Learning and the Brain Conference

iGeneration:
How the Digital Age Is Altering Student Brains, Learning and Teaching

San Francisco, February 2011

Keynotes and Speakers

Thursday

- ***Re-Wired: Understanding the iGeneration and the Way They Learn*** (Larry D. Rosen, PhD)
- ***iBrain: Technological Alteration of the Student Mind*** (Gary W. Small)
- ***Language and Learning: From the Age of Literacy to the Digital Age*** (James Paul Gee, PhD)

Friday

- ***Overcoming the Global Achievement Gap*** (Kenneth Kosik, MD)
- ***The Flat World and Education: Transforming Teaching, Learning and Assessment*** (Linda Darling-Hammond, EdD)
- ***Teaching Digital Natives—Partnering For Real Learning*** (Marc Presky, MBA)

Bart Gummere

Attention is a process of selection

- RAS (Reticular Activating System)
  - Millions of bits of sensory data every second- only 2000 bits can get through each second. Not a sophisticated filter- there to survive- preserve the animal and species
  - Filter is there to limit intake- would overwhelm brain if not there, preserves the brain's limited resources. No data bit is "pre-rated."

The Answer

- **The howling of the wolf… only**
  - That is the only one that gets in, and it gets in at the exclusion of all else.
  - ‘Can it hurt me’ overwhelms all the other observations.

Relevance to Teaching Students

- Students are ALWAYS paying attention to sensory data- it is involuntary
    - Perceived threat gains attention before academic content

- How do we combat this as teachers?
  - Novelty grabs attention
  - Ideally these novelties spark curiosity, since curiosity drives learning

Novelty that is a threat overwhelms

- Teachers must lower any perceived threat
  - Provide a personal sense of security.
  - Routines create security, for the whole class.
  - “Safe place” in the room- develop a protocol to not be called upon.
  - Consistent rule enforcement helps students feel more secure.

Class Openers

Creating Curiosity

- Something new
- Music
- Color
- Movement
- Costume or hat
- Voice (change in volume, pitch or cadence)
- Do something unusual- walk backwards

In all cases, curiosity is most effective in learning when it spurs students to predict what will happen next.

Kelly Moore

-- ***Mind, Brain and Education in the Era of Globalization*** (Mary Helen Immordino-Yang, Ph.D.)

-- ***Teaching and Assessing 21st Century Skills*** (Tony Wagner, Ph.D.)

-- ***Rethinking Learning Disabilities in the Age of Google*** (David Rose, Ed.D.)

Emotions and Learning

Learning and the Brain Conference

2011

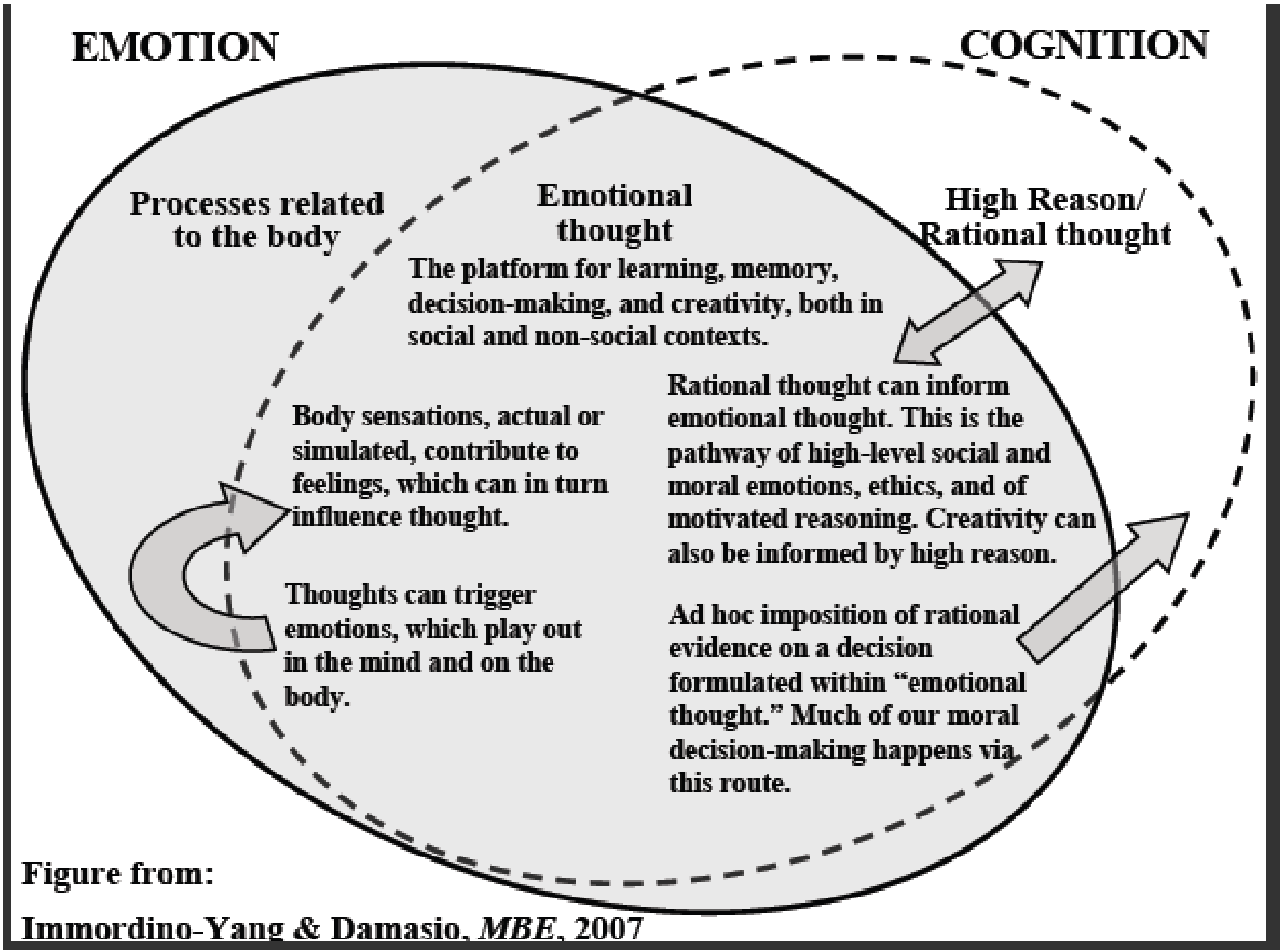
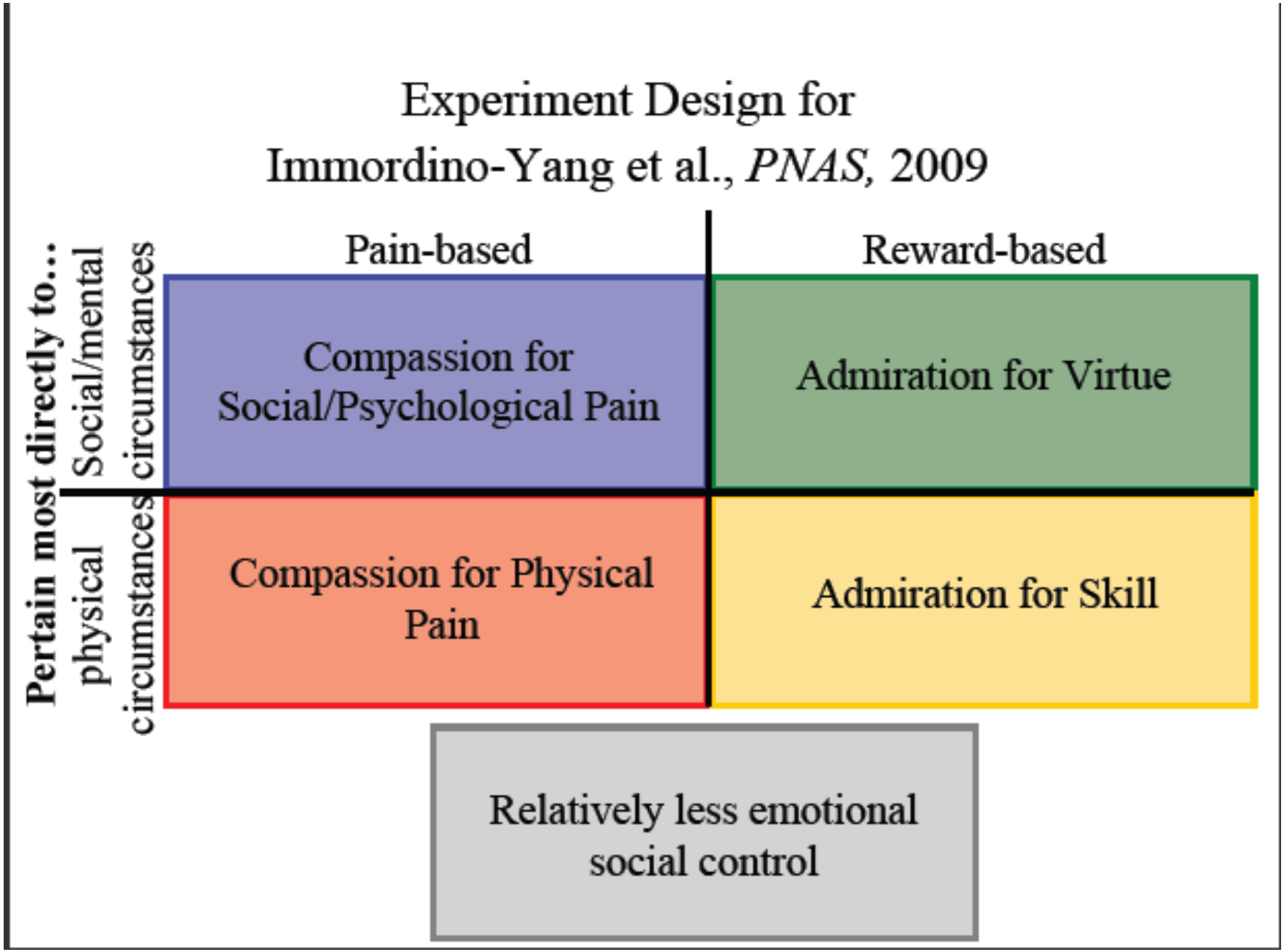
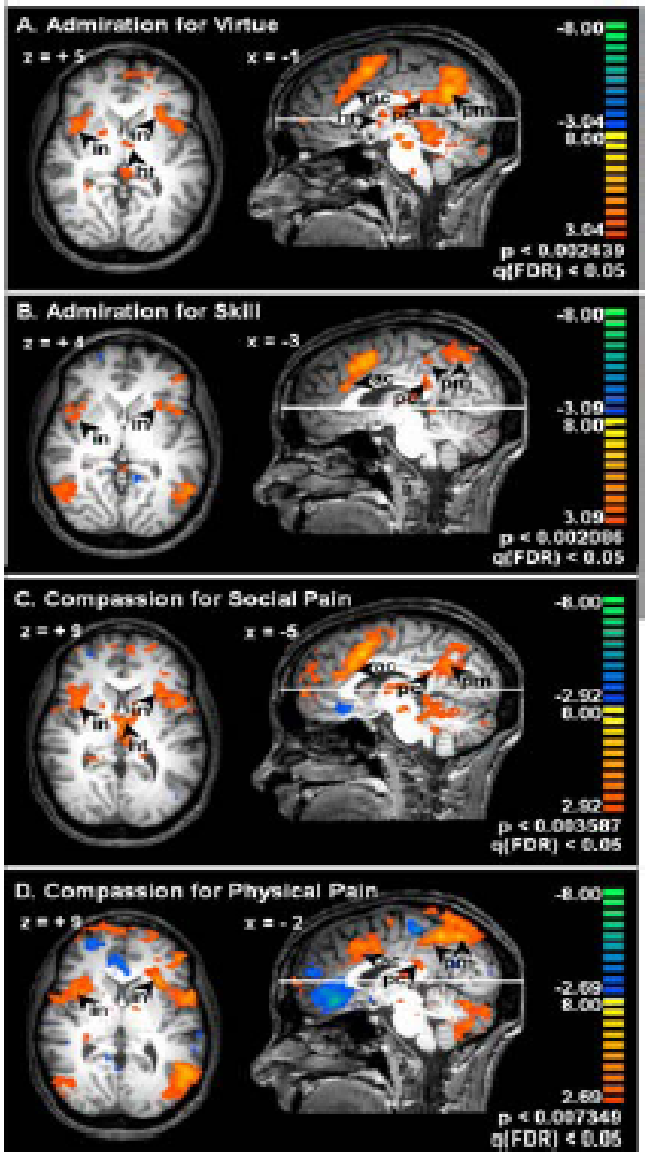
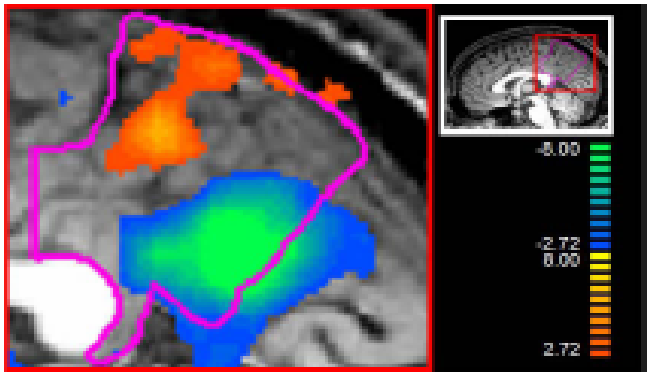


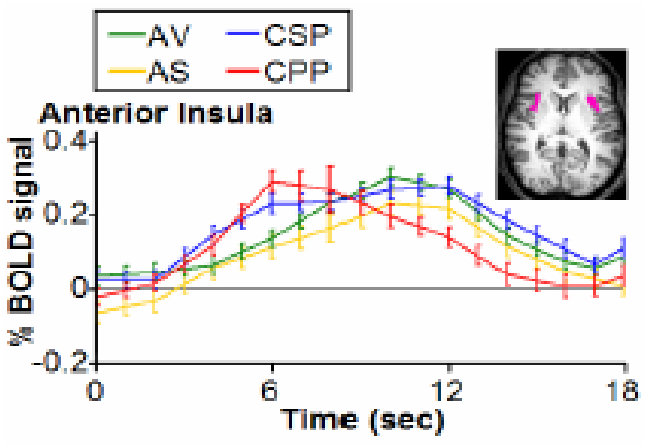
Figure from:

Immordino-Yang & Damasio, *MBE*, 2007


Experiment Design for
Immordino-Yang et al., PNAS, 2009
Pain-based
Reward-based
Pertain most directly to…
Social/mental circumstances
physical circumstances
Compassion for Social/Psychological Pain
Admiration for Virtue
Compassion for Physical Pain
Admiration for Skill
Relatively less emotional social control







Figures from:

Immordino-Yang, McColl, Damasio & Damasio, *PNAS* (2009)

Jonathan Briggs

Learning and the Brain Sessions

- Jeremy Bailenson
  - Social Learning in Virtual Reality: How Avatars Can Make Us Better Teachers
- Daphne Bavelier
  - Brain Action Video Games as Learning Tools
- David Williamson
  - Digital Games, Digital Learning
- Kenneth Kosik
  - Wikification of Knowledge: Implications for Education
- Kurt Fischer (
  - Mind, Brain and Emerging Technology for Robust Learning, Knowledge and Assessment
- Charles Fadel
  - How is Knowledge Better Known Through Skills?

Jeremy Bailenson

- Using Virtual Reality to Explore Reality
  - Basic Method
  - Effects persist *after* VR experiences
  - Virtual height affected negotiations success in VR
  - Similar effects with Race, Gender, Age
  - Self in Advertising / Morphing with candidates

Teaching Examples

- Gaze
- Back to the Future Effect
- Race, Gender
- Action Miming
- Shared body space

Bringing it back into the physical world:

Any connection you make with your students increases your effectiveness.

Bailenson Links

- http://vhil.stanford.edu/pubs/2008/bailenson-IVE-learning.pdf Article on Teaching
- http://vhil.stanford.edu/pubs/?Learning=yes all the teaching based articles
- http://vhil.stanford.edu/projects/ Overview of the ideas Jeremy works with.
- http://vhil.stanford.edu/ The main site

Katie Dodd

Raising Well-Balanced Children in a Fast-Paced Digital World

Denise Clark Pope

Some data

- MS students at high-achieving schools average 2.5 hours of homework a night
- They average 6.9 hrs/week in extracurriculars
- It is recommended that MS students get 10-11 hours of sleep a night, which is nearly impossible
- Cheating admitted by 90% of 7^{th} and 8^{th} graders

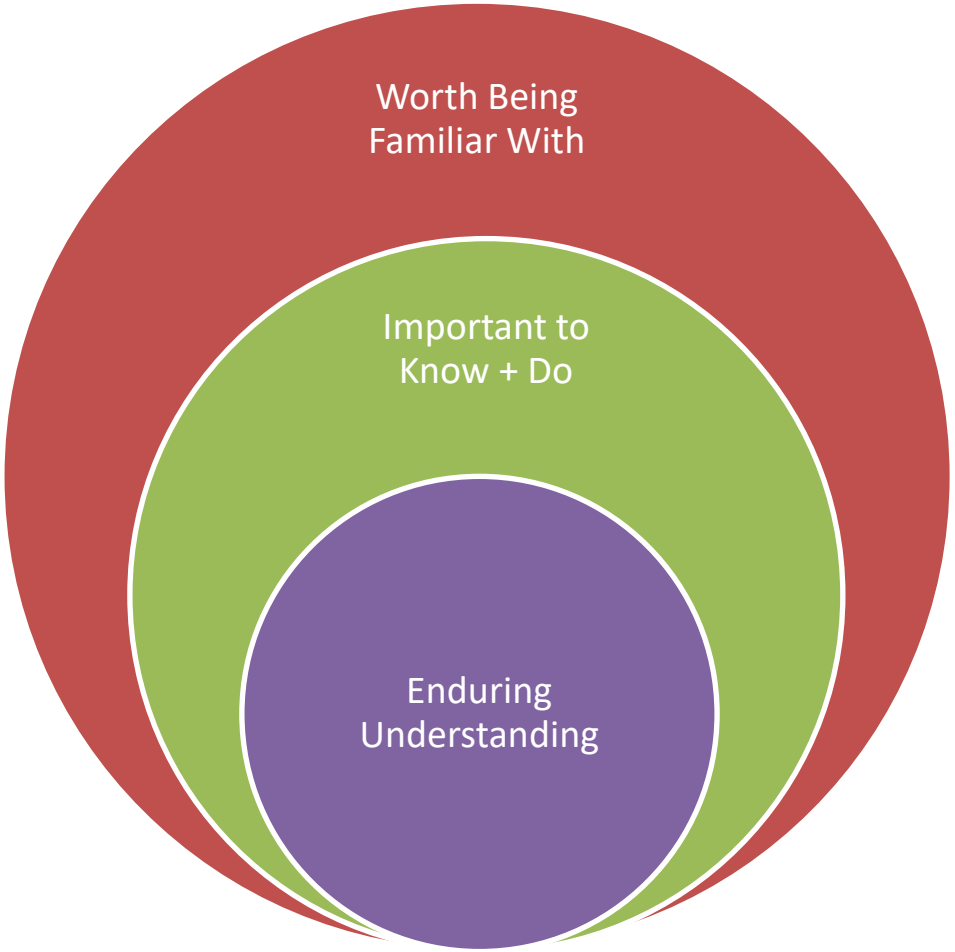
Consequences

- Sleep deprivation affects memory and increases bullying incidents
- People are doing things they know are wrong in order to get good grades
- We've created a generation that has figured out how to jump through a hoop for a reward but they aren't retaining information
- They are not prepared for the 21st century

Safe to Fail

- Kids need to be comfortable with grey areas, taking risks, thinking outside of the box
- Students are “failure deprived”; first B or B- sends Stanford students to the health center with anxiety attacks
- Kids become resilient when they have a safe place to fail
- Want to create a culture of revision and redemption because that’s real-world experience
- Set up policies that allow for mistakes; think about your policy for giving zeroes

Assessment Goals



Traditional tests and quizzes assess the outer circles but aren't good at testing enduring understanding

Need performance-based tasks and projects with lots of scaffolding

- Open-ended
- Complex
- Authentic

Assessment

- Focus on rigorous, relevant projects
- When engagement is up, mental & physical health are up, grades are up, and cheating is down
- Make learning relevant to the student
- Kids need to believe that their teachers care

How to Assess?

- As a class talk about what we mean by excellent work
  - What are the standards?
  - Is there a rubric?
- Do you need to have grades?

Transitions

- Really look at the schedule and the number of periods in a day
- Is there time built in to every period for reflection or to start HW?
- Closure time in every lesson is a good idea
- Kids take 12-13 minutes to switch mental gears

Matt Delaney

- **Mind, Brain and Education in the Era of Globalization** (Mary Helen Immordino-Young, EdD)
- **Teaching and Assessing 21st Century Skills** (Tony Wagner, Phd)
- **Digital Games. Digital Learning** (David William Shaffer, PhD)
- **STOMP: Practice Improves Reasoning Skills** (Silvia Bunge, PhD)
- **Mind, Brain and Emerging Technology for Robust Learning** (Kurt Fischer, PhD)

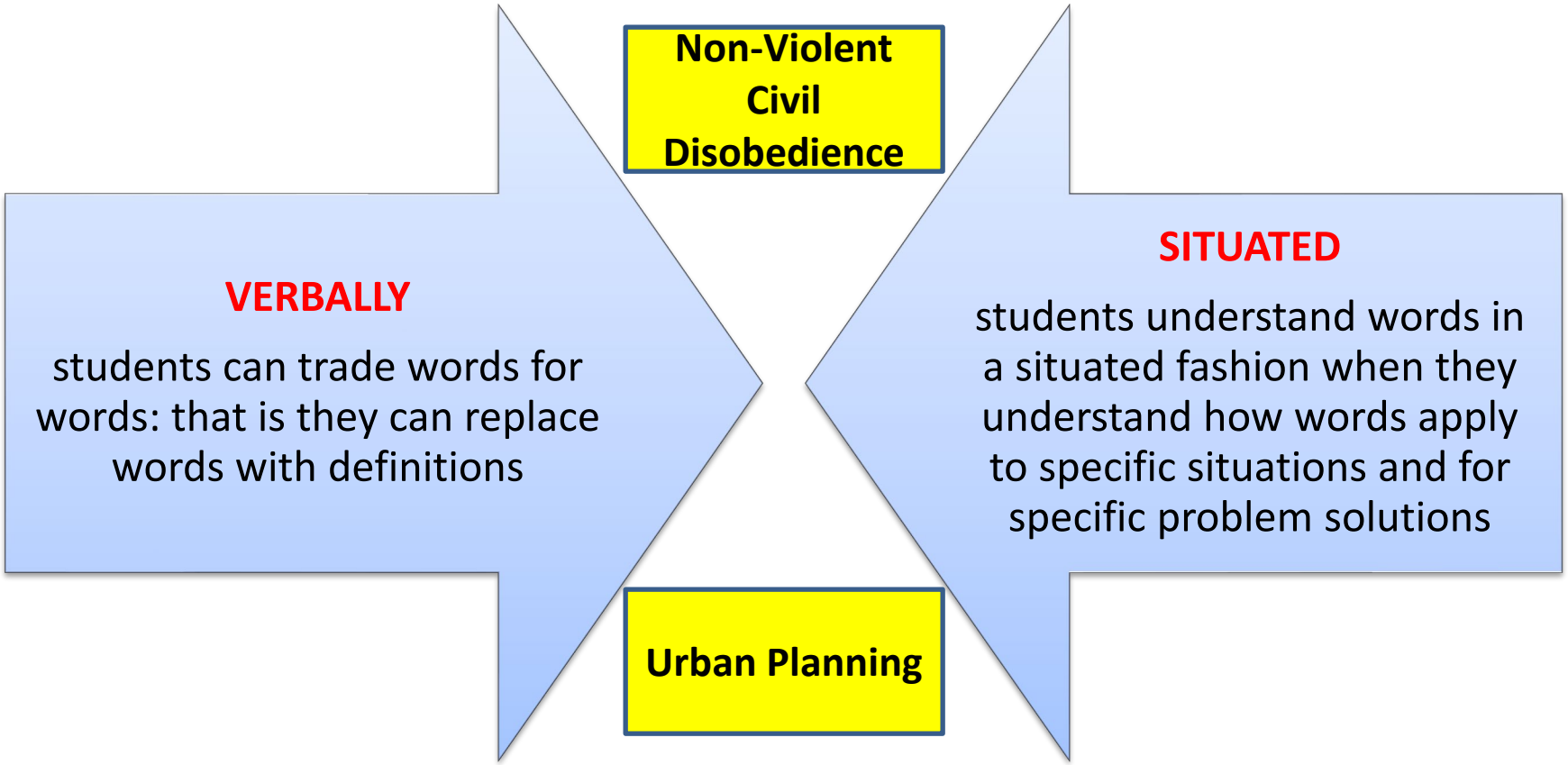
Game Play and Class Play

Learning through Experience

- Satisfy an emotional need
- Provide a goal
- Encourage interpretation and reflection
- **Give immediate and copious feedback**
- Supply a heavy cognitive load (engagement)
- Asks for expert perspective (mentoring inside and outside of game)
- Skills can be applied to new experiences and situations (transferability)
- Must have a wrinkle of debriefing

Digital Games. Digital Learning
(David William Shaffer, PhD)

Ways of Understanding



"People acquire situated meanings for words—that is, meanings that they can apply in actual contexts of use and problem-solving—only when they have heard these words in interactional dialogue with people more expert than themselves (Tomasello, 1999) and when they have experienced the images and actions in which the words apply. (Gee, 2004)"

Research Partnership

EPS and Epistemic Games

- Playing a **collaborative online game in partnered groups for 10 hours.**
- Play in **groups of three or four** with their classmates and they will be **"virtually" employed by a planning firm called Regional Design Associates.**
- fill out a professional bio for the firm's
- Take a **pre-test** and then they are assessed by the same metrics throughout the game experience to identify **their progression towards a finite set of identified "expert" skills of professional urban planners.**
- They interact with teacher and online mentors throughout to **elicit metacognitive reflection**.

Digital Games. Digital Learning
(David William Shaffer, PhD)

Reflections

- Increase use of games and simulations in the classroom which identify and assess specific vocabulary and skills and give students multiple opportunities to play them
- Find more team teaching opportunities where students witnessing and participating actual dialogue between adults on relevant topics and skills (how to do school, how to do specialized work/thinking, how to do life)

Situated Learning and Understanding

- **Dialogue, experience and action are crucial** if people are going to have more than just words for words, if they are going to be able to cash out words for experiences, actions, functions, and problem solving.
- Students must be able to **build simulations in their minds of how words are used in talk and in action in different specific contexts.**
- As they can do this for more and more contexts, students generalize the meanings of the word more and more, but ***the words never lose their moorings in talk,*** **embodied experience, action and problem solving.**

References

- The Classroom of Popular Culture--What Video Games Can Teach Us About Making Students Want to Learn (Gee 2005)