Brain Rules

By Dr. John Medina, molecular biologist

What's a Brain Rule? It's one thing scientists know for sure about how our brains work. Dr. John Medina investigates 12 rules and how they apply to our daily lives, especially at work and school. Here are 3 of them.

Rule #4: We don't pay attention to boring things.

- What we pay attention to is profoundly influenced by memory. Our previous experience predicts where we should pay attention. Culture matters too. Whether in school or in business, these differences can greatly affect how an audience perceives a given presentation.

- We pay attention to things like emotions, threats and sex. Regardless of who you are, the brain pays a great deal of attention to these questions: Can I eat it? Will it eat me? Can I mate with it? Will it mate with me? Have I seen it before?

- The brain is not capable of multi-tasking. We can talk and breathe, but when it comes to higher level tasks, we just can't do it.

- Driving while talking on a cell phone is like driving drunk. The brain is a sequential processor and large fractions of a second are consumed every time the brain switches tasks. This is why cell-phone talkers are a half-second slower to hit the brakes and get in more wrecks.

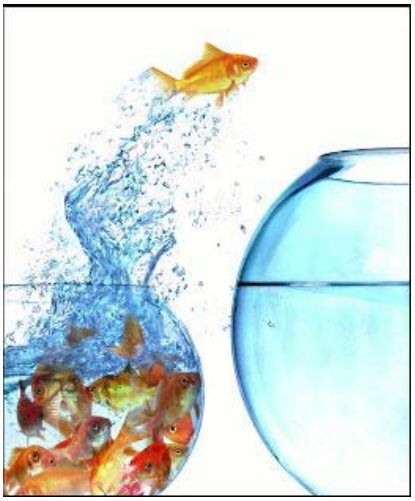
- Workplaces and schools actually encourage this type of multi-tasking. Walk into any office and you'll see people sending e-mail, answering their phones, Instant Messaging, and on MySpace—all at the same time. Research shows your error rate goes up 50% and it takes you twice as long to do things.

- When you're always online you're always distracted. So the always online organization is the always unproductive organization.

- The 10-minute rule: Audience attention drops precipitously at about 10-minute intervals. You must do something emotionally relevant at least every 10 minutes to regain attention.

- The brain pays attention to patterns. Remembering things we've seen before (like, say, quicksand) is a useful evolutionary trait. Chunk content to emphasize the patterns.

Rule #10: Vision trumps all other senses.



- We are incredible at remembering pictures. Hear a piece of information, and three days later you'll remember 10% of it. Add a picture and you'll remember 65%.

- Pictures beat text as well, in part because reading is so inefficient for us. Our brain sees words as lots of tiny pictures, and we have to identify certain features in the letters to be able to read them. That takes time.

- Why is vision such a big deal to us? Perhaps because it's how we've always apprehended major threats, food supplies and reproductive opportunity.

- Toss your PowerPoint presentations. It's text-based (nearly 40 words per slide), with six hierarchical levels of chapters and subheads—all words. Professionals everywhere need to know about the incredible inefficiency of text-based information and the incredible effects of images. Burn your current PowerPoint presentations and make new ones.

Rule #12: We are powerful and natural explorers.

- The desire to explore never leaves us despite the classrooms and cubicles we are stuffed into. Babies are the model of how we learn—not by passive reaction to the environment but by active testing through observation, hypothesis, experiment, and conclusion. Babies methodically do experiments on objects, for example, to see what they will do.

- The method we use to explore our world? Hypothesis testing. You did it last time your lost your keys. You hypothesized that you'd left them on your dresser, you tested the hypothesis by checking there, and you came to a conclusion. Clever!

- Google takes to heart the power of exploration. For 20 percent of their time, employees may go where their mind asks them to go. The proof is in the bottom line: fully 50 percent of new products, including Gmail and Google News, came from "20 percent time."

Source: Brain Rules website: http://brainrules.net/

Drive: the Surprising Truth about What Motivates Us

by Daniel Pink

Myth: If you reward something, you get more of the behavior you want. If you punish something, you get less of the behavior you don't want.

Studies at places like MIT, University of Chicago and Carnegie Mellon have shown that the typical motivation schemes within organizations do not work. The idea of offering incrementally greater rewards for increasingly better performance may work to incentivize mechanical skills and simple straightforward tasks, but once the task calls for even rudimentary cognitive skill, *a larger reward leads to poorer performance*. This finding has been replicated over and over, by psychologists, sociologists, economists, in other countries, across different industries and different economies.

An incentive designed to clarify thinking and sharpen creativity ended up clouding thinking and dulling creativity. Why? Rewards, by their very nature, narrow our focus.

True Motivation
There are three key ingredients of genuine motivation— *autonomy*, *mastery*, and *purpose*. Neglecting these limits what each of us can achieve.

Autonomy: the desire to be self-directed
Traditional management is about compliance. For true engagement on the part of employees, self-direction is better. It requires resisting the temptation to control people — and instead doing everything we can to reawaken their deep-seated sense of autonomy.

- Example: Once every three months, Atlassian, an Australian software company, tells its developers to work on anything they want for the next 24 hours. The only ask is to show results to the company at the end of the allotted time. There is often beer, cake, and fun involved as people work together. This one day of undiluted autonomy has led to a whole array of new product ideas and fixes to existing software problems. Instead of offering a big "innovation bonus" (I'll give you $2500 if you do something cool and amazing), they're saying, "let us just get our your way" so you can do what you're already inclined to do on your own.

Mastery: urge to get better at something
People pursue hobbies to gain mastery; they play musical instruments, excel at sports, build things not necessarily for fame or fortune—why? Because it's fun and it's satisfying to get better at something. Positive feedback can have an enhancing effect on intrinsic motivation.

- Example: Linux was developed by hundreds of people (many who are technically sophisticated, highly skilled people who have paying jobs) volunteering thousands of personal hours to create a product that they give away free. Linux is now powering 1 out of 4 corporate servers in the Fortune 500 companies; Apache is powering the majority of web servers. To an economist, it sounds like a crazy business model but it worked.

Purpose: making a contribution to something
Related to mastery, people want to do things that make a difference. People are natural "purpose maximizers, not only profit maximizers." When the profit motive becomes unhitched from the purpose motive, service goes down the drain and products become crappy. Profit-driven companies become uninspiring places to work and people do not do great things. The companies that flourish are animated by purpose.

- Example: the founder of Skype wanted to be a bit disruptive in the cause of making the world a better place by eliminating phone bills and connecting people around the globe.

The big takeaway here is that if we start treating people like people and not assuming that they're simply like horses responding to carrots and sticks, if we can get past this ideology and look at the science, we can actually build organizations and work lives that make us better off. We should focus our efforts on creating environments for our innate psychological needs to flourish.

We also have the promise of making our world just a little bit better.

This summary of Drive was compiled from the following resources:

- Dan Pink's TED talk: http://www.ted.com/talks/dan_pink_on_motivation.html
- RSA Animate version: http://www.youtube.com/watch?v=u6XAPnuFjJc&feature=player_embedded
- 19 Top Ideas for Education in Drive by Daniel Pink: http://connectedprincipals.com/archives/2202

Learner-Centered Teaching

By Terry Doyle, Ferris State University

"*Although it may irritate the teacher, one of the most intelligent questions a student can ask is, 'Why do we have to do this?'*" — Robert Sylwester

The Rationale for Learner-Centered Teaching

New discoveries about how the human brain learns and the subsequent recommendations for how to teach in harmony with these discoveries have guided the learner-centered approach to teaching. We know from neuroscience research that the dendrites of our brain cells only grow when the brain is actively engaged and the neuron-networks formed in our brains only stay connected when they are used repeatedly (Ratey, 2002, p. 19). We want students to do more firsthand learning, group learning, practicing, reflecting, presenting and teaching of others, because all of these learning activities require active learner engagement.

We put students into small groups not only to promote a deeper level of learning but because learning to talk with or listen to others is, perhaps, the single most important skill needed to be successful in any career field. A rationale for asking students to make presentations before the whole class is that learning to speak in front of others is crucial to career success. Students are being asked to take on more responsibility for their own learning because they will be responsible for it the rest of their lives. If we don't prepare them to be lifelong learners, capable of independent, self-motivated learning, then we have done less than a satisfactory job with their education.

Why We Love to Lecture

There are many tried-and-true reasons for resorting to traditional lecture format:

- Lecture is expedient.
- We worked very hard to learn the subject(s).
- We know our students don't know most of what we have to tell them.
- We went into teaching to help students learn our subject areas.
- We feel powerful when sharing our knowledge—we like to show off.
- We remain in control of the learning process

Then, what are the drawbacks?

- Lecture is often uni-sensory which makes it a much less effective way to learn than many other learning approaches.
- Requires extended attention for the learner.
- Students' brains will begin to habituate the sound of our voice especially if it is unmodulated.
- Lecture doesn't cause the learners to do much work (except multitask).

Sharing Power with Students

We have been so conditioned by a teacher-centered approach that we must be the authority and control all of the aspects of the learning process that moving away from that idea makes many of us uncomfortable. It is this uncomfortableness that our students also feel when we ask them to take more control over their learning by making choices that increase their responsibilities for what and how they learn.

When we share power with our students by offering learning choices, the message is:

- we trust their judgment;
- we trust them to act in ways that are in their best interest;
- and we believe they will make decisions that are mature and reasonable

Trust is empowering and most students will rise to the occasion.

Four tenets of yielding power to learners:

1. Our students cannot improve their abilities to be more responsible for their learning without being given greater responsibility for it.
2. The more control our students take and the more choices we can offer them the greater their desire and willingness to engage in the learning.
3. When students make a choice, they also must learn to live with that choice. This is a very powerful life lesson.
4. When a student has some control over how they learn, they can also discover their strengths and weakness as a learner, a vital meta-cognitive skill they will use the rest of their life.

Facilitating Learning

The facilitator's job is to support everyone in doing his or her best thinking and practice. It involves supporting learning by providing an environment for engagement, initiating activities that get the full participation of learners, and cultivating shared responsibility for the learning between the teacher and the students. It is a learned skill.

Giving meaningful feedback to learners is one of the greatest skills of an effective facilitator of learning. Good feedback is the key to improved learning. Rather than being the sole domain of the teacher, the feedback process works best when both students and teachers are actively involved. Give feedback that focuses more on instruction rather than correction. The message is how to improve.

Compiled from the following sources:

- A Clear Rationale for Learner-Centered Teaching: http://learnercenteredteaching.wordpress.com/articles-and-books/the-learner-centered-classroom/
- How to Share Power with Students: http://www.scribd.com/doc/12701319/How-to-Share-Power-With-Students-to-Promote-Learning
- Learner-Centered Teaching Resources: http://learnercenteredteaching.wordpress.com/learner-centered-teaching-resources/

Changing the Tone through Motivation

By Brian Remer

My daughter, Tilden, is learning to play the clarinet and our house has been filled with squawks, squeaks, and groans for several months now. But, all that noise is not coming from her musical instrument. It's coming from my daughter! You see, she doesn't want to practice. She squawks and squeaks about what she would rather do and my wife and I groan about how we are going to motivate her to put in a little effort.

There are three factors influencing her behavior.

1. Competence: It takes a considerable amount of practice to even begin to feel competent playing the clarinet. Who would want to do something they don't do well?
2. Autonomy: The idea to practice is never hers. There is always someone else telling her what, when, and for how long. Other people, her parents, are in control.
3. Relatedness: Usually she practices in her room, but who wants to sit all by themselves doing something they didn't choose and can't do well?

Psychologist Richard Ryan has incorporated these three factors—competence, autonomy, and relatedness— into a theory about motivation. Through his research, Ryan found that when people felt competent at the task, when they were able to make choices about it, and when they had a strong connection to another person, their intrinsic, internal motivation increased. In short, the more competence, autonomy, and relatedness the person felt, the more likely they were to do the activity on their own. Rewards and punishments don't even need to enter the picture.

Experimenting with Ryan's ideas has changed the tone—both literally and figuratively—of Tilden's clarinet practice. As parents we now make a conscious effort to tolerate the squawks and give positive feedback in order to improve her sense of confidence and competence. We create opportunities for her to make choices and experience some autonomy. For example, she might choose to practice twenty minutes today or ten minutes today and ten minutes tomorrow. And we capitalize on the power of relatedness. One of us might sit next to Tilden just listening to the music as she makes it. The result has been much more enjoyable for everyone.

The implications of Ryan's research on motivation are profound. Whether we are parenting a child, supervising staff, or leading a cross-functional team, we can have a bigger effect on the motivation of others by building competence, offering autonomy, and supporting relatedness. You too can turn squawks and squeaks into beautiful music by focusing on motivation.

Just consider:

- What are the ways you can build competence in the people you supervise or collaborate with?
- How can you encourage those people to experience a sense of autonomy while accomplishing the many things that have to get done?
- How can you do all of this in a way that makes your relationship with them, and their sense of relatedness to each other, stronger?

Source: The Firefly Group, http://www.thefirefly.org/Firefly/html/Ideas.htm#motivation

Teaching Adults Anything

By Sharon Bowman

- Adults remember what *they* write better than what the instructor writes.
- You will remember what you write better than what you read.
- Connections are the key to adult learning.

Step #1: Get learners connected.
At the start of the process, make these important connections:

1. To prior learning
2. To each individual's learning goal
3. To each other

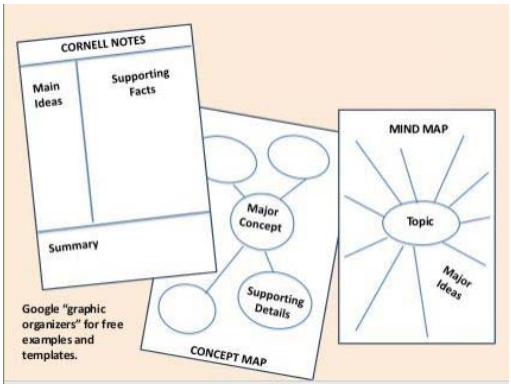
Connection exercises:

- Quick-write: learners write a sentence describing what you want to learn and then tell your table group what you wrote.
- Pair-share: each person introduces his/herself to one other person and tells him or her three facts they already know about the topic.
- Mark-ups: learners read the list of learning objectives and circle the one most important to them; they tell the table group which one was circled and why.

Put the welcome, introductions, announcements, learning objectives, and anything else AFTER the connection activity.

Step #2: Content—chunk, show and tell

- Provide content in small "chunks" of 10-20 minute segments. Insert quick 1-minute activities between longer content segments.
- Use visual aids and tell stories to teach content
    - Visual aids include photos, props, icons, cartoons, videos, graphics, demonstrations, and skits.
    - Telling includes stories, case studies, analogies, and metaphors.
- Provide graphic organizers for learners to take notes.
- Follow each content chunk with a 1-minute review.



Review exercises:

- Each person writes and then shares a one-sentence summary of the main ideas presented so far.
- Learners pair up and ask each other a content-related question; discuss their answers.
- Each person writes a content-related question on an index card, then passes the card to another learner who writes the answer for a later group discussion.

Step #3: Let them do it.
Adult learners need to actively review content or actively practice skills at least six times and in six different ways (6X by 6W).

6X6W exercises:

- Pair teach-back: learners divide into pairs or triads and take turns explaining concepts or demonstrating skills they've learned in the class.
- Table teach-back: each table group chooses a concept or skill to demonstrate or explain to the rest of the class.
- Class teach-back: the class divides in half. Each half teaches or demonstrates a concept or skill to the other half.
- Skill skits: groups of learners create and act out a skit that demonstrates a concept or skill.
- Job-shadowing is also an effective way to practice new learning.

Step #4: Create an action plan.
An action plan is a commitment by the learner to use what has been learned or practiced. It allows learners time to evaluate what they've learned and think about how it applies to their work.

Concluding exercises:

- In pairs or triads, learners walk around the room discussing the most important concepts they learned and what they plan to do with this knowledge back on the job.
- Table groups write and perform short raps, poems or songs as content summaries.

Source: Teach it Quick and Make it Stick, http://www.bowperson.com/articles.htm

Find the Intrinsic Game

Gamification is the application of game-thinking and game mechanics to non-game contexts in order to engage users and solve problems. For Jane McGonigal, who staged the 2011 all-night *Find the Future* game at the New York Public Library, gaming is about provoking positive emotions, strengthening social connections, and building up players' ability to tackle tougher and tougher challenges without giving up.

Gamification techniques applied to learning materials can arouse learner curiosity and drive motivation. Many have attempted to apply game-thinking to education.

Unfortunately, as video game expert Jordan Shapiro writes,

> "Most attempts at educational gaming I've seen take a pretty mundane approach. They are basically glorified quizzes with bells and whistles. They add the digital equivalent of smiley face stickers and gold stars: sound effects, animations, points. Not only are these games boring, they also seem to ignore the plethora of studies that have shown that over reliance on extrinsic motivations in learning can have negative long-term effects."

There is a large body of research showing that when you give people rewards for doing something (extrinsic), it undermines their "intrinsic" or internal motivation for doing it. The trick with effective gamification is to find the intrinsic game in a subject and bring it to life. Noted instructional designer Kathy Sierra recommends eliminating the word "game" and using the formula: "find the intrinsic [reward/experience/beauty, etc.] in [topic/domain/job/activity] and bring it to life." In other words, find the bridge that enables people to discover and achieve for themselves.

Shapiro raves about the game DragonBox, which has unlocked the game nature of algebra in a way that tricks kids into thinking it's fun. "Algebra is the primordial puzzle game." Algebraic equations try to solve for the missing "X"—how game-like is that? DragonBox is a multiplatform game that uses drag and drop mechanics to teach the basics of algebra. Without relying on text, it covers the rules of algebra step-by-step, teaching players only what they need to know to execute the immediate task at hand and get to the next level. Shapiro's 7-year-old son was solving junior high level equations after an hour and half of play.

The level of technical sophistication in something like DragonBox is a barrier for most trainers and instructional designers, causing them to give up on gamification. However, simple games can be compelling and motivating, and there are ways to embed game-like qualities in learning.

Mary-Scott Hunter of Allen Interactions considers these game constructs to be achievable:

- **Timer**
  You can answer that customer question utilizing existing resources, but can you do it in three minutes? When the performance requires a certain measure of unconscious competence (learners must perform tasks quickly or with rote proficiency), integrate a timer into the e-learning. Stage the first few practice activities for learners to complete without a timer, which gives them a chance to master the skill and receive feedback to guide performance. Then challenge them to beat the clock.

- **Collaboration**
  Collaboration is often overlooked as an element of game play. Design situations where collaborators supply hints and clues, but do not give away the full answer. Or maybe each person holds one dimension to the solution. Even better: design a situation where learners have to earn collaboration from co-workers. You answer questions for them and they become available to assist you.

- **Unlock New Worlds**
  As a gamer, one of the greatest thrills comes from earning the right to explore something which was locked away a moment ago. Earning the right to cross a bridge, to access a secret passage, to open mysterious rooms, are the types of rewards that keep me coming back again and again. And yet I can almost see you crossing your arms right now, thinking, "Well, we don't have secret passages in our work environment."
  Allow learners the possibility of 'unlocking a filing cabinet' where the better solutions are stored. After successfully dealing with three difficult customer scenarios, grant access to 'the secret room' where they get the great customers, the ones who are appreciative and fun to work with. Trust me, it will feel like accessing a different world.

- **The Boss Challenge**
  Games are often leveled so that the last challenge the gamer encounters is The Boss. The Boss Challenge is the ultimate challenge, the culmination of every skill acquired along the way. Let the learner know it's coming. Give them chances to practice. We want the learners to win, but the challenge should *feel* hard. If the learner has truly mastered the skill, they will beat The Boss Challenge. Winning really means something when it is hard to achieve.

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