Looking through the Lens of Adolescent Development to Strengthen Secondary Education

Post-Primary Education
and Youth Initiative

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Foreword

For more than four decades, FHI 360's experts have contributed to improving early childhood development and primary education. Now we are making a major commitment to addressing the challenges at the post-primary level through the Post-Primary Education and Youth Initiative. This internal working group draws from best practices in secondary and tertiary education in order to advocate for further investment and greater attention to post-primary education issues. Though this initiative, we aim to increase educational opportunities for students by strengthening connections across all stages of the education cycle, from primary through higher education.

Today's growing youth population faces complex challenges unrecognized in other stages of education. Adolescents have unique needs, as they transition through life's developmental stages and prepare for career and employment opportunities – issues that have not been well-addressed in many education systems around the world. As a result, youth development and youth unemployment are rapidly becoming critical challenges in many countries. To address these challenges, FHI 360 programs support the unique needs of adolescents, strengthen the capacity of local communities and ministries to provide quality education, and help align education policies to meet both student needs and labor market requirements. Our interventions are designed to build life-long skills that prepare students to be successful in all aspects of adulthood.

The working paper series of the Post-Primary Education and Youth Initiative features various research pieces complemented with actual field experiences from FHI 360's programs and best practices from around the world. We are commissioning these papers to be written by experts in post-primary education topics in order to capture the outcomes from our field work, ideas from technical discussions, and the passion that drives us to develop integrated and locally driven solutions for youth who are transitioning to post-primary education. We hope these working papers will inform and shape post-primary policies and practices of governments, donors, school officials, and local partners.

The first paper in this series – "Looking through the Lens of Adolescent Development to Strengthen Secondary Education" – emphasizes the importance of connecting our understanding of secondary education with the realities of adolescent development in the context of the developing world. This paper aims to provide a starting point and guidance to policy makers, school administrators, and educators to re-conceptualize secondary education, especially in developing countries, by incorporating our understanding of how adolescents learn and develop.

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1. Introduction

There are several ongoing debates among policy makers, school administrators, and educators about secondary school expansion in developing countries; however, very little attention is paid to how the developmental stage of secondary school age children—*adolescence*—can influence learning. While some attention is given to whether the secondary school curriculum is relevant to the future working life of the students, discussions about whether the school is relevant to the experience of the adolescents currently attending the school are largely missing. Policy makers and school administrators shy away from asking if the manner in which educators are *teaching* in secondary schools matches with how adolescents *learn,* or if educators are utilizing the *strengths* of adolescents to guide them through their own *learning* process. Formal secondary schools around the world are often designed without acknowledging the universal developmental processes of adolescence. The intent of this paper is to contribute to the understanding of secondary education and the realities of adolescent development in the context of the developing world. This working paper aims to provide a starting point and guidance to policy makers, school administrators and educators to re-conceptualize secondary school education, especially in developing countries, and to incorporate an understanding of how adolescents learn. The paper presents:

- Section 2: Current state of secondary education.
- Section 3: Universal characteristics of adolescent development.
- Section 4: Examples of secondary school programs that successfully incorporate adolescent development characteristics.
- Section 5: Implication of secondary school systems at system, school and classroom level.

Although several research studies and examples cited in this paper are from the United States, certain aspects of adolescent development are to an extent universal and lessons from the U.S. research can be applied to developing contexts.

2. Current State of Secondary Education

Secondary education, classified at the United Nations Educational, Scientific and Cultural Organization's (UNESCO) International Standard Classification of Education (ISCED) levels 2 and 3, is often the intermediary step between primary and tertiary education. Typically, lower secondary (ISCED 2) includes grades 7 to 9 (ages 12–15) and upper secondary (ISCED 3) includes grade 10 to 13 (ages 16–19) (Bregman and Bryner, 2003). Estimates suggest that in 2013 about 71 million lower school-age adolescents were out-of-school (Omoeva, Sylla, Hatch & Gale, 2013). In sub-Saharan Africa the average lower secondary school enrollment rate in 2012 was 50 percent, while completion rate was 37 percent (Hatch, 2015). A myriad of reasons have been cited for the low enrollment and completion rates for secondary school-age adolescents including, but not limited to,

supply of schools, opportunity costs, low levels of primary completion, and relevance of curriculum to society and to students.

While policy makers in several countries have made commitments to universal secondary education, the issues of quality and relevance are becoming more central to secondary school education. The development of 21st century skills and employability of youth after secondary education dominate discussions in both developing countries and in countries with more advanced economies. Conventional secondary schools in most countries are designed to prepare students for tertiary education even when a large percentage of the graduates are not expected to obtain a university degree. In reality, for many students, the lower or upper secondary level ends up being the terminal level before entry into the workforce. It has been suggested that with the development and diversification of national economies, secondary education "may need to offer several exit and entry points so that young people can make the transition from school to work and back to school at different times and in different ways (Gillies, 2003, p 33)." Given these factors, knowledge gained at the secondary school level becomes even more important for students' success in the workforce and continued education.

Around the world, post-primary schooling is segmented in many ways—subject areas, lower and upper secondary, academic and vocational etc.—that are not necessarily aligned with how youth at this age actually learn. Moreover, teachers who may lack subject matter expertise end up relying on lectures and rote memorization as a process to transfer knowledge to students in secondary schools rather than actively engaging the students in their own learning process. With the new emphasis on teaching 21st century skills and non-cognitive skills in secondary schools, policy makers are often adding new subject areas (like computer science, entrepreneurship, etc.) to an already overburdened curriculum, rather than using students' time in the school more efficiently.

A rich body of literature on adolescent development can inform policy makers and school administrators on ways to re-conceptualize secondary school reform, transitioning from teaching additional subjects to incorporating system changes that take into account the appropriate development characteristics of the students. Although the majority of the research in adolescent development comes from the U.S. or other western countries, certain human development characteristics are universal to adolescents growing up in most cultures.

Using a positive youth development approach[1], secondary school systems can take advantage of the natural positive developmental characteristics of adolescence to enhance learning outcomes of secondary school students. The complex and often difficult process of personal development during this stage of life should be viewed by educators as an

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[1] Positive youth development philosophies, in general, move away from a deficit-view (young people as problems to be solved) of young people and encourage an approach towards all youth having assets and potential that should be supported for their positive development (See Blyth, 1999; Hill, McGuire, Parker, & Sage, 2009; Benson, Scales, & Syvertsen, 2010; Lerner & Lerner, 2013).

opportunity to guide the students' learning process and to help them thrive. Adolescents attending secondary schools should be viewed as resources to be developed (Lerner & Lerner, 2013) for their own futures and that of society as a whole. Numerous studies have shown that approaching secondary education through the lens of adolescent development can have a positive impact on learning outcomes (CASEL, 2015).

More specifically, the Stage-Environment Fit theory—one of many positive youth development approaches and frameworks—asserts that student motivation in school is influenced by the "fit" between the characteristics that the student (i.e., the developmental stage of the student) brings to the school (i.e., the environment) and the characteristics of the school itself (Eccles & Midgley, 1989). Evidence from studies on middle schools in the U.S. shows that "school environments that do not fit well with the developmental needs of the adolescents have implications for adolescents' motivation for school achievement, academic motivation, and attachment to school (Eccles et al., 1996)."

The next section provides theories and findings on typical adolescent development that have implications for educators.

3. Universal Characteristics of Adolescent Development

Adolescence is an important developmental stage that encompasses the time between the onset of puberty and adulthood (Cole & Cole, 1993; APA, 2002), with adulthood marked by self-sufficiency, responsibility, and economic and social independence (Tanner, 2010). Many scholars debate the exact ages that comprise the adolescence period, but in the U.S. and in many other countries it is accepted that adolescents are between the ages of 10 and18 or 19 (APA, 2002). These transition years between childhood and early adulthood are significant because the habits and patterns young people set at this time strongly influence who they will be as adults (Atkinson & Sturges, 2003; Jackson & Davis, 2000).

Since G. Stanley Hall's initial conception of adolescent developmental characteristics and education, educators in the U.S. have placed greater emphasis on understanding the developmental needs and characteristics of adolescents in order to design schools and youth programs that support their success. A key development in this work has been a purposeful change in the perception of adolescence that shifts from viewing adolescence as a time of "storm and stress," as was conceptualized by Hall (Arnett, 1999; Urdan & Klein, 1998), towards a "strength-based" view of youth (Catalano, Berglund, Ryan, Lonczak, & Hawkins, 1999) that focuses on positive development and describes positive qualities and assets.

While the adolescent experience varies around the world, it is helpful to consider key similarities among youth from varying countries who are making the transition between childhood and adulthood (APA, 2002; Brown, Larson, & Saraswathi, 2002) and preparing for adult roles and responsibilities. Adolescents grow and mature faster than at

any other stage of development except infancy (Atkinson & Sturges, 2003; McNeely & Blanchard, 2010). Similar to the way infant development is often inconsistent, adolescent development is not always predictable, resulting in great variability across young people of the same age, and even within individuals. This accounts for unpredictable and often conflicting abilities and behaviors that are often difficult for adults to understand. By recognizing that these differences are typical, schools can plan for appropriate support and guidance as students navigate these inconsistent changes.

Recent advancements in neuroscience and brain scan technology reveal that specific brain developments take place during adolescence that lead to physiological maturation that influences certain abilities and behaviors commonly associated with adolescents around the world.

3.1 Adolescent Brain Development

The intensive maturation of the brain during adolescence accounts for many of the characteristics, behaviors, and needs that adolescents demonstrate. While the brain has reached its full adult size by the onset of adolescence, the adolescent brain undergoes significant changes in structure (brain anatomy, e.g., changes in size or organization of parts of the brain) and function (brain activity, e.g., using different parts of the brain when doing different tasks) (Steinberg, 2011), both of which have a profound impact on adolescent behaviors and abilities. Advances in new technologies, such as functional magnetic resonance imaging (MRI), have helped neuroscientists better understand these developmental changes.

3.1.1 Changing Brain Systems
As the brain develops throughout adolescence, the balance and relationship between the prefrontal cortex (the "CEO of the brain") and the limbic system (the emotional response center) changes (Giedd, 2009). Research shows that the brain develops in stages, and this development generally takes place from the back of the brain to the front (Gogtay et al, 2004). Some of the brain regions that mature first are related to the limbic system, and include sensory processing, emotions, and instincts. Last to develop is the prefrontal lobe (or, more specifically, the prefrontal cortex), located directly behind the forehead, which is where executive function skills such as planning, prioritizing, strategizing, paying attention, managing time, organizing, impulse control, and weighing consequences originate. Thus, younger adolescents experience quicker responses to areas like the amygdala, which are connected to emotion and instinct, and almost sluggish responses to their prefrontal cortex (Roaten & Roaten, 2012). Researchers are now finding that the prefrontal cortex is not actually fully developed until the mid-20s (Steinberg, 2012).

This is part of the reason adolescents tend to respond emotionally, rather than rationally, to situations. Moreover, because the prefrontal cortex, which is the mood modulator of the brain, takes a long time to mature, adolescents often experience mood swings and emotional turmoil (Roaten & Roaten, 2012) and are likely to act on impulse, without regard for risk (National Institute of Mental Health, 2011). This makes them more prone to engage in risky behaviors. It also accounts for why older adolescents are at times more

rational and less emotional than their younger peers.

3.1.2 Proliferation and Pruning

Another important aspect of adolescent brain development is the concept of proliferation and pruning (Roaten & Roaten, 2012; Giedd, 2009). Throughout late childhood there is significant growth in the development of neurons (specialized cells that transmit nerve impulses) and synapses (the connections between neurons that allow for the communication of messages). The proliferation of this gray matter, or "thinking part" of the brain, peaks at age 11 in girls and age 12 in boys—around the onset of puberty. Following this peak the brain begins a period of reduction, where the gray matter thins as the excess, or unused synaptic connections, die off —a process known as synaptic pruning (Roaten & Roaten, 2012). Scientists believe that pruning is guided by genetics as well as the use-it-or-lose-it principle (i.e., the cells and the connections that are used will survive and flourish whereas the unused parts will die out) (Giedd, 2002).

This process of pruning, in which students may lose unused connections, highlights the importance of how adolescents spend their time and what activities they participate in, since it is shown to have a lasting impact on brain development.

3.1.3 Increased Connectivity

The teenage brain undergoes increased connectivity, which results in faster communication and integration between the different areas of the brain engaged in thinking. Specifically, a process known as myelination takes place, which encases the interconnections between neurons in a white, fatty tissue called myelin. This insulates the connection, increases the speed of neural impulses, and improves information transmission (Steinberg, 2012). Thus, while synaptic pruning reduces the number of synapses in the brain, myelination ensures there are faster connections in the brain (albeit fewer of them) (Wallis, 2004). This makes thinking more efficient and effective, and helps create even greater efficiencies around routine tasks and procedures.

3.1.4 Hormonal Changes that Accompany the Onset of Puberty

With the onset of puberty, significant hormonal changes affect adolescents' sexual maturation and behavior, as well as their social behavior and responses to stress (National Institute of Mental Health, 2011). Adrenal sex hormones active in the brain influence the systems that regulate mood and excitability (Wallis, 2004). These changing hormone levels, coupled with an overactive limbic system, may account for why adolescents can have sudden emotional flare-ups. At the same time, there is a rapid increase in the levels of dopamine in the brain, a chemical substance that contributes to the feeling of pleasure. "Because things feel especially pleasurable during early adolescence, young adolescents go out of their way to seek rewarding experiences" (Steinberg, 2012). As a result, teenagers may seek pleasure so much so that they do not pay attention to inherent risks of their choices. This reality is only exacerbated by the underdeveloped pre-frontal cortex, the part of the brain that helps weigh risk and "put the brakes on risky, impulsive behavior" (Wallis, 2004).

3.2 Development Dimensions

The significant changes that adolescents experience can be categorized into five common dimensions: physical, cognitive, social, emotional, and moral/ethical. The development of the adolescent brain, as described above, influences all five categories of adolescent development:

1. It is rooted in the physical body and includes the maturation of physical systems;
2. It forms the basis of cognitive development, as increasingly complex thinking skills are direct results of changing brain structures and functions;
3. It is intrinsically tied to social and emotional processes; and
4. It allows the development of morality and ethics only when the brain is able to process increasingly more abstract thinking.

Understanding these five key dimensions of development can build a strong foundation for meeting the needs of adolescents. However, it is important to keep in mind that these development dimensions are *interrelated* and that they *overlap*, making the distinction between them at times arbitrary (Scales & Roehlkepartain, 2003). Overlooking this characteristic can lead to oversimplification of the complexities of human development (Kellough & Kellough, 2008). Adolescents are a sum of these parts, and the interplay of these different developmental dimensions often brings about unique challenges and opportunities. Nevertheless, by thoughtfully preparing adolescents in all five dimensions using research-based best practices, schools can ensure that students develop characteristics (Lerner, 2006) necessary to thrive not only academically, but in all aspects of life.

3.2.1 Physical Development

Adolescence is a time of many physical changes, including rapid growth, improved motor skills, and sexual maturity. Although the sequence of the physical changes is common to all adolescents, the onset and pace of the changes is irregular (Atkinson & Sturges, 2003). Box 1 outlines the general characteristics of the physical changes during this stage. Awareness of the physical changes cause adolescents to feel awkward and uncoordinated in their own body as they adapt to the changes (Atkinson & Sturges, 2003). They often become acutely concerned about their appearance. They experience mood swings due to hormonal changes and awareness of physical changes. Eating habits can be sporadic and unhealthy, with adolescents skipping meals, making poor food choices, or eating late at night. The combination of poor eating habits and lack of physical education and exercise may result in obesity in adolescence and adulthood.

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BOX 1. PHYSICAL DEVELOPMENT CHARACTERISTICS

- Sexual maturation and achieving fertility
- Girls: menstruation begins, development of breasts, etc.
- Boys: enlargement of testes, first ejaculation, facial hair, lowering of voice
- Irregular and varying growth spurts
- Weight gain
- Cartilage in certain skeletal areas (e.g., tailbone) hardens
- Uneven bone-muscle growth and disproportionate changes in weight and muscle development
- High levels of energy alternating with fatigue
- Chemical and hormonal imbalances/swings
- Ravenous appetites and thirst (need water)

Source: Adapted from American Psychological Association, 2002; Atkinson & Sturges, 2003; Caskey & Anfara, 2007; McNeely & Blanchard, 2009; Spano, 2014; and Urdan & Klein, 1998

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Gaps in the knowledge and understanding about sexual maturation can cause social and emotional issues for both boys and girls. Girls who mature early may be unprepared to handle advances from older boys and men who are attracted to them. Early maturing boys may be more likely to engage in delinquent and risky sexual behavior. Inversely, boys who mature late may experience bullying from other boys. Research shows that adolescents are able to deal with sexual issues better when adults adequately prepare them for the changes they will experience (APA, 2002).

3.2.2. Cognitive Development

Changes to the adolescent brain are as significant as physical changes to the body. As discussed earlier, with increased connectivity the adolescent brain gains both efficiency and effectiveness. This results in an increase in young people's ability to comprehend, think, reason, and make sense of the world around them. These increasingly complex cognitive abilities are characterized by a transition from concrete to abstract thinking (Atkinson & Sturges, 2003), which allows adolescents to see the complexities of the world by thinking critically and abstractly. Piaget (1947) theorized that during this developmental stage young people are able to logically analyze situations with a cause and effect relationship, conceptualize hypothetical scenarios, and use symbols or metaphors imaginatively. They are able to conceptualize time where they expand and differentiate past, present, and future. With these changes they develop the ability to plan, evaluate alternatives, and set personal goals (Muuss, 1996). Box 2 summarizes the most common characteristics of the cognitive development dimension observed in adolescents.

BOX 2. COGNITIVE DEVELOPMENT CHARACTERISTICS

- Gains capacity for abstract thinking, critical thinking, and meta-cognition
- Sets goals and follows through
- Improves ability for planning and organization
- Understands multiple perspectives
- Places more importance on life goals and ambitions
- Seeks connections
- Widens range of ability and places more importance on intellectual interests
- Is Highly curious (Many interests, few sustained over time)
- Prefers active over passive learning experiences
- Increases capacity to engage in challenging tasks and places more importance on high achievement
- Begins to self-regulate and take responsibility
- Becomes more self-reflective

Source: Adapted from American Psychological Association, 2002; Atkinson & Sturges, 2003; Caskey & Anfara, 2007; McNeely & Blanchard, 2009; Spano, 2014; and Urdan & Klein, 1998

With the newly developed ability of logical and abstract thinking, adolescents may seem argumentative. But the arguing process is a very natural behavior that allows them to exercise reasoning capabilities while experimenting with new skills. Adolescents may appear self-centered during this stage as they begin connecting to academic content in relation to themselves and their own lives (Atkinson & Sturges, 2003). Although the ability to consider others' perspectives develops during adolescence, the process takes some time (APA, 2002). Similarly, even though most adolescents eventually develop a sense of self-regulation and responsibility, due to these changes in brain development they first experiment with different choices, leading some to risky behaviors like tobacco, alcohol, or drug use, unprotected sex, or reckless driving (see Section 3.1).

3.2.3 Emotional Development

Emotional development during adolescence is primarily characterized by the quest for independence and identity formation (Caskey & Anfara, 2007). In relation to the cognitive development discussed above, this period is marked by an awareness of self and all knowledge in relation to that self. For the first time, adolescents have the cognitive abilities to comprehend their own individuality. Preparation for adult roles is a common feature of the adolescent period across the globe. This also highlights their quest for independence, especially from parents and family, in order to take on the adult role in the future. Identity formation refers to both how a young person sees himself right now as well as in the future, as the possible self he would like to become (Markus & Nurius, 1986). Young people seek to establish themselves as unique individuals, yet also crave

peer and adult approval, a contradiction that can cause anxiety and conflict (Caskey & Anfara, 2007).

BOX 3. EMOTIONAL DEVELOPMENT CHARACTERISTICS

- Exploring self-identity
- Declining engagement with parents
- Searching for acceptance from peers
- Exploring and experimenting with roles in social groups
- Functioning more independently
- Experiencing emotional peaks and valleys
- Easily offended and at times moody (highly sensitive)
- Believing they are alone in personal problems and situations
- Behaving erratically and inconsistently; reverting to childish behavior in times of stress
- Feeling awkward or strange about themselves and their bodies
- Seeking attention, sometimes without regard to how it is perceived or achieved
- Learning to manage emotional stress

Source: Adapted from American Psychological Association, 2002; Atkinson & Sturges, 2003; Caskey & Anfara, 2007; McNeely & Blanchard, 2009; Spano, 2014; and Urdan & Klein, 1998

In their quest for identity, adolescents often experiment with different ways of appearing, behaving, talking, etc., in order to discover individual identity. To develop a strong identity, an adolescent must first develop a solid self-concept (the beliefs one has about oneself) and then build self-esteem (which involves feeling good about one's self-concept). In this process they often become prone to low self-esteem and highly sensitive to criticism or perceived shortcomings (APA, 2002). The emotional stress of identity formation helps adolescents develop emotional intelligence that is useful later in life. They are able to recognize and manage their own emotions and to develop empathy for others; in turn, they also learn to resolve conflict in a constructive manner and to develop a cooperative spirit with others, which is an essential social skill for adult life (APA, 2002).

Identity formation, especially in relation to peers, is extremely important for adolescents. This is the development stage where they become aware of their future as an adult and their existence outside of their family. They oscillate between trying to "fit in" with their peers and finding their individuality. Self-esteem issues become even more important for minority youth when they become aware of the differences from the majority population. Researchers in the U.S. have primarily explored the minority identity issue from the perspective of ethnic minorities, where it is apparent that a strong sense of ethnic identity

is essential for developing strong self-esteem in adolescents belonging to ethnic minorities (Muuss, 1996; APA, 2002). However, this can be true for any adolescent who feels "different" from the majority of their peers in most countries, whether that difference is ethnicity, race, religion, culture, sexuality, disability, etc.

3.2.4 Social Development

The social development dimension is very closely related to the emotional development dimension for adolescents. Along with individual identity formation, the young adolescent seeks group identity beyond the family unit. Although social norms, behavior, and acculturation in society for adolescents vary across cultures, one commonality of the adolescent phase of life is common to most cultures—learning and preparing for their adult roles. "Adolescence can be understood as a weigh-station in the process of 'becoming' an adult, a stage between the 'apprenticeship' of childhood and full social participation in adult life (Smiley, 2011)."

Peer relationships, and the need to belong to a peer group, are central to adolescent development in western countries. As they begin to consider themselves as separate from their own families, adolescents shift their attention to friends and seek to establish a strong sense of group identify (Atkinson & Sturges, 2003). This desire to belong is motivated by several things. Social acceptance triggers positive emotions, which feeds the adolescent brain's reward response. Moreover, adolescents learn from one another and are comforted to know that others are going through the same thing. Scholars on southern African conceptualization of adolescence have also pointed out that the individual identity formation of adolescents is interdependent and in relation to the others in the community (Nsamenang, 2002). In many cultures, adolescents may not necessarily form an individualistic perspective of identity formation, but learn to relate to their peers

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BOX 4. SOCIAL DEVELOPMENT CHARACTERISTICS

- A sense of self is connected to identification with a particular group
- Gravitation towards groups with which they feel an affinity
- Confusion and fright when facing new school/social settings
- Positive peer relations add to feelings of self-worth
- Fierce loyalty to peer group values
- Desire for frequent affirmation of love from adults
- Test limits of acceptable behavior
- Rebellion toward parents and authority figures
- Necessity for moderate times alone to regroup and reflect on daily experiences
- The more teens want to belong, the more susceptible they are to peer pressure
- As they get older, begin to tolerate individual differences and may begin to replace affiliation with peer groups with more intimate relationships

Source: Adapted from American Psychological Association, 2002; Atkinson & Sturges, 2003; Caskey & Anfara, 2007; McNeely & Blanchard, 2009; Spano, 2014; and Urdan & Klein, 1998

and adults within their society. Some basic characteristics of the social development dimensions are presented in Box 4.

As adolescents find their social position within their peers and in relation to the adults, they often experiment with different roles, alternative behaviors, and peer groups. Depending on options available in a particular social environment, this could lead them to delinquent behavior; they can easily be influenced by media and negative interactions with peers and adults at this age (Caskey & Anfara, 2007). However, when positive role models and appropriate adult guidance is available, a more healthy experimentation takes place. Not finding a peer group to belong to can also create issues for adolescents; some adolescents that are rejected by their peers can engage in negative behaviors like drug abuse, which can lead to dropping out of school or violent behavior (APA, 2002). On the other hand, a strong relationship with the family and positive adult role models are associated with better emotional development, better school performance, and engagement in fewer high-risk activities like drug use and abuse (APA, 2002).

3.2.5 Moral/Ethical Development

Moral or ethical development refers to the evolution of a young person's sense of values and ethical behaviors (APA, 2002). As with the social development dimension, the specific set of moral judgments or value systems may differ in any given culture; it is the ability of abstract thinking that allows adolescents to develop a sense of values and ethical behavior. Adolescents, with their cognitive, emotional, and social abilities, are able to consider hypothetical situations and empathize with others to extrapolate their own judgment of right and wrong. Adolescence marks the transition away from a focus on one's owns needs and interests to considering the feelings and rights of others.

Adolescent moral development is characterized by idealism and a desire to make the world a better place (Atkinson & Sturges, 2003). There is also an inherent interest in

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BOX 5. MORAL DEVELOPMENT CHARACTERISTICS

- May test rules and limits
- Able to make principled choices
- Tend to be idealistic
- Have a strong sense of fairness
- Transition from ego-centric to having consideration for others
- Demonstrate evidence that they have a conscience
- Develop their own personal value systems
- Begin to view moral issues in shades of gray as opposed to black and white
- Engage in moral reasoning and prosocial behaviors
- Emphasize personal dignity and human rights
- Pose deep, broad philosophical questions about life
- Are more comfortable with complex, ambiguous issues of morality and fairness

Source: Adapted from American Psychological Association, 2002; Atkinson & Sturges, 2003; Caskey & Anfara, 2007; McNeely & Blanchard, 2009; Spano, 2014; and Urdan & Klein, 1998

justice and fairness in human relations, and as a result, adolescents are drawn to exploring ethical questions related to larger global issues (Caskey & Anfara, 2007). As young people move from early to late adolescence, there is an increasing ability to see the world in shades of gray; adolescents can use their own moral framework to guide them.

4. Examples of Secondary School Programs that Successfully Incorporate Adolescent Development Characteristics

Incorporation and integration of the adolescent development dimensions within secondary education are challenging tasks not only at the classroom level but at the education system level. Within the U.S., the Social and Emotional Learning (SEL) movement for the last few decades has experimented with several approaches to incorporate developmentally appropriate teaching practices in middle and high schools. The U.S. Collaborative for Academic, Social and Emotional Learning has consolidated information on such programs to guide educators in choosing appropriate programs to meet goals of a specific school system (CASEL, 2015).

In this section we present examples of a subset of six of these programs with the intention of providing information to policy makers and educators in developing country settings on the benefits of incorporating developmentally appropriate content in secondary schools to improve academic success of adolescents. Programs were selected based on the following criteria of some applicability to school systems in developing countries:

1. Integrates within the academic curriculum or supports students' academic and cognitive skills
2. Utilizes existing school staff and teachers
3. Incorporates more than one adolescent development dimension
4. Demonstrates positive impact on students' academic achievement

Table 1 provides a summary of the programs to highlight the integrated nature of adolescent development dimensions, varied settings and education system elements of interventions, and the academic achievement outcomes found in program evaluations. This section by no means provides an exhaustive list of all programs and initiatives that have incorporated developmentally appropriate approaches to secondary education, but it is meant to be illustrative of efforts that have shown positive academic outcomes.

TABLE 1. EXAMPLES OF U.S. SECONDARY SCHOOL PROGRAMS

PROGRAM	ADOLESCENT DEVELOPMENT DIMENSIONS	SETTINGS	GRADE LEVEL	EDUCATION SYSTEM ELEMENTS	ACADEMIC OUTCOME
Expeditionary Learning	Cognitive Emotional Social Moral	Classroom School Community Family	6 to 12	• *Professional development*—Teacher and school staff • *Curriculum*—Guidelines and structure for lesson plans to incorporate experiential learning in science, English, social science, math, technology, and the arts. • *Advisory structure*—School staff assigned to small group of students.	Positive academic gains
Facing History and Ourselves	Cognitive Emotional Social Moral	Classroom School Community Family	6 to 12	• Curriculum—Teaching practices infused in regular academic curricula (history, social science, and English)	Higher performance measures in historical understanding
Student Success Skills	Physical Cognitive Emotional	Classroom School Family	K to 12	• *Professional development*—Teachers and School Counselors • *Curriculum*—5 free-standing lessons during regular classes • *Counseling*—Group counseling to students who need extra support	Higher reading and math test scores
Project Based Learning	Cognitive Emotional Social	Classroom School Community	6 to 12	• *Professional Development*—Teachers • *Curriculum*—Instructional methods to incorporate extended projects within academic subjects	Higher test scores in economic literacy
Reading Apprenticeship	Cognitive Emotional Social	Classroom School	6 to 12	• *Professional Development*—Teachers • *Curriculum*—Instructional methods infused on academic classes or stand-alone reading classes	Higher test scores in history, biology, and English
Consistency Management & Cooperative Discipline ®	Cognitive Emotional Social	Classroom School	NA	• *Professional Development*—Teachers and school leaders	Higher reading and math test scores

4.1 Expeditionary Learning

4.1.1 Development Dimensions: Cognitive, Emotional, Social, Moral

The Expeditionary Learning program is a comprehensive school reform approach that is infused within the academic curricula of U.S. middle and high schools. The goal of the program is to support students to develop as individuals, to build character, and to make genuine contributions to the world. The program focuses on developing both relational character (e.g., kindness, honesty, integrity) and performance character (e.g., organization, perseverance, craftsmanship) in students. The program uses either an experiential or a project-based learning approach that incorporates multiple subject areas including science, English, social science, math, technology, and the arts. The program requires schools to make a multi-year commitment and to involve all aspects of the school in reforming its approach to educating adolescents. Expeditionary Learning provides guidelines and structure for lesson plans, assisting teachers in using developmentally appropriate activities for their students. This creates a classroom climate in which students are excited about the opportunity and challenge of the work, feel accountable to their student group for deadlines, and have pride in exceeding their own expectation for the quality of their schoolwork. Schools and teachers develop and implement lessons to build teacher skills around conflict resolution, problem-solving, and communication (CASEL, 2015).

In addition to incorporating the approach within the classroom, teachers also plan "expeditions" i.e., community-building activities or service-learning activities for the students, which not only enhance their academic skills but also foster relational character that can help them make meaningful contributions to the community. The service-learning activities show students that the skills acquired in school can be used to build better communities. These activities serve as the primary source for students to learn about and take action on social justice issues in the community (CASEL, 2015).

The program has a built-in advisory structure with staff assigned to a small group of students. The small-group meetings foster emotional, social, and moral development through relationship-building between staff and students, as well as among the students in the group. The program also actively engages families in school activities and regularly communicates students' progress and accomplishments. The program encourages students to invite community members to participate in various classroom activities while also representing the school in the community (CASEL, 2015). [2]

Quasi-experimental evaluation research on the five Expeditionary Learning programs in Washington, DC and New York City middle schools showed considerable academic gains. Students gained an extra seven months of learning in reading and an extra ten months of learning in math after three years of the program when compared to schools with similar demographics (Nichols-Barrer & Haimson, 2013).

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[2] For more information on the program visit www.elschools.org

4.2 Facing History and Ourselves

4.2.1 Cognitive, Emotional, Social, Moral

The Facing History and Ourselves program incorporates teaching practices in middle and high school academic curricula (history, social science, or English language arts classes) that promote students' emotional, social, and moral learning. Teachers use Facing History lessons in their classrooms that focus on historical periods of intergroup conflict involving racism and prejudice. The lessons highlight examples of individual and collective action to strengthen civil society during times of social conflict. The pedagogical approach emphasizes reflection, interaction, cooperation, deliberation, and discussion of complex and meaningful social and civic issues. Students are encouraged to gain an in-depth understanding of historical processes and events, create a personal connection to the subject matter, and link the past to current social and civic issues (CASEL, 2015). The goal of the program is to "help students learn about racism, antisemitism, and prejudice so they can prevent it from happening in the future (Facing History and Ourselves, 2015)."

The program and its lessons can be implemented by individual teachers in their own classroom, or it can be taken up by the whole school. The school is then encouraged to invite students' families and community members to engage in dialogue on the historical events. Students also gain opportunities to take part in service-learning activities and to practice models of restorative justice (CASEL, 2015).

A randomized control evaluation on Facing History and Ourselves (Barr et al, 2015) found that students in the program, when compared to students in control groups, demonstrated prosocial behavior, greater empathy, better classroom climate, greater civic self-efficacy, greater "political tolerance", better academic achievement (historical understanding performance measure), and fewer conduct problems.

4.3 Student Success Skills

4.3.1 Development Dimensions: Physical, Cognitive, Emotional, Social

The Student Success Skills is a model used from Kindergarten to 12th grade in the U.S. that helps students develop cognitive, social, and self-management skills (Student Success Skills, 2015). It is implemented by teachers and school counselors within the school. Five specific free-standing lessons are delivered in regular classes that provide students with strategies in the following:

1. Developing and practicing memory and cognitive skills
2. Calming anxiety and managing emotions
3. Building a caring, supportive, and encouraging environment
4. Developing healthy optimism
5. Setting goals, monitoring progress, and sharing success

The stress reduction approach for students includes mindfulness strategies like muscle relaxation. After delivering the specific lessons, teachers encourage and coach the

students to apply appropriate skills and strategies in their academic work. School counselors provide support in group counseling sessions to students who need extra guidance. The program also provides skills and strategies to parents to support their children outside of school (CASEL, 2015).

A randomized controlled evaluation of the program (Lemberger et al, 2015) showed that students in middle and high school who participated in the program achieved higher scores in standardized reading and math tests when compared to students in the control group. Middle school students also showed more positive perception of their own soft skills as compared to the control group students.

4.4 Project Based Learning by Buck Institute for Education

4.4.1 Development Dimensions: Cognitive, Emotional, Social

The Buck Institute for Education (BIE) used a Project Based Learning (PBL) model that is designed to help teachers in middle and high schools make learning highly engaging and developmentally appropriate for their students (CASEL, 2015). PBL is a teaching method in which students work on projects for an extended period of time to investigate and respond to an engaging and complex question, problem, or challenge (BIE, 2015). They use their knowledge and skills in a way that prepares them for real life issues. In this deeper learning, they master core academic content (reading, writing, math and/or science) while also developing soft skills[3] like critical thinking, collaboration, effective communication, self-directed learning, time management, and an academic mindset (believing in themselves) (Hewlett, 2015).

Teachers receive training from BIE on the PBL teaching approach and are encouraged to involve parents and the larger community in the students' learning process. Students are also connected to community experts and supporters to complete the projects. The program can be implemented by individual teachers in their classrooms, or a school district could utilize BIE support for implementation in all schools. BIE also organizes international conferences and workshops where teachers and schools participate and share knowledge.

A randomized control trial evaluation conducted by Finkelstein and Hanson (2011) on a PBL economics curriculum showed that after implementation, students in the program scored higher than the students in the control group on economic literacy and on problem-solving skills.

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[3] "Soft skills refer to a broad set of skills, competencies, behaviors, attitudes, and personal qualities that enable people to effectively navigate their environment, work well with others, perform well, and achieve their goals," as defined in "Workforce Connections: Key 'Soft Skills' That Foster Youth Workforce Success: Toward a Consensus Across Fields," a *Child Trends, Inc.* Publication.

4.5 Reading Apprenticeship

4.5.1 Development Dimensions: Cognitive, Emotional, Social

Reading Apprenticeship is an academic literacy program implemented by West Ed (West Ed, 2015). The program provides training to teachers to help them infuse teaching practices into their regular classes that can improve literacy skills for complex texts typically found in middle and high school academic subject areas. Teaching practices in the program are designed to create a positive classroom environment and a "community of readers." Instructional design and the approach of Reading Apprenticeship is rooted in a framework that leads to improvement in learning through interaction between four dimensions: Social, Personal, Cognitive, and Knowledge-Building. In the classroom teachers incorporate the following aspects within these dimensions for reaching "metacognitive conversation" and literacy competency:

1. Social
   * Creating Safety
   * Investigating the relationship between literacy and power
   * Sharing text talk
   * Sharing reading processes, problems, and solutions
   * Noticing and appropriating others' ways of reading
2. Personal
   * Developing reading identity
   * Developing metacognition
   * Developing reader fluency and stamina
   * Developing reader confidence and range
3. Cognitive
   * Getting the big picture
   * Breaking it down
   * Monitoring comprehension
   * Using problem-solving strategies to assist and restore comprehension
   * Setting reading purposes and adjusting reading processes
4. Knowledge-Building
   * Surfacing, building, and refining schema
   * Building knowledge of content, world, text, language and disciplinary discourse and practices

(Adapted from West Ed, 2015

The Reading Apprenticeship curriculum can be implemented in stand-alone classes or it can be integrated within relevant subject areas like science classes. It can be used by individual teachers or across the whole school (CASEL, 2015).

A recent randomized control trial demonstrated the effectiveness of the Reading Apprenticeship approach. When compared to students in the control group, students of teachers who received the Reading Apprenticeship training scored higher in standardized tests in history, biology, and English language arts; the effect sizes suggested that they were over a year ahead than the control group students (Greenleaf et al 2011).

4.6 Consistency Management & Cooperative Discipline®

4.6.1 Development Dimensions: Cognitive, Emotional, Social

Consistency Management & Cooperative Discipline® (CMCD®) is a classroom instructional management program that provides a series of professional development workshops for teachers focusing on student-teacher interaction, classroom environment, and classroom management. The workshop content includes the following areas:

1. Energizing curricula with active learning and higher order questions
2. Effectively using time and learning from each other
3. Creating a positive learning environment
4. Creating a caring community
5. Taking a stand against bullying
6. Managing cooperative groups
7. Managing disruptive behaviors/building positive relationships
8. Creating resources to use in the program

CMCD® also includes workshops for school leaders to support school-wide implementation of the program. The program encourages data-based decision-making and building relationships/communicating with parents (CASEL, 2015).

Quasi-Experimental design research results presented at the annual meeting of the American Education Research Association (Freiberg et al, 2011) and conducted in 2011 showed that students who participated in the program scored higher on both reading and math standardized tests when compared to students in the control group.

4.7 Building Assets, Reducing Risks

4.7.1 Development Dimensions: Cognitive, Emotional, Social

"Building Assets, Reducing Risks" (BARR) framework is an **organizational approach** to promoting students' social and emotional learning that emphasizes providing supports for at-risk students. BARR is designed to be implemented in grades 6 through 10. The program organizes each grade level into teams, with each team being led by three teachers from core academic subjects (i.e., math, English, sciences, or social sciences) who are responsible for 80 to 120 students. Teachers on each team continually monitor the academic achievements and behavioral adjustments of their assigned students, meeting as team to reflect on student ratings and to identify those at-risk of failing. Teams also meet with school support staff on a weekly basis to develop plans for those at-risk students. This process requires daily teacher time and time in the schedule for team meetings. BARR provides a set of activities for relationship-building between teachers and students called "I-Time." BARR is designated as a complementary program, because there is a limited emphasis on the promotion of students' personal competence.

Schools implementing BARR hold an orientation for parents on the topic of the developmental needs of adolescents. Parents are also invited to serve on a parent advisory council.

Results of a 2013 randomized control trial evaluation, conducted on a sample of 548 ninth-grade adolescents, found that those who participated in the BARR program reported more academic credits earned and higher standardized test scores in math and reading compared to students in the control group (Evans & Sharma, 2013; CASEL, 2015).

5. Implications for Secondary Education

Programs described in the previous section show that, at least in the U.S., efforts by teachers and other school staff in incorporating an understanding of adolescent development yields both academic and other social benefits for students. Until recently, there was very little implementation of these approaches within the education system, whether in developed or developing countries. As a result, little research exists on concrete best practices for policy makers and school administrators in implementing these programs. This section provides initial guidance on what elements within the secondary school system need to be seen from an adolescent development perspective.

It is important to acknowledge that for positive change to occur within a classroom, support elements at both the school and the systems levels need to be put in place.

Often the burden of incorporating pedagogical approaches outlined within an education reform framework is placed almost entirely on classroom teachers. In reality, true sector reform requires a systemic approach that restructures education components at three levels (at the minimum): classroom, school, and system. Teachers need modifications in policy and school management to support their work within the classroom. This systems-approach becomes even more important when embarking on ambitious goals, like completely re-conceptualizing secondary school education in a way that aligns with the developmental stage of its students—in this case, adolescence.

While many developing countries, especially in sub-Saharan Africa, aim for universal secondary school access, youth from marginalized groups are often left behind (Jacob & Lehner, 2011). The impetus for universal secondary education provides the optimal policy space to ensure that a systemic reform of secondary education serves the needs of all youth and not just youth from elite families. Policy makers must incorporate all dimensions of adolescent development—physical, cognitive, emotional, social, and moral—in order to help students succeed in secondary schools. When education systems support the healthy development of adolescents, they ensure each student's academic success (in high school, college, and beyond) and success in life (work, relationships, family, and citizenship).

In this section we explore some of the specific re-conceptualizations and modifications that are needed at the classroom, school, and system level to align the learning environment with the developmental stage of adolescence. Many of these strategies require minimal resources and can likely be adapted in developing contexts. These recommendations are derived from the literature on adolescent development, program

evidence, and expert knowledge on education policy reform. Future longitudinal reform case studies and impact evaluations from developing country contexts are needed to find supporting evidence for the effectiveness of this holistic approach.

5.1 Classroom Level

A teacher is directly engaged with the student in the classroom and holds the responsibility for facilitating each student's learning process. Within a secondary school classroom, it is essential for a teacher to be conscious of adolescent development characteristics and to use adolescent abilities to maximize students' learning potential. Teachers in secondary school classrooms can engage some specific instructional practices that enhance adolescent learning.

Maximize students' cognitive potential—Secondary school teachers should consider every interaction they have with the students and the interactions between students as a teaching opportunity. As explained earlier, the adolescent brain is in the process of becoming faster and more efficient in its cognitive abilities, but the process of pruning rids the brain of under-utilized synaptic connections. If certain cognitive abilities are not fully developed or supported during adolescent years, the student may not be able to acquire those skills later in life. Therefore, it is crucial for secondary school teachers to employ active learning pedagogy in their classrooms and to challenge students to expand cognitive skills. Teachers should incorporate activities that involve problem solving, critical thinking, time management, long-term planning, and presentation and communication skills within their lesson plans in all subjects, reinforcing these skills through a variety of activities.

Teachers must recognize that adolescents will undergo cognitive development at varying rates, so instruction must be differentiated to support students based on their readiness and interest. Some students may be at the concrete thinking stage and require more structured learning experiences, while other students develop some level of abstract thinking and need more challenging activities (Caskey & Anfara, 2007). Teachers must differentiate the content (reading level, interest, etc.), the process (varying degrees of rigor and effort), and the product (choice can accommodate interest and ability) to accommodate these different rates of development. Using techniques from the Student Success Skills framework, such as managing emotions and setting and monitoring goals, can facilitate teachers in guiding students' through this cognitive development stage in a manner most appropriate for each student. Deliberate teaching of critical thinking and meta-cognition helps students to develop complex thinking skills, while hands-on, active learning gives students first-hand experience and makes learning more relevant and engaging.

Since adolescents are just beginning to develop abstract thinking skills, teachers should engage them in connecting classroom lessons with real life issues. Work can include real audience outcomes, such as writing letters to the editor or taking oral histories of members of the community. These types of tasks require teenagers to apply their knowledge and skills to meaningful and relevant tasks.

Teachers can also push students to make connections between different subject areas and see how learning all subjects at secondary school is useful to them in life outside school. Integrating Information and Communication Technology (ICT) in all subject areas can further support acquisition of knowledge and also improve students' ICT skills.

Consider physical development—Teachers must respect and understand the physical changes that young people experience and allow for an open and honest discussions on issues related to development, puberty, and sexuality (Atkinson & Sturges, 2003). It is important for adults to encourage adolescents to talk about their feelings and fears regarding the physical changes in their bodies, and really listen to what they have to say. It is most helpful to avoid jumping in too quickly with advice or information (McNeely & Blanchard, 2009).

Teachers should build in time to stretch, take bathroom and snack breaks, and to use other opportunities to move around. Ideally, teachers should vary instructional methods to allow for physical activity and other movement within a class period (Atkinson & Sturges, 2003). Hands-on (e.g., experiential and project-based) and active learning (e.g., group work, role-play, turn-and-talk) experiences harness these methods and are especially conducive to the needs of adolescent learners.

Incorporate Collaborative and Social Learning—Several social learning theorists support the importance of social interaction in learning. In the middle part of the 20th century, Vygotsky, a Russian psychologist, examined how our social environments influence the learning process and suggested that learning takes place through the interactions students have with their peers, teachers, and other experts. In the 1970s, Albert Bandura established the theory of modern social learning, which suggests that people learn in a social context and that a key component is human connection. He explained that there are three variables in the social learning context—the learner, the behavior, and the environment—and each can influence the other. He advocated that learning can occur by observing others, through reinforcement, and through feedback (Bandura, 1971). Secondary school teachers should incorporate cooperative and collaborative learning, which is in line with social learning theory, into their teaching practice. This is particularly important for adolescent learners, whose focus on social and emotional concerns can sometimes get in the way of their academic engagement and success.

Teachers can create a learning environment that maximizes students' ability to interact with each other through discussion, collaboration, and feedback. Fostering classroom and team identity can establish a sense of community and belonging, and students can be invited to help plan events and to make important decisions. Class time can consist of group work that is balanced with partner work and/or independent work. Grouping should be flexible so that students are with different groups for different activities. Sometimes groups should be based on interest, other times ability, and other times social engagement. In addition, adolescents benefit when the school or program establishes clear expectations for social interactions among students.

Ensure emotionally safe learning space—Instructional approaches should ensure that students feel trusted and respected. This may include asking open-ended, non-threatening questions to help engage students, make them feel safe, and to help them think through ideas and options (APA, 2002). It may also include ensuring that students feel their voices are heard, which can be promoted by student-led initiatives, choice in assignments, and meaningful and timely feedback. Curricular experiences may include such activities as reading fiction and non-fiction related to identity development, reflective journal writing, writing personal memoirs, interviewing others to explore different interests and life choices, and watching coming-of-age films that feature a protagonist struggling to find him- or herself. In addition, teachers can use developmentally appropriate strategies that help adolescents feel safe and respected. This includes allowing students to "save face" so they are not embarrassed in front of their peers, or providing teens with space to think about and resolve issues privately. Another strategy is when adults actively practice behaviors that are encouraged in students, such as collaboration, cooperation, and tolerance.

Tackle moral and ethical problems—Moral and ethical development is fostered best through learning experiences that are focused on complex and real problems. As noted earlier, research shows that students engaged in tackling real world problems through various programs. Teachers and school administrators that incorporate techniques from the Expeditionary Learning program can engage students in service-learning that helps students become aware of themselves in relation to the world beyond school. Using elements from the Facing History and Ourselves program, addressed earlier, can help students connect historic lessons with current real world challenges. This allows students to ponder ethical dilemmas and consider possible responses, which helps students to refine their critical thinking skills as they clarify their thinking on complex problems such as building oil pipelines, the use of growth hormones and pesticides in farming, and sex and teen pregnancy.

5.2 School Level

A school environment that provides a safe place for students to acquire academic skills, along with practicing other skills needed for adult life, is an extremely important component for improving secondary education with adolescent development. Integration of adolescent development dimensions into the school structure and operation does not only aim at teaching adolescents their social role, but is in fact an important mechanism for them to achieve academic success.

Scheduling of the school day—The school day should take into account the physical development of adolescence, making sure that students have access to water and nutritious food during the school day, and that the schedule provides opportunities for physical activity and developing physical fitness, as well as for periods of rest (Atkinson & Sturges, 2003). In addition to a rich physical education curriculum, schools could design extended-day programs that embed athletics, dance, and other physical activities before and after the academic day. A range of tactile and physical experiences should be planned to help students channel energy, release stress, and develop greater focus.

Establishing school rules and culture—Establishing clear expectations for social interactions among students includes creating a school-wide culture that follows standards for behavior in a variety of school settings (the playground, the hallway, the classroom). It also includes direct instruction around soft skills to ensure that students develop competencies in areas such as self-awareness, self-management, social awareness, relationship skills, and responsible decision-making (CASEL, 2015). As students develop these competencies, they should have multiple opportunities to practice them throughout the school day. As discussed in Section 4.6.1, the Consistency Management & Cooperative Discipline® (CMCD®) Workshops can foster responsible and ethical social interactions, focusing on such things as bullying and sexual harassment. Opportunities for students to practice leadership, governance, and conflict resolution are important. Secondary schools can also involve students in developing a code of conduct or ethics to encourage them to take on the responsibility for managing the school culture.

Extra-curricular activities—Space for activities outside of regular academic subjects would help students apply the skills acquired in classes to real life issues and also develop their soft skills. Extracurricular activities can take place after school, or even over weekends and summer breaks to keep the students engaged in the school outside of regular school hours. Diverse options should be made available to students to meet individual differences in interests and to accommodate the need for experimenting with varied opportunities. This could include activities in fine arts, dance, music, physical education, field days, constructing models, engaging in simulations, and using manipulatives and games for learning.

Engaging adolescents in multiple exciting, productive, and healthy activities is also essential for their emotional development. As previously mentioned, adolescent brain chemistry, in which the limbic system and the amygdala develop first, rewards them for engaging in pleasurable activities. Even while knowing the risks of certain behaviors, adolescents still engage in unhealthy activities like drug and alcohol abuse, unsafe sexual behavior, and aggressive behavior because the pleasure senses are especially enhanced at this age, while rational thinking centers are less developed. Keeping students engaged in a variety of structured healthy but exciting activities in school is especially important since it can deter them from seeking these unhealthy activities.

Schools can also support specific initiatives that engage most students to help foster a sense of participatory school community and allow students to specifically develop their social and moral skills. This can include activities like student government, service-learning activities in the local community, and mock parliament or congress. These activities allow students to engage with each other in a structured and productive manner while also learning from peer-to-peer interactions and the community environment.

Additionally, the school environment should provide opportunities for youth to explore who they are and who they can be, and offer systemic strategies for developing students' current and future identity. This may include self-assessments, college and career exploration, and goal setting.

Teacher support—School leaders should provide physical and operational space to secondary school teachers to collaborate for problem solving and holistic development of their students. This is especially important in contexts where students interact with multiple teachers, each teaching a separate subject, during the school day. Teachers should be able to collaborate with one another to diagnose and support students; as discussed in Section 4.6.2, the BARR method offers some strategies that may help teachers combine monitoring and reporting efforts in order to ensure a student's success.

As mentioned earlier, programs like Expeditionary Learning, which establish formal advisory programs that match a small group of students with a teacher who will serve as their advocate and mentor, can ensure that every young adolescent is known well by at least one adult in the school (NMSA, 2010). When advisory groups meet regularly, students can discuss concerns and issues that may lie outside the academic curriculum, and can help them develop respect for themselves and others. As discussed above, an advisory program would be more successful and sustainable if teachers are provided with some extra incentives to take on the role (i.e., increased pay, more planning time, professional development training, etc.).

Parent and community engagement—Schools, especially secondary schools, are an important part of the community as they prepare citizens that will contribute to the economic and social development of the community in the very near future. Therefore, engaging community stakeholders in school curricula is key to meeting the needs of both the community and the students. School leaders should welcome parents to get involved in academic activities and to interact with teachers to not only monitor the progress of their children, but also to support the school in ensuring student success. For example, school administrators can engage parents in selecting new textbooks or offer opportunities for parents to tutor students or help with homework. Parents should engage in the operational aspects of the school as well. Parents can help with school maintenance issues, volunteer at school events, and give input to policy makers and administrators on the school's budget. Both academic and operational involvement help parents realize their role as partners of the school community.

School leaders should also provide opportunities to community members who may not have children in the school to participate in school activities. Community members could share their experience with social issues, give career talks, or mentor students. By engaging in the school, community members provide students with opportunities to see the linkages between schooling and participation in adult life. Community members in turn will understand the systemic reality of the schools and be able to make informed demands from policy makers for needed improvements.

5.3 System Level

Policy changes within multiple spheres of influence are crucial to allow schools and teachers to re-conceptualize teaching models at secondary school levels. These policy changes and system level reforms can signal a transformation in the way the government

thinks about secondary education and can create a supportive environment that allows teachers to modify their own practices.

School infrastructures—Access to secondary education after primary education completion is greatly hindered by the availability of nearby schools. In order to attend secondary schools, students living in rural regions, especially in sub-Saharan Africa, often have to relocate and move in with relatives closer to the cities or reside at boarding facilities. There are many reasons for ministries of education to improve access to secondary schools by establishing them in communities (for example, reducing transportation and other costs to the family, safety for girls, etc.), but characteristics of adolescent development are often not used as a rationale. During adolescence, students grow out of their childhood role and learn to adopt adult roles. Removing them from families and communities makes this learning process more difficult. When located close to the student's home, a school can facilitate this process of social development for the student and provide her a safe space to learn her adult role within the community.

When located within the community, secondary schools leaders, staff, and students can better interact with community members. They are able to complete service-learning projects that help them understand the very real problems that exist in their environment. It is also easier for parents and other community members to visit the school and have true local level engagement.

In addition, the architecture of the school itself should facilitate adolescent development in the various dimensions. For example, availability of a playground and other spaces for extracurricular activities can help students exercise. Social spaces outside the classrooms can provide an environment for students to engage in group tasks and healthy social activities. Provision of a library and ICT equipment allows them to learn the academic material in different ways, supporting cognitive development.

Curriculum—In most traditional education systems around the world, the secondary school curriculum is segmented into discrete subject areas within the academic track, or into separate technical and vocational education training (TVET) schools that serve students who do not plan to attain tertiary education. In the academic track, subject area knowledge bases are sequential and build on previous grade level content in order to prepare students for further education. What is often lacking, however, is the connection between the academic knowledge acquired in the classroom and the application to the real world. The recent move to include soft skills lessons in secondary schools has often resulted in additional courses to teach ICT and communication skills, in both the academic and TVET systems, instead of strategically integrating soft skills lessons within the existing curriculum.

As adolescents acquire more complex cognitive skills, they have the ability to think more abstractly and to apply the knowledge to their larger community. This is even more important given the emotional, social, and moral dimensions of development. Secondary education curriculums should integrate all dimensions of adolescent development within existing subject areas; this would not only help improve students' academic and technical

skills, but also increase the attainment of soft skills needed in professional and personal life.

To enhance a curriculum during adolescent development, more practical and real life examples should be included in teaching guides and textbooks. Opportunities for project-based learning should be integrated in multiple subject areas. Curricula should also give some autonomy to school administrators, teachers, and students to participate in curriculum development and to incorporate students' home and community environments in meeting learning objectives.

Policy makers should consider incorporating health education about physical changes adolescents experience and the tools to cope with these changes within early grades of secondary school rather than solely in later grades. As previously discussed, youth that are knowledgeable about these changes are better able to handle issues that may arise during this physical development stage.

Opportunities to practice adult roles and student voice—Since adolescence is the developmental stage in which youth are capable of understanding and developing their role in society at large and adult life, they should be active partners in their own education.

School systems should give students opportunities to develop appropriate understanding of societal value systems which can prepare them for adult roles. Policy makers should ensure that processes are in place to support students' interest in rules and fairness, and provide a structure for students to push boundaries and have their voices heard (e.g., peer mediation, class meetings, and student councils). When designing learning experiences for adolescence, adults must recognize and maximize the important interrelationship between adolescents' intellectual development and their moral reasoning (Scales & Roehlkepartain, 2003).

Secondary education policy should also directly engage youth in communicating their needs and relevance of secondary education. The education structure should provide room for students to get involved in their own schools and also at higher levels to voice their opinion and in turn practice their role as engaged citizens.

Teacher Education—In many developing countries, education for secondary school teachers concentrates on subject matter knowledge rather than pedagogical skills. This is often due to low academic abilities of the student-teacher candidates from their own secondary school education. It is only natural then that secondary school teachers teach their students the same way they had been taught. Modifying the teaching practices of secondary school teachers begins with their own education at the pre-service and in-service education programs. Teacher education programs need to incorporate course content on adolescent development and pedagogical knowledge on developmentally-appropriate teacher practices. Teachers in secondary school pre-service and in-service education programs will also need to be taught with some of these instructional practices so they can model their own teaching based on these instructions.

Teacher Support—Once teachers are in the classroom, it is also important to establish structures that allow them to adapt their lessons so that they are developmentally appropriate. Teacher supervision mechanisms should provide teachers with resources to handle emotional and social issues with students. Teachers should be provided with ample resources (time and compensation) to engage with parents and community members to help them situate students in the larger environment. Policy makers can also create mechanisms or professional networks for teachers to share knowledge and seek support from other teachers within school clusters or districts.

Policy makers should consider creating student advisor roles for secondary school teachers, as well as offering supplementary compensation for teachers taking on such roles. Since secondary school teachers usually specialize in a specific subject area and students end up having multiple teachers, the education structure inhibits any one teacher from having a holistic perspective of any given student. A student advisor role allows teachers to follow the academic and personal progress of a student and to liaise with other school staff to deal with issues. This is an important but time-consuming role, and teachers should not be expected to take this on without extra compensation and support.

Create mechanism for parent and community engagement—Parent Teacher Associations and/or School Management Committees should be engaged not only at the school level, but should also work with policy makers to improve secondary school learning. Parents and community members who interact with adolescents outside of the school environment should engage in a dialogue to inform policy decisions within secondary schools. For example, local education officials could invite school PTA members to participate in committees that can guide local reform processes. Parent groups could speak at school board meetings or schedule meetings with local and national education policy makers. National governments can develop regional and/or national level PTA consultation forums to support policy development and implementation process.

5. Conclusion

In this paper we have shown that adolescence is a distinct period of human development and its stages have implications for how youth learn. It is imperative for educators who are responsible for teaching adolescents to understand the changes students go through and how these changes can be used to benefit the learning process. As many countries around the world commit to expanding access to quality secondary education, policy makers should take adolescent development characteristics into account to ensure that secondary education systems meet the needs of all youth and help them thrive. Although further research is required to develop a set of best practices in achieving whole system reform, lessons from the evidence provided in this paper can be a starting point for policy makers, school administrators, and educators.

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