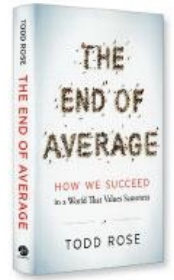# Ending the Average in Education
A study on the importance of student individuality
By Sheri A. Smith, M.A.

Introduction:

In his book, *The End of Average*, Harvard scientist Todd Rose details the idea that there is no average person. Statistically it is not possible for an exactly average person to exist and when carefully researched, data supports this assertion.

Dr. Rose's work is part of a new field – the "Science of Individuality"—in which solutions to social problems in areas such as healthcare and education can be found by beginning with individuals rather than averages. Populace is committed to harnessing this idea to "ensure that all people have the opportunity to live a fulfilling life."

One principle of individuality is jaggedness: the idea that human beings are multi-dimensional and these dimensions are not strongly related to each other. As a result, on any given characteristic a person may score high on one dimension, while scoring in the middle or on the low end of other dimensions (creating a jagged profile). The most important consequence of jaggedness is that people cannot be reduced to a single score or category if you want to understand them.

An easy way to visualize this is to consider the two men below. When you average all of their dimensions together, they come out to about the same size. Now, if you were to ask which man is taller, the only dimension you'd have to consider is their height (one score). However, if you were to ask which man is bigger in size, you'd have to factor in not just their height, but their weight, wingspan, among other factors (more than one score). A jagged profile is a way to visualize the idea that there is not just one "right ideal" to strive for.
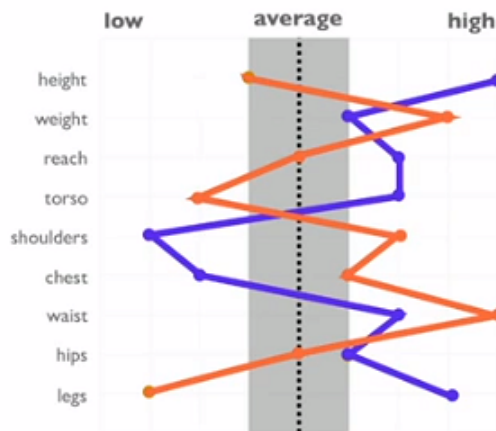
Fundamental Research:

In *The End of Average*, Rose uses the example of a post WWII military study on pilots to demonstrate his point about jaggedness. In this study, over 4,000 pilots were measured across various physical dimensions. Everyone believed this calculation of the average pilot would lead to a better-fitting cockpit - except one researcher. Lieutenant Gilbert Daniels looked more closely at the ten physical dimensions believed to be most relevant for cockpit design. His finding: out of 4,063 pilots, not a single airman fit within the average range on all ten dimensions. A cockpit designed to fit the "average pilot" would actually fit no one. And so, the U.S. military created adjustable cockpits.

The idea of measuring pilots and taking the average to create an "ideal" cockpit has roots in the industrial age at the dawn of standardization. With standardization came efficiency, increased production, and increased wealth globally. While

standardization still makes sense for some parts of manufacturing, the fatal flaw in this idea came when we tried to apply it to human beings. The recognition of this flaw has led most industries to move away from standardization and toward personalization, facilitated by new technologies.

Is there an average student?

Just like adjustable cockpits, education needs to adapt to the same concept that there is no average student. Even though there is growing interest toward personalization in education, the reality is that the system is still almost solely based on standardized models. Rose states that "because every single student has a jagged profile… the average hurts everyone - even our best and brightest" (*The End of Average*, 2013). Reducing students to single dimensions on standardized tests leads to a very limited view of the student and an artificially narrow way of defining success. Even though most parents chafe at the idea of having their kids processed and ranked in a giant system, in most cases, this is still true in practice.

As a personalized ed-tech company, Indigo is in the business of knowing students and looking at them from a multi-dimensional, whole-child perspective. As a result, Indigo wanted to research whether or not the Science of Individuality holds true with students.

Is there really no average student as Rose claims? The answer to this question has enormous implications for not only our educational system but our whole mindset toward defining success and creating pathways for students to achieve that success.

Indigo's research methodology:

To answer the question "Is there an average student?" The Indigo Project sought to replicate the structure of Gilbert Daniels' study of pilots and apply it to students. Daniels demonstrated that using an average can be insufficient even for a single dimension, and "the inadequacy of the 'average man' method is compounded many times when more than one dimension is to be considered" (*The "Average Man", 1952*).

In the study, pilots who fell into the middle 30% of a specific measurement were identified, representing the average of the larger group. From within that group, all members who fell into the average 30% of a second dimension were identified, and so on. By the time Daniels repeated the exercise 10 times, there were no individuals remaining who were average in every measurement. Daniels thus concluded that "the 'average man' is a misleading and illusory concept as a basis for design criteria".

The Indigo Assessment captures 150 dimensions of students - covering the areas of behaviors[1], motivators[2], soft skills[3], and perceptions[4]. Because students can never be represented by just one dimension, Indigo's survey includes four well-known corporate tools that have been used for the past 35 years by our technology partner, Target Training International. With these independent domains, Indigo can get closer than any other tool on the market to representing the whole student – and the whole student can only be completely known through deep relationships and self-exploration. While students do have natural curiosity, aptitude, and uniquely inborn gifts, they also continually evolve as human beings.

Following Gilbert Daniels, from these 4 domains, 10 dimensions were selected that many people would agree are important characteristics in successful students: Competitiveness, Sociability, Love of Learning, Desire to Help Others, Creativity, Planning and Organizing, Teamwork, Handling Stress, Following Directions and Problem Solving. The chart below explains each dimension and which science it is derived from.

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[1] Behaviors are measured by TTI's DISC. DISC is a behavior assessment tool based on the DISC theory of psychologist William Moulton Marston, which centers on four different behavioral traits: dominance, influencing, steadiness, and compliance. This theory was then developed into a behavioral assessment tool by industrial psychologist Walter Vernon Clarke.
[2] The Indigo Motivators Assessment is based on the research of Dr. Eduard Spranger and Gordon Allport and their study of human value, motivation and drive.
[3] Soft Skills are measured using a Likert scale survey developed by Target Training International based on the most important soft skills for workplace success.
[4] Perceptions are measured with TTI's version of the Hartman Value Profile. It is based on the science of formal axiology, developed by Robert S. Hartman, providing rational answers to many of our questions about human values. Our values are the keys to our personalities, to self-knowledge, and to understanding others.

Dimension	Science Derived From
Competitiveness Sociability	DISC – based on Dr. William Moulton Marston's work
Love of Learning Desire to Help Others	Motivators – based on Dr. Edward Spranger's work
Creativity Planning and Organizing Teamwork	Soft Skills – TTI's proprietary research
Handling Stress Following Directions Problem Solving	Axiology – based on Dr. Robert S. Hartman's work

The analysis was run on a dataset of over 15,000 high school students spanning 11 states from many demographics including inner city, rural, suburban, various socio-economic and ethnic backgrounds, and a range academic performance from A's to F's. Using norms from this data set, the average score was identified in each dimension. The middle 30% of all students who fell at the center of the distribution were defined as "average", following Daniels' research.

After establishing the ranges for each of the 10 dimensions, Indigo took the first dimension and determined how many students from the data set fell into that middle 30%. Of those students, we then applied the same middle 30% filter to see if they also fell into the average of the second dimension. After determining that number, the same process was repeated across all 10 dimensions in the study.

LOW PERFORMERS   AVERAGE PERFORMERS   HIGH PERFORMERS
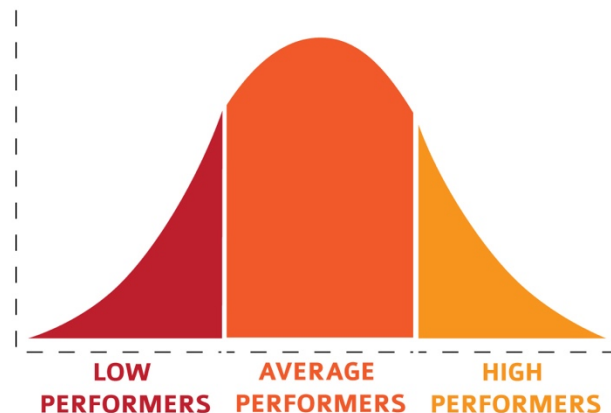
The results:

The results of this study were striking. Out of 15,012 students, not a single one fell into the average of even 9 out of the 10 categories. Even more surprising, less that 2% of the students were average after the first four dimensions. Importantly, the finding of zero average students in our data set was not a result of cherry-picking dimensions – in follow-up analyses we randomized several other sets of 10 dimensions, all resulting in the same or a similar result.

Non-Academic Factor	# Students Before Applying 'Average' Filter for Factor	(Avg Filter Applied, Middle 30%'ile)	# Students Who Are Average in All Previous Factors
Competitveness	15,012	→	5,591
Sociability	5,591	→	1,853
Love of Learning	1,853	→	693
Helping Others	693	→	288
Creativity	288	→	114
Planning/Organizging	114	→	49
Teamwork	49	→	15
Handling Stress	15	→	2
Following Dirctions	2	→	0
Problem Solving	0	→	0

Example of a jagged profile using actual Indigo data with the 10 dimensions used in the study.

Actual High School freshman female who loves volunteering and orchestra, and wants to be a teacher someday (and is an A student)
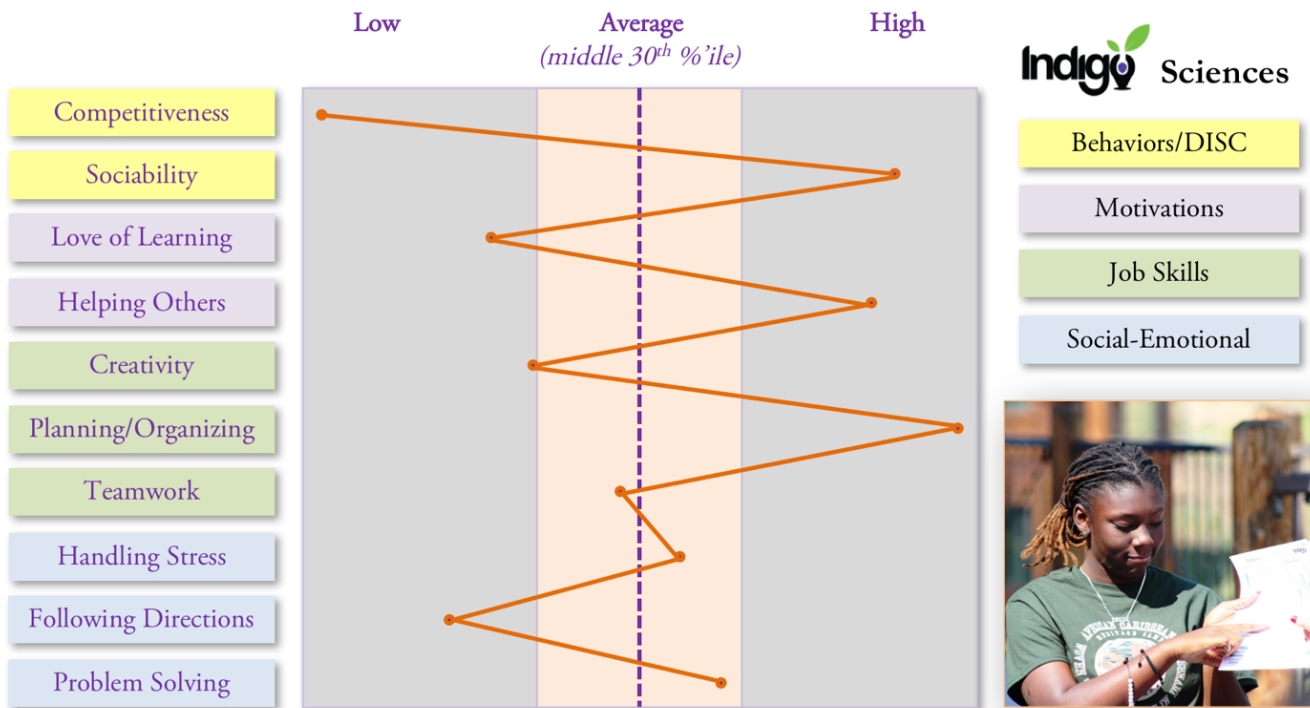
Implications to the End of Average in Education:

Based on this analysis, the "average student" is a myth. As Rose states, "each student, every single one of them, has a jagged profile, meaning they have strengths, they're average at some things, and they have weaknesses".

Despite this fact, the education system is still built on the idea that you can and should teach to the "average." If a student does not fit into a very narrow mold measuring only academic performance, they are considered deficient.

The myth of average has profound implications for education. Two implications that are particularly important for personalized learning are Learning Design and Self-Knowledge.

Learning Design Implications

Learning Design – curriculum, classrooms, standards and requirements – is largely based on the "average student." For example, we look at a student's age and say that by this time in their development, they should be able to do certain things, all at the same time and all at the same pace. If students can't do this (and they shouldn't, according to the Science of Individuality), we expect the teacher to take a standard curriculum and differentiate learning based on his or her expertise even while they are being judged based on the average of their class and their school. This is an unreasonable expectation of educators and sets them up to fail.

If we take the concept of jaggedness seriously, a personalized curriculum that works for all students must be "designed to the edges" rather than the average. How does one design to the edges to accommodate all students on all dimensions from the highest-performing to lowest-performing?   This seems like an intractable problem that we cannot solve easily.

However, there is already a pathway carved out for us through Universal Design for Learning (UDL) – a design framework that is now part of federal legislation under the Every Student Succeeds Act (ESSA).

UDL is an established framework that is encouraged within ESSA (mentioned 6 times *2017:22,23,111,172,213,399).*[5] Central to Universal Design are the guidelines for information being presented in multiple ways. Under the guidelines, students have the opportunity to respond differently to demonstrate their learning, and there are various ways for students to be engaged. The goal is to accommodate all students by reducing barriers and providing support and constructive challenges.
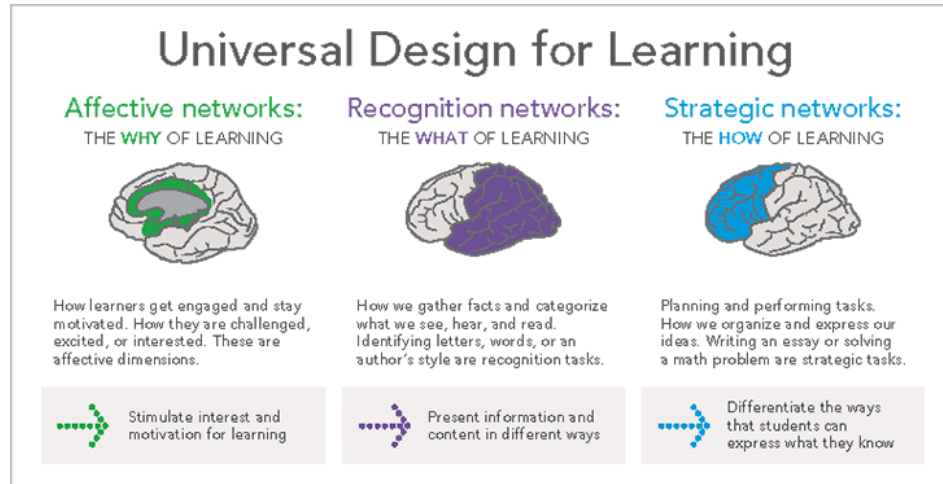
If we continue to use curriculum and ed-tech tools that are based on the idea of "average," we will always have problems and continue putting an unbearable burden on our teachers and schools. With Indigo's large set of non-academic variables, educators have the opportunity to more easily teach to the edges at scale.

Self-Knowledge Implications

The second implication to the end of average in education is much closer to the mission of Indigo Project. The basis of transformational learning and personal fulfillment is self-knowledge. As a result, Indigo's tools and trainings focus on students knowing themselves deeply in order to empower them to make decisions based on who they are intrinsically. These tools also help educators to see themselves and their students as whole people who have unique behaviors, motivators, skills, and ways of looking at the world.

Many programs for personalized learning are simply delivery systems for students to learn at their own pace. While this is better than traditional alternatives, it is not truly personalized learning. Authentic personalized learning must be grounded in self-knowledge. This is the foundation by which student autonomy and agency really function. Without self-knowledge, agency becomes an exercise of "picking" the right answers based on some invisible standard rather than "choosing" the most fulfilling learning path. Adding more options without student engagement can be more destructive than having no options at all.
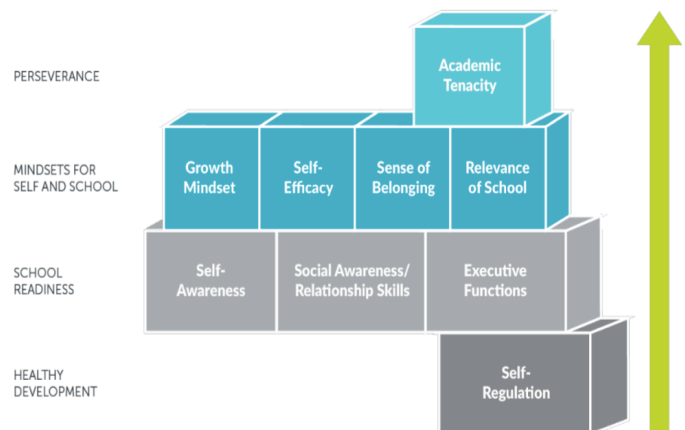
Self-Knowledge is the Foundation for Academic Success

Even though Indigo believes the goal for education is not improved test scores but workplace preparedness and happiness, academics are still the primary metrics for student success. Recent research is establishing that in order to close the academic achievement gap and achieve equity, the education system must address self-awareness, self-regulation, and growth mindset amongst other non-academic factors. Turnaround for Children recently released a student development framework called Building Blocks for Learning that describes this concept in detail. The chart below summarizes the hierarchy of what traits are necessary before academic tenacity can be actualized.

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[5] Visit https://www.theudlproject.com/ for free resources and more information on using UDL in the classroom.

The Building Blocks for Learning framework centers around self-awareness and other SEL components. Carol Dweck, with her work on growth mindset, and Angela Duckworth,[6] researching grit were two of the pioneers in this field highlighting the need for whole child learning. In order for academic tenacity to be achieved, students must be met where they are at.

Indigo's research demonstrating there is no average student highlights why Social Emotional Learning is so effective and the need to implement on an individual level. Indigo's measurement tools and personalized recommendations allows schools to begin this process at scale.

BUILDING BLOCKS FOR LEARNING: DEVELOPMENT OF ACADEMIC TENACITY
Dweck, Walton and Cohen, 2011

Conclusion: Self-Knowledge Leads to Realizing Full Potential

Educational priorities are flawed. We force students to endure testing that tells them little about who they are or how to make decisions in life. Students have little time for learning that really matters: relationship building, soft skills, self-knowledge, and how to exercise their Constitutional right for the pursuit of happiness.

Ending average in education completely changes the priorities of our system. It changes teacher training programs, what we spend our money and time on, how our schools look, how we measure success, how we define ourselves, and perhaps most importantly, how we give people the opportunity for an authentically fulfilling life.

The real change that needs to happen in education is not 1-to-1 laptops, some amazing new common core, or the perfect super school – it's a mindset shift from the system to the individual. This idea is rapidly expanding in the education space. In 2015, Education Reimagined convened a diverse group of educational practitioners, scholars, business people, parents, and advocates who collectively formulated a *Transformational Vision for Education in the United States*[7]. This paper does not describe the "how" to achieving this vision, but it does provide a consensus around what the purpose of education is in the 21st century:

> *"To enable all children to fulfill their full potential as empowered individuals, constructive members of their communities, productive participants in the economy, and engaged citizens of the US and the world."*

In this new vision for education, every student has intrinsic uniqueness and is valued for their differences. They are equipped to put their purpose into action, becoming the best version of themselves. No one can be good at everything, nor should they be. A jagged profile should be embraced and the average should be banned.

This is not a new idea. "Know Thyself" was inscribed in the Greek Temple of Apollo at Delphi. It was true then, and is still true now. Every child has the right to truly know themselves and to choose their own path.

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[6] Carol Dweck wrote "Mindset: the New Psychology of Success" and Angela Duckworth wrote "Grit: the Power of Passion and Perseverance".
[7] The vision document can be downloaded from the Education Reimagined Homepage https://education-reimagined.org/ .