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21st Century Pedagogy of a Classroom Environment of Non-Cognitive Learning Based on Positive Psychology

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Abstract

This study examined modern pedagogy and non-cognitive learning based on positive psychology. It sought to address the problem of connecting all non-cognitive factors together into a encompassing modern pedagogy paradigm. The purpose is to unite the various and new research on non-cognitive factors to create a new pedagogy paradigm of positive psychology for the school environment. Meanwhile, it addressed the five research questions of (i) should non-cognitive learning factors should be included in the 21st century pedagogy paradigm, (ii) what role should grit have in the 21st century pedagogy paradigm, (iii) what role should mindsets have in the 21st century pedagogy paradigm, (iv), what role should character have in the 21st century pedagogy paradigm, and (v) what are the effects of positive psychology on the classroom educational environment? A secondary analysis of literature was used as the methodology. The researcher confirmed that positive psychology should be the framework for this new pedagogy, and that there are strong associations between non-cognitive factors and positive outcomes for students. Recommendations and implications for further research and development are discussed.

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DEDICATION

This thesis is dedicated in loving memory of Dr. Gene K. Emanuel who's influence is still felt today by all his former students or visitor's to UVI's Virgin Islands Caribbean Cultural Center, containing his large collection of Caribbean cultural artifacts donated by his estate. A large number were from the campus mecca of his office that he shared with students, holding informal classes on any subject of interest. Professor Emanuel shared his passion and excitement for the topic of every class he taught that infect his students. He treated his students as equal colleagues in a journey of learning, that combined with his listening and learning from his students. His classes would range from the intellectual to bombarding all of the student's sense's using all forms of media to communicate. He had a vast collection of resources not found in normal course material to share with students. In the hierarchy of academia he aligned him self as a defender of the student class. In short Gene was the most unique, amazing, fun, challenging and outstanding professor I've had the privilege of sharing a classroom with.

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I must further recognize four scholars: Dr. Edward Deming, the father of the quality movement, Dr. Howard Zinn, an activist and historian, Dr. Martin Seligman, the father of positive education and the first master's program devoted to the subject,

and Dr. William Glasser for both reality and choice theory and his 1969 book *Schools Without Failure,* which sparked my interest in education reform. Their research and works have profoundly affected my life, and I am a disciple of each one's movements.

CHAPTER 1

INTRODUCTION TO THE STUDY

"The test score accountability movement has pushed aside many of these so called "non-cognitive" or "soft' skills" and they belong back on the front burner" (Easton, 2012, p. 19).

This quote comes from the director of the Institute of Educational Sciences, U.S. Department of Education, one of the strongest cognitive divisions in the department, which mostly focuses on the cognitive assessment of education. It has been over twenty years since Daniel Goleman (1995) published his seminal work, *Emotional intelligence: Why it can matter more than IQ*, with its finding that emotions social and emotional learning theories, as a noncognitive factor, they have had not found any significant in its rightful place in the present educational pedagogy practice.

In 2012, Paul Tough published his book, *How children succeed: Grit, curiosity and the hidden power of character*, based on new scientific psychological and educational research that found that grit, curiosity, and character matter more than cognitive skills in achieving success in life. This book spawned several major studies advocating changes in pedagogy in the twenty-first century to include these skills. The problem is that no program has integrated all of this new research into a new pedagogy paradigm. Researchers have also used a plethora of different labels and definitions for the same noncognitive factors. Further, there is disagreement concerning what the different factors refer to. For example, Heckman and Kautz (2013) listed alternative terms to describe these skills, including personality traits,

personal attributes, soft skills, noncognitive abilities, socioemotional skills, and character skills. They also claimed that character is a skill rather than a trait. Further, student changes in self-control have been labeled as self-regulation, which has now become an important part of academic success and has come to include deferred gratification. In the past, self-regulation in schools has been mostly concerned with behavior and discipline in the classroom. Noncognitive behaviors are defined, in the educational context, as skills representing the "patterns of thought, feelings and behavior" (Borghans, Duckworth, Heckman, & Weel, 2008) of individuals that may continue to develop throughout their lives (Bloom, 1964) and that contribute in some way to the students' educational learning processes. This research paper will use the label "noncognitive factors," because factors are malleable. These will be distinguished from the psychology terminology of "traits," which are believed to be of a heritable nature, conveying a sense of permanence or immutability.

"Grit" has become a buzzword in education since Angela Duckworth (2007) first coined it. Since her work, grit has been explored by many studies (53 peer-reviewed publications between 2005 and 2015); however, some studies label this factor as engagement, determination, tenacity, persistence, volition, or perseverance, while other research labels it as a character trait. The National Research Council (2012) categorizes noncognitive factors, including grit, within the domain of interpersonal competencies, identifying this domain being one of three domains of skills that the council labels as *deeper learning*. The University of London Institute of Education (Joshi, 2014) labels the noncognitive skill of perseverance as a sub-characteristic along with engagement. Others

believe that these factors are part of an individual's emotions. Regardless of the label, all are malleable to learning or change in the new twenty-first century pedagogy paradigm.

This labeling is a phenomenon that school engagement researchers (Reschly & Christenson, 2012) identify as the "jingle/jangle" problem, which was earlier labeled in the context of mental measurement as the "Jangle Fallacy" (Kelly, 1927). It has only grown with the new research on noncognitive factors. (See Appendix A for a short history.)

This thesis seeks to address the problem of connecting all of the noncognitive factors together and has identified the following areas as aspects of the new twenty-first century pedagogy paradigm: academic mindsets, agency, agreeableness, attributions, attitude, academic tenacity, attentiveness, conscientiousness, character, character strengths, character traits, constructs, curiosity, deeper learning, determination, dispositions, drive, effort, empathy, engagement, emotions, emotional intelligence, experience, extrinsic and intrinsic motivation, flow, focus, guts, grit, fixed mindset, gratitude, growth mindset, gumption, habits, hardiness, humility, inspiration, intrapersonal and interpersonal skills, integrity, locus of control, mindfulness, motivation, neuroticism, openness to experience, persistence, perseverance (toward long-term goals), preferences, resilience, self-control, self-efficacy, self-esteem, self-regulation, personality traits, positive psychology education, prudence, skills for success, paradigm shifts, self-affirmation, social emotional learning, soft skills, tenacity, thrive, trust, virtues, temptation, volition, wellness, willpower, wisdom, and zest.

The positive psychology educational classroom environment was identified as the foundation for introducing this new noncognitive pedagogy paradigm. Positive psychology is the scientific study of positive experiences and positive individual traits as well as of the institutions that facilitate their development. The major goals of the positive psychology educational program are 1) to help students identify their signature character strengths and 2) to increase students' use of these strengths in day-to-day life. The program targets strengths (e.g., kindness, courage, wisdom, perseverance) that are described in the Inventory of Strengths (VIA) classification (Peterson & Seligman, 2004). The founder of this classification system, Martin Seligman (2000), suggested that positive psychology can best be studied through three pillars: (a) the study of positive emotion, (b) the study of positive individual traits, and (c) the study of positive institutions (Seligman, Steen, Park, & Peterson, 2005). Through these pillars, the study of positive psychology has begun to emerge in educational settings (Seligman, 2011). In Australia, positive education has become a new degree track at the university level for doctoral candidates.

Positive psychology is also considered to function at three distinct but interacting levels, the subjective, individual, and group levels (Carr, 2004). Positive psychology also has advantage of seeing emotion and cognition as two complementary aspects of the mind that will react positively to this psychology's interventions.

Positive psychology is a newer school of psychology that comprises several aspects ranging from mindfulness, which traces its roots back to the 200-year-old Vipassanā movement founded by the Burmese monk Medawi, to Carol Dweck's

(2006) Mindset and her new Brainology® program, which teaches students to adopt a growth mindset. One definition by Gable and Haidt (2005) sees positive psychology as "the study of the conditions and processes that contribute to the flourishing or optimal functioning of people, groups, and institutions" (p. 104).

One of the most distinguished international educationalists, Sir Ken Robinson, was an advocate for "the other R's," reflection, relationships, and resilience, and for creativity in schools, as well as an early advocate for the new twenty-first century pedagogy. Robinson (2009) argued that "the economic and intellectual assumptions on which our systems of education have been built originated in another time and for other purposes" (p. 198) and "we cannot meet the challenges of the 21st century with the educational ideologies of the 19th" (p. 1).

Brzycki (2013) suggested, "Modern schooling currently reflects 19th-century methods and processes that reinforce the old paradigm of producing unhealthy people who are becoming more limited in their competencies" (p. 94). Dr. Brzycki thinks that twenty-first century education requires a Copernican shift, and he advocates for his new iSelf model introduced in his new book, *The self in schooling theory and practice: How to create happy, healthy, flourishing children in the 21st century.*

On September 24, 2010, the Oprah Winfrey Show opened with Newark Mayor Cory Booker announcing an initiative to "create a bold new paradigm for educational excellences" (Oprah, 2010). Another guest, Governor Chris Christie of New Jersey, said that this paradigm would start with Newark public schools and become a national model. The last guest, Mark Zuckerberg, the young founder of Facebook, said he was going to write a check for 100 million dollars, to be matched by another $100 million grant, to

turn the Newark School system into a "symbol of educational excellence for the whole nation" (Russakoff, 2015).

This new model was based on a top-down approach that addressed only the traditional three R's of reading, writing, and arithmetic and advocated the traditional reform targets of teacher accountability, more charter schools, and changes to union contracts to allow the flexibility to reward and fire teachers. Now, five years later, a new 2015 best-selling book, *The prize: Who's in charge of America's schools,* by Dale Russakoff, examines the results of this $200 million investment through the lens of a new model. He describes the failures of this top-down model and gives it a C- grade. However, he also notes one exception: Sparks Academy, a Knowledge is Power Program (KIPP) elementary charter school. The KIPP charter school network combines the traditional three R's with positive psychology educational principals, including seven-character strength, zest, grit, optimism, self-control, gratitude, social intelligence, and curiosity, it also includes mindsets as part of its students' noncognitive curriculum.

A 2011 educational monograph, "Supporting students: Investing in innovation and quality," by the Bill & Melinda Gates Foundation, stated, "We have been investing in research that will identify and build academic tenacity in students. We also hope to better understand and invest in learning environments that foster scholastic growth and perseverance" (p. 13).

Recently, Steve Jobs' widow, Laurene Powel Jobs, has invested $50 million into a new initiative, *XQ: The Super School Project,* to create a new school model that starts from scratch to address the new twenty-first century needs including those of the high-tech post-factory worker. This initiative is seeking "audacious" ideas to remake American

high schools. Part of *XQ* is the *Explore the XQ challenge Model: Students in the 21st Century.*

The *P21 Partnership for 21st Century Learning* has within its framework new essential skills for students that include new key subjects and themes that expand and go beyond the traditional three R's. North Carolina was the first state to join and start implementing new skills. It identifies four essential skills: critical thinking and problem solving, communication, collaboration, and creativity and innovation.

A 2013 draft from the U.S. Department of Education Office of Technology, *Promoting grit, tenacity, and perseverance: Critical factors for success in the 21st century* (Cator & Adams), examines the use of a core set of noncognitive factors, including grit, tenacity, and perseverance, to help students meet twenty-first century challenges.

A recent America Education report (Tooley & Bornfreund, 2014), *Skills for success: Supporting and assessing key habits, mindsets, and skills in preK,* found, in its executive summary, that academic tenacity, emotional intelligence, and perseverance toward long-term goals are the kinds of mindsets, habits, and non-technical skills that are important for not only academic success but also professional and personal success.

The University of Chicago Consortium on Chicago School Research's *Teaching adolescents to become learners, the role of non-cognitive factors in shaping school performance: A critical literature review* (Farrington et al., 2012) explored the role and potential of noncognitive factors in transforming educational practices. The most recent TransformEd study on noncognitive factors coined the term "MESH"

(mindsets, essential skills, and habits) to encompass the subset of noncognitive skills that research has linked to student success (Gabrieli, Ansel, & Krachman, 2015).

Dr. Daniel J. Siegel, an advisor to schools, a neuropsychiatrist, and the coauthor of the parenting guide, *The whole-brain child* (2011) and *Brainstorm: The power and purpose of the teenage brain* (2013), said there were three other R's: reflection, relationships, and resilience. He argued that schools should teach these too.

The No Child Left Behind Act (NCLBA) has been blamed for the move to the cognitive-only school program, which emphasized the standardized testing of students. The NCLBA has now been replaced with the Every Student Succeeds Act (ESSA), signed into law by President Obama on December 10, 2015. This act will transfer more power to individual states. It also expands the definition of school success by which schools will be judged. Specifically, it requires states to use at least one indicator of school quality or student success, thereby allowing for meaningful differentiation in school performance that will show in the schools' academic data and accountability systems. States can now choose to add and incorporate factors like noncognitive traits, social emotional skills, and other noncognitive factors into their curriculums and school quality scales.

It is time to integrate all of this recent research on the noncognitive side of human behavior, which has been referred to by psychologists as including both personality traits and soft skills, into a new twenty-first century pedagogy paradigm.

Purpose of the Study

The purpose of this study is to bring together the different and new twenty-first century educational research on noncognitive factors to create a new pedagogy

paradigm of positive psychology for the school environment. This new pedagogy paradigm will be founded on a critical analysis of the most recent literature. It will also examine five research questions.

Research Questions

1. Should noncognitive learning factors should be included in the twenty-first century pedagogy paradigm?
2. What role should grit have in the twenty-first century pedagogy paradigm?
3. What role should mindsets have in the twenty-first century pedagogy paradigm?
4. What role should character have in the twenty-first century pedagogy paradigm?
5. What are the effects of positive psychology on the classroom educational environment?

Significance of the Study

The programs A Nation at Risk, the Race to the Top, No Child Left Behind, the Common Core Curriculum, and Next Generation Science Standards, with standardized testing including the National Assessment of Educational Progress and the Iowa Tests of Basic Skills, are all designed to test students for mastery of the Common Core, with many schools now shifting to the newer Smarter Balanced Assessment Consortium (SBAC) or the Partnership for Assessment of Readiness for College and Careers (PARCC). These high-stakes standardized tests have put great pressure on states, local school districts, school principals, teachers, and students alike to do well on such tests. This context has created a change in traditional educational goals, particularly a shift to the test score accountability movement at the expense of the noncognitive curriculum, and this shift has led collectively to a crisis

in twenty-first-century education. One example is the cheating scandal in Atlanta, Georgia, public schools in which both teachers and administrators were sentenced to prison for organized cheating on standardized testing student scores.

These changes have been exacerbated by reduced budgets that in many schools have resulted in the elimination of extracurricular classes including sports, arts, and music classes. The number of tests starting in kindergarten and the amount of class time devoted to these tests reached the tipping point on October 24, 2015, when President Obama called for reducing testing and setting a limit on the number of tests given to students. These changes should help schools that now focus solely on the traditional "three R's" to meet the tightening NCLB standards, particularly now with the change to the new Every Student Succeeds Act, which gives states more flexibility to add noncognitive programs.

Furthermore, the origination of the Program for International Student Assessment (PISA) in 1997 and its first test results in 2000 served as America's "Sputnik of the twenty-first century," reminiscent of the twentieth-century panic of the American public, after Sputnik was launched, over a large technological gap between the United States and Soviet Union. This resulted in a call to increase the sciences curriculum, which led to today's science, technology, engineering and mathematics (STEM) educational track. When in 2000 PISA test results, American students ranked in the middle of students from other industrial nations in math, science, and reading performance, this strengthened the cognitive-only pedagogy movement. However, in 2012, PISA added component tests designed to capture aspects of noncognitive skills, including openness, locus of control, and motivation

(Organisation of Economic Co-operation and Development, 2013b), thus requiring the addition of noncognitive learning into the new pedagogy. In 2017, the National Assessment of Educational Progress (NAEP), a test for students in the fourth, eighth, and twelfth grades which has been known as the nation's report card, will add questions about students' social-emotional skills, with PISA to follow them soon.

Finally, today's students and employers both complain that graduates are entering the twenty-first century workplace without the necessary skills due to a lack of noncognitive factors in the present pedagogy (Pellegrino & Hilton, 2012).

There is now a nationwide concern over the importance of bringing back or introducing noncognitive factors to play a significant role in the new pedagogy, with many recent reports directed at noncognitive factors (e.g., Sheldon & Lyubomirsky, 2006; Rosen, Glennie, Dalton, Lennon, & Bozick, 2010; Orehek, Bessarabova, Chen, & Kruglanski, 2011; Cator & Adams, 2013; Farrington et al., 2012; National Research Council, 2012; Tooley & Bornfreund, 2014; Kautz et al., 2014; Gutman & Schoon 2013; Nagaoka et al., 2013; Gabrieli et al., 2015).

Perhaps more importantly, a report from America's Promise Alliance, *Don't call them dropouts* (2014), found the top reasons for stopping school to be the following: failing too many classes (27.6%), being bored (25.9%), school not being relevant to students' lives (20.3%), and students having to make money to support their families (19.0%). The first three reasons (73.8%) could be addressed through a new twenty-first century pedagogy.

The recent passage of the Every Student Succeeds Act makes this study even more significant, since this act will allow states to add noncognitive factors to students' curriculums.

This thesis will provide a critical review of noncognitive skills as they relate to education, representing the other side of the cognitive educational coin. The thesis ties together the extant new research that uses different labels or definitions for the same noncognitive factors. It will also propose which part of this new research should be included in the twenty-first century pedagogy paradigm and will illustrate that positive psychology is the best vehicle by which to deliver this research to the classroom environment.

CHAPTER II

METHODOLOGY

The methodology for this thesis is critical literature review of non-cognitive skills and positive psychology in the classroom environment. The research studies were found using the EBSCOhost database, the Education Resources Information Center and Google Scholar. HHS Public Access (peer-reviewed and accepted for publication author manuscripts) was also used. Other methods that were used to find peer-reviewed articles included a review of educational conferences for the most recent APA, ACA, and IPPA conventions. Additionally, the ACA VISTA online digital collection of peer-reviewed conference papers from 2004 was utilized. The researcher also examined the International Positive Psychology Association, Learning Library of Peer-Reviewed Articles; the ProQuest Dissertations and Thesis Database; and recent books on subject-oriented and related behavioral changes that could be adapted to students of this new pedagogy. In order to be considered for use in this

study, the articles must have been published in peer-reviewed journals and must not have been restricted to any geographic or cultural group. The articles were also limited to studies with only human participants.

The peer-reviewed articles were restricted to the past 10 years, such that the study covers the period from 2004 to 2014, with the exception of certain classical scholars in the fields of psychology and education, such as Alfred Adler, Alfred Binet, Benjamin Bloom, Mihaly Csikszentmihalyi, Erik Erikson, Paulo Freire, Sir Francis Galton, Harold Gardner, William James, Lawrence Kohlberg, Abraham Maslow, Jean Piaget, Carl Rogers, Martin Seligman, Charles Spearman, Edward Thorndike, and Lev Vygotsky.

The EBSCOhost database and Google Scholar were searched using the following key terms: (a) "21st Century education," (b) "21st Century learning skills," (c) "21st Century classroom," (d) "Skill to prepare students for future," (e) "Positive psychology education," (f) "Positive Psychology in classroom", (g) Positive classroom environment", (h) "Positive psychology and motivation," (i) "Academic success," (j) " "Non-cognitive factors," (k) "Non-cognitive skills" (l) "Non-cognitive abilities," (m) "Self-efficacy of students," (n) "Grit," (o) "Character education," (p) "Mindset learning," (q) "Academic mindset," (r) "Classroom motivation," and (s) "Student motivation." All of the results from these searches were examined. Then, the articles were categorized into recurring and narrowing themes: first, 21st century pedagogy; second, positive psychology in the classroom; third, positive psychology traits, grit, and character; and last, mindset and its relation to student achievement. They were then organized in order of presentation. Additional methods were used to

find peer- reviewed articles. Research studies were chosen if they (a) addressed 21st century pedagogy, (b) examined how positive psychology can be used in various types of classroom environments, (c) discussed positive motivational tools for the classroom, (d) examined non-cognitive skills, (e) covered self-efficacy, (f) discussed the student mindset, and (g) explored character education.

Several books have been published based on research into different factors of non-cognitive personal development for increasing success in life. These factors could be applied as soft skills within a new pedagogy paradigm; thus, relevant books were reviewed in more depth. These books included *The marshmallow test: Why self-control is the engine of success*, by Walter Mischel (2014); *The power of habit: Why we do what we do in life and business,* by Charles Duhigg (2012); *Mindfulness,* by Ellen J. Langer (2014); *Mindset: The new psychology of success: How we can learn to fulfill our potential,* by Carol S. Dweck, Ph.D. (2006); *The element: How finding your passion changes everything,* by Ken Robinson, Ph.D. (2009); *Distracted: The erosion of attention and the coming dark age,* by Maggie Jackson (2008); *Iconoclast: A neuroscientist reveals how to think differently,* by Gregory Berns (2010); *Drive: The surprising truth about what motivates us,* Daniel H. Pink (2009); *Influence: The psychology of persuasion*, Robert B. Cialdini, Ph.D. (2007); *Willpower: Rediscovering the greatest human strength,* by Roy F. Baumeister and John Tierney (2009); *The power of your child's imagination: How to transform stress and anxiety into joy and success,* by Charlott Reznick, Ph.D. (2009); *Opening minds using language to change lives,* by Peter H. Johnston (2012); *Fostering grit: How do I prepare my students for the real world?* by Thomas Hoerr (2014); *Gumption,* by Lisa

M. Rose (2005), *How children succeed: Grit, curiosity, and the hidden power of character,* by Paul Tough (2012); and *Grit: The power of passion and perseverance,* by Angela Duckworth (2016).

Even though the study of positive psychology in education is relative new, a large number of articles and a significant body of research investigating this subject are available, largely populated during the past six years. The majority of these articles have been experimental studies conducted by their authors. A few important articles have reviewed previous research on the use of positive psychology-based learning and motivational interventions within the school setting. These studies were limited to articles that provided some means of relating the impact of non-cognitive skills, positive psychology, motivation and mindset in the school environment. These review studies have been examined in order to gain a better understanding of the new 21st century pedagogy of non-cognitive skills.

In this research, we will evaluate other research findings using the social science research interpretation of correlations developed by Cohen (1988), in which a correlation of 0.20 is considered small, a correlation of 0.50 is considered medium, and a correlation of 0.80 is considered large. Furthermore, essential measurement terminology was adapted from the *Standards for Educational and Psychological Testing* (AERA, APA, NCME; 2014):

- *Construct.* The concept, characteristic, skill, competency, or attitude that a test is designed to measure.
- *Operationalization*. The process of strictly defining variables into measurable factors.
- *Validity*. The degree to which accumulated evidence and theory support specific interpretations of test scores entailed by proposed uses of a test.
- *Reliability*. The degree to which test scores for a group of test takers are

> consistent over repeated applications of a measurement procedure and, hence, are inferred to be dependable and repeatable for an individual test taker; the degree to which scores are free of errors of measurement for a given group.

For this study, we will use the term *factors* as an umbrella for all the other terms, including ones referring to soft skills, used by other non-cognitive researchers.

CHAPTER III

REVIEW OF THE LITERATURE

The literature review begins with some historical and classical research in the fields of statistics, research design, assessment, intelligence, education, and psychology. The review covers twenty-first century noncognitive educational research as well as research on positive psychology in the classroom environment. The literature has been organized, first, using important historical foundations and then using categories correlated to the relevant research questions to ask in this study:

1. What noncognitive learning factors should be part of the twenty-first century pedagogy paradigm?
2. What role should grit have in the twenty-first century pedagogy paradigm?
3. What role should mindsets have in the twenty-first century pedagogy paradigm?
4. What role should character have in the twenty-first century pedagogy paradigm?
5. What are the effects of positive psychology on the classroom educational environment?

Historical Foundations

The scientific debate over nature versus nurture was first proposed in 1875 by Sir Francis Galton (1892). Today, scientists like Gilbert Gottlieb (1998) have shown that the reality may lie in a combination of both, since it is possible for the

environment to trigger gene activity that effects behavioral change. Today we face the same debate over emotions; some emotions, like fear, are considered inherited survival emotions, while others are considered unmalleable. In his 1968 monograph, *Personality and assessment*, Walter Mischel introduced the acrimonious "person-situation" debate, which questioned whether the person or the situation is more influential in determining a person's behavior. The behaviorist (situationism) and personality psychologist (trait theory) perspectives remained at odds until situationism prevailed, ironically, due to Mischel's (1989) new research on the self-control and delayed gratification of children (i.e., the so-called "marshmallow experiment"); this research tipped the scales back to the personality side and created a new interactionist perspective in which both person and situation contribute to human behavior. Behavioral theorists and cognitive theorists also debate how the brain works and what the methods are that may bring about changes in students. Finally, different perspectives also exist concerning the connection between emotion and cognition, with some now believing that these are different sides of the same coin. In sum, the field of developmental psychology is now the foundation of most educational psychology theories, including social constructivism in education.

Many of the new theories on the importance of noncognitive traits (besides IQ) in education, such as habit, focus, and distractions, are not original; they have been proposed by some of the leaders of early educational theory, including Alfred Binet (1916), in addressing student learning. According to Binet (1916), one

> ...admits of other things than intelligence; to succeed in his studies, one must have qualities which depend on attention, will, and character; for example, a

> certain docility, a regularity of habits, and especially continuity of effort. A child, even if intelligent, will learn little in class if he never listens, if he spends his time in playing tricks, in giggling, is playing truant. (p. 254)

In 1936, Gordon Allport and H. S. Odbert developed the Big Five Character Traits theory. In 1946, Raymond Cattell conducted new research that resulted in a new theory of personality with sixteen factors. The origin of the idea that achievement requires "soft" or "noncognitive" skills in addition to cognitive skills was originally advanced by David Harris (1940).

Almlund et al. (2011) stated, "For cognition, there is a fairly well-established set of terminologies and conventions. Aptitude tests are designed to measure differences in the rates at which individuals learn (i.e., fluid intelligence). Achievement tests are designed to measure acquired knowledge (i.e., crystallized intelligence)" (p. 57). Across communities of practice and research traditions, inconsistency in conceptual terminology is a barrier to the collaboration and progress of noncognitive factors. Many studies use one or more of three interchangeable labels: traits, skills, and factors. In this research study, it will use the label "factors."

Character education in America can be traced to *The New England primer,* first published by printer Benjamin Harris in 1687. The term "positive psychology" originated with Abraham Maslow, who first coined the term in his seminal 1954 book, *Motivation and personality* (p. 354).

Martin Seligman is the father of positive psychology. His theory, unlike other psychological theories, is based on prevention instead of treatment. It teaches optimism, resilience, happiness, and lifelong wellness. The co-founder of positive

psychology is Mihaly Csikszentmihalyi (1990), who developed the theory of flow, which can help eliminate boredom, a major enemy of education in the classroom. At the University of Pennsylvania in 1967, Seligman developed his theory of learned helplessness by conducting experiments using conditioning on dogs. His results contrasted with B.F. Skinner's (1961) predictions on behaviorism, which then had implications for educational practices. Seligman (1995) then collaborated with renowned educators Karen Reivich, Lisa Jaycox, and Jane Gillham to author *The optimistic child: A revolutionary program that safeguards children against depression and builds lifelong resilience.* A main component of his theory was the use of the explanatory style by parents and teachers in addressing children. In 1999, the U.S. Department of Education gave Seligman a grant to develop a program to combat an epidemic of depression among young people through prevention and resistance. Later, Christopher Peterson, the co-founder of positive psychology, developed the Penn Resiliency Program (PRP). In 2004, Peterson and Seligman developed the idea of a "taxonomy of good character," which they published in *Character strength and virtues: A handbook and classification*, which was positioned as a positive psychology version of the APA's *Diagnostic and statistical manual of mental disorders* (DMS). In 2007, Angela Duckworth coined the term "grit." Paul Johnson (2012) and Paul Tough (2012) are just two of the recent researchers who now stress the importance of word usage in affecting children's learning self-efficiency. A large number of new theories, such as that by Carol Dweck (2006), have their roots in the theories of Albert Bandura (1997), which include aggression, social learning theory, moral agency, social cognitive theory, and self-efficacy theory. These

have served as the bases of several new theories, such as the mindset theory (Dweck, 2006).

Psychologists (e.g., Almlund, et al., 2011; Duckworth & Yeager, 2015; Poropat, 2009) have constructed a relatively well-accepted "Big Five" taxonomy of noncognitive skills, utilizing the acronym O.C.E.A.N.: **o**penness to experience, **c**onscientiousness, **e**xtraversion, **a**greeableness, and **n**euroticism. Conscientiousness is the factor that most applies to education. The conscientiousness factor comprises reliability, thoroughness, carefulness, and vigilance as well as the desire to do tasks well, be organized and efficient, act dutifully, be self-disciplined, be hardworking, be organized, follow planning actions, and aim for achievement. In a meta-analysis, Poropat (2009) found the impact of conscientiousness on academic performance to be similar to the impact of intelligence. Furthermore, Almlund et al. (2011) found, "Of the Big Five, conscientiousness best predicts overall attainment and achievement…Conscientiousness predicts college grades to the same degree that SAT scores do" (p. 127). They also found that traits related to conscientiousness play an important role in predicting test score achievement, above and beyond cognitive ability. Further, research has found that "conscientiousness predicts years of schooling with the same strength as measures of intelligence" (Almlund et al., 2011, p. 20).

The concept of noncognitive learning stems from Nobel prize-winning economist James Heckman (Heckman & Rubinstein 2001), who popularized the term *noncognitive.* His research argues that beyond academic knowledge and technical skills, noncognitive factors such as motivation, time management, and self-regulation

are critical for later-in-life outcomes, including career success. There is still disagreement on the contrast between cognition and personality, and some researchers (Kyllonen, Walters, & Kaufman, 2005) have found what they label "quasi-cognitive" traits.

The major modern educational psychology literature was reviewed as a potential foundation for the new twenty-first century paradigm pedagogy. This literature is based on the research and theories of John Dewey (1902), Abram Maslow (1954), Jean Piaget (1952), Lev Vygotsky (1986), Erik Erikson (1968), and Lawrence Kolberg (1958). However, one fault with these theories is the lack of female subjects in their corresponding research studies. Most of these early psychological theories were based on constructionism and cognitive-based theories. The first intelligence testing was done by Alfred Binet (1916), who developed the IQ test. This was followed by Raymond Cattel's (1963) theory of fluid intelligence, Paulo Freire's (1970) theory of inclusive language, Howard Gardner's (1983) theory of multiple intelligences, and Robert Sternberg's (1998a) triarchic theories of intelligence and metacognition (1998b).

Recently, more private foundations have been initiating programs intended to push the frontiers of theory, measurement, and practice surrounding these noncognitive factors. For example, the Bill & Melinda Gates Foundation, the Raikes Foundation, the Lumina Foundation, the Stupski Foundation, the Spencer Foundation, the Moore Foundation, and the MacArthur Foundation have all initiated programs or given grants facilitating significant advances through new research. In 2010, the William and Flora Hewlett Foundation used its research to promote and finance a set

of educational outcomes labeled “deeper learning,” leading 500 high schools in 10 school reform networks nationwide to use “deeper learning” practices. The Gates Foundation has also conducted a large research study on the cognitive and noncognitive traits of high school students, which is currently undergoing peer review in preparation for publication.

Twenty-first Century Noncognitive Learning Factors

The 2012 PISA report (OECD, 2013c) of the last test results revealed findings related to noncognitive factors including happiness, well-being, resilience, anxiety, drive, engagement, motivation, mathematics self-beliefs, locus of control, self-efficacy, perseverance, intrinsic and instrumental motivation, perseverance, engagement, sense of belonging, openness to problem solving, attitudes toward school, and intrinsic and instrumental motivations to learn mathematics. The report also stated that “across most countries and economies, socio-economically disadvantaged students not only score lower in mathematics, they also have lower levels of engagement, drive, motivation and self-beliefs” (OECD, 2013c, p. 9). However, disadvantaged students with high resilience break this link, showing much higher levels of perseverance.

Cator and Adams’ (2013) seminal research literature review of the role of noncognitive factors in educating students offered two central conclusions, including that “across the board in research, practice, policy, industry, and popular culture, there is an emerging and convergent recognition that non-cognitive factors—and particularly grit, tenacity, and perseverance—should play an essential role in evolving educational priorities” (p. 75). Similarly, they noted, like other researchers (e.g.,

Borghans et. al., 2008; Farrington et al., 2012; Gabrieli et al., 2015; Heckman et al., 2007; Kautz et al., 2014; Moffitt et al., 2011; Spengler et al., 2015) that "a growing body of research suggests that noncognitive factors can have just as strong an influence on academic performance and professional attainment as intellectual factors" (Cator & Adams, 2013, p. 75). Along the same lines, Borghans et al. (2008) suggested, "The power of traits other than cognitive ability for success in life is vividly demonstrated by the Perry Preschool study" (p. 973).

The Institute of Education, University of London (Gutman & Schoon, 2013) publication, *The impact of non-cognitive skills for young people,* identified eight noncognitive skills consisting of self-perceptions, motivation, perseverance, self-control, meta-cognition, social competencies, resilience and coping, and creativity, and examined the available evidence on their impacts. (See Appendix B for a copy.)

The New American Foundation, in a new Education Policy research study by Melissa Tooley and Laura Bornfreund (2014), *Skills for success: Supporting and assessing key habits, mindsets, and skills PreK-12,* found a variety of different terms describing noncognitive skills; thus, the foundation has adopted "Skills for Success" as a term encompassing academic tenacity, perseverance toward long-term goals, and emotional intelligence. Growth mindset, grit, and character are a few of the most-used terms. These are used because certain habits, mindsets, and non-technical skills beyond academic content learning are integral to academic, professional, and personal success.

Camille A. Farrington (2012), one of the authors of *Teaching adolescents to become learners: The role of non-cognitive factors in shaping school performance: A*

critical literature review, found that in addition to academic skills and content knowledge, it is critical for students to develop sets of behaviors, attitudes, skills, and strategies that are vital to academic performance in the classroom. However, these may only show up indirectly in student cognitive testing scores. Though researchers label these factors as *noncognitive skills*, Farrington et al. (2012) label them as *noncognitive factors* in order to broaden the term to reflect a more expansive understanding of noncognitive factors in student performance.

This expansive label now includes five general categories of noncognitive factors related to students' academic performance: academic behaviors, academic perseverance, academic mindsets, learning strategies, and social skills. (See Appendix C for definition.) In this research, it will review only the literature on academic perseverance, including grit, tenacity, delayed gratification, self-discipline, and self-control. Farrington (2012) defines academic perseverance in the following way: "To persevere academically requires that students stay focused on a goal despite obstacles (grit or persistence) and forego distractions or temptations to prioritize higher pursuits over lower pleasures (delayed gratification, self-discipline, self-control)" (p. 9).

One of the educational areas not affected by NCLB focuses on cognitive learning and standardized testing in kindergarten classrooms and preschool programs, including the federal government's Head Start (HHS) program, whose curriculum still includes many noncognitive elements. Borghans et al. (2008) noted that "the power of traits other than cognitive ability for success in life is vividly demonstrated by the Perry Preschool study…Something besides IQ was changed by the intervention" (p. 973). A recent study, *The effect of the Perry Preschool Program on*

the cognitive and non-cognitive skills of its participants (Heckman et al., 2007), attributed success to the personalities and motivations of the participants in the intervention group. The Carolina Abecedarian Project and the HighScope Perry Preschool Study are two of the oldest and best known preschool projects. Their participants were low-income African American children identified as being at risk of school failure. Both programs continued with longitudinal follow-up studies (with the last Perry follow-up at forty years of age and the last Abecedarian follow-up at thirty-five). Both programs used both cognitive and noncognitive elements in the curriculum, and both programs' intervention groups have shown positive lifelong results in comparison to the control groups. (See Appendix D for details on the two programs' results.) As Tooley (2014, p. 34) describes them,

> High-quality pre-K programs are proof that the conversation does need not be about whether schools should focus on imparting content knowledge or skills for success. Both are important, and they are, in many ways, symbiotic. Certain skills (e.g., perseverance) help students attain knowledge, while certain knowledge (e.g., knowing that "intelligence" is not fixed, but malleable) helps students improve their skills (e.g., perseverance).

The Penn Resiliency Program (PRP) is a school educational program designed to incorporate, as its main message, the prevention of and resistance to depression among younger children. Over the past 20 years, 2,000 children between the ages of 8 and 15 from several countries have participated in the Penn Resiliency Program. The empirically validated effects, as demonstrated by the evaluations, show increased psychological resilience as well as reduced or prevented symptoms of depression,

feelings of hopelessness, levels of clinical depression, anxiety, and aggression, and involvement with criminality (Seligman et al., 2009). Seligman (2010) also reported replications of the Penn Resiliency Program to involve an additional 3,000 children before 2010.

Durlak et al. (2011) conducted a meta-analysis of 213 school-based universal social and emotional learning (SEL) programs involving 270,034 students ranging from kindergarten to high school. Compared to controls, SEL participants demonstrated significantly improved social and emotional skills, attitudes, behaviors, and academic performance leading to an 11 percentile-point gain in achievement.

As mentioned in the introduction, Booker, Christie, and Zuckerberg's (Oprah, 2010) educational initiative to "create a bold new paradigm for educational excellence" has only achieved a single success so far: the Sparks Academy, a Knowledge is Power Program elementary charter school. The KIPP charter school network combines the traditional three R's with positive psychology educational principles, including teaching seven-character strength, zest, grit, optimism, self-control, gratitude, social intelligence, and curiosity, also mindset as part of its noncognitive curriculum.

KIPP attracted national attention in 1999 when a KIPP Academy middle school in the South Bronx became famous because the five highest test scores in a New York City eighth grade city-wide achievement test came from its population of almost all low-income minority students who had been recruited a year earlier. However, this may only have been a Hawthorne effect (Mayo, 1933), since a follow-up years later revealed that many of these students struggled in non-KIPP high schools and in college and that only 36% graduated from college. The leaders of

KIPP undertook a study to determine why and to discover what was lacking in the curriculum. Their research found that the students were lacking in noncognitive skills. These findings led to the work of positive psychology researchers, including Peterson and Seligman on character strengths (2004), Duckworth on grit (2007), and Dweck (2006) on mindset theories.

Mike Feinberg and Dave Levin, both graduates of the Teach for America program, founded KIPP in 1994 as a charter school in Houston, Texas. There are currently 183 KIPP schools in 20 states and the District of Columbia, serving nearly 70,000 students. The KIPP school slogan is, "Work hard Be nice." The majority of KIPP schools are middle schools, serving grades 5 through 8. Several rigorous studies (Angrist et al., 2011; Davidson, 2014; Educational Policy Institute, 2005; Nichols et al., 2014; Ross et al., 2007; Tuttle et al., 2013) have confirmed that many KIPP middle schools have significant, positive impacts on student academic performance, including in math and reading tests. KIPP has garnered high praise for its students' academic achievements, which have been shown to be statistically significant (Tuttle et al., 2013). Nichols-Barrer et al. (2014) "estimated that over three years KIPP middle schools have an average cumulative impact of 0.21 standard deviations in reading and 0.36 standard deviations in math, roughly equivalent to an additional eight to 11 months of learning" (p. 63).

KIPP charter schools have several differences from other schools, including 60% more instructional time for their students and a token motivation program. However, other schools could duplicate the KIPP program and integrate it into their own systems or adapt its noncognitive curriculum, including its teachings on self-

control, which involve teaching students Walter Mischel's (1989, 2014) theories of self-control and having them wear T-shirts with the slogan "Don't Eat The Marshmallow."

The Role of Grit in Twenty-first Century Pedagogy

"Grit" was first incorporated into the research literature as an important topic of study in education in 2007 (Duckworth, Peterson, Matthews, & Kelly, 2007). Grit refers to perseverance and a passion for long-term goals. It entails working strenuously toward challenges and maintaining effort and interest over years despite failure, adversity, and plateaus. According to the researchers, "The gritty individual approaches achievement as a marathon; his or her advantage is stamina. Whereas disappointment or boredom signals to others that it is time to change trajectory and cut losses, the gritty individual stays the course" (pp. 1087–1088).

The importance of intellectual talent in determining achievement in all professional domains is well established; however, less is known about other individual differences that predict success. Duckworth et al. (2007) tested the importance of a single noncognitive trait: grit. It has been shown to explain an average of 4% of the variance in success outcomes, including educational attainment, among two samples of adults (N = 1,545 and N = 690); to affect grade point average among Ivy League undergraduates (N = 138); to determine retention in two classes of cadets in the United States Military Academy, West Point (N = 1,218 and N = 1,308); and to affect rankings in the National Spelling Bee (N = 175). Grit has not been shown to relate positively to IQ; however, it has been shown to be highly correlated with conscientiousness. Nonetheless, grit has demonstrated an incremental predictive

validity of success measures over and beyond IQ and conscientiousness. Collectively, these findings suggest that the achievement of difficult goals entails not only talent but also the sustained and focused application of talent over time (Duckworth et al., 2007, p. 1087).

Of the Big Five, conscientiousness is the only personality trait that is consistently shown to have a relationship with academic performance. In a meta-analysis, Poropat (2009) found that the size of the effect of conscientiousness on academic performance is similar to the size of the effect of intelligence on academic performance. Duckworth et al. (2007) suggested that grit is perhaps a mistakenly overlooked facet of conscientiousness.

A draft from the U.S. Department of Education Office of Educational Technology, *Promoting grit, tenacity, and perseverance: Critical factors for success in the 21st century*, by Karen Cator and Bernadette Adams (2013), examined the potential for students to develop the "noncognitive" factors—attitudes, dispositions, attributes, social skills, and intrapersonal resources, independent of their intellectual ability—that high-achieving students draw upon to achieve success. The authors focused on three core sets of noncognitive factors—grit, tenacity, and perseverance—in the belief that these are needed for individuals to succeed in long-term and higher-order goals in order to overcome the obstacles, barriers, and challenges that they will face during their schooling and life.

Another view of three positive psychological constructs—grit, striving for mastery, and flow—is that they are clearly interconnected. In his popular book, *Drive: The surprising truth about what motivates us*, Dan Pink (2009) argues that the

experience of flow will motivate us to strive for mastery and become grittier. Mark Dunkelman (Reeves et al., 2014) found that grit is important to nearly any relationship an individual has and suggests the need to uncover ways to instill additional grit in the future. Furthermore, the KIPP charter school leadership found that there was a need to add noncognitive skills to the curriculum; in particular, they identified a need to incorporate Duckworth's (2005) grit into their students' learning.

The Role of Mindsets in Twenty-first Century Pedagogy

Recently, mindsets have generated new attention among researchers through several new, simple, short-term interventions directed at changing students' mindsets that have resulted in surprisingly lasting effects on the students' school performance. Snipes, Fancsali, and Stoker (2012) stated,

> The term *academic mindsets* refers to the student attitudes, beliefs, and dispositions about school and learning that are associated with positive academic outcomes and school success. The core logic behind a focus on academic mindsets is that student attitudes, beliefs, and dispositions affect the quality, duration, and intensity with which students engage in critical academic behaviors (e.g., attending class, studying). (p. 6)

These authors found that academic mindsets foster behaviors that can improve academic and learning outcomes.

Some initiatives have also involved computer-based programs for students. Examples of such approaches include ThinkTools® and Brainology®. The latter is an interactive computer-based growth mindset workshop that teaches students that the brain is malleable. These studies suggest that "it can be as important to change

people's…interpretations of the social world and their place in it—as it is to change the objective environment" (Wilson, 2006, p. 1252) of schools and classrooms. Yaeger and Walton (2011) conducted research on social-psychological interventions designed to change students' beliefs and feelings of self-efficacy (i.e., their mindsets) as learners. Yaeger and Walton's work provides evidence that motivation and related intrapersonal skills enhance deeper learning as well as evidence that changes in attributions can lead to a positive, self-reinforcing cycle of academic improvement. Finally, the authors showed that using only relatively brief interventions can lead to large and sustained gains in student achievement, as students develop durable, transferable intrapersonal skills that they can apply to new learning challenges. As Maga et al. (2014) put it, "Numerous studies have clearly established that academic self-efficacy has a profound impact on academic performance" (p. 123).

Several researchers (Blackwell, Tresniewski, & Dweck, 2007; Yeager & Dweck, 2012) have found that students' mindsets can be changed—a result that promotes resilience. Previous studies (e.g., Yeager et al., 2012) have illustrated the importance of teaching students the science underlying people's potential to change their socially and academically relevant characteristics and then showing them how to apply these insights to their academic and personal lives.

There is strong evidence that mindsets affect student performance. Strong, positive mindsets make students much more likely to engage with academic work, demonstrate positive academic behaviors, and persist despite setbacks. Mindsets are shaped by school and classroom contexts, but they are also malleable at an individual level through experimental interventions (Farrington et al., 2012, p. 38).

The Role of Character in Twenty-first Century Pedagogy

Character education is currently experiencing a new cycle of popularity, and many feel that it should be part of any future pedagogy. The importance of character education dates back to Aristotle and Plato (Ackrill, 1997). Character education in America can be traced to *The New England primer,* first published by printer Benjamin Harris in 1687. Character has many definitions, and there are debates regarding where and how it is shaped or originates and whether or not it is innate. In American public schools, character education has very deep roots. John Dewey is considered one of the fathers of modern American character education, expounding on the inclusion of character education in his 1909 book, *Moral principles in education.* This book was based on the concept of students developing both moral inquiry and moral deliberation skills. In child psychologist Jean Piaget's (1952) theory of cognitive development, individuals have four developmental stages, which begin at birth and continue through age 16. Piaget also advocated for character education in his book (1932), *The moral judgment of the child,* and he believed in two basic principles relating to moral education: that children develop moral ideas in stages and that children create their own conceptions of the world. In *Moral education in the school: A developmental view*, Lawrence Kohlberg (1966), following Piaget's (1952) earlier work on the cognitive development approach, defined six moral development stages based on his empirical research, with the higher stages being better than the lower stages. He also applied his theories of moral education to schools.

Character education began to decline in popularity in the middle of the twentieth century; however, it experienced a comeback starting in the 1990s. Ferkany and Creed (2014) suggested that

> the revival of character education in the 1990s was inspired partly by the perceived failure of the cognitive-developmental approaches that preceded it to impart substantive moral values and to educate for other aspects of mature moral agency, such as moral perception, empathy, and moral resolve. (p. 10)

However, the arrival in 2001 of the No Child Left Behind Act led to the de-emphasis of character education, along with other noncognitive elements of the curriculum. This character education would later be relegated to the curriculum of personal safety and anti-bullying programs.

Another renowned child psychologist, Eric Erickson (1963, 1968, 1980), saw character as comprising personal integrity in his eighth stage, ego integrity versus despair. He suggested (1968) that an individual's failure to achieve integrity would lead to a feeling of despair.

This is one reason why positive psychology takes a different perspective on character education, with its emphasis on preventing depression and despair and promoting optimism, gratitude, and happiness and identifying 24 individual character strengths (VIA). In the past, character education in schools has been incorporated into national programs such as the Virtues Project™, which developed an educational program to introduce virtues as part of a daily curriculum that includes 52 virtues (an expansion of Aristotle's seven virtues) thought to help determine personal character. Another national virtues program is the Character Education Network, which is

devoted to developing 11 positive character traits in students: responsibility, perseverance, caring, self-discipline, citizenship, honesty, courage, respect, fairness, integrity, and purpose. Another large national organization, the Character Education Partnership, suggests that there are 11 principles that schools need to implement into their culture. One of these is character, about which the following can be said: "The school defines 'character' comprehensively to include thinking, feeling, and doing" (Character, 2014, p. 4).

Paul Tough (2012) stated that "*character* is one of those words that complicates any conversation, mostly because it can mean very different things to different people" (p. 58). In President Clinton's 1996 State of the Union address, he said, "I challenge all our schools to teach character education…" This research question of character in a twenty-first century pedagogy will focus on character as a noncognitive factor that can be taught, learned, and changed. In particular, rather than focusing on the earlier morality-based character education, the research question on character examines the new personal growth and achievement models based on positive psychology.

Character is the foundation of positive education programs including the Inventory of Strengths (VIA), formerly known as the "Values in Action Inventory." The VIA is a psychological assessment measure designed to identify an individual's profile of character strengths. It was developed by Christopher Peterson and Martin Seligman (2004) and is based on 6 virtues that correspond with 24 character strengths (see Appendix E for a copy), each comprising various individualized structures, that characterize and spell out the individual traits of every person. The authors also

developed a VIA test for character strengths for children. (See Appendix F for a copy). According to O'Grady (2013), these VIA tests provide detailed personal strength profiles that are a starting point for lessons designed to maximize those strengths as learning assets.

The major change implemented by the KIPP charter schools, following the research findings suggesting the addition of noncognitive skills to the curriculum, was the adoption of character education, based on Peterson and Seligman's (2004) Inventory of Strengths. The KIPP schools also customized the VIA to emphasize seven of the character strengths they found most valuable. (See Appendix F for a copy of the KIPP Character report card.)

According to James J. Heckman, the 2000 Nobel Laureate in Economic Sciences (2013),

> Character skills matter at least as much as cognitive skills. A multiplicity of skills is needed for success in life. The power of personality, or character, has been demonstrated in numerous studies in addition to the longer-established power of cognitive traits like IQ and scores on achievement tests. If anything, character strengths matter more. (p. 14)

Heckman (2014) also believed that traditional models place too much emphasis on cognitive skills to the detriment of character skills, which matter just as much.

Amitai Etzioni (in Reeves et al., 2014) argued that character education should require the development of two specific personality capabilities rather than the acquisition of specific values or virtues. These two capabilities are self-discipline and

empathy. The focus of positive psychology-based character programs is on these types of noncognitive factors.

Effects of Positive Psychology on the Classroom Educational Environment

Positive education represents a paradigm shift in which education serves to cultivate students' intellectual minds while developing a broader set of character strengths, virtues, resilience, optimism, happiness, and well-being for life, rather than merely embodying the route to academic achievement. Gable and Haidt (2005) defined positive psychology as "the study of the conditions and processes that contribute to the flourishing or optimal functioning of people, groups, and institutions" (p. 104). Other researchers view it as a new field of research springing from the need to rebalance the negative and positive attributes of human nature, to show this can be an important part of education (Buck, Carr, & Robertson, 2008). Also, O'Grady found (2013) that "neuroscience based cognition is three-dimensional: thinking about ideas, about feelings and about feeling based action…Positive psychology is the only educational taxonomy that address this 3-D learning: academic, social, and emotional processes" (p. 42–43). Critchley and Gibbs (2012) conducted a recent quantitative study that validated the effects of positive psychology intervention in a school environment. This intervention aimed to encourage a positive emotion in the classroom—happiness. The subjects of the study reported that adopting a positive outlook was very beneficial in the school setting. Reschly et al. (2008) also studied the role of positive emotions and their effects on students in grades 7 through 10 during the school day. They found that the presence of positive emotions is related to greater personal and environmental resources such as more

frequent student engagement in school activities and more supportive relationships with adults. Their results showed that frequent experiences of positive emotions in school relate to broadened cognitive and behavioral coping strategies. Furthermore, well-being is one of the foundations of positive psychology, with subjective well-being involving either a negative or a positive effect. Skinner, Furrer, Marchand, and Kinderman (2008) concluded that the affective dimension of subjective well-being is an important catalyst for students' engagement in learning activities, another reason to incorporate a positive educational pedagogy.

In 2012, for the first time, the PISA survey incorporated a question asking students to rate happiness at school, stating that "as schools are a, if not *the*, primary social environment for 15-year-olds, these subjective evaluations provide a good indication of whether education systems are able to foster or hinder overall student well-being" (OECD, 2013c, p. 25).

According to Immordino-Yang and Damasio (2007), "When we educators fail to appreciate the importance of students' emotions, we fail to appreciate a critical force in students' learning. One could argue, in fact, that we fail to appreciate the very reason that students learn at all" (p. 9). Also, Durlak et al. (2011) concluded that emotions can facilitate or impede children's work ethic, commitment, academic engagement, and, ultimately, scholastic success. Zins, Weissberg, Wang, and Walberg (2004), in their study on the success of a social emotional learning (SEL) curriculum, found that teaching and learning in schools have strong social, emotional, and academic components. Scoffman and Barnes (2011) conducted research on the emotion of happiness and its impact on learning and school curricula. They found that

emotions pervade motivation, decision-making, social functioning, and learning, traits that have positive implications for education. Thus, happiness in particular should be promoted for students' current and future well-being.

Happiness and well-being are two of the goals and benefits of positive psychology education. Scoffman and Barnes (2011) concluded that a focus on happiness might underlie a positive curriculum reform. Another benefit of positive psychology is the prevention of negative emotions and the promotion of optimism. students' enjoyment, hope, and pride are positively related to academic achievement, while hopelessness is negatively related, according to Pekrun et al. (2011). Most emotions are negative, while only a few are positive. (See appendix G for a copy of positive and negative emotional faces). As a result, students fight a constant battle to remain positive. Fredrickson (2014) believed that the lack of empirical studies on positive emotions resulted from such emotions being more diffuse and fewer in number than negative emotions.

Shoshani and Steinmetz (2012) joined the growing body of work suggesting that positive psychology interventions (Froh et al., 2008; Seligman et al., 2009; Williams, 2011) and positive psychology health interventions within school environments can improve adolescents' mental health and well-being. The incorporation of elements of positive psychology into school curricula will bring about a decisive shift in the role of schools, changing them from academic institutions focused primarily on imparting knowledge and skills to holistic institutions that meet a wide range of student needs in many areas of life by coordinating both socioemotional and academic learning.

There is substantial evidence from well controlled studies that skills that increase resilience, positive emotion, engagement, and meaning can be taught to schoolchildren (Seligman, 2009). For example, Webb, Meth, and Jordan (2010) endorsed the positive results that positive psychology instills in students. According to the authors, students in positive psychology-based programs develop resiliency, positive self-esteem, optimism, and high motivation. They also believed that with children and adolescents, there is a strong relationship between serious depression and suicide. Further, they suggested that low self-esteem is a cause of students dropping out. Positive psychology-based education programs can help prevent all of these things.

One of the principles of positive psychology education is the promotion of positive emotions in students. In Bradberry and Greaves' (2005) book, *The emotional intelligence quick book,* they broke down emotional intelligence (EI) into four parts: *self-awareness, self-management, social awareness,* and *relationship management.* The authors believed that when we fail to use our emotional intelligent skills, we are more likely to turn to other less effective means of managing our moods. In such cases, we are twice as likely to experience anxiety, depression, substance abuse, and even thoughts of suicide. Thus, emotional intelligence has a tremendous impact on our happiness and contentment (Bradberry, 2005).

Another leading educator, Patty O'Grady, in her 2013 book, *Positive psychology in the elementary school classroom,* provides a thorough examination of neuroscience research, educational theory, and teaching strategies that can be combined to produce a school climate that helps children grow both cognitively and

emotionally. In addition to explaining the science behind the connection between emotional and academic competence, this book also teaches the reader about specific classroom activities that will enable children to develop confidence and enjoy an accomplished life.

Seligman, Steen, Park, and Peterson (2005), the authors of *Positive psychology progress*: *Empirical validation of interventions,* examine the great recent success of positive psychology as an accepted theory for the treatment and prevention of depression. They also verify that positive education curricula are creating positive results in terms of student participation.

Karen Reivich and Jane Gillham (2009) examined Seligman's (2009) research, which developed the Penn Resiliency Program (PRP) and the Strath Haven Positive Psychology Curriculum, to determine whether well-being can be taught to schoolchildren. They followed the strong belief that intervention programs must be evidence-based.

Kelm and McIntosh's (2012) study, "Effects of school-wide positive behavior support on teacher self-efficacy," found that positive behavior had a significant effect on higher teacher self-efficacy, leading teachers to feel better able to engage students of all ability levels and to develop strategies for them than teachers felt at non-school wide positive behavioral interventions and supports (SW-PBIS) schools. This provides more support for the implementation of and training of teachers in positive psychology.

Ivankovi and Rijavec (2012) explored the influence of a positive psychology program on fourth grade students' optimism and classroom climate in primary school.

The purpose of the study was to examine the influence of positive psychology in the classroom and to determine whether it led to an increase in optimism among fourth grade students. The quantitative research survey question was: Can positive psychology increase optimism in fourth grade students if implemented properly? The results of the survey found that the program had positive effects in terms of increasing levels of optimism.

A recent study by the Strath Haven Positive Psychology Curriculum Program resulted in the basic finding that this positive psychology program improved social skills including empathy, assertiveness, cooperation, and self-control, while it also reduced poor conduct and increased achievement, engagement in learning, and enjoyment in school. Teachers also reported observing increased levels of curiosity, love of learning, and creativity (Seligman, 2011).

Van-Dijk and Kluger (2004) conducted quantitative research to determine whether the effects of feedback on students' motivation are completely moderated by a regulatory focus. Their research explored the problem of the application of Higgins' (1997) regulatory focus theory along with the effect of positive and negative feedback on performance and motivation, which were moderated by task type in this study. One of the main purposes of the study was to demonstrate that no experts in regulatory focus theory are able to differentiate between predominantly prevention tasks and predominantly promotion tasks. This may be important for the roles of teachers in the classroom environment.

A promising research study by Durlak et al. (2011) involved a meta-analysis of school-based instructional programs designed to foster social and emotional

learning. It located 213 studies targeting students aged 5 to 18 without any identified adjustment or learning problems. The study included a control group and reported sufficient data to allow the calculation of effect sizes. This study was one of the most extensive reviews of such interventions, and it relied on empirical evidence that included control groups. On average, participating students exhibited higher academic achievement, with associated gains in performance estimated to be equivalent to 11 percentile points. These results were approximately constant across grades. The data suggest that participants benefited from the interventions and, specifically, that their social and behavioral skills also improved. The study revealed positive effects from these interventions in both cognitive and noncognitive areas. Furthermore, the students' social and behavioral skills improved.

CHAPTER IV

CRITICAL ANALYSIS OF THE LITERATURE

Twenty-first Century Noncognitive Learning Factors in the New Pedagogy

Behncke (2009) provided experimental evidence that short-term exogenous shocks to noncognitive skills affect test performance by, for example, reducing test anxiety. Students who were exposed to her intervention achieved higher average test scores than students in the control group. Behncke (2009) also found that giving words of encouragement, which may boost short-term self-efficacy or self-esteem, before a diagnostic math test was associated with 2.5% higher scores across all students ($p \square 0.05$) and 8% higher scores amongst those with self-reported difficulties in math ($p \square 0.01$). Thus, importantly, students with low math grades and self-assessed difficulties in math gained particularly from the positive affirmation.

The results suggest that noncognitive skills can be shaped, even in the very short term, and that teachers might increase their students' performance through interventions of positive affirmations of their noncognitive skills. The following sentence was added to the verbal test instructions of intervention group: "I am sure that you will solve the given problems very well. You have already taken tests in the past with success; otherwise you would not be here" (p. 6). This correlates to both the mindset and the use of the explanatory style of positive psychology, thus validating Johnson's (2012) argument that positive word choice can change everything and improve students' test results. Affirmative instructions are also part of Dweck's (2006) Mindsets Brainology® program for students.

Cator and Adams (2013) closely examined a core set of noncognitive factors including grit, tenacity, and perseverance. They found that "these factors are essential to an individual's capacity to strive for and succeed at long-term and higher-order goals, and to persist in the face of the array of challenges and obstacles encountered throughout schooling and life" (p. *v*).

Tooley (2014) found proof supporting the teaching of Skills For Success (SFS) approach, suggesting that skills should be started as early as possible and then reinforced until graduation. Furthermore, the conversation should not be about whether schools should focus on imparting content knowledge or skills for success, since "both are important, and are in many ways symbiotic. Certain skills (e.g., perseverance) help students attain knowledge, while certain knowledge (e.g., knowing that 'intelligence' is not fixed, but malleable) helps students improve their skills (e.g., perseverance)" (Tooley, 2014, p. 36). The author found that many schools

that recognized the importance of SFS did not have the resources to do both and that, in these cases, schools always chose the traditional academic content knowledge. For this reason, he recommended government funding for adding SFS to school curricula.

Nichols-Barrer et al. (2014) took a critical look at the KIPP charter school network. While recognizing that these schools have a record of success, the authors sought to examine whether the case studies benefited from advantages that would preclude the program from being replicated on a large scale, including the advantage of enrollment patterns, which public schools cannot match. This led to the following key question: "Whether KIPP's positive effects on learning are attributable to a peer environment that is more conducive to academic achievement than the peer environment found in traditional public schools" (p. 65). The data clearly showed that KIPP students' success could not be explained by any advantages of student enrollment patterns or environment. However, the authors noted that there could be unmeasured differences between students attracted to KIPP and those enrolling in other schools.

Cator and Adams (2013) argued that if noncognitive factors are malleable and critical to academic performance, a key task for educators becomes the intentional development of these skills, traits, strategies, and attitudes along with the development of content knowledge and academic skills.

The Dunedin Multidisciplinary Health and Development Study (Moffitt et al. (2011), also known as the Dunedin Longitudinal Study, may be one of the most extensive and important longitudinal studies of all time. The original pool of study participants was selected from people born between April 1, 1972, and March 31,

1973, who were still living in the Otago region three years after birth. Assessment started at age 3 and continued at ages 5, 7, 9, 11, 13, 15, 18, 21, 26, 32, and, most recently, 38 (2010–2012), with future assessments scheduled for ages 44 and 50. The study also contains a cohort of 500-paired siblings, tracking and comparing them in a way designed to facilitate "a compelling quasi-experimental research design that can isolate the influence of self-control" (Moffit et al., 2011, pp. 2696–2697). The Dunedin Longitudinal Study differs from other longitudinal studies in its emphasis on the retention of study members; the most recent assessment (age 38) achieved 96% participation compared to a 20–40% loss experienced by most other studies (Moffitt et al., 2011). As an additional measure of reliability, the study brings its participants from wherever they are in the world back to Dunedin for the duration of their assessment. Here they undertake a day of interviews, dental examinations, physical tests, blood tests, computer questionnaires, and surveys. The study includes many sub-studies, and the inclusion of participants' parents and children facilitates the development of a multiple-generation study. For example, when the original study group members were teenagers (age 15), their lifestyles, behaviors, attitudes, and health were studied. Now the second generation is being studied to identify changes.

Moffitt et al. (2011) developed a sub-study based on the Dunedin study's data, in which differences in self-control between individuals are present in early childhood and can predict multiple indicators of health, wealth, and crime across three decades of life in both genders (p. 5). This study found that there is some longitudinal stability of self-control, with long-term implications for physical health, substance dependence, personal finance, and criminal offenses. It also found that "data collected

at the ages of 13, 15, 18, and 21 showed that children with poor self-control were more likely to make mistakes as adolescents, resulting in 'snares' that trapped them in harmful lifestyles" (Moffit et al., 2011, pp. 2696–2697). This further supports the idea that self-control is an important noncognitive element of the new twenty-first century pedagogy paradigm. Along the same lines, new research by Gabrieli et al. (2015) found the following:

> It is important to note that the impact of non-cognitive competency gains may, in fact, be far longer lasting and deeper than the comparable boosts in academic skills, which are often prone to diminish over time. In the cases of the Perry Preschool and Project STAR experiments, it is notable that early academic gains faded away over time—a common occurrence in academic interventions. But years later, those who had received the intervention reaped large gains on important outcomes, apparently mediated by the less monitored non-cognitive competency gains resulting from the initial intervention. (p. 24)

A very recent study by Spengler et al. (2015), entitled, "Student characteristics and behaviors at age 12 predict occupational success 40 years later over and above childhood IQ and parental socioeconomic status," was based on a two-wave longitudinal sample spanning 40 years from childhood (age 12) to middle adulthood (age 52). The first wave examined how student characteristics and behaviors in late childhood (beginning in 1968) predicted subjects' success in adulthood (assessed in wave two in 2008). The study was conducted in response to research arguing that educational systems need to pay more attention to "soft" or social emotional skills, which the students learned under hypnosis. These skills may help students achieve

success later in life. The study concluded that "student characteristics and behavior play significant roles in important outcomes over and above social economic factors and cognitive abilities" (Spengler et al., 2015, p. 1339).

Twenty-first Century Role of Grit in a New Pedagogy

Farrington et al. (2012) advocated for a significant and pervasive shift in educational priorities to promote not only content knowledge but also the noncognitive factors of grit, tenacity, and perseverance.

Important examples of the value of noncognitive factors for students are gratitude and grit, which Evan M. Kleiman (2013), using a longitudinal study of 209 college students, found confer resiliency against suicide by increasing students' feelings of having meaning in life.

Some researchers who have strongly advocated for grit interventions for students (Cator & Adams, 2013) also warn that there has not been sufficient research on the potential risks or costs of educational attainment, academic achievement, and emotional well-being in different circumstances. Perseverance can be detrimental for some students in certain conditions, including performance tasks or goals. However, achieving perseverance is in the best interest of students with long-term or mastery-oriented goals. Thus, educators must guard against the misapplication of grit, and grit may not be productive for all students. For example, in accountability-driven climates that place extremely high expectations on students, grit could work against the students' best interests. Furthermore, Duckworth's (2009) eight-question grit scale test has the problem of relying solely on self-evaluation, which is subject to error. (See Appendix H for a copy.) It is also important to note that much of the research

tying academic perseverance to student performance has been conducted on high-achieving students at elite institutions (Duckworth, Peterson, Matthews, & Kelly, 2007; Duckworth & Seligman, 2005, 2006).

If grit is going to be incorporated into a new curriculum, Cantor and Adams (2013) found that there are two major contextual factors that can promote grit, tenacity, and perseverance. As they suggest, "First, students need to have the opportunity to take on long-term or higher-order goals (or purposes) that, to them, are 'worthy' of pursuit. Second, they need a rigorous and supportive learning environment to help them pursue these goals" (Cantor & Adams, 2013, p. 36). This will require major changes from the present pedagogy and school environments.

Twenty-first Century Role of Mindsets in the New Pedagogy

The 2012 PISA report (OECD, 2013c) reveals very worrying gender differences in students' attitudes towards mathematics, such that "even when girls perform as well as boys in mathematics, they report less perseverance, less motivation to learn mathematics, less belief in their own mathematics skills, and higher levels of anxiety about mathematics" (p. 4). Furthermore, "Even when the average girl underperforms in mathematics compared with the average boy, the gender gap in favor of boys is even wider among the highest-achieving students" (p. 4). Noncognitive research on mindsets identifies an intervention that may close this gender gap by improving female students' self-efficacy and view of implicit intelligence from entity-based to incremental.

Several researchers agree that academic mindsets influence students' academic behaviors and strategies, which then facilitate school success (Farrington et

al., 2012; Snipes et al., 2012; Yeager & Walton, 2011). Dweck et al. (2011) concluded, in a review of current evidence on academic mindsets and what they term "academic tenacity," that "educational interventions and initiatives that target these psychological factors can have transformative effects on students' experience and achievement in school, improving core academic outcomes such as GPA and test scores months and even years later" (p. 3). However, Yeager and Walton (2011) warned that implicit, theory-based interventions should be customized to address students' mindsets in their given context or at their given age—and that even then, these interventions can only be applied with a deep knowledge of the underlying psychology the interventions are trying to instill.

Good, Aronson, and Inzlicht (2003) conducted a randomized controlled trial to measure the effect on academic achievement among four groups of seventh grade students, starting at the beginning of the school year. One group received messages on the incremental theory of intelligence; the second received an "attribution message;" the third received a combination of the first two messages; and the fourth was the control group, which received messages about the perils of drug use. At the end of the school year, the groups that received messages on intelligence and attribution had higher performances than the control group students who did not receive such messages. The effect sizes were 0.52 and 0.71, respectively, which suggests that the students receiving the message interventions experienced large and statistically significant gains. Blackwell, Trzesniewski, and Dweck (2007) also showed that teaching middle school students to have a "growth mindset"—the belief that intelligence is malleable and grows with effort—had a significant positive impact

on academic achievement. The extensive body of research on mindsets further suggests that a psychosocial approach could have major implications for reform efforts aimed at closing racial/ethnic gaps in student performance and educational attainment. This is one reason that KIPP charter schools that enroll mostly low-income minority students have added mindsets to their curricula.

Twenty-first Century Role of Character in the New Pedagogy

Davidson (2014) suggested that "character education should be at the center of the most pressing educational and economic issues, not on the sideline" (p. 79). The U.S. government, after much research and many hearings, agrees, and since 1995, through the Partnerships in Character Education Program, the Department of Education has awarded 97 grants to assist in designing, implementing, and sustaining high-quality opportunities for students to learn and understand the importance of strong character in their lives.

Seligman and Peterson have classified self-regulation, or self-control, as a part of the virtue, temperance. Self-regulation is defined in its exercise as being when "…the individual exerts control over his or her own response so as to pursue goals and live up to standards;" however, this is not a character strength that can be exhibited consistently, because the use and exerting of self-regulation depletes its capacity (Peterson et al., 2004, p. 442). Seligman et al. (2005) conducted another positive psychology character intervention study of students, in which the participants completed the VIA strengths inventory and were told to use their signature strengths in a new way every day for one week. In an immediate post-test, the participants

reported being happier and less depressed, illustrating the rapid effectiveness of these types of interventions.

Reeves, Dunkelman, Heckman, Etzioni, and Rose (2014) found that the debate concerning whether schools should engage in character education is moot and that schools cannot avoid influencing character; the only question is whether this influence will be imparted unwittingly or deliberately.

Heckman et al. (2013) suggested that the "evaluations of the Perry Preschool program provide some of the most compelling evidence that character skills can be boosted in ways that produce adult success" (p. 43). The benefits of character as part of a new pedagogy are justified by significant research (Duckworth, Peterson, Matthews, & Kelly, 2007; Dweck, 2006; Ericsson, Charness, Feltovich, & Hoffman 2006; Peterson & Seligman, 2004; Pink, 2009) supporting the development of moral and performance-oriented character as powerful predictors of excellence. According to Shoshani and Sloane (2013), research in this field has also found the following:

> Character strengths in adolescents have been associated with desirable outcomes such as subjective well-being, life satisfaction, fewer symptoms of depression and suicidal ideation…, leadership, tolerance, ability to delay gratification, kindness, and altruism…, and a reduction of problems such as substance use, alcohol abuse, smoking, and violence. (p. 1165)

Effects of Positive Psychology on the Classroom Educational Environment

Seligman, Ernst, Gillham, Reivich, and Linkins (2009) provided strong evidence for positive education as part of the classroom curriculum and environment. They believed that positive education needs to be introduced into the classroom

because “more well-being is synergistic with better learning” (p. 294). Increased well-being is likely to increase learning, which is the traditional goal of education.

> Positive education is defined as education for both traditional skills and happiness. The high prevalence worldwide of depression among young people, the small rise in life satisfaction, and the synergy between learning and positive emotion all argue that the skills for happiness should be taught in school. There is substantial evidence from well controlled studies that skills that increase resilience, positive emotion, engagement and meaning can be taught to schoolchildren. (Seligman et al., 2009, p. 293)

Marques et al. (2011) chose 367 middle school students to participate in a study to see whether positive psychology constructs could predict adolescents’ academic achievement and mental health. The study employed, translated, and validated measures of target constructs (i.e., hope, life satisfaction, self-worth, and mental health). The research showed that positive variables related statistically to future measures of mental health and academic achievement. Success in school is affected by students’ satisfaction with life, particularly among students in cultures that place a heavy emphasis on academic achievement.

Durlak et al. (2011) analyzed the effectiveness of programs designed to foster social and emotional learning in schools, measuring six student outcomes in the cognitive and noncognitive areas of positive social behaviors, social and emotional skills, attitudes toward self and others, emotional distress, conduct problems, and academic performance. The resulting meta-analysis showed statistically significant, positive effect sizes for each of the six outcomes, with the strongest effects ($d = 0.57$)

appearing for social and emotional skills. The authors believed that the effects across the different outcomes resulted from students transferring what they had learned about positive social and emotional skills by displaying improved behavior throughout the school day. In another positive psychology character intervention, participants completed the VIA strengths inventory and were told to use their signature strengths in a new way every day for one week. In an immediate post-test, the participants reported being happier and less depressed (Seligman et al., 2005).

Kelm and McIntosh (2012) examined the effects of school-wide positive behavior in supporting teacher self-efficacy and found that such behavior had a significant effect on increasing teacher self-efficacy. Teachers supported by such programs felt better able to engage students of all ability levels and to develop strategies for them than teachers at non-SWPB schools. This is further evidence supporting the implementation and training of teachers in positive psychology education.

One of Maga et al.'s (2014) research objectives was to determine why some students give up when faced with academic difficulties, while others rise to the challenge by using perseverance and academic strategies to obtain higher grades. They examined how emotions, motivation, and self-regulated learning contribute to academic achievement. They identified achievement emotions consisting of two types, activity emotions and outcome emotions, as notably affecting academic outcomes. The first of their research findings was as follows:

> Students' positive emotions positively affect their organization of academic study time and summarization of study materials in a personal way. Positive

> emotions also have a positive effect on students' evaluation of learning and performance, strategic preparation for exams, and metacognitive reflection during their study. (p. 128)

The second important finding was that "the results show the influence of emotions on diverse facets of motivation to learn. In particular, students' positive emotions enhance their beliefs on incremental theory of intelligence and confidence in their intelligence" (p. 128). The conclusions of this study were that emotions are closely linked to motivation, self-regulated learning, and academic achievement and that positive emotions have greater weight than negative on motivation and self-regulated learning.

Recent research by Seligman et al. (2009), Fredrickson (2004), Froh et al. (2008), Snyder et al. (2003), Lock and Latham (2004), Peterson and Seligman (2004), and Williams (2011) has identified positive psychology factors that contribute to children's and adolescents' subjective well-being, which are the goals of positive psychology. This body of research has included such factors as gratitude, hope, happiness, goal setting, and character strengths, which are associated with student well-being. Pekrun, Elliot, and Maier (2009) also found that positive emotional experiences play an important role in academic achievement and have a considerable impact on students' ultimate success in the academic domain. These findings suggest that all of these factors can be improved through the educational intervention of positive psychology.

CHAPTER V

CONCLUSION

This critical analysis considered the use of noncognitive factors for inclusion in a twenty-first century pedagogy paradigm incorporating the framework of positive psychology education within the school environment. The literature in this review was evaluated to respond to five research questions, and those answers confirmed the need for a new, twenty-first century pedagogy paradigm that incorporates noncognitive as well as cognitive factors. Farrington et al. (2012) identified five noncognitive skills that serve as the foundation for this new pedagogy. The literature further confirmed that positive psychology should be the framework for this new pedagogy. In conclusion, although much is known about the role of noncognitive factors in academic performance, there is still more to learn about how to leverage noncognitive factors to transform the practice of education from its current focus on content knowledge and assessable academic skills to the broader development of students as learners. The literary discussion of noncognitive skills was complicated and contested, but the evidence is compelling that there are strong associations between noncognitive factors and positive outcomes for students. Measurable factors such as grit, school engagement, and self-control are correlated with positive outcomes in the students' future lives, such as academic attainment, improved finances in adulthood, and reduced crime. All four of the major longitudinal studies reviewed, which followed participants from early childhood to middle age adulthood, confirmed these outcomes. These studies also confirmed the importance of preschool programs for children for short- and long-term success outcomes.

Responses to Research Questions

Research Question #1. Should noncognitive learning factors be part of the twenty-first century pedagogy paradigm? Yes, noncognitive learning factors should be the foundation of the twenty-first century pedagogy paradigm. The research literature shows that these factors are important as stand-alone elements and that they have lasting, long-term, and even lifelong benefits for students. It also shows that these factors contribute to students' academic performance.

Research Question #2. What role should grit play in the twenty-first century pedagogy paradigm? More research is needed before grit should be added as a test for all students; research is also needed to determine which students will benefit from increasing grit. (See Appendix J for negative aspects of grit.) There has not yet been empirical research to validate interventions to increase grit among all students. Thus, individual testing of grit should, for now, be only one aspect of the new pedagogy.

Research Question #3. What role should mindsets play in the twenty-first century pedagogy paradigm? Mindsets are another of the pillars of the new pedagogy research, and they are proven to result in successful interventions to increase academic performance. In particular, Dweck's (2006) Brainology® should be included in the new paradigm. At present, programs are only available for math; thus, new programs for the other R's need to be developed. However, all students can be taught to have growth mindsets instead of fixed mindsets.

Research Question #4. What role should character play in the new twenty-first century pedagogy paradigm? Character should be one of the pillars of the new

twenty-first century pedagogy paradigm. The research literature shows that character has positive effects on student attitudes and well-being and that it improves their academic performance. If older versions of character education, which include philosophical, citizenship, religious, or moral bases (e.g., the Virtues Project), are part of the present pedagogy, they should stay; however, proven positive psychology character programs should be added. All students and teachers should be given the VIA character strength test.

Research Question #5. What are the effects of positive psychology on the classroom educational environment? The body of literature supporting the inclusion of positive psychology in the classroom environment was the strongest among all the research studies. It should be the foundation of this new twenty-first pedagogy paradigm.

Limitations of the Study

All research is based on previously done studies and is limited to educational research from K-16. Except for some positive psychology literature, all other literature deals with noncognitive factors.

Recommendations for Future Research

Before the author can recommend new research, a system must first be designed to represent, measure (with good metrics), and qualify these noncognitive factors, so that empirical research will provide reliability and validity in the results. Thus, first and foremost, new test instruments are needed. All of the current literature acknowledges the nature of issues with current test instruments, which tend to be one of four types: surveys (i.e., self-reports and informant reports), social network

analyses, situational judgment tests, or behavioral observations. All existing measurement types have shortcomings or potential problems related to being administered to students in school environments. (See Appendix J for Table 1 of serious limitations of questionnaires and performance tasks, self-reports, and teacher report questionnaires.) Noncognitive factors require new and better test instruments to gain acceptance from the educational community and policy makers.

Future research should begin by avoiding the Jangle Fallacy and addressing the jingle/jangle problem by pursuing consensus on a universal term for noncognitive factors. Tooley and Bornfreund (2014) acknowledged this problem and decided to use the phrase "skills for success" to describe their outcomes. Another problem stems from the labeling or definition of emotions: *interest* is sometimes used interchangeably with curiosity, intrigue, excitement, or wonder; *joy* is often used interchangeably with *happiness*; and *contentment* is often used interchangeably with other low-arousal positive emotion terms such as *tranquility, serenity,* or *love*. Emotions are also sometimes referred to as feelings.

This research paper chose to use the term "noncognitive factors." To develop a new pedagogy including noncognitive factors requires the identification of a satisfactory and concrete list of these factors as well as systems or scales to measure them. Measurements and methodological research are required to validate an accurate and complete list of education-related noncognitive factors as well as to provide us with metrics that are both reliable and valid. Adopting the term "factors," especially in relation to personality constructs, will facilitate the use of the statistical work of Parson and Spearman, including their factor analysis, as methods by which to test

noncognitive factors for empirical research (as well as research on new electronics tools in the classroom, including the use of sensors on students in the classroom to monitor and record emotions). (See Appendix K for information regarding four sensors.)

Recommendations for Implementation

There are at least four major challenges to the inclusion of noncognitive factors based on positive psychology as key ingredients of a twenty-first century pedagogy paradigm. First, noncognitive factors in the education process must be defined in order to determine which ones matter. In other words, we need to reach a consensus regarding which factors should and can be introduced in a new pedagogy. Second, it will be necessary to establish how the different factors matter, particularly with regard to their roles as both inputs and outcomes. To contribute to these decisions, a list of noncognitive factors will be required. The criteria for inclusion on this list will be whether a given factor is one of five noncognitive factors identified by Farrington et al. (2012) as being capable of contributing to students' academic success, including their academic behaviors, academic perseverance, academic mindsets, social skills, and learning strategies. Further, one should consider whether the factor is related to academic performance. Is it malleable? What is the role of the classroom context in shaping the factor? Are there clear, actionable strategies for classroom practice? Will changing the factor significantly narrow existing gaps in achievement by gender or race/ethnicity? Third, guidelines must be developed for noncognitive factor-based changes to the education system that are necessary to achieve improvements. A new model for how best to teach students in the classroom

is needed. Fourth, empirical research needs to validate these steps and their results as well as to assess whether and how students' learning and development is occurring in the classroom.

Thus, we must design systems to represent, measure, and quantify noncognitive factors. To achieve this, new research designs and methods need to be developed to measure noncognitive factors in students' academic performance. At present, most educational research relies on using the quantitative methods of surveys, interviews, and questionnaires. However, the grit and VIA tests are self-report evaluations, subject to error and fakery. Furthermore, the results of some interventions are followed up by longitudinal studies. There is also wide reliance on bivariate analyses, which can show the relationship between two measures, such as the use of a given noncognitive factor and GPA, IQ, age, or gender, or social economic status (SES). Multivariate analyses, by contrast, include more than one explanatory measure. From such studies, one can assess the relationship between each noncognitive factor and students' academic outcomes net of other factors. Although multivariate and multilevel studies do not prove causality, they provide stronger opportunities to assert causality, because they account for potential alternative explanations of school success.

REFLECTION

First, it was exciting and rewarding to discover all the information available on noncognitive factors that can increase academic performance and help produce lifelong success. There is a plethora of valuable reviewed research that was not included in this thesis but which nevertheless has significant educational value.

However, positive psychology education and its importance as a psychological immunization for students has only been briefly explored. My research makes a strong argument for noncognitive over cognitive factors, for students' lifelong success, to be included in the new pedagogy paradigm. It reaffirms the importance of words and language in effecting motivation and academic success. There is also more than one type of mindset, including the Pygmalion effect of teachers expectation for the student.

The importance of Bandura's self-efficacy theory, which is the foundation of Dweck's Mindset and Brainology for math students, is well established; however, research is required to devise a method to provide all students with high self-efficacy. There is a need for the educational foundations or psychological organizations working in this area to address the problem of the common labeling of noncognitive terms and to end this jingle/jangle problem. I feel an obligation to be a catalyst to initiate actions to implement these much needed changes.

Definition of Terms

Achievement emotions is emotions directly tied to achievement activities or achievement outcomes.

Achievement motivation is a desire to accomplish academic activities successfully.

Academic behaviors are observable behaviors that show students' engagement and effort.

Academic mindsets include the student attitudes, beliefs, and dispositions about school and learning that are associated with positive academic outcomes and school success.

Academic perseverance is a student's tendency to complete school assignments in a timely and thorough manner, to the best of his or her ability, despite distractions, obstacles, or level of challenge.

Academic self-efficacy is the students' convictions that they can successfully perform given academic tasks at designated levels.

Academic tenacity refers to the mindsets and skills that allow students to look beyond short-term concerns to longer-term or higher-order goals, as well as to withstand challenges and setbacks to persevere toward these goals.

Achievement emotions is emotions directly tied to achievement activities of achievement outcomes.

Achievement goals represent the purposes that students pursue as they engage in achievement behavior.

Activity emotions is pertaining to ongoing achievement related activities

Agency is the way that students utilize effective learning strategies and demonstrate a positive mindset, which not only helps them drive their own learning to do

better in school, but also helps them navigate the typical barriers to success.

Blended learning is a formal education program that leverages both technology-based and face-to-face instructional approaches.

Character is broadly conceived to encompass the cognitive, emotional, and behavioral aspects of moral life.

Character education is the deliberate effort to develop virtues that are good for the individual and good for society.

Classroom environment is the shared perceptions of students and teachers in within the classroom.

Cognition is all forms of knowing and awareness, such as perceiving, conceiving, remembering, reasoning, judging, imagining, and problem solving.

Cognitive engagement is the idea of investment; it incorporates thoughtfulness and willingness to exert the effort necessary to comprehend complex ideas and master difficult skills.

Cooperative goal structure is one where the goals of the separate individuals are so linked together that there is a positive correlation between their goal attainments.

Compensatory education comprises supplementary programs or services designed to help children at risk of cognitive impairment and low educational achievement succeed.

Crystallized intelligence is the ability to use skills, knowledge, and experience.

Deeper learning is the process of learning for transfer. It enables an individual to take what was learned in one situation and apply it to new situations.

Disposition is an artificial habit, a preparation, a state of readiness, or a tendency to

act in a specified way that should be learned.

Educated incapacity is when students are inundated with too much information at once.

Effortful control is when students are constantly faced with tasks that are important for long-term goals but that, in the short term, are not desirable or intrinsically motivating.

Emotions is a multiple-component process that comprises specific affective, cognitive, psychological and behavioral elements.

Emotional engagement is students' positive and negative reactions to teachers, classmates, academics, and school.

Entity theory of intelligence is the individual believe that intelligence is fixed.

Executive functions, including self-regulation, problem-solving, and intentional control, are functions that are necessary for the transition to elementary school, but that students often do not develop. These include the ability to control and regulate attention in the face of distractions and the ability to inhibit inferior but strong impulses (e.g., surfing the Internet) to act on superior goals (e.g., completing homework assignments).

Expectancy beliefs are judgments of one's capacity to achieve designated types of performance.

Explanatory style is a psychological attribute that indicates how people explain to themselves why they experience a particular event, either positive or negative, it comprises the three critical elements of permanence (*stable vs. unstable*), pervasiveness (*global vs. local/specific*), and personalization (*internal vs. external).*

Fluid intelligence is the capacity to reason and solve novel problems, independent of any knowledge from the past.

Habit is the effortless performance of a task (i.e., an action that requires no effort).

Hope is the overall perception that one's goals can be met.

Human capita refers to the abilities and skills of any individual, especially those acquired through investment in education and training that enhance potential income earning potential.

Flow is a state in which people typically experience deep enjoyment, creativity, and loss of a sense of time, and total involvement in life.

Flourishing reduces the impact of negative emotions, increases positive emotions, or changes the subject such that an individual thinks about other people, rather than him- or herself.

"g" is a unitary factor widely interpreted as general mental ability.

Goal structure is the type of social interdependence linking students' goals to each other.

Gratitude is a virtue or an emotional state resulting from a recognition of future, contemporary or previous benefits received.

Grit refers to tenacity, perseverance, and the ability to never give up; a passion for long-term goals.

Gumption is the ability to conceptualize an ambitious goal, develop a plan to accomplish the goal, and complete all tasks to successfully achieve the goal.

Incremental theory of intelligence is the individual believe that intelligence is

malleable.

Jangle fallacy is when investigators use different measures with different names to study a single psychological construct or competency.

Jingle/jangle problem is as follows: *jingle* occurs when the same term is used to refer to different concepts, and *jangle* occurs when different terms are used for the same concept.

Knowledge of results refers to how individuals acquire a skill much more rapidly if they receive feedback about the correctness of what they have done.

Learning strategies are tactics that students use to help them remember, think, and learn.

Long-term memory contains two distinct types of information: semantic information about "the way the world is" and procedural information about "how things are done."

Malleable is another word for being teachable in terms of personal constructs, traits, or factors.

Mental contrasting involves concentrating simultaneously on both a positive outcome and the obstacles in the way.

Metacognition is a person's ability to select, monitor, manage, and evaluate cognitive processing during the learning or performance of a cognitive task.

Micro flow refers to activities that can be engaged in during boring or tedious activities until something interesting is said or happens.

Mind is human consciousness that originates in the brain.

Mindfulness is an awareness that emerges through paying attention on purpose, in the

present moment, and non-judgmentally to the unfolding of experience moment-by-moment.

Motivation is what people value or desire.

Neuroplasticity is the shaping and reshaping of neural connections based on experiences and learning.

Non-cognitive skills is a term used to contrast a variety of behaviors, personality characteristics, and attitudes with academic skills, aptitudes, and attainment.

Optimal experience is what makes an experience genuinely satisfying through a state of consciousness called *flow*.

Optimism is the belief that bad events are temporary, are not one's own fault, and are confined to present circumstances.

Organization refers to academic time management and involves allocating time for different activities.

Outcome emotions is pertaining to the outcomes of these activities.

Paradigm shifts are changes that create a new "game" with a new set of rules.

Performance character strength (of drive) is the ability to apply oneself to a task and stick with it.

Performance task is a situation that has been carefully designed to elicit meaningful differences in behavior of a certain kind.

Permanence is whether a person believes that the cause of a bad event is permanent and never changing (the pessimistic view) or temporary (the optimistic view).

Perseverance is pursuing goals with determination and resilience.

Personal meaning is an attribute from positive psychology field.

Personality is a patterning of dispositional traits, characteristic adaptations, and integrative life stories set in culture and shaped by human nature.

Personality traits is patterns of thoughts, feelings, and behaviors.

Personalization is a person's view of who is to blame for the occurrence of a negative event.

Pervasiveness is concerned with an individual's belief about the extent of a problem: whether it is global and affects everything (the pessimistic view) or whether it is specific and affects only one thing (the optimistic view).

Positive emotions about the future include faith, trust, confidence, hope, and optimism.

Positive emotions about the present include joy, ecstasy, calm, zest, ebullience, pleasure, and flow.

Positive emotions about the Past include satisfaction, contentment, fulfillment, pride, and serenity.

Positive psychology is the study of the conditions and processes that contribute to the flourishing or optimal functioning of people, groups, and institutions.

Post hoc ergo propter hoc fallacy is based upon the mistaken notion that simply because one thing happens after another, the first event was a cause of the second event.

Project-based learning is students taking on real-world problems in any discipline and develop long-term projects around these problems.

Pro-social is values that are relatively stable, pervasive and enduring holistic beliefs that people hold about what is right and wrong and how to treat others.

Prudence is the ability to defer gratification and look to the future.

Purpose is a higher understanding of why one is here and taking actions to manifest this understanding in all that one does.

Pygmalion effect is students do better when more is expected of them.

Regulatory fit theory is when a person pursues a goal in a way that maintains the person's own personal values and beliefs.

Resilience is the ability to persist in the face of challenges and bounce back from adversity.

School climate refers to the quality and character of school life as it relates to norms and values, interpersonal relations and social interactions, and organizational processes and structures.

Self-affirmation theory is how individuals adapt to information or experiences that are threatening to their self-concept.

Self-control is the capacity to regulate thoughts, feelings, or behaviors when they conflict with valued goals.

Self-discipline is a focus toward controlling emotions, impulses, and desires; giving one's best in all situations.

Self-efficacy is the extent or strength of one's belief in one's own ability to complete tasks and reach goals.

Self-esteem is an individual's subjective estimation of his or her own worth.

Self-evaluation is a high level of self-awareness and the ability to monitor one's own learning and performance.

Self-regulated student is characterized as a student who is aware not only of task requirements but also of his own needs with regard to optimal learning

experiences.

Self-regulation is when an individual exerts control over his or her own response so as to pursue goals and live up to standards.

Social emotional learning integrates competence-promotion and youth-development frameworks to reduce risk factors and foster protective mechanisms for positive adjustment.

Social interdependence is when individuals share common goals and each individual's goal attainment is affected by the actions of the others.

Social skills are behaviors that allow students to interact with peers and adult's in positive and productive ways.

Specific transfer is the idea that learning A affects one's learning of B only to the extent that A and B have elements in common.

Stereotype threat is a risk for students of groups with prevailing stereotypes of poor performance in school, such as ethnic minorities and girls (e.g., in math).

Strengths is a pre-existing capacity for a particular way of behaving, thinking, or feeling that is authentic and energizing to the user and that enables optimal functioning, development, and performance.

Strong methods are relatively specific algorithms that are particular to a domain and that make it possible to solve problems efficiently.

Student engagement refers to a student's level of participation and intrinsic interest in school.

Subjective well-being is a person's cognitive and affective evaluation of his or her life.

The power law of practice states that acquiring skill takes time, often requiring

hundreds or thousands of instances of practice in retrieving a piece of information or executing a procedure.

Virtues is the content of our character.

Well-being is the pervasive sense that life has been and is good.

Working memory is what people use to process and act on information immediately.

Zest is defined as living life with a sense of excitement, anticipation, and energy.

21st competencies are transferable knowledge and skills.

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Note: References marked with an asterisk (*) are major research reviews from which content was extensively used. Two asterisk (**) are detailed in Table 1.

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Tables

Table 1

Summary of Important Literature Included in the Critical Analysis of the Literature

Author(s)	Purpose	Research Method	Results
Almlund, Duckworth, Heckman, Kautz 2011	To measure Big-five personality traits.	Research synthesis	Found conscientiousness is strongest of Big-five for academic performance and has strong correlation with outcomes of number of adult domains.
Behncke (2009)	To determine if non-cognitive interventions of a positive affirmation immediately before math test will raise test score	Mixed-methods	Found a shock to student's non-cognitive skills shortly before math test raised motivation, self-confidence and reduced test anxiety with higher test scores; students with low math skills & self confidence especially benefited from intervention.

Critchley & Gibbs (2012)	To determine if the ideals of positive psychology impact the well-being and efficacy beliefs of staff members within a school	Qualitative using interviews and questionnaires	Validated the effects of a positive psychology intervention in a school environment. Participants commented on how adapting a positive outlook was useful in the school setting.
Duckworth & Seligman (2005)	To determine if self-discipline is a motivational factor in academic performance	Mixed-method To demonstrate how girls earn higher grades than boys because of their high levels of self-discipline	Highly self-disciplined adolescents outperformed their more impulsive peers on every academic-performance variable; self- discipline predicted academic performance more robustly than IQ.
Duckworth & Seligman (2006)	To demonstrate how girls earn higher grades than boys because of their high levels of self-discipline	Mixed-method	Girls were more self-disciplined than boys on every measure.
Duckworth, Peterson, Mathews, & Kelly (2007)	To test importance of I non-cognitive trait *Grit*	Mixed-method using 3 studies	*Grit* did not relate positively to IQ but was highly correlated with Big Five Conscientiousness. *Grit* demonstrated incremental predictive validity of success measures over and beyond IQ and conscientiousness.
Durlak, Weissberg, Dymnicki, Taylor, Kriston & Schellinger (2011)	To empirical evidence regarding the positive impact of SEL programs.	Meta-analysis	Found significantly improved social and emotional skills, attitudes, behavior, and academic performance that reflected an 11-percentile-point gain in

			achievement.
Ivankovi & Rijavec (2012)	To examine the influence of positive psychology in the classroom and determine if it leads to an increase in optimism in fourth-grade students.	Quantitative using surveys	Positive effects of the program increased levels of optimism.
Mega, Ronconi, & De Beni 2014	To test theoretical model linking emotions, self-regulated learning, and motivation to academic achievement.	Mixed-methods	Found influence of emotions on different aspects of self-regulated learning, also diverse facets of motivation to learn & positive emotions have greater weight on self- regulated learning and motivation than negative emotions.
Orehek, Bessarabova, Chen, & Kruglanski (2011)	To see if positive affect really does work in goal completion	Quantitative using surveys	When positive affect is experienced after a promise to complete a goal, it sometimes leads to a decrease in activation of the goal, but sometimes leads to an increased or maintained activation of the goal; positive affect can also serve as information to suggest both goal progress and goal commitment.
Poropat, (2009)	To find correlation of personality traits and academic performance.	Meta-analysis	Studies controlling for secondary academic performance found conscientiousness predicted college grades as a measure at same level as cognitive ability.

Reschly, Huebner, Appleton, & Antaramian (2008)	To see if frequent positive emotions during school are associated with higher levels of student engagement	3-year longitudinal study using questionnaires	Experience of frequent positive emotions in school relate to broadened cognitive and behavioral coping strategies; association between frequent positive emotions and several student engagement variables were partially mediated by broadened coping strategies; positive emotions appeared to be related to greater personal and environmental resources—greater student engagement in school activities and more supportive relationships with adults.
Seligman, Ernst, Gillham, Reivich, & Linkins, 2009.	Find evidence from well controlled studies that skills that increase resilience, positive emotion, engagement and meaning can be taught to schoolchildren.	Mixed-method	Found positive psychology programs increased student enjoyment and engagement in school and empathy, cooperation, assertiveness, self-control.
Seligman, Steen, Park, & Peterson (2005)	Can positive psychology make people happier by positive interventions?	Mixed-method& Interventions were delivered via internet.	Found interventions that made people lastingly happier and interventions also reduced depressive symptoms lastingly.
Sheldon & Lyubomirsky (2006)	To examine the motivational predictors and positive emotion outcomes of	4-week longitudinal, quantitative study using	Only the best possible self-exercise produced significant increase in immediate positive affect and prompted the

	practicing two happiness strategies: expressing gratitude and visualizing best possible selves.	questionnaires	highest degree of self-concordant motivation.
Shogren, Lopez, & Wehmeyer (2006)	To identify the associations between hope, optimism, locus of control, self-determination, and life satisfaction in adolescents with and without cognitive disabilities using structural equation modeling	Quantitative using surveys and rating scales.	Feedback sign positively related to performance only for those working on the cognitively intense task and not given a chance to reaffirm; otherwise, feedback sign was negatively related to performance. When cognitive resources were needed to reduce discrepancies in both a task goal and a self-concept goal, feedback sign was positively related to performance.
Shoshani &Steninmetz (2013)	To evaluate a positive psychology school-based intervention aimed at enhancing mental health and empowering the entire educational staff and students at large middle school.	1 year intervention program, followed by 2-year Longitudinal repeated measures design.	Showed significant decreases in general distress, anxiety and depression symptoms among the intervention participants, whereas symptoms in the control group increased. Also increased optimism, Self-esteem-efficacy
Spengler, Brunner, Damian, Lüdtke, Martin, & Roberts (2015).	To examine how student's characteristic and behaviors in late childhood predict career success in adulthood.	Two-wave longitudinal life span nationally representative sampling with multistage sampling. To examine	Student characteristic and behaviors played significant roles in important life outcomes over and above I.Q. and SES.

Appendices

Appendix # A. Brief History Jingle/Jangle Problem & Non-cognitive Factors.

Jingle-Jangle Fallacy

Definition: *Jingle-jangle fallacies* is the erroneous assumptions that two different things are the same because they bear the same name (*jingle fallacy*) or that two identical or almost identical things are different because they are labeled differently (*jangle fallacy*) In research, a jangle fallacy describes the inference that two measures

Early in the twentieth century in mental measurement, Truman Lee Kelly (1927) observed that investigators sometimes used different measures—with different names--to study a single psychological construct or competency and this led to a treat of construct validity. Kelly labeled this problem the "jangle fallacy" resulting in the misuse of scientific resources, resulting in multiple tests being used to study the same construct, with investigators using one measure to study a construct sometimes ignored the research results that other investigators who used other measures to study the very same construct. Today papers and reports on non-cognitive factors or 21st century skills used different language to describe the same construct, an instance of the "jangle fallacy", and include educational researcher in 2012 Thesis approval sheet.....ii

Reschly and Christenson observed a "Jingle/Jangle" Problem—"jingle" occurs when the same term is used to refer to different concepts, and "jangle" occurs when different terms are used for the same concept. In tests designed to assess emotional intelligence the jangle fallacy has shown up because many of the tests used measure merely personality or regular IQ-tests. You can have a jingle fallacy can occur when personality and values are sometimes conflated and treated as the same construct. One of the main problems is all the different ideas about what exactly an attribute like grit, tenacity, and perseverance are and which requires the need to clarify both the terminology and conceptualizations to prevent the phenomena of jingle-jangle for researches.

Richard V. Reeves and Joanna Venator 2014 in a Brookings, Educational issue, *social mobility memos,* Jingle-Jangle Fallacies for Non-Cognitive Factors, said, "Terminologically speaking, scholarship on "non-cognitive factors" is a mess. This is a field where words count, too. Are we examining behaviors, skills, strengths or traits? Are we promoting "character," "socio-emotional learning," or "soft skills?" Two fallacies in particular are impeding progress: the "jingle" and the "jangle". (Social Mobility Memos on Character and Opportunity | Number 13 of 13).

This really states the present problem of doing research on non-cognitive factors for education with the three disciplines of economics, psychology, and education. "A particular attribute may be labeled a "skill" by an economist, a "personality trait" by a psychologist, a certain kind of "learning" by an educationalist, or a "character" dimensions by a moral philosopher. Each may have the same concept in mind, but miss each other's work or meaning because of the confusion of terms." (Reeves & Venator 2014, p. 1) Several recent major studies on non-cognitive in educational curriculum have used different labels to address the same issues. Also Angela Duckworth has now coined the term "grit" as a label for several attributes, effort, determination, drive, perseverance, persistence, resilience, and tenacity. Also grit has had another meaning for a long time. Does this help clarify or just confuse the problem of multi labeling of terms?

Non-Cognitive Factors

Starting with Binet and Simon who noted that performance in school "admits other things than intelligence; to succeed in his studies, one must have qualities which

depend on attention, will and character." Duckworth et al 2015, point out that way back as 1899, William James asserted that some school work will be "repulsive and cannot be done without voluntarily jerking back the attention to it every now and then" (p. 179).

A major hindrance is the notion of "cognitive skills" has garnered much more adherence than the term "non-cognitive skills," both are difficult to define with precision, often misinterpreted because of lack of consensual definitions, hard to measure without influence of the other, and representative of heterogeneous rather than homogenous categories (Duckworth, Quinn, Lynam, Loeber, & Stouthamer-Loeber, 2011; Gardner, 2004; Heckman & Kautz, 2013; Sternberg, 2008). Also some claim that cognitive ability is also mutable (Nisbett, 2009; Nisbett et al., 2012). The most recent research by Angela Duckworth and David Yeager (2015) have found,

> There has been perennial interest in personal qualities other than cognitive ability that determine success, including self-control, grit, growth mindset, and many others. Attempts to measure such qualities for the purposes of educational policy and practice, however, are more recent. In this article, we identify serious challenges to doing so. We first address confusion over terminology, including the descriptor "non-cognitive." We conclude that debate over the optimal name for his broad category of personal qualities obscures substantial agreement about the specific attributes worth measuring.

Measurement Matters:
Assessing Personal Qualities Other Than Cognitive Ability for Educational Purposes

Measurement matters. While reason and imagination also advance knowledge (Kuhn, 1961), only measurement makes it possible to observe patterns and to experiment—to put our guesses about what is and is not true to the test (Kelvin,1883). From a practical standpoint, intentionally changing something is dramatically easier when you can quantify with precision how much or how little of it there is (Drucker, 1974).

In recent years, scholars, practitioners, and the lay public have grown increasingly interested in measuring and changing attributes other than cognitive ability (Heckman & Kautz, 2013; Levin, 2013; Naemi, Burrus, Kyllonen, & Roberts, 2012; Stecher & Hamilton, 2014; Tough, 2013; Willingham, 1985). These so-called "non-cognitive" qualities are diverse and collectively facilitate goal-directed effort (e.g., grit, self-control, growth mindset), healthy social relationships (e.g., gratitude, emotional intelligence, social belonging), and sound judgment and decision making (e.g., curiosity, open-mindedness). Longitudinal research has confirmed such qualities powerfully predict academic, economic, social, psychological, and physical well-being (Almlund, Duckworth, Heckman, & Kautz, 2011; Borghans, Duckworth, Heckman, & ter Weel, 2008; Farrington et al., 2012; Jackson, Connolly, Garrison, Levin, & Connolly, 2015; Moffitt et al., 2011; Naemi et al., 2012; Yeager & Walton, 2011).

A Rose by any Other Name: Naming and Defining the Category

Reliable and predictive performance tasks to assess academic aptitude

(i.e., the capacity to acquire new academic skills and knowledge) and academic achievement (i.e., previously acquired skills and knowledge) have been available for well over a century (Roberts, Markham, Matthews, & Zeidner, 2005). The influence of such measures on contemporary educational policy and practice is hard to overstate.

Yet parallel measures for human attributes other than cognitive ability have not followed suit. Notably, pioneers in the measurement of cognitive ability shared the intuition that these other qualities were crucial to success both in and out of the classroom. For instance, the creator of the first valid IQ test wrote that success in school "admits of other things than intelligence; to succeed in his studies, one must have qualities which depend especially on attention, will, and character" (Binet, 1916, p. 254). The author of the widely used Weschler tests of cognitive ability likewise observed that "in addition to intellective there are also definite non-intellective factors which determine intelligent behavior" (Weschler, 1943, p. 103). Our guess is that the present asymmetry represents more of an engineering problem than a difference in importance: attributes other than cognitive ability are just as consequential but may be harder to measure (Stecher & Hamilton, 2014).

Of the descriptor "non-cognitive," Easton (2013) has pointed out, "Everybody hates this term but everyone knows roughly what you mean when you use it…" Where did the term originate? Messick (1979) explains: "Once the term cognitive is appropriated to refer to intellective abilities and subject-matter achievement in conventional school areas…the term comes to the fore

by default to describe everything else" (p. 282). The term is problematic. Arguably too broad to be useful, this terminology also seems to imply that there are features of human behavior that are devoid of cognition. On the contrary, every facet of psychological functioning, from perception to personality, is inherently "cognitive" insofar as processing of information is involved. For example, self-control, a canonical "non-cognitive" attribute, depends crucially on how temptations are represented in the mind. Cognitive strategies that recast temptations in less alluring terms (e.g., thinking about a marshmallow as a fluffy white cloud instead of a sticky, sweet treat) dramatically improve our ability to resist them (Fujita, 2011; Mischel et al., 2011). And, exercising self-control also relies on executive function, a suite of top-down cognitive processes including working memory (Blair & Raver, 2015; Diamond, 2013). Hence, from a psychological perspective, the term is simply inaccurate.

Given such obvious deficiencies, several alternatives have emerged. Without exception, these terms have both proponents and critics. For example, some prefer—while others, with equal fervor, detest—the terms character (Berkowitz, 2012; Damon,2010;Peterson &Seligman, 2004; Tough, 2013), character skills (Heckman & Kautz, 2014), or virtue (Kristjansson, 2013; for a review of moral character education, see Lapsley & Yeager, 2012). To speak of character or virtue is, obviously, to speak of admirable and beneficial qualities. This usefully ties contemporary efforts toward the cultivation of such positive qualities to venerated thinkers of the

past, from Plato and Aristotle to Benjamin Franklin and Horace Mann to Martin term Luther King Jr., who in 1947 declared, “Intelligence plus character—that is the goal of true education.”

Many educators, however, prefer terminology without moral connotations. Some have adopted the term social and emotional learning (SEL) competencies, a phrase that highlights the relevance of emotions and social relationships to any complete view of child development(Durlak et al., 2015; Elias, 1997; Weissberg & Cascarino, 2013). SEL terminology has grown increasingly popular in education, and a search on Google n-gram shows that mention of the phrase “social and emotional learning” has increased 19-fold in published books since its introduction in 1994 (Merrell & Gueldner, 2010). The SEL moniker may, however, inadvertently suggest a distinction from academic priorities, even though the data show that children perform better in school when SEL competencies are developed (Durlak, Weissberg, Dymnicki, Taylor,& Schellinger, 2011).

Psychologists who study individual differences among children might alternatively suggest the terms personality, dispositions, and temperament. But such “trait” terminology may incorrectly suggest that these attributes cannot be changed by people’s experiences, and the connotation of immutability is at odds with both empirical evidence (Caspi, Roberts, & Shiner, 2005; Roberts & DelVecchio, 2000; Roberts, Walton, & Viechtbauer, 2006) and pedagogical aims (Tough, 2011). Indeed, widespread interest in personal qualities is fueled in large part by the assumption that students can

learn, practice, and improve them.

Next, the terms twenty-first century skills, twenty-first century competencies, and new basic skills have made their timely appearance (Murnane & Levy, 1996; Pellegrino & Hilton, 2012; Soland, Hamilton, & Stecher, 2013). Likewise, some authors have used the terms soft skills (Heckman & Kautz, 2012). Unlike "trait" terminology, "skill" terminology usefully connotes malleability. However, referring to skills may implicitly exclude beliefs (e.g., growth mindset), values (e.g., prosocial motivation), and other relational attitudes (e.g., trust). The narrowness of "skill" terminology is obvious when considering attributes like gratitude, generosity, and honesty. Yes, these behaviors can be practiced and improved, but an authentic desire to be grateful, generous, and/or honest is an essential aspect of these dispositions. As far as the descriptor "twenty-first century" or "new" is concerned, it seems fair to question whether attributes like self-control and gratitude—of central concern to every major philosophical and religious tradition since ancient times—are of special relevance to modernity. Indeed, these may be more timeless than timely.

Finally, all of these terms—virtues, traits, competencies, or skills—have the disadvantage of implying that they are consistently demonstrated across all possible life situations. But they are not (Fleeson & Noftle, 2008; Mischel, 1968; Ross & Nisbett, 1991; Ross, Lepper, & Ward, 2010; Wagerman & Funder, 2009). For instance, self-control is undermined when people are laboring under the burden of a negative stereotype (Inzlicht &

Kang, 2010) or when authority figures are perceived as unreliable (Kidd, Palmeri, & Aslin, 2013; Mischel, 1961). Learners are grittier when they have been asked to reflect on their purpose in life (Yeager et al., 2014), and organizations can create a fixed mindset climate that undermines employee motivation independently of employees' own prior mindset beliefs (Murphy & Dweck, 2009).

We believe that all of the above terms refer to the same conceptual space, even if connotations (e.g., morality, mutability, or consistency across settings) differ. Crucially, all of the attributes of interest are (a) conceptually independent from cognitive ability, (b) generally accepted as beneficial to the student and to others in society, (c) relatively rank-order stable over time in the absence of exogenous forces (e.g., intentional intervention, life events, changes in social roles), (d) potentially responsive to intervention, and (e) dependent on situational factors for their expression.

From a scientific perspective, agreement about the optimal terminology for the overarching category of interest may be less important than consensus about the specific attributes in question and, in particular, their definition and measurement. Of course, a community of practice (e.g., a school district, a reform movement, a networked improvement community) benefits from consensual terminology (Bryk, Gomez, Grunow, & LeMahieu, 2015). Marching under the same flag, rather than several different ones, would make more obvious the fact that many researchers and educators are working to measure and improve the same student attributes (Bryk, Gomez, Grunow,

& LeMahieu, 2015; Langley et al., 2009). However, because each community of practice has its own previously established concerns and priorities, the choice of a motivating umbrella term is perhaps best left to these groups themselves and not to theoretical psychologists.

Our view is pragmatic, not ideological. We suggest that the potentially interminable debate about what to call this category of student attributes draws attention away from the very urgent question of how to measure them. In this review, we refer to personal qualities as shorthand for "positive personal qualities other than cognitive ability that lead to student success" (see Willingham, 1985). Of course, this terminology is provisional because it, too, has flaws. For instance, attitudes and beliefs are not quite satisfyingly described as "qualities" per se. In any case, we expect that communities of research or practice will adopt more descriptive terms as they see fit.

[1] Interestingly, while the notion of "cognitive skills" has garnered much more adherence than the term "non-cognitive skills," both are difficult to define with precision, often misinterpreted because of lack of consensual definitions, hard to measure without influence of the other, and representative of heterogeneous rather than homogenous categories (Duckworth, Quinn, Lynam, Loeber, & Stouthamer-Loeber, 2011; Gardner, 2004; Heckman & Kautz, 2013; Sternberg, 2008).

[2] We hasten to point out that cognitive ability is also mutable (Nisbett, 2009; Nisbett et al., 2012).

Table 2

Summary for Practitioners and Policymakers

Conclusions

- There is a scientific consensus in the behavioral sciences that success in school and beyond depends critically on many attributes other than cognitive ability.
- As shown in Table 1, measures created for basic theory development have various advantages and limitations.

- These limitations often undermine validity for applied uses.
- Self-report and teacher-report questionnaire measures may potentially produce the *opposite* finding of the truth if used for between-school or within-school, over time comparisons, as in *program evaluation* and *school accountability.*
- Existing questionnaire and performance task measures are rarely sufficiently reliable to use for *diagnosis*, and may produce group biases.
- Both questionnaire and performance tasks may be useful for *practice improvement* under some circumstances.

Recommendations

- A consensual umbrella term for this heterogeneous set of competencies may be less important than clarity about the individual constructs.
- A multi-method approach to assessment is a useful strategy for increasing validity.
- A high priority for research is to improve the suite of performance tasks available for *program evaluation and practice improvement.*
- A second priority is to develop novel and innovative measures, capitalizing on advances in theory and technology.

(Duckworth & Yeager 2015, p. 237-155)

Appendix # B. Non-cognitive Skills for Young People, identified eight non-cognitive skills.

Table 1 provides a summary of our main findings concerning non-cognitive skills. As shown in Table 1, we assess for each non-cognitive skill (1) the robustness of measurement, (2) the malleability (i.e., as determined by the average effect size of its improvement in experimental studies), (3) the causal effect on other outcomes (i.e., as determined by the average effect size shown in experimental studies), and the strength of the evidence (see Appendix for a definition of these categories).

Table 1: Summary of findings on Non-Cognitive Skills

	Quality of measurement	Malleability	Effect on other outcomes	Strength of evidence
1. Self-perceptions				
Self-concept ability	High	Medium	Not available	Medium
Self-efficacy	High	High	High	Medium

2. Motivation				
Achievement goal theory	High	Medium	Low to medium	Medium
Intrinsic motivation	High	Medium	Low to medium	High
Expectancy-value theory	Medium	Not available	Medium to high	Medium
3. Perseverance				
Engagement	Medium	Not available	Not available	Low
Grit	Medium	No evidence	No evidence	Low
4. Self-control	Medium	Low to medium	Low	Medium
5. Meta-cognition	Medium	Medium to high	Medium to high	High
6. Social competencies				
Leadership skills	Low	Not available	No evidence	Low
Social skills	Medium	Medium to high	Low to medium	High
7. Resilience and coping	Medium	High	Low	Medium

8. Creativity	Medium	Not available	No evidence	Low

(Gutman & Schoon 2013, p. 40).

Appendix # C. The Five Non-Cognitive Factors.

In their review of the existing research, the University of Chicago scholars Farrington et al 2012, identify five non-cognitive general categories factors that contribute to students' academic performance. They are:

1. **Academic Behaviors** – observable behaviors that show students' engagement and effort. Including going to class, doing homework, organizing materials, participation, and studying.

2. **Academic Mindsets -** students' attitudes and beliefs about their academic work and ability. Including, I belong in an academic community, My ability and competence grow with my effort, I can succeed at this, and this work has value for me.

3. **Academic Perseverance** – the ability to overcome distractions, obstacles and challenges to complete academic work. Includes, grit, tenacity, delayed gratification, self-discipline, and self-control.

4. **Learning Strategies** – tactics that students use to help them remember, think and learn. Include, study skills, metacognitive strategies, self-regulated learning, and goal-setting.

5. **Social Skills** – behaviors that allow students to interact with peers and adults in positive and productive ways. Includes, interpersonal skills, empathy, cooperation, assertion, and responsibility.

(Farrington et al., 2012, p. 9-11).

Appendix D. Short overview of Perry & Abecedarian pre-school programs.

The HighScope Perry Preschool Project (1962) and the North Carolina Abecedarian Project (1972) are two of the most renowned preschool program of controlled intervention aimed at disadvantaged black children that were followed up with longitudinal studies with Abecedarian doing follow up assessments at ages 3, 4, 5, 6.5, 8, 12, 15, 21, and 30, while the Perry did follow ups at ages 27 and 40. These

interventions involved both cognitive and non-cognitive elements. The results show that the interventions did have long term effects on the lives of the treatment group over the control group with the non-cognitive elements having lasting long term positive results over cognitive results. The Perry program did not have any lasting effects on approving participants I.Q. by age 10 both the treatment and control groups showed the same average I.Q. scores. The Abecedarian program that started earlier and lasted longer did show lasting improvements in I.Q. for girls till age 21.James J. Heckman Tim Kautz (2013) examined several interventions including Perry and Abecedarian projects, with one of the interesting conclusions being, "Evaluations of the Perry Preschool program provide some of the most compelling evidence that character skills can be boosted in ways that produce adult success." (Heckman et al 2013, p. 43) and

> As with Perry, the benefits of the ABC program differ across genders. For girls, the program improved educational attainment, reduced participation in criminal activity, de- creased substance abuse, and improved internalizing and externalizing behavior. Like the Perry program, ABC improved employment and health for males and produced substantial improvements in character skills. (p. 47).

Both of these program have had several scholarly research studies examining the results included one sited above (Heckman et al 2013, p. 43). After a literature review of several studies for this short overview of programs for appendix c. all the following is from Wikipedia, the free encyclopedia but checked for accuracy from original studies.

The HighScope Perry Preschool Project

Effectiveness of the program:
The HighScope Perry Preschool Project was evaluated in a randomized controlled trial of 123 children (58 were randomly assigned to a treatment group that received the program and a control group of 65 children that did not). Prior to the program, the preschool and control groups were equivalent in measures of intellectual performance and demographic characteristics. After the program the educational and life outcomes for the children receiving the program were much superior to outcomes for the children not receiving the program. Many of the program effects were significant or approaching significance.
Educational outcomes for preschool group (versus control group):
At age 27 follow-up, Completed an average of almost 1 full year more of schooling (11.9 years vs. 11 years) Spent an average of 1.3 fewer years in special education services — e.g., for mental, emotional, speech, or learning impairment (3.9 years vs. 5.2 years) 44 percent higher high school graduation rate (66% vs. 45%)
Pregnancy outcomes for preschool group (versus control group):
At age 27 follow-up
Much lower proportion of out-of-wedlock births (57% vs. 83%)
Fewer teen pregnancies on average (0.6 pregnancies/woman vs. 1.2 pregnancies/woman) (not significant <.05)
Lifetime criminal activity for preschool group (versus control group):
At age 40 follow-up 46 percent less likely to have served time in jail or prison (28% vs. 52%) 33 percent lower arrest rate for violent crimes (32% vs. 48%)
Economic outcomes for preschool group (versus control group):
At age 40 follow-up 42 percent higher median monthly income ($1,856 vs. $1,308) 26 percent less likely to have received government assistance (e.g. welfare, food stamps) in the past ten years (59% vs. 80%)

The Carolina Abecedarian Project

The participants in this experiment were 111 infants born between 1972 and 1977. Of these, 57 were given high-quality intervention, consisting in part of educational games based on the latest in educational theory. The other 54 acted as a control group. An overwhelming majority (98 percent) of the children who participated in the experiment were African-American. The average starting age of participants was 4.4 months.[Whereas other childhood programs started at age two, the Abecedarian Project started from infancy and continued for five years, a period longer than most other programs. The participants received child care for 6–8 hours a day, five days a week. Educational activities were game-based and emphasized language. The control group was provided with nutritional supplements, social services, and health care to ensure that these factors did not affect the outcomes of the experiment.[All the 111 infants were identified as "high risk" based on maternal education (which was on average 10th grade), family income, and other factors. The teacher-child ratio was low. It ranged from 1:3 for infants to 1:6 at age

Significant findings
Follow-up assessment of the participants involved in the project has been ongoing. So far, outcomes have been measured at ages 3, 4, 5, 6.5, 8, 12, 15, 21, and 30.[5] The areas covered were cognitive functioning, academic skills, educational attainment, employment, parenthood, and social adjustment. The significant findings of the experiment were as follows:[
Impact of child care/preschool on reading and math achievement, and cognitive ability, at age 21: An increase of 1.8 grade levels in reading achievement. An increase of 1.3 grade levels in math achievement. A modest increase in Full-Scale IQ (4.4 points), and in Verbal IQ (4.2 points).
Impact of child care/preschool on life outcomes at age 21:Completion of a half-year more of education. Much higher percentage enrolled in school at age 21 (42 percent vs. 20 percent). Much higher percentage attended, or still attending, a 4-year college (36 percent vs. 14 percent)
Much higher percentage engaged in skilled jobs (47 percent vs. 27 percent)
Much lower percentage of teen-aged parents (26 percent vs. 45 percent). Reduction of criminal activity
Statistically significant outcomes at age 30. Four times more likely to have graduated from a four-year college (23 percent vs. 6 percent)
More likely to have been employed consistently over the previous two years (74 percent vs. 53 percent)
Five times less likely to have used public assistance in the previous seven years (4 percent vs. 20 percent)
Delayed becoming parents by average of almost two years
(Most recent information from Developmental Psychology, January 18, 2012, cited in uncnews.unc.edu, January 19, 2012)
The project concluded that high quality, educational child care from early infancy was therefore of utmost importance.
Other, less intensive programs, notably the Head Start Program, but also others, have not been as successful. It may be that they provided too little too late compared with the Abecedarian program.

Effects of the Abecedarian Project at the age-30 follow-up:
All of the following effects are statistically significant at the 0.05 level, unless noted otherwise.
Compared to the control group, Abecedarian group members –
Were 42% more likely to have been employed for at least 16 of the 24 months preceding the age-30 follow-up (75.0% of the Abecedarian group vs. 53.0% of the control group).
Were 81% less likely to have received welfare for a total of nine months or more between the ages of 22.5 and 30 years (3.9% for the Abecedarian group vs. 20.4% for the control group).
Were almost four times as likely to have graduated from college (23.1% for the Abecedarian group vs. 6.1% for the control group).
Completed 1.2 more years of education (an average of 13.5 years for the Abecedarian group vs. 12.3 years for the control group).

Were 1.8 years older when their first child was born (an average of 21.8 years of age for the Abecedarian group vs. 20.0 years of age for the control group).
The study found no statistically significant effects on high school graduation rates, income, and type of employment, marital status, mental or physical health, criminal activity, or substance use. The non-significant effects on high school graduation, income, type of employment, and marital status tended to favor the Abecedarian group. There was no clear pattern of effects – positive or negative – on the other outcomes.

Appendix E. Copy of 24 Character Strengths (VIA).

Appendix # F. Copy of children 24 character strengths test (VIA).

Below is a list of statements describing people who are 8 to 17 years old. Please read each one, and then decide **how much it is like you** and mark the correct radio button. There are no right or wrong answers. Please be as honest as you possibly can. We will rank your strengths and compare them to others' strengths when you have answered all of the 198 questions.

All questions must be completed for this questionnaire to be scored.

1.
I love art, music, dance, or theater.
Very Much Like Me
Mostly Like Me
Somewhat Like Me
A Little Like Me
Not Like Me At All

2.
I stick up for other kids who are being treated unfairly.
Very Much Like Me
Mostly Like Me
Somewhat Like Me
A Little Like Me
Not Like Me At All

3.
I like to think of different ways to solve problems.
Very Much Like Me
Mostly Like Me
Somewhat Like Me
A Little Like Me
Not Like Me At All

4.
I don't have many questions about things.
Very Much Like Me
Mostly Like Me
Somewhat Like Me
A Little Like Me
Not Like Me At All

5.
In a group, I give easier tasks to the people I like.
Very Much Like Me
Mostly Like Me

Somewhat Like Me
A Little Like Me
Not Like Me At All

6.

I can still be friends with people who were mean to me, if they apologize.
Very Much Like Me
Mostly Like Me
Somewhat Like Me
A Little Like Me
Not Like Me At All

7.

I complain more often than I feel grateful about my life.
Very Much Like Me
Mostly Like Me
Somewhat Like Me
A Little Like Me
Not Like Me At All

8.

I always keep my word.
Very Much Like Me
Mostly Like Me
Somewhat Like Me
A Little Like Me
Not Like Me At All

9.

No matter what I do, things will not work out for me.
Very Much Like Me
Mostly Like Me
Somewhat Like Me
A Little Like Me
Not Like Me At All

10.

People often tell me that I act too seriously.
Very Much Like Me
Mostly Like Me
Somewhat Like Me
A Little Like Me
Not Like Me At All

11.

I keep at my homework until I am done with it.
Very Much Like Me
Mostly Like Me
Somewhat Like Me
A Little Like Me
Not Like Me At All

12.

I make good judgments even in difficult situations.
Very Much Like Me
Mostly Like Me
Somewhat Like Me
A Little Like Me
Not Like Me At All
13.
When my friends are upset, I listen to them and comfort them.
Very Much Like Me
Mostly Like Me
Somewhat Like Me
A Little Like Me
Not Like Me At All
14.
When people in my group do not agree, I can't get them to work together.
Very Much Like Me
Mostly Like Me
Somewhat Like Me
A Little Like Me
Not Like Me At All
15.
I always feel that I am loved.
Very Much Like Me
Mostly Like Me
Somewhat Like Me
A Little Like Me
Not Like Me At All
16.
I am excited when I learn something new.
Very Much Like Me
Mostly Like Me
Somewhat Like Me
A Little Like Me
Not Like Me At All
17.
I think that I am always right.
Very Much Like Me
Mostly Like Me
Somewhat Like Me
A Little Like Me
Not Like Me At All
18.
I am very careful at whatever I do.
Very Much Like Me
Mostly Like Me
Somewhat Like Me

A Little Like Me
Not Like Me At All
19.
If I have money, I usually spend it all at once without planning.
Very Much Like Me
Mostly Like Me
Somewhat Like Me
A Little Like Me
Not Like Me At All
20.
In most social situations, I talk and behave the right way.
Very Much Like Me
Mostly Like Me
Somewhat Like Me
A Little Like Me
Not Like Me At All

Appendix G. Example of Character Report Card for one hypothetical child.

KIPP:CHARACTER REPORT CARD

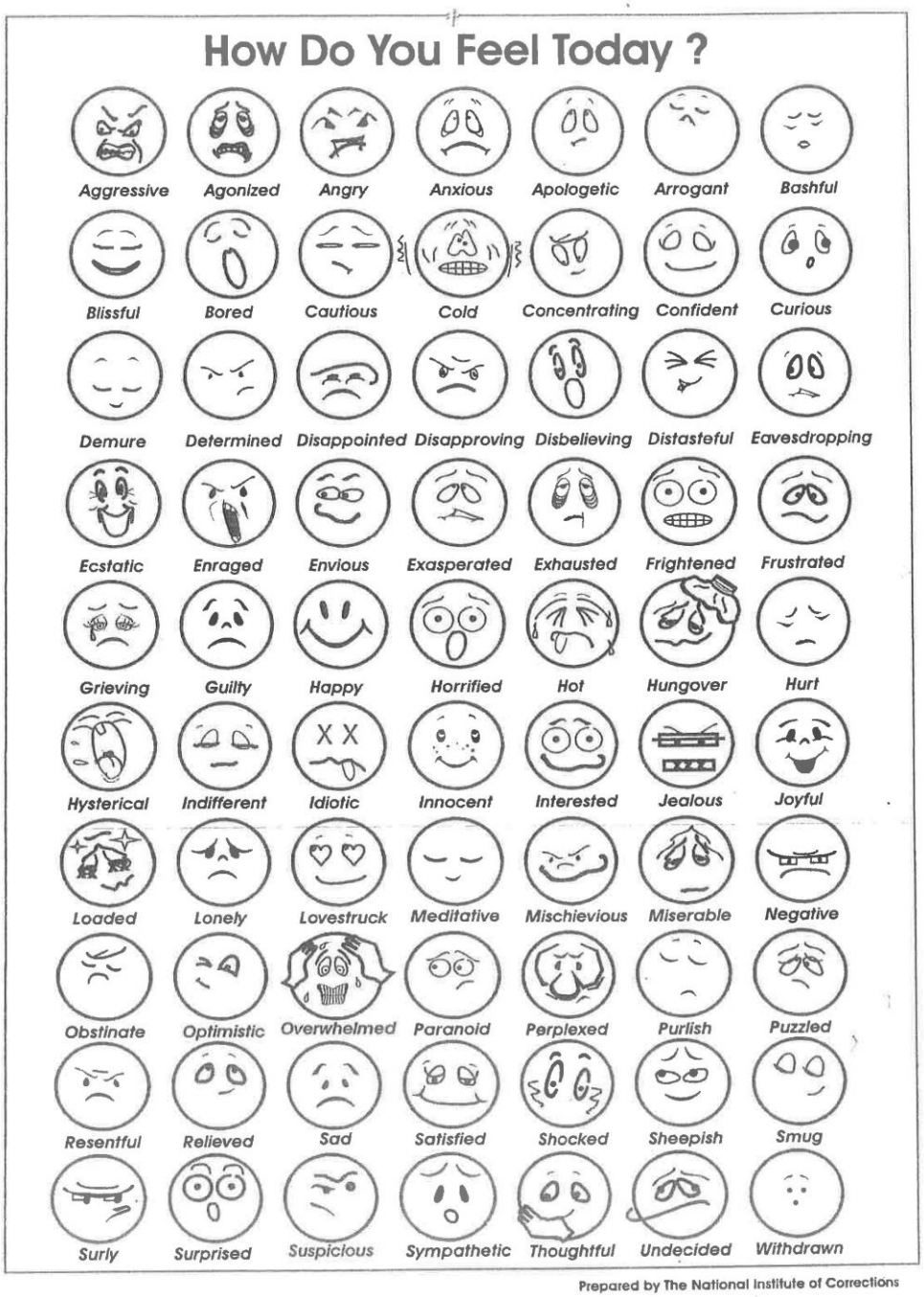
Jane Smith Grade: 8	KIPP Imagine Date: 01/28/11	Q2	Q2					
	OVERALL SCORE	4.30	Teacher 1	Teacher 2	Teacher 3	Teacher 4	Teacher 5	Teacher 6
Zest		4.28						
1	Actively participates	4.50	4	5	5	4	4	5
2	Shows enthusiasm	4.17	5	4	3	4	4	5
3	Invigorates others	4.17	3	4	5	4	5	4
Grit		4.11						
4	Finishes whatever he or she begins	4.00	4	5	3	4	4	4
5	Tries very hard even after experiencing failure	4.17	5	4	4	3	4	5
6	Works independently with focus	4.17	4	4	3	4	5	5
Self Control – School Work		4.33						
7	Comes to class prepared	4.50	4	5	5	5	4	4
8	Pays attention and resists distractions	4.50	4	5	4	5	4	5
9	Remembers and follows directions	4.17	4	5	5	4	3	4
10	Gets to work right away rather than procrastinating	4.17	5	4	4	4	3	5
Self Control - Interpersonal		4.54						
11	Remains calm even when criticized or otherwise provoked	4.50	4	5	4	5	5	4
12	Allows others to speak without interruption	4.83	5	5	5	4	5	5
13	Is polite to adults and peers	4.50	4	5	4	5	4	5
14	Keeps his/her temper in check	4.33	4	5	4	4	5	4
Optimism		4.25						
15	Gets over frustrations and setbacks quickly	4.33	5	4	4	4	5	4
16	Believes that effort will improve his or her future	4.17	5	4	4	3	4	5
Gratitude		4.25						
17	Recognizes and shows appreciation for others	4.17	4	4	5	4	5	3
18	Recognizes and shows appreciation for his/her opportunities	4.33	5	4	5	3	4	5
Social Intelligence		4.33						
19	Is able to find solutions during conflicts with others	4.17	4	4	3	5	4	5
20	Demonstrates respect for feelings of others	4.50	5	4	4	4	5	5
21	Knows when and how to include others	4.33	5	4	4	4	5	4
Curiosity		4.28						
22	Is eager to explore new things	4.17	5	4	3	4	5	4
23	Asks and answers questions to deepen understanding	4.50	5	4	5	4	4	5
24	Actively listens to others	4.17	4	4	5	4	5	3

SCALE

1= Very much unlike the student
2= Unlike the student
3= Somewhat like the student
4= Like the student
5= Very much like the student

Source: the website of Angela Duckworth, available at http://www.sas.upenn.edu/~duckwort/ (Shechtman et al 2013, p.39).

Appendix H. Copy of different emotions mostly negative (87%).



Appendix I. . Copy Angela Duckworth 8-Item Grit Scale Test for Children.

8- Item Grit Scale

Directions for taking the Grit Scale: Please respond to the following 8 items. Be honest – there are no right or wrong answers!

1. New ideas and projects sometimes distract me from previous ones.*

    Very much like me

    Mostly like me

    Somewhat like me

    Not much like me

    Not like me at all

2. Setbacks (delays and obstacles) don't discourage me. I bounce back from disappointments faster than most people.

    Very much like me

    Mostly like me

    Somewhat like me

    Not much like me

    Not like me at all

3. I have been obsessed with a certain idea or project for a short time but later lost interest.*

    Very much like me

    Mostly like me

    Somewhat like me

    Not much like me

    Not like me at all

4. I am a hard worker.

    Very much like me

- Mostly like me
- Somewhat like me
- Not much like me
- Not like me at all

5. I often set a goal but later choose to pursue (follow) a different one. *
   - Very much like me
   - Mostly like me
   - Somewhat like me
   - Not much like me
   - Not like me at all
6. I have difficulty maintaining (keeping) my focus on projects that take more than a few months to complete. *
   - Very much like me
   - Mostly like me
   - Somewhat like me
   - Not much like me
   - Not like me at all
7. I finish whatever I begin.
   - Very much like me
   - Mostly like me
   - Somewhat like me
   - Not much like me
   - Not like me at all
8. I am diligent (hard working and careful).
   - Very much like me
   - Mostly like me

- Somewhat like me
- Not much like me
- Not like me at all Scoring:

For questions 2, 4, 7 and 8 assign the following points: 5 = Very much like me 4 = Mostly like me 3 = Somewhat like me 2 = Not much like me 1 = Not like me at all

For questions 1, 3, 5 and 6 assign the following points: 1 = Very much like me 2 = Mostly like me 3 = Somewhat like me 4 = Not much like me 5 = Not like me at all

Add up all the points and divide by 8. The maximum score on this scale is 5 (extremely gritty), and the lowest scale on this scale is 1 (not at all gritty).

Duckworth, A.L, & Quinn, P.D. (2009). Development and validation of the Short Grit Scale (GritS). Journal of Personality Assessment, 91, 166-174. http://www.sas.upenn.edu/~duckwort/images/Duckworth%20and%20Quinn.pdf

Duckworth, A.L., Peterson, C., Matthews, M.D., & Kelly, D.R. (2007). Grit: Perseverance and passion for long-term goals. Journal of Personality and Social Psychology, 9, 1087-1101. http://www.sas.upenn.edu/~duckwort/images/Grit%20JPSP .pdf

Appendix J. Copy of negative elements of Grit.

The Dark Side of Grit: Potential Costs and Risks

An important theme that emerged in many interviews and in the literature is that grit can have a "dark side." It is not necessarily always productive and can have costs and risks—especially in this accountability-driven climate and in communities that place extremely high expectations on students. While little research has examined this to date, some speculations encountered were as follows:

- Persevering in the face of challenges or setbacks to accomplish goals that are extrinsically motivated, unimportant to the student, or in some way inappropriate for the student can potentially induce stress, anxiety, and distraction, and have detrimental impacts on students' long-term retention, conceptual learning, and psychological well-being.
- As grit becomes a more popular notion in education, there is a risk that poorly informed educators or parents could misuse the idea and introduce what

psychologists call the "fundamental attribution error"—the tendency to overvalue personality-based explanations for observed behaviors and undervalue situational explanations. In other words, there is a risk that individuals could over attribute students' poor performance to a lack of "grittiness" without considering that critical supports are lacking in the environment.

- Perseverance that is the result of a "token economy" that places a strong emphasis on punishments and rewards may undermine long-term grit; in particular, while these fundamentally manipulative supports can seem to "work" in the short-run, when students go to a different environment without these supports, they may not have developed the appropriate psychological resources to continue to thrive.

- In our interview with psychologist Carol Dweck of Stanford University, she discussed an emerging trend that many undergraduate students have developed the expectation that their decisions about their studies and professional direction must come from an inherent "passion"—rather than through the effort and work of fully engaging in what they are doing. While a rare few may be driven by specific passions, for many students, this expectation is false and can undermine their persistence when they begin to encounter challenges in a chosen direction. Theoretically, there may be important links to the rich and extensive achievement orientation literature that makes distinctions between "mastery-oriented" goals and "performance-oriented" goals. Little systematic research has investigated these links to date. Careful research in this area is necessary to help educators learn how to protect students and to gauge and fine-tune practices and interventions.

(Shechtman et al 2013, p.36).

Appendix # K. Serious limitations of questioners & performance tasks.

Table 1

Serious Limitations of Questionnaires and Performance Tasks

Serious limitations of Self-Report and Teacher Report Questionnaires

Misinterpretation by participant: Student or teacher may read or interpret the item in a way that differs from researcher intent

Lack of insight or information: Student or teacher may not be astute or accurate reporters of behaviors or internal states (e.g., emotions, motivation) for a variety of reasons

Insensitivity to short-term changes: Questionnaires scores may not reflect subtle changes over a short periods of time

Reference bias: The frame of reference (i.e., implicit standards) used when making judgments may differ across students or teachers

Faking and social desirability: Students or teachers may provide answers that are desirable but not accurate

Serious Limitations of Self-Report and Teacher Report Questionnaires

Misinterpretation by researcher: Researchers may make inaccurate assumptions about underlying reasons for student behavior

Insensitivity to typical behavior: Tasks, which optimize motivation, to perform well (i.e. elicit maximal performance) may not reflect behavior in everyday situations

Task impurity: Task performance may be influenced by irrelevant competencies (e.g., hand-eye coordination)

Artificial situations: Performance tasks may foist students into situations (e.g., doing academic work with distracting videogames in view) that they might proactively avoid in real life

Practice effects: Scores on sequential administrations may be less accurate (e.g., because of increased familiarity with task, boredom)

Extraneous situational influences: Task performance may be influenced by aspects of environment in which task is performed or by physiological state (e.g., time of day, noise in classroom, hunger, fatigue)

Random error: Scores may be influenced by purely random error (e.g., respondent randomly marking the wrong answer)

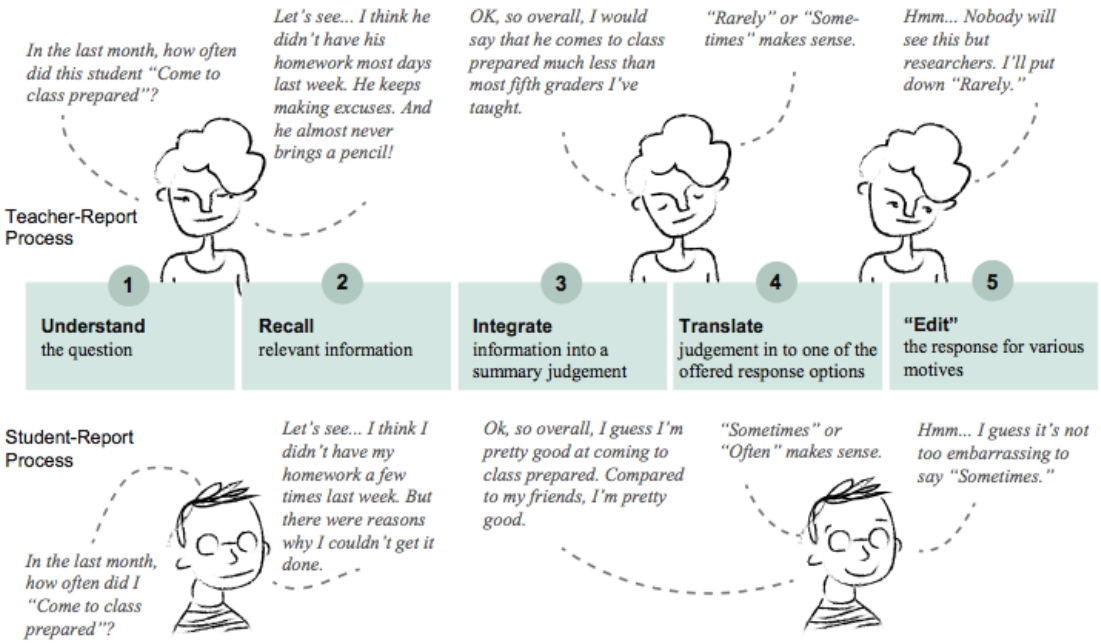
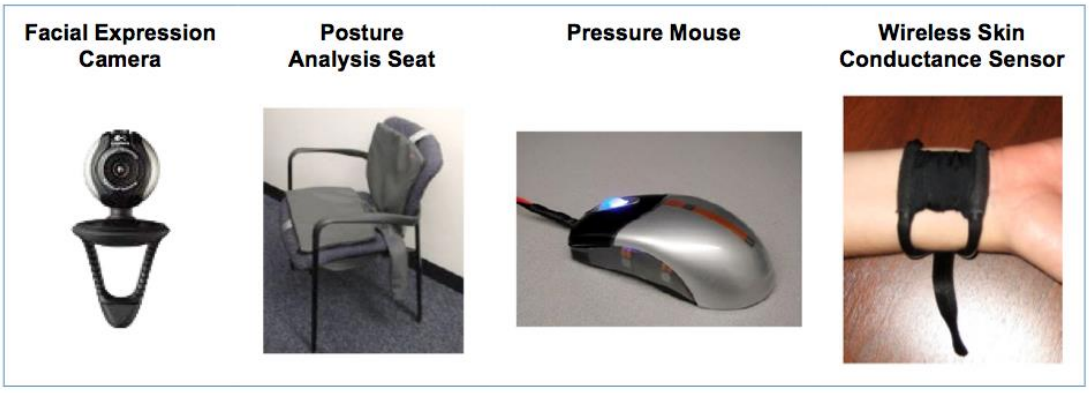


FIGURE 1. *The process by which students and teachers respond to questionnaire items.*

(Duckworth & Yates 2015, p. 53-54).

Appendix L. Copy of four sensors.

Exhibit 11. Four parallel streams of affective sensors used while a student is engaged in *Wayang Outpost,* an online tutoring system



Source: Woolf, B., Burleson, W., Arroyo, I., Dragon, T., Cooper, D., & Picard, R. (2009). Affect-aware tutors: Recognising and responding to student affect. *International Journal of Learning Technology*, 3/4, 129–164.

(Shechtman et al 2013, p.44).