They Knew Calculus When They Left: The Thinking Disconnect Between High School and University

High school graduation and high test scores don't mean students are prepared for college work. Mr. St. Jarre suggests secondary schools focus more on preparing students to think and learn and less time on training them to imitate and perform in exchange for grades.

BY KEVIN ST. JARRE

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EACH YEAR, high schools hear from graduates, their parents, and indirectly from professors that another crop of 18-year-olds are insufficiently prepared for the rigors of university study.

The educators who invested blood, sweat, and tears into those students are stunned and stung. After all, those students could read and write well when they graduated from high school. Some of them were reading books that many college freshmen never have to, or could hope to. They were writing well, and with complexity, in two languages. They could do honors calculus, non-Euclidean geometry, and even a little organic chemistry.

The universities admitted a record number of students, noting that their SAT scores and GPAs were acceptable. But when the new arrivals are tested on campus, the students often perform below the university's target levels and find themselves in remedial courses.

Why the disconnect?

One student, John, returned from a prominent New England university to visit his high school teachers and admitted he was struggling. One of the teachers teased him about partying too much. John insisted he was not but that he felt academically unprepared even though he had graduated from high school with honors and had met and exceeded every possible standard, both state and local.

None of his teachers questioned him further, nor did anyone directly answer his plea for support, for answers, for a strategy. The conversation drifted. As he left, the same teacher advised John to cut down on his partying. John just shook his head. I felt real pity for him. He had come for answers to a place where there were none.

The teachers who had seen him succeed at the secondary level believed John must have been prepared to succeed at university. He simply wasn't applying himself fully.

The odd bit in all this is that all of the stakeholders were correct, except for the part about partying too much. John met and exceeded the standards in high school. He graduated with a 3.98 GPA and an SAT score of 2300. The teachers and school leaders in his pre-college years had been successful. Based upon standards mandated by the state and augmented with more-detailed local standards, John was prepared for university. John was in the highest percentiles for national standardized tests, both performance assessments and college-entrance exams. So he could do and did know what all the stakeholders had insisted was important.

However, the universities were also correct that John was not prepared for college work.

John's university grades were on par with his roommate, Michael. But Michael seemed to be having an easier go of it, going out at night, and more able to participate in complex discussions in class. Michael had mostly B's and the occasional C in high school. In fact, he'd even failed a class his freshman year in high school. Michael had spent most of his high school years trying to get out of doing homework — especially the busy-work. Occasionally, Michael had thrown himself into a project, when a teacher had really allowed him to be creative and think outside the box. But the repetitive stuff? Michael simply hadn't done that work. But even in avoiding that work, and the consequences for not doing it, Michael had had to be exceedingly creative and quick thinking.

In contrast, John had done the repetitive work in high school and was exceptionally good at deducing what teachers wanted. When teachers assigned a paper, he followed the format to the letter. When assigned a number of pages to write, he immediately asked if his grade would be augmented if he wrote more than the minimum. Savvy teachers always told John that content was more important than the length, but as the lengths grew longer his scores were higher. And if they weren't, he would fight for a higher grade or ask for extra credit. He did this in large part because parents, educators, and college admissions personnel told him that if he wanted to get accepted by universities, he would need high grades, and he believed it.

At university, John turned in a 20-page effort and received a failing grade. Michael wrote four pages and earned an A and glowing feedback from the professor. Desperate, John asked Michael what professors want-

ed. Michael would shrug, smile, and suggest that John do it his own way. This only made John feel more frustrated. There must be a set way, a preferred way, a format, or formula for success. What was the standard? The rubrics, when there were rubrics, said only, "Student synthesized an analytic response to" and words to that effect. They did not indicate the number of pages required, didn't provide key points to hit, there was no chapter to regurgitate. John simply couldn't guess the magic formula, so he had thrown everything into the paper. John began to think the professors just hated him personally, and then later he blamed his high school for not preparing him correctly.

John had been sent to university as one of the high school's most successfully trained pets that year.

NOT PROPERLY PREPARED

Clearly John was correct, he had not been properly prepared. John had learned to do school well. Like the brightest dog in the kennel, he had learned the tricks his teachers and their leaders wanted him to learn. He met every standard. He could do it all — except think creatively and bravely for himself so he could master the same standards in new contexts.

John was a master of self-discipline, he was very capable of learning new things, he had an incredible work ethic, and he was very intrinsically motivated, but he had never been taught to think. Not "critical thinking" in the edu-speak of late, which is just another dog trick. Achievements such as identifying key pieces within a larger whole and reassembling them is no more thinking than a dog fetching a particular stick tossed into a woodpile. John had been sent to university as one of the high school's most successfully trained pets that year.

Michael, on the other hand, was an intellectual survivor. He had limited self-discipline. But he was able to learn by seeing through the nonsense portion of public education, taking what he wanted from the system. He worked when he saw benefit in it, took intellectual risks, and learned to think on his feet and creatively to get away with it.

That problem solving and creativity, his self-correcting and adaptive thinking, was serving Michael better at university than all of John's memorization, memorization of those things Michael could easily look up on Google. Michael had limitations, but his were different. Michael needed to learn how to work hard even when it's not fun, but John's task was much more daunting for he had to learn how, for the first time in his life, to truly think.

At an early age, students like John are often anxious about whether they will succeed. They figure out what pleases the teacher, and are rewarded, and they like it. They are intuitive and quickly learn that learning with curiosity about all things interesting does not necessarily earn them another gold star or another public pat on the back. They learn that the performance the teacher wants is more important than exploration and

inquiry. In the coming years, they will not question the need to learn odd anachronistic things like writing in cursive, even though most adults never use it except for their own signatures. Students like John will labor to write in cursive as best they can and, more important, better than anyone else, working for the reward.

In high school, their need to beat others, to maintain that high status will even lead many of the most talented to cheat. They will justify it by claiming the teacher cannot or does not teach the material well enough for them to maintain the levels of success they are used to. They do not see themselves as failures and still consider themselves academically superior to those earning honest C's. They simply do not measure success by thinking and learning; they measure it by grades, sometimes no matter how they are achieved.

John and students like him start out as our best and brightest, and they are trained out of it. They are corrupted by our praise of "nice" work devoid of thinking and our criticism of work that falls outside the scope of the standard we want them to reach.

BUILDING A POOL IN MINNESOTA

Imagine a geometry student who is asked to compute the increase in volume necessary to make an in-ground pool suitable for a larger number of people. The pool is in his northern Minnesota hometown. The student answers that increasing the size of an in-ground pool in northern Minnesota is madness, that frost would tear it apart at its new seam, and that an entirely new pool would need to be constructed. He receives no credit for this answer. Perhaps he should have included how large the new pool would have to be, but he was so astonished that someone would suggest such a project that he walked away from the work. Sometimes these students are actually told, "You are thinking too much, focus on the problem."

After all, the student might have wondered why he should have to do any thinking for people who obviously, in his opinion, had not. The geometry student did not receive a reward, and indeed was criticized because he had not performed the trick properly.

Some dogs will chase a stick tossed into the back of a moving truck, and some dogs will not. Those who do not are often labeled lazy or underachieving, punishing them for recognizing the futility of the exercise. Most of our schools reward the dogs that chase the truck, even though they invariably come back with nothing more than the performance we wanted. They worked hard and ran fast, they looked good, they led the pack, but in the end . . . no stick. Still, they get a gold star. Effort without thinking, counterintuitive lessons without learning, performance without purpose and we are still handing out A's.

When they get to university, the exercise on the same geometry standard might be very similar, but the potential differences are enough to cause problems for students like John. Instead of being told the local population has increased and being asked to compute the necessary corresponding increase in pool volume to accommodate, they are asked to simply consider the problem of having a small in-ground public pool in a growing northern Minnesota town. Those who simply add on to the pool geometrically fail the assessment because they did not consider challenges such as frost heave. They afterwards consider the question a trick question and the assessment unfair. After all, they expected to be herded like cattle down a chute toward an answer, so that they could anticipate which performance the professor would reward. Instead, they were set free to explore the problem, to analyze and synthesize, and they failed.

Universities then tell secondary schools that the freshmen they received were unprepared. The high schools try to increase rigor, but more often it is more along the lines of rigor mortis. A large part of the problem is that most high schools are too rigid to allow thinking in the first place, but in response to pressure they only become less likely to allow thinking.

Government increases its micromanagement thereby increasing rigidity, new tests are created, funding is threatened, and all because thinking in learning was not allowed or at least unwittingly discouraged.

Universities are not blameless. University admissions policies that highlight a student's high school GPA as a key component for admission keep pressure on students to perform for grades and not to focus on thinking and learning. Still, the universities want thinkers. They can teach thinkers. Remember that institutions of higher learning are not asking for students who have already learned everything the university has to offer. They only want students who have been taught how to learn and think. Students who, when faced with problems in a new context, can self-correct their own thinking, adapt, and succeed. Not students trained to imitate and to perform in exchange for grades, who become confused when the conditions and context are not identical to secondary school. The universities want thinkers and learners, not performers. ■

■ *KEVIN ST. JARRE is an author, educator, and consultant living in Maine. www. kevinstjarre.com.*