

Embrace Mistakes

EDUARDO BRICEÑO

Mistakes can be frustrating, embarrassing, and disheartening, which may lead us to always want to avoid them. But avoiding mistakes keeps us from taking on challenges we can learn from.

If we're inside *Hermes*, the spacecraft in the book and film *The Martian*, calculating the velocity needed to intersect Mark Watney and bring him home, we need to get the right answer or he'll die. Ideally, we want an expert astrodynamist to work on that problem using skills she has already mastered so that she doesn't make an error. But if that astrodynamist had never challenged herself to tackle problems beyond what she knew, inevitably making errors and learning from them along the way, she never would have built the expertise needed to become an elite member of NASA.

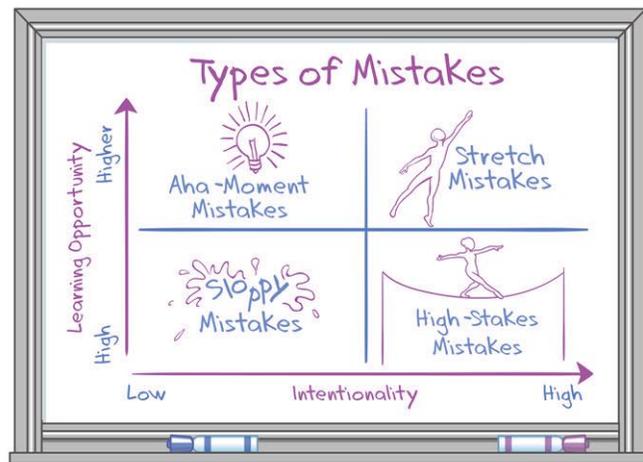
Mistakes to Avoid or Pursue

Distinguishing mistakes we want to pursue from those we want to avoid helps us learn more effectively.

If we desire a high rate of improvement, we must pursue *stretch mistakes*. These happen when we work on skills we haven't mastered. If we're attempting a task that we don't know how to do yet, we're bound to make mistakes. When we try to solve a tough math problem, we can learn a lot by reviewing our work and identifying where we made mistakes and what we can learn from them. We pursue stretch mistakes not by trying to do things incorrectly, but by attempting tasks that are challenging. Thereby we learn and grow.

The *aha-moment mistake* happens when we do something as we intended, but then realize it was a mistake to do so. For example, if our astrodynamist-in-training is trying to predict the trajectory of an object moving very fast, she may apply Newton's laws of motion and then realize that the object is moving in ways not predicted by the model. That may lead her to discover that she must take into account Einstein's special relativity. Although we can't seek out aha-moment mistakes, when they happen, we can treasure them as learning opportunities.

Some mistakes are not as desirable. We want to avoid *sloppy mistakes*, which are errors we make when doing something we have already mastered. But we're human and sometimes make them. When we do, let's learn from them. We can examine what led to the error



mindsetworks.com

and decide how we could change our processes to avoid them. Perhaps it was a lack of focus—sloppy mistakes can be good reminders to minimize distractions, slow down, and pay attention to the details.

Finally, we can minimize *high-stakes mistakes*—mistakes that could have disastrous consequences. A high-stakes situation could be one in which lives are at risk, such as when saving Mark Watney or designing a bridge.

Non-life-threatening situations may also be considered high stakes, such as a college entrance exam or job interview. In those situations, we may focus on what we have mastered rather than on what we're learning. After we perform, whether successful or not, we can reflect on what we can learn from those experiences, and then go back to seeking out new challenges.

Some teachers (and our grade-conscious education system) may inadvertently send the message that mistakes are undesirable. But learners who don't take the difficult classes and who don't try the challenging problems miss the opportunities to make mistakes, analyze the thinking that led to them, learn from such confusion, and improve. We learn the most when we view mistakes as opportunities to enhance our abilities.

So what challenge will you tackle next, and what will you do when you make your next mistake? ■

Eduardo Briceño is the cofounder and CEO of Mindset Works. He and his colleagues write regularly at mindsetworks.com.

Twitter: @ebriceno8

<http://dx.doi.org/10.4169/mathhorizons.23.4.34>