

Friends, Family and other Concerned Citizens,

The response to [my initial letter on Common Core](#) was overwhelming and eye opening. There were many of you -- teachers, parents and everyday citizens throughout many states – that expressed your shock and surprise at the facts presented. Remember: Knowledge is Power. I do believe that education is the key to truth and honesty, so I have decided to share with you additional information about the base foundations of the Common Core State Standards, SBAC Testing and the current focus of the U.S. Department of Education that is now driving our local education.

The U.S. Department of Education hired SRI International, a research and development firm, to develop a report called, [Promoting Grit, Tenacity, and Perseverance: Critical Factors for Success in the 21<sup>st</sup> Century](#). The draft was released in February 2013. You can find this document along with other supporting documents on the U.S. Department of Education's website under the division of [Office of Educational Technology](#).

It is CRUCIAL for parents, teachers, leaders—ALL citizens to read and understand this document. It provides the ***foundational understanding for the new direction of public education***. It also provides a means to better understand the connections between the Common Core State Standards, SBAC Testing, State Longitudinal Data Systems, Data Mining and MANY technological tools and programs commonly found in our local schools that are collecting data on our children.

Due to the length of the report (about 130 pgs.), I know it is unreasonable to expect the majority of people to muddle through it. With this in mind, I have written a “synopsis” of what I believe to be the most important parts of this document by offering quotes straight from the document, showing where these quotes can be found and presenting a few ideas, clarifications and questions that I believe are pertinent to the discussion. However, I will always insist that you not believe me but search these things out for yourself. I am just hoping to guide you in where you might start your own research.

Note: I am choosing to bold and italicize important words or phrases in this letter in order to bring close attention to them. Please note that this doesn't mean these words and phrases are bold and italicized in the original document. I am also choosing to put all quotes in red, so you can easily find them.

Being a research and development brief, this report does focus on certain research questions. I have listed 2 of the 4 questions below.

Research Questions:

1. **“What are grit, tenacity and perseverance? What are the key components of these competencies, what psychological and contextual factors support and promote them?”**
2. **“How are these factors measured currently? How can they be measure in the future? How can technology provide new tools and strategies?”** (p. vi, 4<sup>th</sup> paragraph)

It is important to pay attention to the all parts pertaining to technology in this document. Technology drives the majority of all measurement and data. Technology (devices, tools, programs...etc.) are the venues that are providing the means to gather mass amounts of data (“big data” or “data mining” are the terms used by the authors of this and other supporting documents found on the USDOE’s website called [Expanding Evidence: Approaches for Measuring Learning in a Digital World](#) and [Enhancing Teaching and Learning through Educational Data Mining and Learning Analytics](#).) The terms ‘data mining’ and ‘learning analytics’ will be mentioned later in this letter in the measurement section. It is

important to note that much, if not most of the money granted to Idaho from creating its State Longitudinal Data System (ISEE/SchoolNet) has gone to putting more technology into our schools. Although I believe that more technology can be a positive thing, I do have to wonder if the motives are good or just “data driven.”

## Opening Paragraph --

“The test score accountability movement and conventional educational approaches tend to focus on intellectual aspects of success, such as content knowledge. However this is not sufficient. If students are to achieve their full potential, they must have opportunities to engage and develop a much richer set of skills. There is a growing movement to explore the potential of the **“noncognitive” factors – attributes, dispositions, social skills, attitudes and intrapersonal resources**, independent of intellectual ability” (p. v, Executive Summary, 1<sup>st</sup> paragraph)

Re-worded: This means our traditional education system, set up to focus on a child’s intellectual (cognitive) factors and on attaining specific knowledge in content areas, is no longer sufficient. The current focus of education is now to explore/teach/measure the noncognitive factors of students. These factors consist of a student’s attributes, dispositions, social skills, attitudes and intrapersonal resources. It is important to note that they believe these noncognitive factors should be explored independently of the child’s intellectual ability.

In the introduction of this brief, it states “In national policy, there is increasing attention on 21<sup>st</sup> century competencies (which **encompass a range of noncognitive factors**, including grit), and **persistence is now part of the Common Core State Standards for Mathematics**. The popular media also reports on interest in these factors.” (p. V in Executive Summary, 3<sup>rd</sup> paragraph)

The connection to this document and the Common Core State Standards is that the CCSS are being used as a doorway to 1) focus on the noncognitive factors of students and 2) encourage/allow/demand immense amounts of data mining to take place. This document delves deep into the types of data mining and data gathering tools that are being used/considered.

“This brief has a special focus on the **new and emerging roles technologies** can play in this paradigm shift. **Technologies provide opportunities to advance education far beyond what has been possible before.**” (p. vi, in Executive Summary, paragraph 2)

The following quote seems a little misplaced, but I thought the recommendations listed in reference to “shifting educational priorities” needed to be seen.

“Conclusion 5: While there is a great deal of work in this area broadly, the importance of grit, tenacity and perseverance in education is not necessarily widely known, and stakeholders at many levels may not understand the importance of investing resources in these priorities. In many settings, **awareness-raising is necessary so that teachers, administrators, parents and all other stakeholders in the educational community see these issues as important and become invested in supporting change.**

Recommendations 5a: **Educators, administrators, and parents** who understand the importance of these issues and are passionate about **shifting educational priorities**, within their own institutions and beyond, **need to become proactive advocates for change in the educational community to gain buy-in, tangible support for students as they pursue big goals, financial resources, and political support.**” (p. xiv, Executive Summary, paragraph 1&2)

## Chapter 1--Introduction

“The purpose of this brief is to distill the critical themes, questions, conclusions, and recommendations around theory, **measurement, and the design of learning environments, with an eye toward identifying potential new roles for technology.**” (p. 2 3<sup>rd</sup> paragraph)

“The brief is also closely tied to themes in the [Expanding Evidence report](#), which explores new and emerging opportunities available in an era of rapidly **evolving and expanding technology.**” (p. 2, 3<sup>rd</sup> paragraph)

### “An Exciting Time of Change and Progress”

The following are bullet points associated with the **progress made in studying and working with noncognitive factors such as a child’s attributes, dispositions, social skills, attitudes and intrapersonal resources.**

\*Research in laboratories and school settings provide a rich empirical foundation for understanding these noncognitive factors and best practices to promote them.

\*A broad range of programs across settings have begun to implement and test models to teach and/or promote these factors for a wide variety of **students across age levels.**

\*Private foundations have initiated programs intended to push the frontiers of theory, measurement, and practice around these factors. (First example listed is The Bill and Melinda Gates Foundation)

\*These factors have come into the spotlight in important **national educational policy documents and initiatives.**

\*These **factors have taken the stage in popular media**, indicating their appeal to the general public

\***New technologies** are providing opportunities with the potential to advance education far beyond what has been possible before.

-**Technology permits greater sophistication of assessment** and adaptation to individual learning needs. New forms of data structures can capture learning events at a “**micro-level,**” such as time-stamped, categorized, and/or automatically scored data for each significant interaction the students has with a learning system.” (pgs. 4-8, bullet points)

## Chapter 2 – What are Grit, Tenacity, and Perseverance? A Hypothesized Model

Definition of grit:

“(1) perseverance to accomplish goals in the face of challenges and setbacks, and (2) engaging the mutually influencing psychological resources” (p. 15, paragraph 1)

Psychological Resources are labeled as

- “1. Academic mindsets...how students frame themselves as learners....Mindsets include beliefs, attitudes, dispositions, values, and ways of perceiving oneself.
2. Effortful control... Successful students marshal willpower and regulate their attention in the face of distractions.
3. Strategies and tactics...(Students) need actionable skills for taking responsibility and initiative, and for being productive under conditions of uncertainty...” (p. 15, paragraphs 2-4)

“A natural question to ask is to what extent self-discipline and self-control are personality traits that are fairly stable over time or context, and to what extent they entail skills that can be developed. This question has been examined from multiple perspectives, ranging from ***longitudinal studies that track individuals over time or across contexts, to studies that have introduced interventions to alter executive functions***. As for most fundamental personality characteristics, evidence suggests that ***there can be powerful influences from both individual temperamental tendencies and situational factors, and that these capacities can be cultivated***. (p. 26, paragraph 2)

### Chapter 3 – Measuring Grit, Tenacity, and Perseverance

This by far is the most disturbing chapter for me. Please take the time to read through all of the quotes/information I will present. This is actually a great chapter to read straight from the document itself, so you can know for sure that what you are reading is actually there. It is hard to believe.

“With the prevalence of new digital learning resources and ***learning technologies***, new forms of measurement are emerging, making it possible ***to go beyond conventional approaches***. For example, ***data mining techniques*** can track students’ trajectories of persistence and learning over time, thereby providing actionable feedback to students and teachers. In addition, ***functional Magnetic Resonance Imaging (fMRI) and physiological indicators offer insight into the biology and neuroscience underlying observed students behaviors.***” (p. 32, paragraph 1)

### “Essential Measurement Terminology

***(Adapted from the Standards for Educational and Psychological Testing...)***

Construct . The concept, characteristic, skill, competency, or attitude that a test is designed to measure.” (p. 32, bottom right margin)

“...we use the term “disposition” to mean enduring tendencies, independent of any claims about their origin or malleability. We consider dispositions to be enduring tendencies that can be the result of any number of factors in the environment or the individual’s innate temperament. ***We also make no general claims here in either direction about whether dispositions are changeable, malleable, or teachable—malleability will be highly dependent on what the dispositions is and the nature of the opportunities that individuals encounter.***” (p. 34, top right margin)

Start watching for the words “malleable” or “malleability” within programs your children/students are using. Most programs choosing to support these research and development ideas by setting themselves up to gather student data are repeating phrases in their advertisements that are found within this document as selling points and as proof of their buy in. Khan Academy is on the front line in this regards as well as other programs. To all the teachers who may read this, I know it is hard to stomach that Khan Academy is now part of this. My next letter about will be specifically about

Khan (and other companies), its transformation to fit the views in this report and all the links and facts to show it. I have used Khan Academy in my classroom , and I have been very upset to find all that I have in my research. If you would like my “Khan Academy and other programs linked to Data Mining and Common Core” paper sent directly to you, feel free to e-mail me with a request. I would be happy to send it when it is finished. Please know that I will NOT keep your e-mail address or ever use your name in any way. Knowledge is open to all, no matter your stance on issues.

“Measuring academic mindsets, for instance, could involve **assessing beliefs about effort and intelligence, academic goals, or feelings of belonging**...Measuring effortful control could involve **examining executive functions, self-discipline, self-control, or delay of gratification**...Strategies and tactics reflect both ability to plan and ability to monitor goals and progress. Many measures also capture the protective factors and positive assets that can contribute to students’ resilience in the face of adversity. Thus, in **measuring these psychological resources**, it is important to understand that they are multifaceted and require specific questions or techniques for each component skill or attribute.” (p. 35, paragraph 1)

Measurement Approaches mentioned in this report are Self-Report, Informant Reports, School Records, and Behavioral Task Performance.

#### Self-Report

“...the most familiar and widely used measurement approach for noncognitive factors is self-report. In such measures, **participants typically respond independently to a set of items that ask for ratings of their perceptions, attitudes, goals, emotions, and beliefs**. Self-report can be used to measure dispositional constructs...researchers can examine consistency in participant’s ratings to determine the strength of the belief or skill. Self-report can also be used to measure process constructs; ...in the Experience Sampling Method, participants typically carry around a handheld device that “beeps” them at random intervals, prompting self-report of experience in that moment. **Such data can be used to make inferences about emotions, thoughts, and behaviors within and across specific situations.**” (p. 35, 4<sup>th</sup> paragraph)

#### Informant Reports

“Informant reports are those made by someone other than the student him or herself...typically conducted by teachers, parents, or observers who are visiting or watching video of the classroom as researchers or evaluators....**teachers are in a unique position to provide important judgments and feedback about students’ grit, tenacity, perseverance, and other psychological resources.**” (p. 37, 3<sup>rd</sup> paragraph)

I don’t believe that teachers should be providing judgments in data form about their view of students’ noncognitive attributes or other psychological resources. We see and know a lot, but it doesn’t mean that it needs to be recorded data. It just provides us opportunity to help and support the students that we care about.

#### School Records

“Data at the institutional level is becoming increasingly streamlines and cross-referenced, improving the capacity to link students data within and across systems. ” (p. 40, 2<sup>nd</sup> paragraph)

"Data from school records provides new possibilities for ***rich longitudinal analyses*** of educational impacts, as well as for ***informing early warning systems that can be used to identify students who are not managing to persevere in the face of all of the challenges of schooling.***" (p. 40, 4<sup>th</sup> paragraph)

## Behavioral Task Performance

I will warn you that this section is a little overwhelming and a little surreal. It is crucial that you understand what they are suggesting, so please read over it as many times as you need. Also share this with anyone you may feel has influence to help make change at the state level. I will put few of my own comments in this section because it truly speaks for itself.

"Behavioral task performance measures are the broad set of methods used to ***capture behaviors consistent with perseverance or lack thereof***—and in many cases, ***associated emotional experience, physical movements or facial expressions, physiological responses, and thoughts***—that students do in response to a particular challenge....can be elicited in a range of contexts, such as a laboratory experiment, the classroom, and informal learning setting, or a digital learning environment." (p.41, 1<sup>st</sup> paragraph)

## "New Methods for Measuring Behavioral Task Performance

### ***Educational Data Mining***

(EDM) develops methods and ***applies techniques from statistics, machine learning, and data mining to analyze data collected during teaching and learning.*** EDM tests learning theories and informs educational practice (US Department of Education Office of Educational Technology, 2012, p.9)

### ***Learning Analytics***

Applies ***techniques from information science, sociology, psychology, statistics, machine learning, and data mining to analyze data collected during education administration and services, teaching, and learning.*** Learning analytics creates application that directly influence educational practice (US Department of Education Office of Educational Technology, 2012, p.9)

### ***Affective Computing***

Is the study and development of systems and devices that ***can recognize, interpret process, and simulate aspects of human affect. Emotional or physiological variables can be used to enrich the understanding and usefulness of behavioral indicators. Discrete emotions particularly relevant to reactions to challenge—such as interest, frustration, anxiety, and boredom—may be measured through analysis of facial expressions, EEG brain wave patterns, skin conductance, heart rate variability, posture and eye-tracking.***" (p. 41, right hand margin)

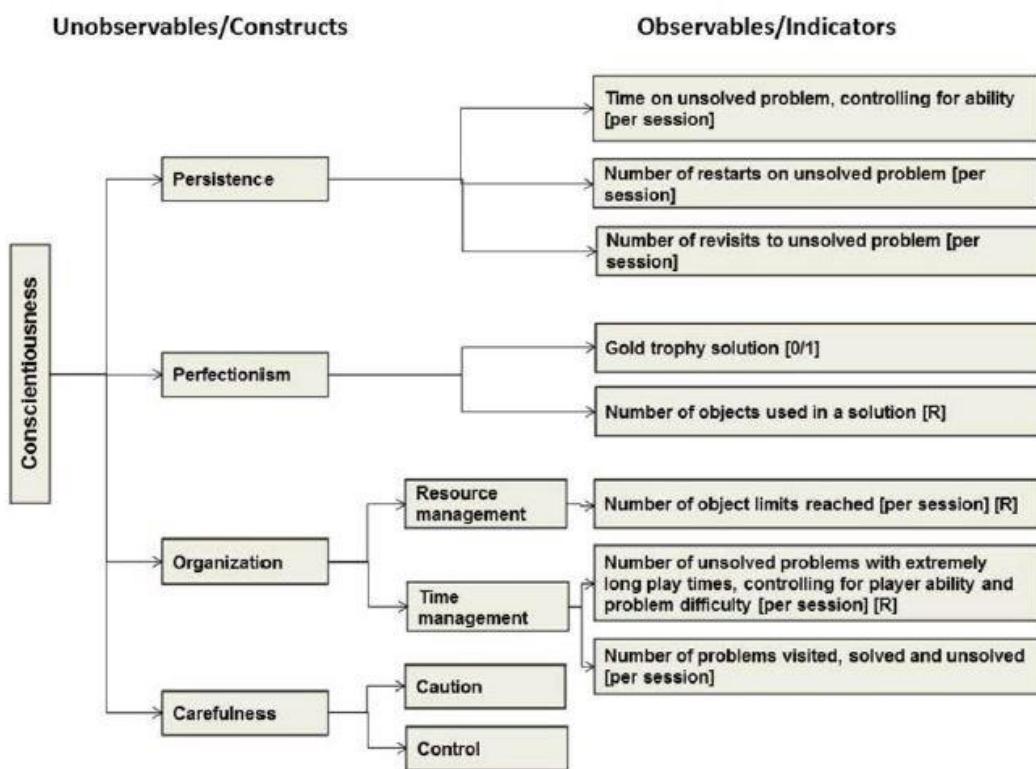
***"Educational data mining (EDM) and learning analytics within digital learning environments allow for "micro-level" analyses of moment-by-moment learning processes."*** (p. 41, 2<sup>nd</sup> paragraph)

"Student data collected in online learning systems can be used to develop models about processes associated with grit, which then can be used, for example, to ***design interventions or adaptations to a learning system to promote desirable behaviors.*** Dependent behavioral variables associated with a challenge at hand may include responses to failure (e.g., time on task, help-seeking, revisiting a problem, gaming the system, number of attempts to solve a problem, use of

hints), robustness of strategy use (e.g., planning, monitoring, tools used, number of solutions tried, or delay or gratification or impulse control in the face of an enticing off-task stimulus.) Such data can be examined for discrete tasks or aggregated over many tasks.” (p. 41, 3<sup>rd</sup> paragraph)

“The field of **affective computing is also emerging**. Researchers are exploring how to gather complex **affective data** and generate meaningful and usable information to feed back to learnings, teachers, researchers, and the technology itself. **Connections to neuroscience are also beginning to emerge.**” (p. 41, 4<sup>th</sup> paragraph)

A game called Newton’s Playground has been developed to measure the constructs of persistence, perfectionism, organization and carefulness in children. Please see their model below to show how this development works. This is on page 43 of the document, and it is worth your time to read how they map this out, and then consider all of the other digital learning games/programs your children use at home and at school.



Source: Shute, V., & Ventura, M. (in press). *Measuring and supporting learning in games stealth assessment*. White paper for MIT series. MacArthur Foundation. Retrieved from <http://myweb.fsu.edu/vshute/publications.html>

We are still on the topic of **Behavioral Task Performance** methodologies....

It is important to note now that 2 of the 4 new tests given as part of the new SBAC tests in Idaho involve a **Performance Task** in English Language Arts and a **Performance Task** in Math. I found it very interesting to see the same name here but just reversed. Log in as a guest [HERE](#) to view sample SBAC tests and performance tasks.

"Interaction patterns also can be explored by **tracking eye movements** to see where learners focus attention during problem solving. Conati and Merten (2007), for example, used an eye-tracking device to examine metacognitive behaviors that are relevant for learning mathematical functions. **The device provided information about how learners explored the stimuli..."** (p.44, 1<sup>st</sup> paragraph)

"Examples of **affective computing methods are growing**. McQuiggan, Lee, and Lester have used **data mining techniques as well as physiological response data from a biofeedback apparatus that measures blood volume, pulse, and galvanic skin response to examine student frustration in an online learning environment...**" (p. 44, 2<sup>nd</sup> paragraph)

From reading this document several times, I believe that **affective computing** is going to be one of their primary focuses. It is definitely a phrase to watch out for.

**"Sensors provide constant, parallel streams of data and are used with data mining techniques and self-report measures to examine frustration, motivation/flow, confidence, boredom, and fatigue. The MIT Media Lab Mood Meter is a device that can be used to detect emotion (smiles) among groups. The Mood Meter includes a camera and a laptop. The camera captures facial expressions, and software on the laptop extracts geometric properties on faces (like distances between corner lips and eyes) to provide a smile intensity score.** While this type of tool may not be necessary in a small class of students it could be useful for examining emotional responses in informal learning environments for large groups, like museums."

 (p.44, 2<sup>nd</sup> paragraph)

"The field of **neuroscience also offers methods for insight into some of the psychological resources** associated with grit, especially effortful control. Using **neuroimaging techniques**, such as fMRI, it is possible to examine which parts of the brain are active during times of anxiety or stress and the effects of some interventions. For example, Slagter, Davidson, and Lutz have investigated the effects of systematic mental training and meditation to enhance cognitive control and maintain optimal levels of arousal....studies have reported functional and structural changes in the brain and improved performance of long-term practitioners of mindfulness and concentration meditation techniques that enhance attentional focus. These initial findings are promising evidence of the cognitive plasticity and malleability of brain functioning for processes related to grit. **While it is impractical to use fMRI in the classroom** (i.e., it is a prohibitively expensive, room-sized machine), Ed Dieterle and Ash Vasudeva of the **Bill & Melinda Gates Foundation point out** that researchers such as Jon Gabrieli and Richard Davidson are beginning to use **multiple methods to explore how specific brain activity is correlated with other cognitive and affective indicators that are practical to measure in school settings.**" (p. 44 last paragraph – p. 45 1<sup>st</sup> paragraph)

"Measures of behavioral task performance hold strong promise for deepening the field's understanding of the interactions among the cognitive and affective processes underlying grit....They **do not require participants to have fully developed verbal skills or be able to articulate their own internal processes**. Micro-level indicators also have the potential to be seamlessly integrated into a learning environment, and indicators can provide measures of behavior in real time, making it possible to examine and address dynamic changes in student understanding." (p. 45, 2<sup>nd</sup> paragraph)

"Another issue with some micro-level indicators is that the approaches for gathering information can be intrusive or impractical for use in school settings. For instance, **eye tracking devices can be distracting**, difficult for people with heavy eyelashes or glasses, and compromised movements from participants." (p. 45, 3<sup>rd</sup> paragraph)

"Conclusion 10: There are important **opportunities to leverage new and emerging advances in technology (e.g., educational data mining, affective computing, online resources, tools for teachers)** to develop unprecedented approaches for a wide range of students.

Recommendations 10: Researchers should **work closely with technology developers** to continue to explore how to integrate best practices into new and emerging digital learning environments that are well **positioned to promote grit, tenacity, and perseverance, and key psychological resources** (mindsets, learning strategies, and effortful control) for a range of purposes." (p. xv, Executive Summary, paragraph 7 & 8)

"Conclusion 11: There is a **critical need to advance measurement methods** for several purposes.....**New and emerging technologies provide important new opportunities.**

Recommendation 11: Researchers should continue to investigate how to **leverage and augment new technology – based digital learning environments, using methods such as educational data mining and affective computing.** Research efforts should include assessment experts, who can apply techniques such as ECD to design and validate measures aligned with advances in theory." (p. xvi, Executive Summary, paragraph 1 & 2)

"If perseverance is conceptualized as a set of processes, measurement may focus on sequences of behaviors, emotions, physiological reactions, and/or thoughts that unfold over time during learning, extracting indicators of persistence and giving up. **New technologies using educational data mining and "affecting computing" (the study and development of systems and devices that can recognize, interpret process and simulate aspects of human affect) are beginning to focus on 'micro-level' moment-by-moment data.....Measurement may also target the psychological resources that contribute to and interact with perseverance...."** (p. ix, Executive Summary, 1<sup>st</sup> paragraph)

#### Evidence-Centered Design (ECD)

"There are always assumptions in the development of measures, and these assumptions need to be made explicit so that appropriate inferences about student performance can be made....three questions are helpful in initiating discussion about this: **(1) What complex of knowledge, skills or other attributes should be assessed? (2) What behaviors or performances should reveal those constructs? And (3) What tasks or situations should elicit those behaviors?** ....A task template would elaborate further task design features as well as the **psychometric properties of the assessment.**" (p. 46, 3<sup>rd</sup> paragraph)

"As new forms of measurement emerge and new types of personal data become available, the field must also deal with critical **ethical considerations....Learners and educators have the potential to get forms of feedback about their behaviors, emotions, physiological responses, and cognitive processes that have never been available before.** Measurement developers must carefully consider the impacts of releasing such data, sometimes of a sensitive nature, and incorporate feedback mechanisms that are valuable, respectful and serve to support productive mindsets. " (p. 48, 1<sup>st</sup> paragraph)

"The development of valid and reliable measures will be an important factor as we expand the capacity to design and evaluate learning environments that promote and/or teach, grit, tenacity, and perseverance....**Some of the most promising new directions are educational data mining and affective computing. The method of evidence-centered**

***design can help measurement designers build strong validity arguments as we advance measurement of these complex variables.***" (p. 48, 2<sup>nd</sup> paragraph)

I know I have presented a lot of information here (please excuse me for any typos or other mistakes), and I am hoping that you will go through it several more times. It is definitely information that requires multiple reads. I didn't know exactly how to approach this and make it easy for the reader.....

Please feel free to share this with anyone who has an ear to hear or eyes to see what is happening in education.

Thanks for your time again,

LeAnn Castor

A Concerned Idaho teacher