

## Chapter 7

# Adolescent Development: Taking a Closer Look at the Brain and Virtual Learning Experiences

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### **ABSTRACT**

*In the chapter, adolescent development, brain development, positive and negative effects of social media on academic achievements, and the educational experiences of young, virtual learners will be examined. Further discussion will entail the importance of social-emotional competencies found in learners that contribute and enhance students' overall positive functioning in academic settings. Pertinent research and literature related to the above stated themes, will also be explored, analysed, and discussed within the context of the chapter's framework.*

### **INTRODUCTION**

In the following chapter, adolescent development, brain development, positive and negative effects of social media on academic achievements and the educational experiences of young virtual learners will be examined. Further discussion will entail the importance of social-emotional competencies found in learners that contribute and enhance students' overall positive functioning in academic settings. Pertinent research and literature related to the above stated themes, will also be explored, analysed and discussed within the context of the chapter's framework.

### **ADOLESCENT DEVELOPMENT**

Human Development across the life cycle has key developmental milestones, socially, emotionally, physically and cognitively, that may or may not come with many trials and tribulations. Early adolescence is a time of complex transitions with increased responsibility and independence. These transitions and/or

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changes may often be difficult for young adults, as they are often accompanied by academic and social stress. These stressors go hand in hand with emotional stress and are interrelated to one's overall well-being. With the many changes that adolescents go through, this period of development not only is a significant period for their learning but also for risk behaviors related to mental health, physical health, alcohol and substance use, accidents, trauma, sexual health, and nutrition (Loschert et al., 2019).

As the adolescent brain prepares for adulthood, its development inherently is in alignment with the learning environment and experiences of adolescents, that coincide with the reward systems that affect the motivation of certain adolescent behaviors (Loschert et al., 2019). Young adults are developing their understanding of social surroundings personal identities, career interests that all influence the mindset of one's abilities to be successful learners (Loschert et al., 2019). According to Loschert et al. (2019) adolescents are less likely to engage in academic learning if school environments do not promote growth mindsets, connect academic learning to students' interests and values, and allow adolescent students to build supportive relationships with their peers and adult educators. It is imperative that educators understand the need for adolescents to seek learning environments consistent within the social and cultural contexts of their lives. Encouraging growth mindsets, validating students' abilities, knowledge and skill, all assist academic progress.

## **The Adolescent Brain**

The human brain weighs about three pounds and contains over ten billion neurons and another hundred billion support cells. Eventually the brain forms over a hundred trillion connections. Different parts of the brain develop at different rates. For example, the emotional/pleasure part (limbic system) of the brain develops before the logical/decision-making part (pre-frontal cortex). Adolescent brains are more sensitive to dopamine, produced when risks are taken and oxytocin, linked to social rewards. Such rewards can be achieving an academic goal, winning a race, or kissing a mate. All of these stated experiences create a natural high in the brain. This exact feeling of pleasure is enacted in computer based instruction. For example, when computer feedback indicates a correct prediction or answer, dopamine is then released. Thus, with every surge of dopamine, a state of happiness is triggered and the craving for more, fuels student activity (Feinstein, 2011).

In turn, this quest for dopamine becomes also a challenge for student learning. Educational institutions must consistently improve educational content rigorously; as once something is learned the amount of dopamine released becomes weaker and weaker with continued practice (Willis, 2011). Thus, educators must increase the complexity of a task, to continue to be a motivating factor for students to continue the activity (Cohen et al., 2010).

The underdevelopment of the frontal cortex leads to more "gut" reactions than reasoning and is more likely to use the amygdala (emotions) than the prefrontal cortex (reasoning) for information processing. The frontal cortex undergoes significant changes during adolescence and is not fully developed until mid-20's. The prefrontal cortex is part of the frontal lobe and helps with impulse control, judgments, reasoning and one of the last areas of the brain to develop fully. The temporal lobes of the brain control hearing, understanding of speech, sorting new information and short-term memory and contains the amygdala and hippocampus; matures around 18-19 years of age. The amygdala of the teenage brain is the emotional part of the brain that is responsible for processing one's feelings, in contrast to the developed adult brain that relies on the frontal lobes, associated with higher order thinking. As a result, adults are able to make reflective decisions, logically analyze information, and temper the irrational amygdala.

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