Assessing Student Performance and School Success with Non-Cognitive Measures

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ABSTRACT

In these times when high-stakes, norm-referenced, subject area testing has become the most common criterion of school success, nationally and internationally, it might be surprising, if not disconcerting, to learn there are other variables just as significant being given much less attention. Intelligence and talent clearly have a meaningful role to play in learning, but we have learned lately that our beliefs about how intellect works may be even more influential. Recent research in Education and Psychology has demonstrated that non-cognitive factors have a significant influence on learning. Certain of these traits (school climate, collective efficacy, and academic optimism) have bearing in the realm of school effectiveness while others (grit, resilience, persistence, and self-efficacy) are more applicable to individual student success. This paper will provide a foundation for school leaders to understand and consider developing the vital role of non-cognitive assessments in their schools.

Introduction

A distinction between cognitive and non-cognitive factors must be drawn as a basis for us to discern the relationship of these two sources of data about human learning. When we speak of non-cognitive skills, we mean the kind of influences that contribute to motivation and staying power in the application of cognitive skills. In his current book, Tough (2012) claims that what matters most in learning is not the amount of knowledge we can infuse into children’s brains, but the development of qualities like “persistence, self-control, curiosity, conscientiousness, grit, and self-confidence.” Psychologists refer to these traits as “Personality traits” whereas economists refer to them as “Non-Cognitive Skills”. This writer prefers the latter designation due to the broader view that designation permits.

Heckman, an Economist from the University of Chicago, (In Tough, 2012), directed studies of students at the highly successful Perry Pre-school in Ypsilanti, Michigan which catered to at-risk youth.
These studies randomly assigned pupils into experimental and control groups, which he and his colleagues followed for 35 years. While the two groups grew even in I.Q. by third grade so that any gains for the treatment group were wiped out, growth in curiosity, self-control, and social fluidity were responsible for over two-thirds of Perry’s benefits for kids. As Bandura (2000, posits “When faced with obstacles, setbacks, and failures, those who doubt their capabilities slacken their efforts, give up, or settle for mediocre solutions. Those who have a strong belief in their capabilities redouble their effort to master the challenges.” (p. 120) The at-risk students from the Perry School who benefitted most from the program demonstrated far stronger non-cognitive than cognitive development.

This elaboration of the power of non-cognitive skills will begin with a consideration of the role of intelligence in learning, beginning with the traditional conception of IQ as the outcome measure of intelligence testing. We have come to revere the Verbal and non-Verbal scales of the Wechsler Intelligence Scale for Children (WISC) and the Stanford-Binet. Clearly, these two cognitive-based instruments have much to disclose regarding human learning. However, it seems that we stand to gain some equally useful information about how we learn when we attend to our students’ perception of the intellect. There are two complimentary understandings of intelligence (the “fixed” and the “growth” models) that when taken together provide us with a more complete picture of the complicated mosaic that comprises the human mind. They also provide greater insight into the kind of instructional techniques necessary to engage our students productively and ensure their learning. In the long run the individual perceptions we hold of the nature of our intellect will yield greater benefits than our IQ which is derived at a given point in time. For it is our beliefs about our capabilities, not a test score, that will enable us to achieve at the highest possible level. Finally, the developmental view of intellect is a positive growth model that will set the stage for the study of a number of non-cognitive constructs that we will explore in this paper.
Intelligence and Talent

As the classical cognitive measure, IQ has been found to be the most reliable predictor of achievement. Whether the criterion measure is GPA in college or graduate school, income, or the complexity of one’s eventual occupation, IQ tends to account for up to one-third of the variance in those measures of success (Duckworth, et al, 2007). Yet, even Terman’s well-known longitudinal studies of gifted children (Terman and Oden, 1947) found that the non-cognitive qualities of perseverance, self-confidence, and integration toward goals were more predictive than IQ of whether the mentally gifted student grew up to be accomplished in a professional field, such as academia, medicine, or law. It seems that when it comes to long term success of the kind that requires real-world application, IQ tends to yield diminished levels of reliability. Perhaps intelligence, as measured by the IQ test, is not the dynamic indicator of intellect we need to provide us with a true measure of the developing mind.

One of the invaluable truths that Psychology has taught us is the profound relationship between one’s beliefs and their influence on behavior. Fortunately, the related truth also exists that beliefs can be changed (Dweck, 2002). When one adopts either a fixed entity theory of intelligence, as opposed to the alternative incremental, or growth, theory (Blackwell, Trzesniewski, and Dweck, 2007) that preference can have either a deleterious or enabling influence, respectively, on the students’ response to challenges and setbacks. The student who believes that intellect is a stable trait sees little value in making a fervent effort to struggle over a concept that is not readily understandable. On the other hand, the individual who sees intellect as a developing entity holds the view that increased effort may be exactly what is required to acquire the elusive idea. In fact, it was found that theory of intelligence was a significant
predictor of mathematics achievement during the challenging transition to junior high school (Blackwell et al, 2007). Apparently a time of challenge, such as transition to junior high, brings to the fore divergent intellectual theories (fixed or growth) and their attendant influence on learning.

Students who held a fixed entity theory in elementary school were most often not negatively affected. Perhaps the more supportive atmosphere of the elementary level minimizes the level of anxiety experienced by students at that level, and neutralizes the urgency for students to adopt a theory of intellect. Most importantly, Blackwell, et al (2007) demonstrated that more preferable mental models with beneficial effects for student achievement can be taught to students. Thus, when we delve further into the amount of IQ-controlled variance as an influence on student success, we find that perhaps a more nuanced view of IQ, such as fixed or dynamic intelligence theory, should be considered. This kind of refinement of cognitive functioning is often accompanied by the introduction of non-cognitive factors. We are likely to find, as Duckworth, et al discovered, “among relatively intelligent individuals, those who are less bright than their peers compensate by working harder and with more determination.” It is against a background of the effects of contrasting perceptions of the intellect and their implications for learning that we will explore several non-cognitive factors. We will also consider how these factors tend to influence the conditions of the workplace, and thereby affect student achievement.

School leaders are well aware of the trend among a growing percentage of novice teachers to depart the profession in their first five years. A loss of self-confidence is thought to be a major contributor to the lack of teacher retention. “Teachers higher in Life Satisfaction may be more adept at engaging their pupils, and their zest and enthusiasm may spread to their students.” (Duckworth et al, 2009, p.545). Bandura (2000) tells us this about novice teachers, “…sustained effort and perseverance in the face of difficulty will strengthen their sense of efficacy and result in a stronger sense of resilience.” The support of colleagues and principal has a significant impact on novice teachers’ self-efficacy (Day,
et al, 2006). Notice the nature of these characteristics lies in the non-cognitive realm. How many teachers can be retained if only we could find a way to support their work? Nieto (2003) suggests that to retain teachers’ commitment in the profession schools need to become places where teachers find community and engage in their intellectual work.

We begin with some ideas from organizational theory and research and proceed from there to explore aspects of individual or personality theory and research.

**Organizational Theory and Research**

School conditions that facilitate the possibility for growth among students and faculty tend to be more positive, or open, in their *school climate* (Hoy & Tarter, 1997). Leadership tends to listen to teacher suggestions, avoids intense faculty scrutiny, and restrains from overloading teachers with “administrivia’. Faculty is more likely to exude confidence in their ability to “get through” to their students. They work on a more collegial basis, personally relate to one another, and they are highly committed to their tasks (Hoy & Hoy, 2009).

Bandura (1997) conceived of a related construct that he identified as *collective efficacy*. He defined it as “the group’s shared belief in its conjoint capabilities to organize and execute courses of action required to produce given levels of attainments”(p. 477). In other words when teachers believe that no matter how difficult it may be to motivate students, they are capable of doing so and proceed accordingly, they are demonstrating collective efficacy. It is not a great stretch to realize the relation of an Open School Climate to the emergence of collective efficacy. The latter construct has been studied rather thoroughly (Goddard, Hoy, & Woolfolk Hoy, 2000; Rivard, Follo, & Walsh, 2004; Forsyth, Adams, & Hoy, 2011). Collective efficacy was shown to have a positive effect on student achievement. Like the personality trait of “grit” which will be discussed later in this paper, it reflects perseverance in
the face of unmotivated or disinterested learners. Of course the socio-cultural context of the school and the students’ SES can have an influence on the preparedness of the learners, as well.

Another non-cognitive feature of school effectiveness is Academic Optimism. Coined by Hoy and his colleagues (Hoy, Tarter, and Woolfolk Hoy, 2006), this construct has consistently demonstrated a positive influence on student achievement when we control for socioeconomic status. Academic optimism is comprised of three organizational properties: academic press, collective efficacy of the faculty, and faculty trust in parents and students.

The first of these properties, academic press, was discovered to be more influential on student achievement than the instructional leadership of the principal when SES was controlled (Alig-Mielcarek & Hoy, 2005). It appears that the existence of a press for academic success makes a difference in student achievement, and that difference even overwhelms the influence of the school’s instructional leader. It constitutes a school environment where high but attainable goals are set for students, their learning environment is orderly, students are diligent, and achievement is respected (Hoy & Miskel, 2005).

Secondly, the kind of efficacy included in the academic optimism construct is collective efficacy, defined as, ”the judgment of teachers that the faculty as a whole can organize and execute the actions required to have positive effects on students” (Goddard, Hoy, and Woolfolk Hoy, 2004; cited in Hoy, Tarter, and Woolfolk Hoy, 2006, p. 428). Imagine the power of a group of faculty members who firmly believe that there is no student they are incapable of instructing when they and their colleagues make the commitment to do so. Bandura (1997) tells us that success for teachers and their students depends upon a strong sense of efficacy. They need a mutual strength along with the resilience to meet “the inevitable tribulations of life.” Efficacy is a prerequisite for optimism. In a mutually reinforcing manner, optimism
tends to affect one’s goals and ambitions by enacting drive and motivation, and those interactions generate the perseverance and resilience needed to attain the desired outcome(s) (Tarter and Hoy, 2011).

Finally, another collective school property is trust in parents and students. Here trust is defined as “a willingness to be vulnerable to another party based on the confidence that that party is benevolent, reliable, competent, honest, and open.” (Hoy, Tarter, and Woolfolk Hoy, 2006, p. 429). Although only a few studies have examined the relationship between trust and learning, Goddard, Tschannen-Moran, and Hoy( 2001) found a direct and significant connection between trust and student achievement while controlling for SES. It seems that human trust is basic to learning. Where those responsible for students’ performance trust one another, their goals for student learning are in accord and learning is unimpeded. As Bryk and Schneider (2002) found in their three-year longitudinal study in 12 Chicago schools, trust among teachers, parents, and students positively affected student attendance, learning persistence, and the faculty’s willingness to try new practices.

Leadership has a critical role in the acquisition of trust. In fact, without trust leadership is not possible to establish. This precept also applies to trust between teacher and students and parents, which enhances student achievement. A culture of trust in schools is often as important as socioeconomic status for its influence on learning. If one aspires to create a school as a Professional learning Community (PLC), trust must be a vital component of that school. Principals should be transparent, constructive, and optimistic with parents, students, and staff (Hoy & Tarter, 2011). Only under these circumstances will stakeholders imbue the kind of mutual trust in leadership that permits real progress. “Academic optimism paints a rich picture of human agency that explains behavior in terms of cognitive, affective, and behavioral dimensions” (Hoy, Tarter, and Woolfolk Hoy, 2006, p. 431). The good news is that these properties can be acquired. A school that suffers from an aura of pessimism can be turned
optimistic with the development of collectively efficacious, trusting, and academically-oriented stakeholders.

**Personality Factors**

A relatively recent N.Y. Times magazine article (Tough, 9/14/11) highlighted the joint interest in teaching Character Education shared by the leadership of a prestigious New York City private school and the co-founder of the Kipp network of charter schools. When the Kipp Schools’ leadership discovered that only 33%, not the anticipated 75%, of its Middle School graduates made it through a four-year college, they began to question the reason why. After a period of analysis, the schools’ leadership colleagues observed that the students who tended to maintain their college commitment were ones possessed of exceptional character traits, such as persistence, optimism, and social intelligence. It was not the students with the highest IQ or SAT scores or the highest GPAs who tended to be most successful with their college program. This discovery prompted these school leaders to seek further elaboration of the factors that drove the character of the college completers.

At about the same time, Angela Duckworth (2007), an Assistant Professor at the University of Pennsylvania, and Christopher Peterson of the University of Michigan unearthed a set of character strengths that Peterson eventually reduced to these seven: zest, grit, self-control, social intelligence, gratitude, optimism, and curiosity. This set of traits was considered to be highly predictive of life satisfaction and strong achievement. They were next compiled into an evaluation portfolio using the 24 most statistically reliable indicators of the seven character strengths. Duckworth et al (2007) found at least one of the character strengths—“grit”—to be measureable using a Scale of 12 carefully constructed and extensively researched self-report items. Grit is defined as “a passion and perseverance to accomplish long term goals whatever the obstacles and no matter how long it may take” (Duckworth,
et al, 2009). My personal anecdotal observations of Gifted and Talented youngsters over five years indicated that perseverance was the distinguishing characteristic of gifted students and appeared more influential than any cognitive trait(s).

Duckworth’s Grit Scale was administered to about 1,200 West Point freshmen who were about to begin the very demanding summer series of exercises known as the “Beast Barracks”. Previously these cadets’ survival of this challenge was best predicted based upon academic grades, physical fitness, and leadership potential in what is known as the “Whole Candidate Score”. Duckworth and her colleagues (2009) found that the Grit Scale was a more effective predictor of the cadets who would successfully completed the “Beast Barracks” or those who tended to drop out during the experience. (See: The Video: : www.youtube.com/watch?v=qaeFnxSfSC4). In a related study (Duckworth, et al, 2009), she also found that despite relatively low College Board scores, students who performed most strongly on the “Grit Scale” at a prestigious university achieved the highest GPAs.

Thus “grit” has emerged along with “self-control” as strong indicators of student performance. While Duckworth(2009) and her team of researchers from U. Penn found IQ to continue to be the better predictor of scores on statewide achievement tests, self-control measures were more dependable indicators of report card grades. Using Teach for America (TFA) teachers, Duckworth and her colleagues measured grit, life satisfaction (Contentment with one’s life situation), and Optimistic explanatory style (Being less likely to reduce effort and see themselves as in control of their own outcomes, when confronted with adversity.) to determine the influence of these traits on teacher performance. They found that grit and life satisfaction mediated the beneficial effects of optimism in stressful circumstances (p. 541). Only grit and life satisfaction, were predictive of teachers’ performance, however all three (grit, life satisfaction, and optimistic explanatory style) predicted the academic performance of their students. These traits are beneficial topics for the professional
development of teachers. The University of Pennsylvania has developed a group intervention program that has been used successfully with elementary, middle school and young adult subjects. The U. of Penn. Resiliency program would seem to hold applicability for instructional purposes as well.

We will conclude this brief review of non-cognitive personal characteristics by examining the role of resilience. Gu & Day (2007) refer to Hargreaves (1998) who claims that emotions are at the heart of teaching. Good teachers, he claims are emotional and passionate. He goes on to suggest that most teachers will tell you they entered the profession to work with children not to construct standards-based formative assessment techniques. It is in the emotional satisfaction of attaining pupil growth and progress that they derive their motivation and draw their resilience. In truth, resilience --- the capacity to continue to “bounce back”, to recover strength or spirit quickly and efficiently in the face of adversity--- can be enhanced or inhibited by our work setting, our colleagues, and the strength of our beliefs or aspirations. An individual may demonstrate resilience in one context but fail to do so in another setting. Sustained resilience was found to be affected by influences from three dimensions: personal (outside school), situated (within school), and professional (relation between values/beliefs and school policy) (Gu & Day, 2007). School leaders can attend to these influences and foster resilience among their faculty or ignore them at the peril of diminishing resilience in teachers.

As Gu & Day (2007) conclude, “…resilience is determined by the interaction between the internal assets of the individual and the external environments in which the individual lives and grows.” (p. 1314) It is not embedded in our DNA. Resilience, like the growth model of intelligence, tends to emerge when we confront challenging circumstances. It sustains our commitment to providing our students with the best teaching even when they resist our efforts to do so. The resilient teacher welcomes the challenge that often accompanies the teaching act. He/she draws upon the inner strength to
persevere with a sense of self-confidence and capacity to meet the need to engage and connect with the most resistant learner(s).

Conclusions

This paper has attempted to provide some contrasting awareness of the influence of cognitive and non-cognitive factors as they influence learning. The discussion began with recognition of the influence of IQ in accounting for much of the variance in determining student success. However, theory of intellect was suggested to be a more reliable predictor when the “fixed” perception of intelligence is replaced with a “growth” perception. The latter is the more optimistic and hopeful view of intellectual potential, and the positive view that tends to drive effort and achievement. Thus, the individual who takes encouragement from the “growth” model of intelligence is more likely to exercise perseverance, a trait that characterizes even the most productive of gifted students.

Next, we examined aspects of organizational theory featuring non-cognitive elements. First, we considered school climate, the personality equivalent in the school organization. It is comprised of collegial relations, reduced scrutiny, and high task commitment. An open school climate provides a positive influence on the school setting. A second factor, collective efficacy has been shown to have a significant positive impact on student achievement. It is the collective self-confidence of a faculty enabling them to overcome an unmotivated student body. Finally, we considered the construct of academic optimism, consisting of collective efficacy, trust among stakeholders, and academic emphasis. There is sufficient evidence to support the case for significant influence of these organizational constructs on student achievement.

We maintained that the students with the greatest character strength not those with the highest IQ have the most impressive level of real-world success. We saw Duckworth’s (2007) concept of “grit
serve as a better predictor of success in the rigorous West Point initiation known as “beast barracks” when compared with a combination of academic, physical, and leadership criteria. Grit is just one of seven character traits (grit, zest, self-control, social intelligence, gratitude, optimism, and curiosity) identified by the combined work of Duckworth and Peterson (Tough, 2011). While time did not permit a more thorough review of all seven of these non-cognitive, or personality, traits, we reported the influence of grit and resilience. It should be clear that these are desirable character traits for both students and teachers. The efficacious individual regardless of their station in life can benefit from the presence of grit and/or resilience. The inclination to persevere in the face of unprecedented challenge is one of the most sustaining qualities that we can impart to students. Furthermore, an organization that reflects a healthy climate, collective efficacy and is academically optimistic is likely to imbue grit and resilience among its teaching staff and its students.

Why do I present these non-cognitive traits to a convention of school leaders? It is in the hope that you will begin to realize that these traits can be taught to students and their teachers. Realizing the value in grit, perseverance and resilience we must address these character traits and supplement our exclusive reliance upon cognitive measures to assess learning in our schools.
Reference List


Duckworth, A. L.: www.youtube.com/watch?v=qaeFnx5fSC4


