<td>---------</td>
</tr>
<tr>
<td>Designing the professional career development track for social and national education teachers</td>
<td>Educational supervisors and teachers</td>
<td>By 2020, the Ministry of Education seeks to complete the reference framework and publish it on MoE’s e-gate.</td>
</tr>
<tr>
<td>Enriching Sharia knowledge (Ethraa)</td>
<td>Islamic Awareness supervisors in Ministry of Education Bureau and departments (Boys/Girls)</td>
<td>Organize a workshop in participation with 100 specialists from 46 education directorates, prepare 70 practical application forms for the Enriching Sharia Knowledge Program, form a scientific committee for the program, and participate in Prince Nayef’s competition.</td>
</tr>
<tr>
<td>Enhancing the teaching of Holy Quran</td>
<td>Islamic Awareness supervisors in MoE and departments (Boys/Girls)</td>
<td>Implement a workshop on qualitative experiences in teaching Quran in Quran Memorization Schools in 46 education directorates, participate in King Salman Quran Memorization Competition, participate in the General Organization for the Preservation of the Holy Quran’s competition, and organize the Quran Memorization Schools Leaders Forum for 100 specialists.</td>
</tr>
<tr>
<td>Addressing ideological threats</td>
<td>Islamic Awareness supervisors in MoE and departments (Boys/Girls)</td>
<td>Organize a workshop to increase the efficiency of Islamic Awareness supervisors to address ideological threats in 46 education directorates, a workshop on citizenship principles and tracing the roots of citizenship in Sharia, and a discussion seminar on the development of the plan of education on ideological threats. In addition, prepare 92 male and female supervisors from all education directorates.</td>
</tr>
</tbody>
</table>
Tertiary Education Pathways and Skills in a Changing Economy

<table>
<thead>
<tr>
<th>Program/Project</th>
<th>Target Group</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifelong learning (Istedamah)</td>
<td>Students with low academic qualifications aged 15 – 29 years across KSA</td>
<td>This project offers vocational training, life skills, and awareness programs in 300 centers across KSA.</td>
</tr>
<tr>
<td>Awareness and literacy campaigns</td>
<td>Illiterate males and females living in remote communities in villages and abandoned villages</td>
<td>This project aims to develop the literacy and numeracy skills of illiterate males and females. The program involves mobile vans, which travel to rural areas without access to public schools and offer educational services using computers.</td>
</tr>
<tr>
<td>Yearlong literacy programs</td>
<td>Illiterate males and females</td>
<td>The program offers illiterate people in both rural and urban areas an incentive of $266.60 (SAR 1000) to earn a literacy certificate, which would enable them to enroll in primary education.</td>
</tr>
<tr>
<td>Technical education experts</td>
<td>Technical education supervisors across KSA</td>
<td>This project aims to form an approved team of experts in each education directorate across KSA to support the distinguished projects of the technical education supervisors and teachers in a way that would serve the supervision and education process and meet the needs of the labor market.</td>
</tr>
<tr>
<td>‘Mehan’ (occupations of the future)</td>
<td>High school students across KSA</td>
<td>Mehan is an innovative recruitment agency in KSA that targets looking at new and upcoming job profiles and connects them with students at all levels. This is a special program with Mehan for training and placement of high school students.</td>
</tr>
<tr>
<td>Aramco’s environmental education initiative</td>
<td>Elementary graders (Boys/Girls) across KSA</td>
<td>Aramco’s Environmental Education Program is designed to instill the values of conservation and stewardship in young people. More than 1,800 schools have been reached, and 1,100 Friends of the Environment clubs have been established Kingdom-wide. The program also has scholarships for school students who submit conversation ideas.</td>
</tr>
<tr>
<td>‘Maharati’ Training and skills</td>
<td>Elementary, middle, and high school students across KSA</td>
<td>By 2020, aims to train 90,000 students on life skills. The project is working towards localizing this training at 1,500 schools. It will prepare experts in life skills training and develop basic skills training kits.</td>
</tr>
<tr>
<td>Entrepreneurship Program</td>
<td>High school students across KSA (Boys/Girls)</td>
<td>The Ministry of Education aims to cooperate with several entities, including the King Salman Youth Center, the National Entrepreneurship</td>
</tr>
<tr>
<td>Program/Project</td>
<td>Target Group</td>
<td>Details</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>The Innovation System Program</td>
<td>Ninth and tenth graders (Girls)</td>
<td>This program seeks to achieve to grow programs and activities that enhance creativity and innovation among at least 90% of the gifted female students.</td>
</tr>
<tr>
<td>Program for developing dialogue, culture, and communication skills</td>
<td>Middle and high school students (Boys/Girls)</td>
<td>This program involves preparing worksheets, organizing dialogue tournaments, and providing training to 30% of total general education students.</td>
</tr>
<tr>
<td>TVTC’s Technical Colleges</td>
<td>Holders of secondary (high school) diplomas</td>
<td>Technical colleges offer diplomas and Bachelor’s degrees in a vocational specialization that allows graduates to work as technicians in the labor market.</td>
</tr>
<tr>
<td>TVTC’s Strategic Partnership Programs</td>
<td>Students enrolled in Technical Colleges or secondary technical and industrial institutes</td>
<td>TVTC creates strategic partnerships with private sector companies following an employment-based training strategy, with students guaranteed a job at the sponsoring organization after the end of the program.</td>
</tr>
<tr>
<td>TVTC’s National Entrepreneurship Institute (Riyadh)</td>
<td>High school students across KSA (Boys/Girls)</td>
<td>Riyadh is a national center specialized in the dissemination of the culture of self-employment. The Institute offers training and awareness programs to enable entrepreneurs to start and operate their projects according to international best practice.</td>
</tr>
<tr>
<td>TVTC’s International technical colleges</td>
<td>Holders of secondary (high school) diplomas</td>
<td>The programs are accredited by the ministry of civil service and offer flexible training programs in cooperation with the best international training service providers to ensure high-quality technical and vocational training for the Saudi national workforce.</td>
</tr>
<tr>
<td>TVTC’s Secondary technical and industrial institutes</td>
<td>Students who completed the intermediate level of general education</td>
<td>The secondary technical and industrial institutes provide students with technical and vocational skills that are commensurate with the needs of the labor market and aim to</td>
</tr>
<tr>
<td>Program/Project</td>
<td>Target Group</td>
<td>Details</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>-------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>TVTC’s Atqin</td>
<td>Males and females aged 15+</td>
<td>Community service training program that offers members of the community the chance to learn basic technical and professional skills for use in their daily lives. A recent example is a driving and car-maintenance program for girls.</td>
</tr>
<tr>
<td>expand vocational training to meet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>labor market needs.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Other Themes**

**Special Education**

<table>
<thead>
<tr>
<th>Program/Project</th>
<th>Target Group</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing special education support centers (first</td>
<td>Special education students (Boys/Girl) across KSA</td>
<td>Starting operation in 7 support centers upon their development in 2017/2018.</td>
</tr>
<tr>
<td>phase)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Providing early intervention programs for disabled</td>
<td>Children with disabilities who are at-risk in public and national (private)</td>
<td>This program aims to develop an integrated system of organized procedures for educational, therapeutic, and preventive services, which seek to promote the maximum growth possible for children under 6 years of age who have special needs and to offer support to their families. It will offer early intervention services in 50 public kindergartens in 2017/2018.</td>
</tr>
<tr>
<td>and at-risk children aged 3–6 years (first phase)</td>
<td>kindergartens</td>
<td></td>
</tr>
<tr>
<td>Providing educational services to children admitted</td>
<td>Students admitted in hospitals for long stays</td>
<td>This initiative was launched to provide educational services for children residing in oncology centers and hospitals and facilitate their access to education. It is preparing to offer services to 200 students in 2017/2018.</td>
</tr>
<tr>
<td>to oncology centers and hospitals and the like</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(the first phase)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanism of work in autism institutes and center/</td>
<td>Autism centers and programs and hyperactivity programs</td>
<td>The goal is to prepare a solid mechanism of work in autism and hyperactivity programs by 2020.</td>
</tr>
<tr>
<td>Mechanism of work in hyperactivity and attention</td>
<td></td>
<td></td>
</tr>
<tr>
<td>deficit programs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class sign language dictionary to teachers of</td>
<td>Male and female students in hearing impairment institutes and programs</td>
<td>By 2020, the Ministry of Education seeks to create an e-sign language dictionary.</td>
</tr>
<tr>
<td>students with hearing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Program/Project

<table>
<thead>
<tr>
<th>Program/Project</th>
<th>Target Group</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>impairment (elementary classes)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Establishing the technical assistance center to provide education to persons</td>
<td>Male and female students in special education institutes and programs</td>
<td>By 2020, the goal is for the center to start its operation.</td>
</tr>
<tr>
<td>with disability (the first phase)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The audio content of cultural and educational books for students with visual</td>
<td>Male and female students in visual disability institutes and programs</td>
<td>Prepare CDs with audio content.</td>
</tr>
<tr>
<td>disability program</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improving the Education Mechanism for Slow Learners Program (Yaseer)</td>
<td>Special education male and female supervisors</td>
<td>Improve mechanisms for special education.</td>
</tr>
</tbody>
</table>

### Sports

<table>
<thead>
<tr>
<th>Program/Project</th>
<th>Target Group</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>The tenth school sports tournament</td>
<td>Middle and high schools (Boys)</td>
<td>The tournament consists of activities in a variety of sports, including football / basketball / handball / volleyball / table tennis / track and field / swimming / gymnastics / badminton / racquetball / track and field (mental) / goalball (visual) / Hall ball (auditory) / tennis ball (auditory – mental).</td>
</tr>
<tr>
<td>Training program for physical education teachers</td>
<td>Physical education teachers</td>
<td>The program develops teacher competencies in line with the new curricula and guidelines. Teachers will acquire new skills, such as the ability to draft behavioral objectives, and incorporate them into the physical education subject.</td>
</tr>
</tbody>
</table>
Appendix II: Datasets

The tables below provide a comprehensive stocktaking of available education-relevant data collected by the Ministry of Education, in addition to other education stakeholders in the Kingdom. The information was compiled by the Evidence for Policy Design (EPoD) research team, based on information received from Ministry of Education officials and other education stakeholders between October 2017 and July 2018. The tables provide a single source for education stakeholders to learn about available education data in Saudi Arabia to facilitate policy research collaborations and evidence-based policy reform in the Kingdom.

Ministry of Education Datasets

**Noor Student Dataset**

<table>
<thead>
<tr>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Source</strong></td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td><strong>Size</strong></td>
</tr>
<tr>
<td><strong>Timeframe</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variable</strong></td>
</tr>
<tr>
<td>Civil Record</td>
</tr>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>Nationality</td>
</tr>
<tr>
<td>Date of Birth</td>
</tr>
<tr>
<td>Administrative Region</td>
</tr>
<tr>
<td>Age</td>
</tr>
<tr>
<td>Student File Status</td>
</tr>
<tr>
<td>Enrollment Status</td>
</tr>
<tr>
<td>Education Department</td>
</tr>
<tr>
<td>School</td>
</tr>
<tr>
<td>Office</td>
</tr>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>--------------------------</td>
</tr>
<tr>
<td>School Type</td>
</tr>
<tr>
<td>School Classification</td>
</tr>
<tr>
<td>Education Type</td>
</tr>
<tr>
<td>Education Level</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Grade</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Track</td>
</tr>
<tr>
<td>Absences</td>
</tr>
<tr>
<td>Father's Education Level</td>
</tr>
<tr>
<td>Mother's Education Level</td>
</tr>
<tr>
<td>First Semester Score</td>
</tr>
<tr>
<td>Second Semester Score</td>
</tr>
<tr>
<td>Final Score</td>
</tr>
<tr>
<td>SAAT Average</td>
</tr>
<tr>
<td>GAT Average</td>
</tr>
</tbody>
</table>

**Noor Teacher Dataset**

<table>
<thead>
<tr>
<th>Details</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Source</td>
<td>Deputyship of Planning and Information, Ministry of Education</td>
</tr>
<tr>
<td>Description</td>
<td>This dataset contains data on all Saudi education sector employees, both inside and outside the Kingdom. Includes data on teachers as well as administrators and other school employees. The observations are at the employee level.</td>
</tr>
</tbody>
</table>
### Details

<table>
<thead>
<tr>
<th><strong>Size</strong></th>
<th>N = 530,603 for 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Timeframe</strong></td>
<td>2009–2017 (updated annually)</td>
</tr>
</tbody>
</table>

### Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Record</td>
<td>Teacher ID</td>
</tr>
<tr>
<td>School Number in Noor System</td>
<td>Noor System number of school in which employee works</td>
</tr>
<tr>
<td>Education Sector</td>
<td>Cities and rural areas in KSA + Schools Outside KSA + Ministry Sector</td>
</tr>
<tr>
<td>Ministry Number</td>
<td>School ID number assigned by Ministry of Education</td>
</tr>
<tr>
<td>School Name</td>
<td>Name of school in which employee works</td>
</tr>
<tr>
<td>Teaching Subject</td>
<td>The specific subject area that the teacher is assigned to teach within his/her Approved Specialization</td>
</tr>
<tr>
<td>Specialization</td>
<td>The teacher’s degree specialization</td>
</tr>
<tr>
<td>Approved Specialization</td>
<td>The subject area that the teacher is assigned to teach</td>
</tr>
<tr>
<td>Qualified Specialization</td>
<td>The specific subject that the teacher is qualified to teach</td>
</tr>
<tr>
<td>First Name</td>
<td>First name</td>
</tr>
<tr>
<td>Last Name</td>
<td>Last name</td>
</tr>
<tr>
<td>Father’s Name</td>
<td>Father’s name</td>
</tr>
<tr>
<td>Grandfather’s Name</td>
<td>Grandfather’s name</td>
</tr>
<tr>
<td>Gender</td>
<td>Gender</td>
</tr>
<tr>
<td>Nationality Code</td>
<td>Nationality code (assigned by Ministry of Education)</td>
</tr>
<tr>
<td>Nationality</td>
<td>Nationality</td>
</tr>
<tr>
<td>Date of Birth</td>
<td>Date of birth dd/mm/yyyy (hijri)</td>
</tr>
<tr>
<td>Birth Place</td>
<td>Place of birth</td>
</tr>
<tr>
<td>Degree</td>
<td>The degree that the teacher earned (BA, MA, KG BA, less than secondary, etc.)</td>
</tr>
<tr>
<td>Qualification Level</td>
<td>The education level(s) that the teacher is qualified to teach (adult education, primary, kindergarten, etc.)</td>
</tr>
<tr>
<td>Degree Date</td>
<td>The year in which the teacher earned their degree</td>
</tr>
<tr>
<td>General Evaluation</td>
<td>The teacher’s final grade on their transcript. Categories are: Excellent, Very Good, Good, Acceptable, Weak</td>
</tr>
<tr>
<td>Cumulative Average</td>
<td>The Cumulative Average on teacher’s transcript, numerical. Changed as % across obs.</td>
</tr>
<tr>
<td>Cumulative Average From</td>
<td>The grading scale. Most common scales: 4, 5, 100.</td>
</tr>
<tr>
<td>Graduation Semester</td>
<td>The teacher’s graduation semester/date</td>
</tr>
</tbody>
</table>

39 This number is based on a subset of the full dataset, which does not include data for private and international schools. The actual dataset is larger (estimated size is around 600,000 observations) and includes private, public, and international schools.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>University/College/Institute</td>
<td>Name of the institution from which the teacher earned their degree</td>
</tr>
<tr>
<td>University Country</td>
<td>The country from which the teacher earned their degree</td>
</tr>
<tr>
<td>Current Job Code</td>
<td>Current job code (assigned by Ministry of Education)</td>
</tr>
<tr>
<td>Current Job</td>
<td>Categories include teacher, nurse, bus driver, security guard, librarian, etc.</td>
</tr>
<tr>
<td>Job Type</td>
<td>Educational/Administrative</td>
</tr>
<tr>
<td>Mobile Number</td>
<td>Employee’s mobile number</td>
</tr>
<tr>
<td>Home Number</td>
<td>Employee’s home number</td>
</tr>
<tr>
<td>Email</td>
<td>Employee’s email</td>
</tr>
<tr>
<td>Employee Status Code</td>
<td>Employee status code (assigned by Ministry of Education)</td>
</tr>
<tr>
<td>Employee Status</td>
<td>The teacher's current status, e.g. teaching, continuing his/her studies, early retirement, etc.</td>
</tr>
<tr>
<td>Class Allocation</td>
<td>The number of classes the teacher is assigned to teach</td>
</tr>
<tr>
<td>Current Performance</td>
<td>Current performance based on the evaluation of his/her supervisor, numeric.</td>
</tr>
<tr>
<td>Current Performance From</td>
<td>The grading scale. Most common is 100.</td>
</tr>
<tr>
<td>Previous Performance</td>
<td>Previous performance based on the evaluation of his/her supervisor, numeric.</td>
</tr>
<tr>
<td>Previous Performance From</td>
<td>Refers to the grading scale. Most common is 100.</td>
</tr>
<tr>
<td>Job Title Code</td>
<td>Job title code (assigned by Ministry of Education)</td>
</tr>
<tr>
<td>Job Title</td>
<td>Mostly similar to Current Job, with some different values</td>
</tr>
<tr>
<td>Authority</td>
<td>Public, Private, International, or Royal commission</td>
</tr>
<tr>
<td>Date Joined MoE</td>
<td>Date employee joined Ministry of Education, in any educational or administrative position</td>
</tr>
<tr>
<td>Age</td>
<td>Age</td>
</tr>
<tr>
<td>Education Department</td>
<td>Refers to the education department with which the school is associated</td>
</tr>
<tr>
<td>Excused Absences</td>
<td>Number of excused absences</td>
</tr>
<tr>
<td>Unexcused Absences</td>
<td>Number of unexcused absences</td>
</tr>
<tr>
<td>Excellence Award</td>
<td>Yes/No – Refers to whether or not the employee received an MoE excellence award for teaching</td>
</tr>
<tr>
<td>Education Office</td>
<td>The education office with which the school is associated. Each education department has several education offices that fall under it and are responsible for specific areas within the region (e.g. the Education Office in Alharas falls under the General Department of Education in Riyadh)</td>
</tr>
<tr>
<td>Education Level</td>
<td>Kindergarten, Primary, Intermediate, Secondary, or Adult Education</td>
</tr>
<tr>
<td>Education Type</td>
<td>Quran Memorization (Girls/Boys), Special Education (Girls/Boys), International Education (Boys), General</td>
</tr>
</tbody>
</table>
### Noor School Dataset

#### Details

<table>
<thead>
<tr>
<th>Source</th>
<th>Deputyship of Planning and Information, Ministry of Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>This dataset contains data on all schools in KSA, both public and private. The observations are at the school level</td>
</tr>
<tr>
<td>Size</td>
<td>N = 157,762 for 2017</td>
</tr>
<tr>
<td>Timeframe</td>
<td>2009–2017 (updated annually)</td>
</tr>
</tbody>
</table>

#### Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education Department</td>
<td>Refers to the education department with which the school is associated</td>
</tr>
<tr>
<td>Education Office</td>
<td>The education office with which the school is associated. Each education department has several education offices that fall under it and are responsible for specific areas within the region (e.g. the Education Office in Alharas falls under the General Department of Education in Riyadh)</td>
</tr>
<tr>
<td>School Gender</td>
<td>Girls/Boys</td>
</tr>
<tr>
<td>Authority</td>
<td>Public, Private, International, or Royal commission</td>
</tr>
<tr>
<td>School Type</td>
<td>Schools in KSA fall into one of these categories: Day, Night, Adult Female Education, Quran Memorization School, Special Education</td>
</tr>
<tr>
<td>Ministry Number</td>
<td>School ID number assigned by Ministry of Education</td>
</tr>
<tr>
<td>School Name</td>
<td></td>
</tr>
<tr>
<td>Administrative Region</td>
<td>One of the 13 KSA regions</td>
</tr>
<tr>
<td>City/Village</td>
<td>Name of city or village</td>
</tr>
<tr>
<td>Education Level</td>
<td>Kindergarten, Primary, Intermediate, Secondary, or Adult Education</td>
</tr>
<tr>
<td>Education Type</td>
<td>Quran Memorization (Girls/Boys), Special Education (Girls/Boys), International Education (Boys), General Education (Girls/Boys), Adult Education (Girls/Boys), General Education-outside KSA</td>
</tr>
<tr>
<td>Variable</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Education Sector</td>
<td>Cities and rural areas in KSA + Schools Outside KSA + Ministry Sector</td>
</tr>
<tr>
<td>School Principal Name</td>
<td>Principal name</td>
</tr>
<tr>
<td>Email</td>
<td>Principal email</td>
</tr>
<tr>
<td>P.O. Box</td>
<td>Principal P.O. Box</td>
</tr>
<tr>
<td>Mobile</td>
<td>Principal mobile</td>
</tr>
<tr>
<td>Grade</td>
<td>Specific grade. e.g. Primary 2, Intermediate 1</td>
</tr>
<tr>
<td></td>
<td>Categories: KG (1–3), Primary (1–6), Intermediate (1–3), Secondary (1–3),</td>
</tr>
<tr>
<td></td>
<td>Literacy Program (1–3), No Illiteracy Program, Course-based system class</td>
</tr>
<tr>
<td>Number of Students</td>
<td>Number of students in school</td>
</tr>
<tr>
<td>Number of Classes</td>
<td>Number of classes in school</td>
</tr>
<tr>
<td>Specialization (course-based</td>
<td>Either Humanities or Natural Sciences track</td>
</tr>
<tr>
<td>system)</td>
<td></td>
</tr>
<tr>
<td>Attendance</td>
<td>Attendance rate</td>
</tr>
<tr>
<td>Number of Learning Resource</td>
<td>Number of learning resource centers</td>
</tr>
<tr>
<td>Centers</td>
<td></td>
</tr>
<tr>
<td>Number of Withdrown Students</td>
<td>Number of students who withdrew from school</td>
</tr>
<tr>
<td>Number of Student Transfers</td>
<td>Number of student transfers</td>
</tr>
<tr>
<td>GPA Average</td>
<td>GPA score for a specific grade</td>
</tr>
<tr>
<td>GAT Average</td>
<td>Qiyas General Aptitude Test average score for a specific grade</td>
</tr>
<tr>
<td>Number of Good Behavior</td>
<td>Number of positive school behaviors</td>
</tr>
<tr>
<td>Number of Bad Behavior</td>
<td>Number of infractions</td>
</tr>
</tbody>
</table>
Other National Datasets

Qiyas Teacher Assessment

<table>
<thead>
<tr>
<th>Source</th>
<th>Education and Training Evaluation Commission (ETEC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Data on the Teacher Competency Test (Kifaiyat) administered by the National Center for Assessment (Qiyas).</td>
</tr>
<tr>
<td>Size</td>
<td>N = 352,094</td>
</tr>
<tr>
<td>Timeframe</td>
<td>2008–2017 (updated annually)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td>Qiyas student ID</td>
</tr>
<tr>
<td>Gender</td>
<td>Gender</td>
</tr>
<tr>
<td>Degree</td>
<td>Individual’s degree level (BA, MA, KG BA, less than secondary, etc.)</td>
</tr>
<tr>
<td>Current Age</td>
<td>Age</td>
</tr>
<tr>
<td>Exam Specialty</td>
<td>Refers to the specific test taken, either the general teacher competency test or one of the specialized subject tests (e.g. Biology, History, Kindergarten, etc.)</td>
</tr>
<tr>
<td>General Exam Date</td>
<td>Test date (general test)</td>
</tr>
<tr>
<td>General Score</td>
<td>Score on the general test</td>
</tr>
<tr>
<td>Specialty Exam Date</td>
<td>Test date (specialty test)</td>
</tr>
<tr>
<td>Specialty Score</td>
<td>Score on the specialized test (null values for individuals who only took the general test)</td>
</tr>
<tr>
<td>Test Passed</td>
<td>Yes/No</td>
</tr>
<tr>
<td>School Cycle</td>
<td>Education level (Adult Education; Intermediate Level; Kindergarten; Primary Level; Secondary Level)</td>
</tr>
<tr>
<td>Region</td>
<td>One of the 13 KSA regions</td>
</tr>
<tr>
<td>Teaching year</td>
<td>2014–2018</td>
</tr>
<tr>
<td>School ID</td>
<td>School ID</td>
</tr>
</tbody>
</table>

Qiyas Student Assessment

<table>
<thead>
<tr>
<th>Source</th>
<th>Education and Training Evaluation Commission (ETEC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Data on the General Aptitude Test (GAT), the university entrance exam administered by the National Center for Assessment (Qiyas).</td>
</tr>
<tr>
<td>Size</td>
<td>N = 2,073,444</td>
</tr>
<tr>
<td>Timeframe</td>
<td>2012–2017 (updated annually)</td>
</tr>
</tbody>
</table>
# Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student ID</td>
<td>Qiyas student ID</td>
</tr>
<tr>
<td>School ID</td>
<td>School ID</td>
</tr>
<tr>
<td>Date</td>
<td>Test date</td>
</tr>
<tr>
<td>City</td>
<td>Name of city in KSA</td>
</tr>
<tr>
<td>Region</td>
<td>Name of administrative region</td>
</tr>
<tr>
<td>Gender</td>
<td>Gender</td>
</tr>
<tr>
<td>Nationality</td>
<td>Student nationality</td>
</tr>
<tr>
<td>Score</td>
<td>Total score on the Qiyas General Aptitude Test</td>
</tr>
<tr>
<td>Type</td>
<td>Scientific or Theoretical</td>
</tr>
</tbody>
</table>

## Other Education Datasets

<table>
<thead>
<tr>
<th>Dataset</th>
<th>Source</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education and Training Survey</td>
<td>General Authority for Statistics (GaStat)</td>
<td>The Education and Training Survey is an annual survey that contains figures on student enrollment and distribution across age groups, regions, and education levels.</td>
</tr>
<tr>
<td>Saudi Arabian Monetary Agency (SAMA) Annual Statistics</td>
<td>The Saudi Arabian Monetary Agency yearly statistics webpage</td>
<td>The SAMA Annual Statistics is a collection of national financial statistics. The dataset also contains miscellaneous education statistics on schools, teachers, and students in general, higher, and technical education.</td>
</tr>
<tr>
<td>TVTC Open Data Library</td>
<td>Technical and Vocational Training Corporation (TVTC) open data webpage</td>
<td>The Open Data Library provides publicly accessible statistical reports on applicants, trainees, and graduates of TVTC’s programs.</td>
</tr>
<tr>
<td>Qiyas Gifted Student Assessment</td>
<td>National Center for Assessment (Qiyas)</td>
<td>Data on students who took the Mawhiba gifted student identification test administered by the National Center for Assessment (Qiyas).</td>
</tr>
</tbody>
</table>

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40 These are additional datasets that contain education-sector specific variables that can be useful for future collaborations and policy research studies.

41 For more details, please see: [https://www.tvtc.gov.sa/English/OpenData/Pages/About%20Open%20Data.aspx](https://www.tvtc.gov.sa/English/OpenData/Pages/About%20Open%20Data.aspx)
<table>
<thead>
<tr>
<th>Dataset</th>
<th>Source</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Childhood Environmental Rating Scale (ECERS) Scores</td>
<td>Early Childhood Education Department, Ministry of Education</td>
<td>ECERS is an evaluation instrument for rating early childhood settings. The Ministry of Education adapted the ECERS instrument to produce a new version for Saudi Arabia. The Ministry launched ECERS on a pilot scale in 2017 and plans to expand to all of KSA in 2018.</td>
</tr>
</tbody>
</table>
### International Datasets

**The TIMSS 2015 International Database**

<table>
<thead>
<tr>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Source</strong></td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td><strong>Size</strong></td>
</tr>
<tr>
<td><strong>Timeframe</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data files</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>File</strong></td>
</tr>
<tr>
<td>TIMSS Fourth grade school background data files</td>
</tr>
<tr>
<td>TIMSS Fourth grade student achievement data files</td>
</tr>
<tr>
<td>TIMSS Fourth grade student background data files</td>
</tr>
<tr>
<td>TIMSS Fourth grade home background data files</td>
</tr>
<tr>
<td>TIMSS Fourth grade within-country scoring reliability data files</td>
</tr>
</tbody>
</table>

42 For more details, please see: [http://timssandpirls.bc.edu/timss2015/international-database/](http://timssandpirls.bc.edu/timss2015/international-database/)
<table>
<thead>
<tr>
<th>File</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIMSS Fourth grade student-teacher linkage files</td>
<td>Contain information required to link the student and teacher data files.</td>
</tr>
<tr>
<td>TIMSS Fourth grade teacher background data files</td>
<td>The mathematics and science teachers were administered at least one questionnaire with questions pertaining to their background and their teaching practices in the classes of the sampled students. Each teacher was asked to respond to a questionnaire for each class taught that contained sampled students. The background data files contain one record for each of the classes taught either by a mathematics or a science teacher.</td>
</tr>
<tr>
<td>TIMSS Eighth grade school background data files</td>
<td>School principals’ responses to the questions in the TIMSS 2015 school context questionnaires</td>
</tr>
<tr>
<td>TIMSS Eighth grade student achievement data files</td>
<td>Student responses to the individual achievement items in the TIMSS 2015 assessments</td>
</tr>
<tr>
<td>TIMSS Eighth grade student background data files</td>
<td>Students who participated in TIMSS 2015 were administered a context questionnaire with questions related to their home background, school experiences, and attitudes towards mathematics and science. The student background data file contains students’ responses to these questions</td>
</tr>
<tr>
<td>TIMSS Eighth grade within-country scoring reliability data files</td>
<td>Contains data that can be used to investigate the reliability of the TIMSS constructed response item scoring</td>
</tr>
<tr>
<td>TIMSS Eighth grade student-teacher linkage files</td>
<td>Contain information required to link the student and teacher data files.</td>
</tr>
<tr>
<td>TIMSS Eighth grade mathematics teacher background data files</td>
<td>The mathematics and science teachers were administered at least one questionnaire with questions pertaining to their background and their teaching practices in the classes of the sampled students. Each teacher was asked to respond to a questionnaire for each class taught that contained sampled students. The background data files contain one record for each of the classes taught either by a mathematics or a science teacher.</td>
</tr>
<tr>
<td>TIMSS Eighth grade science teacher background data files</td>
<td>The mathematics and science teachers were administered at least one questionnaire with questions pertaining to their background and their teaching practices in the classes of the sampled students. Each teacher was asked to respond to a questionnaire for each class taught that contained sampled students. The background data files contain one record for each of the classes taught either by a mathematics or a science teacher.</td>
</tr>
<tr>
<td>TIMSS Numeracy school background data files</td>
<td>School principals’ responses to the questions in the TIMSS 2015 school context questionnaires</td>
</tr>
<tr>
<td>File</td>
<td>Description</td>
</tr>
</tbody>
</table>
|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------
| TIMSS Numeracy student achievement data files | Student responses to the individual achievement items in the TIMSS 2015 assessments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| TIMSS Numeracy student background data files  | Students who participated in TIMSS 2015 were administered a context questionnaire with questions related to their home background, school experiences, and attitudes towards mathematics and science. The student background data file contains students’ responses to these questions                                                                                                                                                                                                                                                                                                                                                   |
| TIMSS Numeracy home background data files     | Responses to an Early Learning Survey questionnaire, which was completed by the students’ parents or guardians. This questionnaire asked questions about preparations for primary schooling, including attendance in preschool and literacy and numeracy activities in the home before the child began school                                                                                                                                                                                                                                                                                     |
| TIMSS Numeracy within-country scoring reliability data files | Contains data that can be used to investigate the reliability of the TIMSS constructed response item scoring                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| TIMSS Numeracy student-teacher linkage files  | Contain information required to link the student and teacher data files.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| TIMSS Numeracy teacher background data files  | The mathematics and science teachers were administered at least one questionnaire with questions pertaining to their background and their teaching practices in the classes of the sampled students. Each teacher was asked to respond to a questionnaire for each class taught that contained sampled students. The background data files contain one record for each of the classes taught either by a mathematics or a science teacher.                                                                                                                                                                                                                                                                 |

The PIRLS 2016 International Database

| Details |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------
| Description | PIRLS is an international comparative assessment of student achievement in reading conducted by IEA. The database includes student reading achievement data, as well as the student, parent, teacher, school, and curricular background data, for 50 countries and 11 benchmarking entities, along with support materials.                                                                                                                                                                                                                                                                                                                                 |
| Size    | The database includes data from 346,852 students, 337,332 parents, 16,476 teachers, 12,124 school principals, and the National Research Coordinators of each country.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Timeframe | 2011–2016                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |


<table>
<thead>
<tr>
<th>File</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIRLS school background data files</td>
<td>Contains school principals’ responses to the questions in the PIRLS 2016 school context questionnaires</td>
</tr>
<tr>
<td>PIRLS student achievement data files</td>
<td>Contain the student responses to the individual achievement items in the PIRLS 2016 assessments</td>
</tr>
<tr>
<td>PIRLS student background data files</td>
<td>Students who participated in PIRLS 2016 were administered a context questionnaire with questions related to their home background, school experiences, and attitudes towards reading. The student background data files contain students’ responses to these questions</td>
</tr>
<tr>
<td>PIRLS home background data files</td>
<td>Responses to the Learning to Read Survey questionnaire, which was completed by the students’ parents or guardians. This questionnaire asked questions about preparations for primary schooling, including attendance in preschool and literacy-centered activities in the home before the child began school. Parents answered questions about home resources in addition to information about their highest level of education and their employment situation.</td>
</tr>
<tr>
<td>PIRLS within-country scoring reliability data files</td>
<td>Contain data that can be used to investigate the reliability of the constructed response item scoring</td>
</tr>
<tr>
<td>PIRLS student-teacher linkage files</td>
<td>The PIRLS 2016 student-teacher linkage data files contain information required to link the student and teacher data files</td>
</tr>
<tr>
<td>PIRLS teacher background data files</td>
<td>The reading teachers of the students who were sampled in PIRLS 2016 were administered a questionnaire with questions pertaining to their background and their teaching practices in the classes of the sampled students. Each teacher was asked to respond to a questionnaire for each class taught that contained sampled students. The background data files contain one record for each of the sampled classes taught by a reading teacher</td>
</tr>
<tr>
<td>PIRLS Literacy school background data files</td>
<td>Contains school principals’ responses to the questions in the PIRLS 2016 school context questionnaires</td>
</tr>
<tr>
<td>PIRLS Literacy student achievement data files</td>
<td>Contain the student responses to the individual achievement items in the PIRLS 2016 assessments</td>
</tr>
<tr>
<td>PIRLS Literacy student background data files</td>
<td>Students who participated in PIRLS 2016 were administered a context questionnaire with questions related to their home background, school experiences, and attitudes towards reading. The student background data files contain students’ responses to these questions</td>
</tr>
<tr>
<td>File</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td>PIRLS Literacy home background data files</td>
<td>Responses to the Learning to Read Survey questionnaire, which was completed by the students’ parents or guardians. This questionnaire asked questions about preparations for primary schooling, including attendance in preschool and literacy-centered activities in the home before the child began school. Parents answered questions about home resources in addition to information about their highest level of education and their employment situation.</td>
</tr>
<tr>
<td>PIRLS Literacy within-country scoring reliability data files</td>
<td>Contain data that can be used to investigate the reliability of the constructed response item scoring</td>
</tr>
<tr>
<td>PIRLS Literacy student-teacher linkage files</td>
<td>The PIRLS 2016 student-teacher linkage data files contain information required to link the student and teacher data files</td>
</tr>
<tr>
<td>PIRLS Literacy teacher background data files</td>
<td>The reading teachers of the students who were sampled in PIRLS 2016 were administered a questionnaire with questions pertaining to their background and their teaching practices in the classes of the sampled students. Each teacher was asked to respond to a questionnaire for each class taught that contained sampled students. The background data files contain one record for each of the sampled classes taught by a reading teacher</td>
</tr>
<tr>
<td>ePIRLS school background data files</td>
<td>Contains school principals’ responses to the questions in the PIRLS 2016 school context questionnaires</td>
</tr>
<tr>
<td>ePIRLS student achievement data files</td>
<td>Contain the student responses to the individual achievement items in the PIRLS 2016 assessments</td>
</tr>
<tr>
<td>ePIRLS student background data files</td>
<td>Students who participated in PIRLS 2016 were administered a context questionnaire with questions related to their home background, school experiences, and attitudes towards reading. The student background data files contain students’ responses to these questions</td>
</tr>
<tr>
<td>ePIRLS home background data files</td>
<td>Responses to the Learning to Read Survey questionnaire, which was completed by the students’ parents or guardians. This questionnaire asked questions about preparations for primary schooling, including attendance in preschool and literacy-centered activities in the home before the child began school. Parents answered questions about home resources in addition to information about their highest level of education and their employment situation.</td>
</tr>
<tr>
<td>ePIRLS within-country scoring reliability data files</td>
<td>Contain data that can be used to investigate the reliability of the constructed response item scoring</td>
</tr>
<tr>
<td>File</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ePIRLS student-teacher linkage files</td>
<td>The PIRLS 2016 student-teacher linkage data files contain information required to link the student and teacher data files</td>
</tr>
<tr>
<td>ePIRLS teacher background data files</td>
<td>The reading teachers of the students who were sampled in PIRLS 2016 were administered a questionnaire with questions pertaining to their background and their teaching practices in the classes of the sampled students. Each teacher was asked to respond to a questionnaire for each class taught that contained sampled students. The background data files contain one record for each of the sampled classes taught by a reading teacher</td>
</tr>
</tbody>
</table>
Appendix III: Bibliography

The following is a list of all references used throughout the report. The list can serve as a valuable reference for researchers and policymakers interested in the Saudi education context and associated education research.


Qiyas. 2015. “Information and Statistics on the GAT for the Second Period of the Academic Year 1436/1437 AH.”


