Annex 5 – Evidence From Around the World

1. In addition to extensive quantitative and qualitative data analyses, evidence-based findings from international research on education infrastructure as well as cognitive and socioemotional skills were used to guide development of the analytical framework and contextualize findings. The review of international evidence that was used to inform the preparation of this report is presented below.

Education Infrastructure and Student Outcomes

2. Although it may seem obvious that education infrastructure affects student performance, international evidence highlights two channels by which infrastructure affects students: location and quality. These dimensions correspond to two separate though related bodies of evidence on education infrastructure: (i) the location of infrastructure within the context of school network planning and organization; and (ii) the quality of infrastructure in designing environments for effective teaching and learning. Both of these bodies of evidence highlight key aspects that should be taken into consideration for strategic investments in education infrastructure.

3. In growing or overcrowded areas, authorities may decide to expand existing school buildings or build new schools to maintain access to education, which clearly necessitates a decision on school location. However, many decisions on investments in education infrastructure are for existing buildings. Even so, strategic planning for education infrastructure requires authorities to evaluate whether the location of such infrastructure is still adequate given its utilization, population dispersion and enrollment trends, transportation options, and environmental and natural disaster risk, among other relevant factors. The location of education and training (E&T) institutions within communities is an important dimension in and of itself, because it directly affects distance to school, which has been shown to affect student enrollment and retention. The number and location of E&T institutions may also affect total enrollment, which has an effect on the performance and motivation of both students and teachers. Finally, the location of E&T institutions in relation to labor markets (e.g., vocational education and training schools) can affect school–employer linkages and the school-to-work transition for students.

4. The other key dimension of education infrastructure is quality, including: (i) compliance with minimum infrastructure standards; and (ii) alignment of facilities design with learning principles. At the most basic level, education infrastructure needs to be structurally sound to provide a safe and secure learning environment for students. Other standards beyond structural stability include environmental factors such as light, sound, and ventilation, as well as the functionality of subsystems like heating and plumbing. Many aspects of minimally acceptable standards for education infrastructure are already defined by government authorities in the form of official laws and norms. Additionally, evidence from around the world points to several traversal principles that should guide the design and organization of learning environments in the 21st century, including learner-centeredness, active engagement, social learning through group-based activities, and sensitivity to individual differences among learners (Dumont, Istance, and Benavides 2010). High-quality education infrastructure meets minimum standards and is designed with modern learning principles in mind. The quality of education infrastructure has also been
shown to play an important role in explaining variation in students’ motivation, performance, and labor market outcomes.

**Location of Education Infrastructure**

5. Evidence shows that the location of E&T infrastructure is integrally linked to four critical factors that affect opportunities to learn: (i) distance to school and commuting time; (ii) school segregation; (iii) total enrollment (school size) and dual shifts; and (iv) linkages between E&T institutions and employers. Decisions on the location of education infrastructure automatically affect home-to-school distance and commuting time, which is important because long distances or commutes discourage on-time enrollment, strain children’s energy level and attention span, limit students’ ability to participate in extracurricular activities, and create potential safety risks for students while commuting. At the same time, location is an important consideration for investments in education infrastructure to the extent that E&T institutions are located in spatially segregated areas. This is common for Roma students in Romania, many of whom are affected by school segregation because they attend schools located in spatially segregated areas. The selective expansion or modernization of existing E&T institutions may, directly or indirectly, cause enrollment demand and school size to increase, which matters because larger schools may benefit from greater capacity and resources but suffer from overcrowding and dual-shift schooling. Finally, the proximity of E&T institutions to employers affects opportunities for school–employer engagement and the development of institutional linkages that can facilitate the school-to-work transition (Figure 1).

![Figure 1. Location of Education Infrastructure and Opportunities to Learn](image)

**Location and Distance to School**

6. Declining enrollments led the Government of Romania (GoR) to launch a school consolidation process in 2010–2011 driven by the introduction of a per-student financing mechanism. Declining student-age populations have led to changes in the size of the school-age cohort and to shifts in the demand for education at various levels, in Romania and many other countries in the region. The introduction of a per-student financing formula in Romania was expected to offer incentives to local governments for school and staff rationalization. Although evidence has shown that per-student financing formulas are an effective mechanism for school network optimization, experience from some countries also shows that the school consolidation process, if not managed carefully, can have detrimental effects on students and communities. In Romania, the school network optimization process did result in some positive efficiency
improvements, including larger average class sizes and a decline in management and
administrative costs resulting from a decline in legal entity schools (World Bank 2012). However,
major challenges arose around availability of funding for school buses and poor road conditions.
In rural areas, school network optimization resulted in a significant increase in the average distance
to school – up to 80 percent in some areas (EIB 2013). In neighboring Bulgaria, school network
consolidation resulted in an increase in dropout rates of 8–12 percentage points (more than twice
the national average) among pupils from schools that were closed down, especially in rural areas
where Roma children are widespread (World Bank 2010).

7. **The location of education infrastructure, including adjustments to the school network,**
*affects distance to school and commuting time, which in turn affect student enrollment and
dropout rates.* The evidence on distance is clear: the closer the school is to home, the more likely
children are to attend and to enroll at the appropriate age (Filmer 2004). Less time needed to reach
school encourages parents to send their children to school at a younger age, thereby reducing the
probability that children will drop out (World Bank 2005a). In Romania, urbanization and
improved road networks and transportation alternatives permit students to attend schools farther
from their homes, meaning that commuting time may be more relevant than distance (Bard,
Gardener, and Wieland 2006). Even so, both distance and commuting time affect enrollment and
retention because they tax the stamina of children, limit engagement with peers and school staff in
extracurricular activities, reduce parental involvement in school activities, and create potential
safety risks for students (Berry and West 2010; Strang 1987). Even in countries with high
enrollment, evidence shows that the likelihood of school dropouts, truancy, and discipline
problems is greater in rural areas where transportation time is higher or transportation means are
inconvenient or lacking (Bard, Gardener, and Wieland 2006). Distance and commuting time have
been shown to have a particularly negative effect on girls’ enrollment, especially in rural areas, as
well as that of students with physical disabilities (World Bank 2005b).

8. **Distance to school and lack of available public transport are reasons cited for high
dropout rates and non-attendance for Roma students.** Although almost all Roma children in
Romania have primary schools within walking distance (less than 3 kilometers), many Roma live
at the outskirts of villages or towns or in segregated settlements, often without easy access to a
school due to missing roads, lack of safe pavement, and longer walking distances (Gatti et al.
2016). However, Roma children and families tend to live farther from secondary schools, which
are typically located in city centers. Almost half of Roma in Romania live more than 10 kilometers
from the nearest city centers, and over 20 percent live more than 1 kilometer from a bus stop (Gatti
et al. 2016). The high costs of education, including transportation as well as other costs for fees,
books, etc., are the most commonly cited¹ reasons for why Roma children do not attend or drop
out of school (Gatti et al. 2016). Roma parents’ concerns about safety, especially of their daughters,
are also cited as a correlate of distance to school and a factor resulting in early school leaving (FRA
2014).

¹ Based on survey data from the 2011 Regional Roma Survey, conducted by the UNDP, World Bank, and EC.
Location and School Segregation

9. **Location is an important dimension of school infrastructure to the extent that E&T institutions are located in spatially segregated areas.** The supply of E&T institutions, the degree of spatial (or residential) segregation, and the degree of free school choice can result in different forms of education segregation unless active measures to the contrary are implemented. In the case of Roma students, segregation can take three key forms: (i) attending Roma-majority schools that exist in predominantly Roma (or spatially segregated) areas; (ii) attending Roma-majority classes, often at a remedial level, and separated from the majority; and (iii) placement in special education even when they do not meet specific requirements for it (Gatti et al. 2016). Research shows that the segregation of children belonging to ethnic minority groups into distinctive classes or schools is a discriminatory practice that may have serious negative consequences on their mental and psychological development, educational performance, and professional opportunities (FRA 2014). It can also result in inefficient use of school inputs, such as school infrastructure, to the extent that segregation results in uneven (inefficient) distribution of space and overcrowding. Although spatial segregation may not always be the cause of education segregation, it is a key source of segregation in service provision (including education) for Roma in Romania. Over 50 percent of Roma in Romania live in neighborhoods where the dominant ethnicity is Roma (Brüggemann 2012).

10. **Romania has made a commitment to equal treatment in education by reducing ethnic segregation and perceptions of discrimination.** Romania’s *National Strategy for Roma Inclusion* specifically aims to reduce the educational gap between Roma and non-Roma students and to reduce ethnic discrimination and segregation in schools. Furthermore, several dimensions of the EU legal framework governing the use of European Structural and Investment Funds aim to: (i) prevent these funds from supporting or strengthening isolated facilities; or (ii) actively and significantly reduce existing isolated settings. That said, segregation of Roma children is persistent in Romania, despite official policies prohibiting it. According to the 2011 Roma survey conducted by FRA, approximately 26 percent of Roma children attend segregated schools or classes, partly the result of spatial segregation. This is an important reality to keep in mind, given that schools in Romania with higher shares of ethnic minority students are often characterized by poor school infrastructure, sanitation, and equipment, limited learning resources, lower teachers’ qualifications, and high teacher turnover (Brüggemann 2012; Duminică and Ivasiuc 2010; Surdu 2008).

Location, School Size, and Dual-Shift Schooling

11. **Strategic decisions regarding investment in existing E&T institutions versus new ones in alternate locations are likely to have an effect on school enrollment size, depending on how catchment areas are determined and how flexible they are.** School catchment areas determine the geographic area from which students are eligible to attend a local school. If school locations are determined in order to serve larger catchment areas, then these schools may also have relatively high total enrollment compared with schools in smaller catchment areas. At the same time, schools with renovated or newly constructed facilities may attract students from farther away, even though they could attend schools closer to their homes. Depending on the flexibility and size of catchment areas, total enrollment in schools selected for infrastructure investments may increase. If facilities
selected for investments can accommodate higher enrollments, then the total school size may increase, with potentially negative effects on students and staff. On the other hand, if facilities are modernized but capacity is not expanded, increasing enrollment would necessitate dual-shift schooling, which may also be problematic.

12. Evidence on school size is mixed: larger schools tend to have greater capacity and more resources, but overcrowding can reduce learning opportunities and limit the quality of student–teacher interactions. Larger schools are often more diverse in terms of course offerings, facilities and equipment, and teaching staff. In larger schools, teachers have more opportunities to specialize and interact with professional networks, while dedicating more of their time to teaching and less to administrative tasks (Nitta, Holley, and Wrobel 2010). Students may also benefit from being in larger schools because instruction can be organized around more homogenous groups, avoiding the need for multi-grade classes, and more resources are available to equalize opportunity for disadvantaged students (Loveless and Hess 2006). However, larger schools may impose additional transportation costs on parents, and fail to cultivate the positive school climate often found in smaller schools, including strong interpersonal relationships, greater participation in extracurricular activities, and more opportunities for developing student leadership (Humlum and Smith 2015; Borland and Howsen 2003). Teacher satisfaction also tends to be lower in large schools, perhaps due to discipline problems among students or a loss of the cooperative and community-like environment that persists in smaller schools (Cotton 1996; Slate and Jones 2005). Empirical evidence shows that at the primary level, students generally benefit from being in smaller schools, whereas secondary schools appear to have an “optimal” school size, as student performance is highest in schools that are neither very small nor very large (Leithwood and Jantzi 2009; Ares Abalde 2014).

13. Investments that modernize and equip E&T facilities without increasing their total capacity may result in overcrowding. This, in turn, leads schools to operate in dual shifts, whereby one group of students comes to school early in the day and a second group comes later in the day. Dual-shift schooling allows a school to accommodate a larger number of students without having to construct another building. This can be beneficial from an efficiency point of view, but dual-shift schooling can have negative consequences as well. In Romania, information on the effects of dual-shift schooling on achievement is inconclusive: some dual-shift schools see impressive results on achievement tests, whereas some single-shift schools record very poor performance. Although this information is inconclusive, most educators and specialists agree that dual-shift schooling negatively affects the learning environment in relation to single-shift schooling (Bray 2008). Dual shifts can reduce teaching time and condense the school day, creating a hurried environment. Pupils and staff of different shifts may not easily identify with each other, creating the sense that the two shifts are actually two separate schools. Dual-shift schooling also forces authorities to reduce extracurricular activities because the school day becomes too tight, and school facilities may be too congested to allow simultaneous activity by children of multiple shifts.
Location and Linkages with the Labor Market

14. A separate but critical consideration with respect to the location of education infrastructure relates to the proximity and linkages between E&T institutions and labor market institutions, particularly employers but also community organizations that provide employment services. For Romania, important objectives to be achieved with the utilization of EU funds are to improve labor market relevance and strengthen the quality of E&T systems. Romania also wants to use these funds to invest in cities and regions to support growth, increase competitiveness, and create jobs. For example, Romania’s growth poles policy defined 7 growth poles, one for each development region beyond Bucharest, and 13 urban development centers of regional importance (World Bank 2014). The location of upper secondary, vocational, tertiary, and adult E&T institutions in relation to employers, especially within growth poles and other centers of economic development, may have an important effect on regional development and therefore is an important dimension to consider when prioritizing investments in infrastructure.

15. Evidence shows that proximity between E&T and labor market institutions can facilitate linkages like employer engagement and support students in making the transition from school to work. Evidence on regional development emphasizes the importance of learning networks that are embedded in regional “skill ecosystems” (Finegold 1999). Proximity between schools, universities, employers, and other community organizations affects opportunities for learning and skills development, as well as the formation of social and professional networks that support young people to make the transition from school to work (Dalzi1 2015). In rural areas, schools have few opportunities for interaction with industry and employers, whereas more opportunities exist in quasi-urban and urban areas, especially those centers designated as growth poles. Evidence points to three levels of employer engagement with E&T institutions. These include: (i) engagement in leadership, governance, financing, and staff development at the school level; (ii) engagement in curriculum development and lesson planning at the teacher level; and (iii) engagement in supporting work experience, workplace visits, apprenticeships/training schemes, and mentoring at the student level (Burge, Wilson, and Smith-Crallan 2012). The proximity of E&T institutions to employers can play an important role in supporting employer engagement at all three of these levels and in embedding E&T institutions more broadly into regional skill ecosystems.

Quality of Education Infrastructure and Student Performance

16. Quality—the other critical dimension of education infrastructure—can be defined using two criteria: (i) compliance with minimum infrastructure standards; and (ii) alignment of facilities design with recognized learning principles. In school infrastructure planning, quality tends to be defined through construction specifications and educational specifications. Such specifications identify the minimally acceptable standards for infrastructure that must be in place for a school facility to be safe and operational for the students and staff who use the facility. Minimum standards are essential for monitoring infrastructure conditions, identifying investment needs, and promoting equal access to school facilities at a defined level of quality. Minimum standards are also important for economic reasons; e.g., to reduce maintenance and utility costs. Compliance with minimum standards represents a fundamental measure of the quality of school infrastructure. However, as E&T institutions are places of learning, all investments in education...
infrastructure should be evaluated based on what they will contribute to learning. For this reason, a definition of education infrastructure quality should also consider how infrastructure can be better designed or utilized to enhance the learning environment for students.

17. Evidence gathered over the last 30 years clearly demonstrates that learning environments, shaped by infrastructure, affect learners. Research from fields including educational psychology, sociology, and economics points to a second definition of education infrastructure quality: the alignment between facilities design and recognized learning principles. Researchers have advocated for a move beyond “flexibility” of infrastructure, instead arguing for facilities designs and learning environments that: encourage active engagement in learning as well as group work; are sensitive to individual differences among learners; and promote “horizontal connectedness” across areas of knowledge and subjects as well as to the community and wider world (OECD 2013). Such learning environments can help to stimulate the development of both cognitive and socioemotional skills. The OECD’s Center for Effective Learning Environments (CELE) has gathered extensive evidence on 21st century learning environments and provides in-depth case studies of many innovative school facility designs from around the world. For these reasons, the quality of education infrastructure can be thought of as a continuum, ranging from low-quality infrastructure that is noncompliant with minimum standards to high-quality infrastructure that meets minimum standards and optimizes learning for its students. This notion is illustrated in Figure 2.

![Figure 2. Quality of Education Infrastructure](image)

18. Fresh air in classrooms is critical for keeping students healthy and alert. Several studies have found ventilation rates in many schools to be inadequate, which poses risks to student health and well-being (Daisey, Angell, and Apte 2003). For example, researchers in the United States found an increase of 50–370 percent in the incidence of respiratory illness in spaces with low ventilation rates, as are commonly found in schools (E.O. Lawrence Berkeley National Laboratory 2016). Other studies have linked air recirculation and low ventilation rates in classrooms with lower average daily attendance and slower speeds in completing academic tasks (Wyon and Wargocki 2007; Shendell et al. 2004). Less evidence exists on the effects of classroom temperature on student performance, although a notable experimental study in Denmark that addressed both air quality and temperature found that for 10- to 12-year-olds, numerical and language test speeds increased when temperature was reduced slightly and ventilation rates were increased (Wargocki and Wyon 2007).
19. Natural light is also known to affect student performance. Evidence has shown that natural light regulates sleep and wake cycles, and as a result, the availability of natural light in classrooms affects students’ alertness (Rea, Bullough, and Figueiro 2001). Several studies have found that access to daylight affects student learning because daylight plays a role in the production of certain hormones that facilitate learning (Kuller and Lindsten 1992; Figueiro and Rea 2010). In fact, determining the optimal level of natural daylight in classroom settings is an area of ongoing research (Tanner 2009).

20. Another important aspect of the internal environmental quality of school facilities is that of sound and acoustics. Evidence on the relationship between acoustics in classrooms and student learning defines relevant metrics, and based on those, suggests that noise levels in classrooms are often far in excess of optimal conditions for understanding speech (Crandell and Smaldino 2000; Picard and Bradley 2001). Several other major studies conclude that students’ ability to hear their teacher clearly has a substantial impact on both their short-term memory and academic performance (Berg, Blair, and Benson 1996; Knecht et al. 2002; Feth and Whitelaw 1999; Sato and Bradley 2008; Klatte et al. 2010).

21. Although individual environmental factors are important, evidence from schools in the United Kingdom indicates that the holistic impact of educational infrastructure is more relevant. Rather than focusing on measurable dimensions of heat, light, sound, and air quality, this research proceeds from the notion that the effect of the built environment on students is experienced simultaneously through multiple sensory inputs (Barrett et al. 2015). In particular, this research, which was also carried out in Romania under an adapted approach to inform preparation of this report, evaluates an organizing model comprising three dimensions, or design principles, that are relevant when analyzing educational infrastructure and learning environment:

- **Stimulation**, including visual complexity and color. This dimension reflects the fact that various levels of stimulation are appropriate for students engaged in different activities.
- **Individualization**, including ownership, flexibility, and connection. This dimension reflects the desire of learners to interact with spaces to address individual preferences.
- **Naturalness**, including light, sound, temperature, air quality, and links to nature. This dimension addresses the importance of automatic responses to the availability of healthy, natural elements within one’s environment (Barrett and Barrett 2010).

22. The underpinning hypothesis is that pupils’ academic progress is dependent on a full range of factors drawn from across all three of the design principles. The authors confirmed that the stimulation, individualization, and naturalness (SIN) conceptual model is a useful framework for organizing and studying the holistic impact of learning spaces on students. This study also concluded that a holistic conception of design, including key design parameters, explains a significant share of variation in student achievement. In this particular case, the naturalness design principle accounted for 50 percent of the impact on learning, while the other two accounted for roughly 25 percent each.

23. Perceptions of infrastructure quality also affect student and teacher outcomes. Without direct measures of infrastructure conditions, some researchers have relied on self-reported ratings of the quality of infrastructure conditions. These studies find that poor-quality ratings for school facilities are strongly associated with student absences and higher rates of suspensions and risky
behaviors, especially for secondary schools (Boese and Shaw 2005; Branham 2004; Kumar, O’Malley, and Johnston 2008). Additionally, the OECD’s Programme for International Student Assessment (PISA) surveys school directors on their perceptions as to whether inadequacies or shortages of school buildings, heating/cooling systems, or instructional space hinder the capacity to provide instruction. Although more school resources are not automatically linked to better student performance, international evidence from PISA shows that a minimum level of resources—including education infrastructure—is a precondition for skills acquisition and high student performance. Evidence focused on teachers also shows that poor-quality education infrastructure is associated with lower health outcomes for teachers, lower rates of teacher attendance and retention, and more negative attitudes about their schools and classrooms (Buckley, Schneider, and Shang 2005; Earthman and Lemasters 2009; Schneider 2003; Sheets 2009).

24. As mentioned before, schools with consistently higher shares of children from ethnic minority groups—especially those schools located in rural areas—are often characterized by poor school infrastructure, sanitation, and equipment. Schools in communities with higher shares of Roma tend to be overcrowded, with students attending school in two to three shifts due to a lack of space (UNICEF 2012). The insufficient quality of education infrastructure in ethnically segregated schools is particularly problematic given that many Roma children and youth live in overcrowded conditions, slums, old and poorly maintained multistory housing, or social housing units that are also characterized by substandard infrastructure (Gatti et al. 2016). In these circumstances, E&T institutions may be among the few or the only places where Roma have access to adequate sanitation and physical environments for teaching and learning.

25. Infrastructure quality also affects labor market outcomes in two ways: (i) directly, through its effect on the acquisition of cognitive and socioemotional skills; and (ii) indirectly, through employers’ perceptions of institutional quality. This is especially important for secondary and tertiary E&T institutions, when students can choose: (i) whether to participate beyond the compulsory level; and (ii) which institution to select once the decision to participate has been made. Evidence shows that students and parents use infrastructure elements, such as the availability, quality, and modernity of laboratory equipment, computing resources, and libraries, as indicators of institutional quality more generally (Litten and Hall 1989). The evidence above shows that low-quality infrastructure can have a direct and detrimental effect on learning and skills formation, which contributes to the heterogeneity of cognitive and socioemotional skills possessed by graduates and trainees. However, infrastructure quality also affects employers’ perceptions. Because skills heterogeneity exists, qualifications and credentials do not fully signal the skills that graduates and trainees possess, forcing employers to rely on other indicators of skill and ability. Evidence shows that employers, like students and parents, react to institutional reputation, which is driven in part by infrastructure quality as an indicator of educational quality. For these reasons, investments to modernize education infrastructure and equipment can improve opportunities for skills development for enrolled students as well as employers’ perceptions of educational quality.
Evidence on the Development of Cognitive and Socioemotional Skills

Defining Cognitive and Socioemotional Skills

Cognitive skills capture individual capacity to (i) acquire knowledge, thoughts, and experience as well as to (ii) interpret, extrapolate, and reflect based on acquired knowledge. It includes diverse capacities such as analytical, problem-solving, and memory skills. These skills can and have been a part of interventions as early as early childhood, during which the formation of these skills translates into measurable, scaffolded actions such as learning to stack or nest objects, awareness of concepts such as “more” or “less”, familiarity with alphabets and numbers, and knowledge of key personal information (Naudeau et al. 2012). Some of these cognitive skills are most commonly assessed through intelligence quotient (IQ) tests and standardized assessments (Kautz et al. 2014). A wealth of evidence suggests that these skills drive children’s lifetime outcomes, including completing tertiary education, finding a job, and earning a good salary. However, growing research shows that cognitive development alone does not guarantee individual and societal development and has its limitations in promoting a well-balanced lifestyle (Heckman, Stixrud, and Urzua 2006).

Socioemotional skills, also known as noncognitive skills, capture individual capacity that is (i) manifested in consistent patterns of thoughts, feelings and behaviors, (ii) developed through formal and/or informal learning experiences, and (iii) influential over important socioeconomic outcomes throughout individuals’ lives. These skills include diverse personality elements such as empathy, teamwork, and confidence. At an early age, these skills include building children's trust with their primary caregivers, building behavior management skills (following directions), developing social perception which includes building empathy towards oneself and others, and controlling oneself through stressful situations (Naudeau et al. 2012). Some of these skills have also been called “executive function processes” (Fernald et al. 2009). This includes being able to control impulses and the ability to sustain attention for the given task (Naudeau et al. 2012). Executive function processes can be divided into two types: “cool” processes, such as the non-emotional components of a given task, and “hot” processes, which refer to emotional aspects, such as the ability to delay gratification (Naudeau et al. 2012). These noncognitive skills play an important role as people navigate their adult lives by allowing them to manage social situations that can be especially challenging. These skills can broadly be divided into three categories: achieving goals, working with others, and managing emotions (OECD 2015).

Cognitive and socioemotional skills are not separable. In fact, many of the relevant skills possess strong cognitive and socioemotional factors. For instance, critical thinking has not only a strong cognitive component that pushes individuals to reflect on new information and interpret and find solutions to novel problems, but also a strong noncognitive component that prompts individuals to build creativity and imagination (Halpern 1998; John and Srivastava 1999).

The combined forces of both cognitive and socioemotional skills enable a child to be “school ready.” School readiness can be defined as possessing the required skills to be successful in school (Naudeau et al. 2012). Table 1 articulates the specific skills that indicate school readiness for a child when he/she first enters a formal learning space such as a school (Kagan, Moore, and Bredekamp 1998).
Table 1. Skills Indicative of School Readiness

<table>
<thead>
<tr>
<th>Cognitive Development</th>
<th>Socioemotional Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>School-learned knowledge</td>
<td>Ability to form positive relationships with teachers and peers</td>
</tr>
<tr>
<td>Knowledge of properties of objects, understanding relationships between objects,</td>
<td>Aspects of self-concept and self-efficacy and the ability to express feelings appropriately</td>
</tr>
<tr>
<td>learning social conventions</td>
<td></td>
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</tbody>
</table>


Skills Drive Education, Social, and Labor Market Outcomes

Empirical research has shown that the formation of both cognitive and noncognitive skills can drastically improve participation in education, social outcomes, civic engagement, and the labor market. An OECD report showed longitudinal evidence from nine countries that building both cognitive and noncognitive skills: drastically improved participation in tertiary education, attendance, and labor market outcomes; drove higher health outcomes and subjective measures of well-being; and reduced anti-social behavior. Cognitive skills such as reading, numeracy, and scientific literacy allow individuals to understand information and solve problems. Noncognitive skills such as perseverance and emotional stability also support the individual to achieve more positive outcomes. These skills allow individuals to build stronger relationships, build trust, and work together.

The Perry Preschool Program is a famous case study that provides evidence on the positive effects of building noncognitive skills. The program established a two-year structure where students between the ages of 3-4 attended two and a half hours of center-based preschool for five days a week. (Kautz et al. 2014). The program ended two years after its inception and students from both the control and treatment group joined the same school (Kautz et al. 2014). The results showed that by age 10, both the control and treatment groups had the same average IQ, although as time passed participants of the preschool program had higher rates of high school completion (71 percent versus 54 percent), which in turn resulted in higher monthly earnings and rates of homeownership (36 percent versus 13 percent) (Schweinhart et al. 2005). Further exploration showed that the main reason behind this substantive difference was the difference in noncognitive skills (Heckman, Pinto, and Savelyev 2013). Other than this, additional noncognitive skills interventions that led to higher involvement in education include the Seattle Social Development Project (SSDP), which targeted students from grade one to grade six and emphasized building relationships and attachments between students, parents, and teachers (Kautz et al. 2014). This intervention had a variety of long-term outcomes, including improved grades and behavior during adolescence (Kautz et al. 2014).

Beyond education, building strong noncognitive skills can affect other factors, such as social and health outcomes. Programs and interventions that strengthen young children's social and emotional abilities can lead to fewer health complications later on in life, partly because they reduce the chances of mental health problems (Naudeau et al. 2012). They lead children and young
adults to make smart choices, such as using seatbelts, and reducing the use of cigarettes and legal and illegal drugs (Schulman 2005). Research has also shown that investment in noncognitive skills reduces children’s and youth's engagement with high-risk behavior, such as risky sexual behavior, illegal substance use, and criminal activity (Lynch 2005). An example is an intervention in Turkey that showed that children whose families participated in a skills development program showed lower levels of delinquency than those who did not participate (Kagitcibasi et al. 2009). Additionally, with the increase in better social outcomes, these young adults go on to enter the labor market as healthy individuals who can deal with the stress that arises while working (OECD 2015). They are seen to be more altruistic, engaged with society, and productive citizens (OECD 2015).

Building and Measuring Cognitive and Noncognitive Skills

Both cognitive and socioemotional skills can and should be built throughout individuals’ lives. Cognitive skills, including ones that are usually measured through academic tests and grades, have been shown to influence an individual’s participation in education and in the labor market. They also influence broader social outcomes such as health status and social and political participation (OECD 2015). Skills development is not only influenced by genetic background and the environment, but also by the inputs contributed by families, schools, and communities as well as by policies, culture, and social institutions (OECD 2015).

Cognitive and socioemotional skills can be developed in formal learning environments through targeted programs and early investment coupled with strong teacher training policies focused on both cognitive and noncognitive skills. Additionally, the integration of noncognitive skills into other school structures such as curricula, standards, and assessment is another way in which these skills can be built at an early stage in an individual's life.

Families can play a large part in helping build these skills, especially socioemotional skills, by providing guidance, developing habits, and imparting values (OECD 2015). Research shows that families that provide stimulating activities help build both cognitive and noncognitive skills in the home environment (Baxter and Smart 2011). An analysis done by PISA showed that parents who engaged with their children by telling stories, singing songs, and reading to them were more likely to create an environment conducive to building noncognitive skills (OECD 2015). Additionally, parents and their strategies toward discipline and behavior management played an integral role in skill formation (Kiernan and Huerta 2008).

Informal learning through active engagement with the community is another way in which these skills can be built. By participating in positive extracurricular, cultural activities, individuals can build high self-esteem and develop teamwork skills (OECD 2015). Through active participation at all levels starting from home and school environments all the way up to national curriculum standards and policies, effective structures can and have been built to foster these skills.