Mind, Brain & Education: Strategies to Support Active Learning, Critical Thinking & Real-World Transfer

Dr. Kristen Betts
Online Learning Council
Drexel University
October 2, 2018
Dr. Kristen Betts

- Clinical Professor, School of Education, EdD & MS Programs
  Sr. Director eLearning, Provost Office
- CAO, Forbes Education
- Director, Online & Blended Learning, Armstrong State University, University System of Georgia
- Online Learning Consortium, Certificate Instructor; QM Peer Reviewer
- Programs & Courses:
  - Johns Hopkins University: Mind, Brain & Teaching Graduate Program
  - Harvard University, Extension, Neuroscience of Learning: An Introduction to Mind, Brain, Health, and Education
  - Learning & Brain Summer Institute with Dr. Judy Willis

Research:
- Program Design, Faculty Development, Online Neuropedagogy
- Student/faculty recruitment, engagement, retention
- Online & Blended Education, Non-Traditional Students
- “High Touch” – Experiential Learning, Active Learning
• Mind, Brain & Education Science
• Human Learning Principles
• Neuromyths & Evidence-Based Practices
• Active Learning & Practice
• Transfer of Learning
• Real-World Transfer
• Presentation
• Self-Assessment
• Group Work
• Take Home Quiz
• Homework
Mind, Brain & Education Science

Focus: “how humans learn best in order to develop more effective teaching methods.”

Dr. Tracey Tokuhama-Espinosa, 2011

MBE Timeline

1981 – First neuroeducation dissertation
1990s – Kurt Fischer, prominent early work in Mind, Brain & Education
2002 – Harvard University, MBE Program; OECD Report
2004 – International Mind, Brain, and Education Society (IMBES)
2007 – Journal of MBE
2006-08 & 2016-17 – Mind, Brain Education: Principles & Tenets, 4,500 & 3,041 resources
Self-Assessment: Correct, Incorrect or Don’t Know-DK

1. Listening to classical music increases reasoning ability. ____

2. Some of us are “left-brained” and some are “right-brained” due to hemispheric dominance and this helps explain differences in how we learn. ____

3. Individuals learn better when they receive information in their preferred learning styles (e.g., auditory, visual, kinesthetic). ____

4. We only use 10% of our brain. ____

5. There are critical periods in human development after which certain skills can no longer be learned. ____
<table>
<thead>
<tr>
<th>Assertions</th>
<th>Answer Key</th>
</tr>
</thead>
<tbody>
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<td>1. Listening to classical music increases reasoning ability.</td>
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<td></td>
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</tr>
<tr>
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<td></td>
</tr>
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<td>4. We only use 10% of our brain.</td>
<td>Incorrect</td>
</tr>
<tr>
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<td>Incorrect</td>
</tr>
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<td>skills can no longer be learned.</td>
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</tr>
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**Neuromyths** – misconceptions, misunderstanding, misquoting, or misreading information about the brain

(Organisation for Economic Cooperation and Development, 2002; Geake & Cooper, 2003; Goswami, 2006).

Educator’s conceptualization of knowledge:

(a) greatly impacts her/his pedagogy.

(b) affect learners’ epistemological beliefs.
Research Studies Related to Mind, Brain & Education Science

International Study
Neuromyths & Evidence-Based Practices
AY 2017-18
Higher Education:
Instructors, Instructional Designers, Administrators-PD
Neuromyth Research

• 2002-17, K-12 Education Studies, Prevalence of Neuromyths

• 2017-18, Drexel University, Online Learning Consortium, Seven IHEs (int’l)

• Neuromyths & Evidence-Based Practices, Higher Education
  • 23 Neuromyths (32)
  • 28 Evidence-Based Practices
  • Predictors, NM and EBP

• Instructors, Instructional Designers, Administrators-Prof Dev.
• On-Campus, Blended/Hybrid, Online
• 4 year, 2 year institutions
• USA & International
• N=1,038 responses, 48 states, 46 countries
### Preliminary Results

<table>
<thead>
<tr>
<th>Answer Key</th>
<th>Percentage Correct Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Instructor</strong></td>
<td><strong>Instructional Designer</strong></td>
</tr>
<tr>
<td>Incorrect</td>
<td>16.1%</td>
</tr>
<tr>
<td>Incorrect</td>
<td>29.8%</td>
</tr>
<tr>
<td>Incorrect</td>
<td>29.8%</td>
</tr>
<tr>
<td>Incorrect</td>
<td>47.2%</td>
</tr>
<tr>
<td>Incorrect</td>
<td>71.5%</td>
</tr>
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4. We only use 10% of our brain.

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Learning Styles Challenge — Year Eight — Now at $5,000

CLASSIC POSTS, MYTHS AND WORSE, AUGUST 2014

https://www.worklearning.com/2014/08/04/learning-styles-challenge-year-eight/

Homework. p. 30
“The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn”

Alvin Toffler
Mind, Brain & Education Science

Human Learning Principles

Dr. Tracey Tokuhama-Espinosa, 2016-17
Delphi Panel
40 experts from 11 countries
neuroscience, psychology, education
MBE Principles

1. Human brains are as unique as human faces.

2. Each individual’s brain is differently prepared to learn different tasks.

Neurodiversity

“neurological diversity”

Neurodiversity is a natural and valuable form of diversity, found in every human society.

~ Autism Acceptance Month: Acceptance is an Action
3. The brain changes constantly with **experience**.

4. **Neuroplasticity** exists throughout the lifespan.

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Dr. Tracey Tokuhama-Espinosa, 2018
Dr. Lara Boyd | TEDxVancouver

After Watching This, Your Brain Will Not be the Same

Brain Behavior Laboratory, The University of British Columbia

https://www.youtube.com/watch?v=LNHBMFczznE&feature=youtu.be&t=1m33s

Homework
(watch full video)
“Teachers are brain changers.”

~ Glenn Whitman & Ian Kelleher, *Neuro Teach*, 2016

“Educators are brain changers.”
MBE Principles

5. New learning is influenced by prior experiences.

6. There is no new learning without some form of attention and some form of memory.

Yale

Interactions Between Attention and Memory (fMRI)
Chun and Turk-Browne (2015)

“Attention and memory cannot operate without each other.”

“Memory from past experience guides what should be attended.”

Dr. Tracey Tokuhama-Espinosa, 2018
Group Work: Correct, Incorrect or Don’t Know - DK

1. Rereading course materials is an effective strategy for learning. _____

2. Human memory works much like a digital recording device or video camera in that it accurately records the events we have experienced. _____

3. Frequent, low stakes tests do not enhance learning. _____

4. Learning should be spaced out over time. _____

5. Repeated practice and rehearsal of learned material or a skill will help to consolidate it in long-term memory. _____
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<td>Incorrect</td>
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<tr>
<td>2. Human memory works much like a digital recording device or video camera in that it accurately records the events we have experienced.</td>
<td>Incorrect</td>
</tr>
<tr>
<td>3. Frequent, low stakes tests do not enhance learning.</td>
<td>Incorrect</td>
</tr>
<tr>
<td>4. Learning should be spaced out over time.</td>
<td>Correct</td>
</tr>
<tr>
<td>5. Repeated practice and rehearsal of learned material or a skill will help to consolidate it in long-term memory.</td>
<td>Correct</td>
</tr>
<tr>
<td>Preliminary Results</td>
<td>Answer Key</td>
</tr>
<tr>
<td>---------------------</td>
<td>------------</td>
</tr>
<tr>
<td></td>
<td>Instructor</td>
</tr>
<tr>
<td>1. Rereading course materials is an effective strategy for learning.</td>
<td>Incorrect</td>
</tr>
<tr>
<td></td>
<td>25.8%</td>
</tr>
<tr>
<td>2. Human memory works much like a digital recording device or video camera in that it accurately records the events we have experienced.</td>
<td>Incorrect</td>
</tr>
<tr>
<td></td>
<td>68.9%</td>
</tr>
<tr>
<td>3. Frequent, low stakes tests do not enhance learning.</td>
<td>Incorrect</td>
</tr>
<tr>
<td></td>
<td>71.9%</td>
</tr>
<tr>
<td>4. Learning should be spaced out over time.</td>
<td>Correct</td>
</tr>
<tr>
<td></td>
<td>75.6%</td>
</tr>
<tr>
<td>5. Repeated practice and rehearsal of learned material or a skill will help to consolidate it in long-term memory.</td>
<td>Correct</td>
</tr>
<tr>
<td></td>
<td>93.0%</td>
</tr>
</tbody>
</table>
How engaged are your students in active learning?

Practice:
• Formative Assessment
• Summative Assessment

Feedback:
• Instructor & Technology
• Fail Mindfully / Fail Forward, Build Upon Success
“Metacognition includes a critical awareness of (a) one’s thinking and learning and (b) oneself as a thinker and learner.”

“Metacognitive practices help students become aware of their strengths and weaknesses as learners, writers, readers, test-takers, group members, etc.” ~ Vanderbilt, 2018
Awareness is the greatest agent for change.

Eckhart Tolle
“Practice & Feedback”

Neurons that fire together wire together.

Positive & Negative Transfer

“Mastery”
“Think axons and myelin, not "muscle memory" — muscles don't have "memory."

~ NPR, 2017
“Knowledge cannot be taught; it must be created newly in the brain of each student.”

~Barbara Sabitzer
A diagram with the words "paradigm shift".
Online Learning

“Learning” Online
Sure, I will try a distance education course.
Me?
But I have not done online before.

2001-10
2011-17 “Learning Online” Students
Future

On-Campus, Blended & Online

“Learning” Online

2018
Proposed Definition

“Online” neuropedagogy builds upon neuroscience, psychology, and education and concepts of neuroplasticity and neurodiversity facilitating educational online experiences through teaching, active learning, and assessment across educational formats (e.g., classroom, blended/hybrid and online) to support comprehension, application, and transfer of knowledge and learning.

(Betts, 2018)
Instruction & Instructional Design
Research Studies Related to Mind, Brain & Education Science

- International Study Neuromyths & Evidence-Based Practices AY 2017-18
  Higher Education: Instructors, Instructional Designers, Administrators-PD

- Spatial Visualization & Immersive Virtual Reality AY 2017-18
  BME, SoE, CNHP, CoMAD
  Spatial Visualization performance using newly developed IVR application
“Practice”

Spatial Visualization & Immersive Virtual Reality

- AY 2017-18
- Student Success
- Cognitive & Non-Cognitive
- GPA, Test Scores
- Mindset, GRIT, Creativity, Imposter Phenomenon, Perspectives in Engineering Education

Purdue Spatial Visualization Assessment
- 30 questions, 25 minutes
- Paper or 2D online
Immersive Virtual Reality (Spatial Visualization)
Functional Near-Infrared Spectroscopy (fNIR)
Drexel University Conquer Collaborative

Mind, Brain & Education
Practice: All course formats*
Feedback: Technology
Transfer: Purdue SVA, Real-World

*Low stakes, classwork, HW
Research Studies Related to Mind, Brain & Education Science

International Study Neuromyths & Evidence-Based Practices AY 2017-18
Higher Education: Instructors, Instructional Designers, Administrators-PD

Spatial Visualization & Immersive Virtual Reality AY 2017-18
BME, SoE, CNHP, CoMAD
Spatial Visualization performance using newly developed IVR application

Transfer of Learning AY 2017-18
SoE: EDUC 802/815
High Touch Instruction, Practice, Feedback, Transfer of Learning
EDUC 815 & EDUC 802

EDUC 802
• Discussion Boards
• Blogs
• Case Study
• Professional Learning Need
• Group Project - Future Learning

EDUC 815
• Discussion Boards
• Annotated Bibliography
• Poster Presentation
• Large Paper

Challenges:
• Limited Writing
• DB – Read, Post, Reply
• Limited Differentiation

Changes:
✓ One-on-One in Weeks 1 & 2 – Discuss “Transfer”
✓ Discussion Boards – Practice, creativity, low-stakes “Walking around classroom”
✓ Three Papers – Practice, Feedback, Real-World
✓ Reflections – Application of Choice
Practice & Feedback

• Not all students in an on-campus course participate

• “Learning” online – all students participate
One Assignment at a Time

• Discussion Boards, Transfer
• Scaffolded Papers, Real-World Transfer
• Projects, Real-World Transfer
• Feedback
EDUC 802: Discussion Board (scaffolding eFlipBook)

Communication in the digital age
How a school admin gets the message out
As a snow day unfolds...

Just to be sure, I check the web for the latest weather updates. School Messenger sends me notifications about any changes to the schedule in case there's a chance for a snow day. My phone might ring in bed!

Sometimes when the kids are out, the office staff and administrators have to report to work. Just because I'm driving, doesn't mean I'm not getting digital. XM radio, Bluetooth phone connectivity, and my Audible app make my car into a moving office.

Travel time is for technology too...

Social Media
Besides the calls and email, we also use linked social media to fill up our followers.

Once I'm at work, it's data, data, data...
With no students or staff around, it's the perfect time for some data analysis and planning. Some of the tools we use to look at student achievement are state data (benchmarking) and the PSSA Standards. Aligned System site.

Of course, I'd much rather be at home...
Where my digital footprint extends far beyond the work day. Snow days are great for spending time with the kids, either playing outside, or sometimes inside, on the X box, or web surfing. It's also a great time to catch up on some coursework, and post a few blog entries or discussion board responses.

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**MY DIGITAL DAY**
EDUC 802: JANUARY 25, 2016

**STARTING MY DAY**
Before work, I check my calendar and our substitute system on my phone.

**OFF TO WORK**

**ALWAYS AVAILABLE**
Whether using my phone, walkie talkie, or laptop, I am constantly connected with others throughout my day.

**WHAT WOULD I DO WITHOUT IT?**
At school, I rely on my laptop to access Google Docs, Blackboard, Skyward, and other programs.

**TIME TOGETHER**
In the evening, we use our wireless speaker to listen to the news or music while making dinner.

**TIME FOR ME**
I do yoga using the website doyogawithme.com. I usually stream it on my iPad.

**TIME TO UNWIND**
I am often online in the evening, doing banking or browsing for something to buy from Amazon. I also access BlackBoard and check emails.

**WORKING FROM HOME**
Time to logoff and gear up for another day!

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* I created this in Pictochart. It was easy to use and has additional options for purchase. Keyboard shortcuts, such as cut and paste, were able to be used in this application, and the guidelines and grid were helpful in aligning the text boxes and objects.
EDUC 802: Discussion Board (scaffolding eFlipBook)

Concept Map: Learning Theories

Maslow’s Hierarchy of Need
- View of Knowledge: Individuals gain motivation as they climb the pyramid of need.
- View of Learning: Individuals must have their needs met at the bottom in order to reach the top.

Social Learning Theory
- View of Knowledge: Individuals demonstrate behaviors that they observe.
- View of Learning: Individuals learn new behaviors from watching others. People exhibit specific behaviors based on what others gain or avoid by performing the same behaviors.
- Instruction: Individuals develop meaning during instruction when ideas/expectations are modeled.

Multiple Intelligences
- View of Learning: Individuals access information differently through different learning

Constructivism
- View of Knowledge: Individuals gain knowledge through experience and reflection.
- View of Learning: Individuals interpret and learn from experiences. After reflection, individuals test their new knowledge in the world around them. Then they decide to use the same strategies or change based on outcomes.
- Instruction: Students benefit from being actively engaged in experiences. Ex: Hands on experience, role play, internships, debate

Learning Theories

Instruction: In order for individuals to make adequate progress their needs must be met starting at a physiological level.

- Bandura
- View of Knowledge: Individuals gain motivation as they climb the pyramid of need.

Theorists
- Dewey
- Piaget
- Bruner
- Vygotsky
**Concept Map: Learning Theories**

**Associative Learning Theory**
(Beetham & Sharpe, 2013, Appendix 1)
Theorists: Skinner and Gagné

- Learners build knowledge in step-by-step ways
  - While knowledge can be represented internally, learners must show observable evidence of their knowledge in external media.

**Constructive (Individual) Learning Theory**
(Beetham & Sharpe, 2013, Appendix 1)
Theorists: Biggs, Piaget, Papert, and Kolb

- Learners build knowledge by active discovery
  - Understanding how a learner internalizes knowledge and skills is central to this theory.
  - Kolb’s Cycle, below, illustrates this process.

**Constructive (Social) Learning Theory**
(Beetham & Sharpe, 2013, Appendix 1)
Theorists: Laurillard, Pask, and Vygotsky

- Learners build knowledge by dialoguing and collaborating
  - How learners engage with their social environment is foundational to how learners assimilate new knowledge.
  - Vygotsky’s Zone of Proximal Development (ZPD), below, illustrates what learners can do without and with help. The people in the learners’ social environment are critical to learning.

**Situative Learning Theory**
(Beetham & Sharpe, 2013, Appendix 1)
Theorists: Lave & Wenger; Cole, Engstrom, & Wertsch

- Learners build knowledge by developing practice in a given community
  - Knowledge is related to a particular and specific community.

**Self-Determination/Maslow’s Hierarchy of Needs**
Theorist: Maslow

- Learners build knowledge by progressing sequentially from one level of pyramid to the next
  - Learners need to identify where they are in the hierarchy for knowledge to cement and assimilate. Burleson & Thoron (2014) present Maslow’s Hierarchy of Needs in the figure below.

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**Learn through Operant Conditioning**
- Individuals learn by association
  - Basic stimulus-response (S-R)
  - Learning is reinforced by anything that strengthens desired response
  - Need routines of organized activity

**Learn through Actively Exploring**
- Individuals learn by actively exploring, feedback sharing, and making conclusions based on their experiences
  - Learners integrate new concepts/skills into their existing schema & frameworks
  - Learners apply knowledge to new situations and environments

**Learn through Discussing & Collaborating**
- Individuals learn by engaging with peers and teachers present in their environment
  - Through collaboration, learners develop a specific skill

**Learn if and when basic needs are met**
- Learners can attempt to understand a new concept, but if they are preoccupied with other needs that are more immediate to them, learning and assimilation of knowledge will not occur
  - Learners have different motivations at every level of the hierarchy.
Performing in American Sign Language has the power to tell a story in more dimensions than spoken language.

TAMI SANTIPRANONG

Nicole Lynn Malinoski
Ed. D Leadership and Management – Drexel University
E-Portfolio Book
EDUC 802 – Summer 2017

Links to include with:
- Reviews
- Resumes
- Cover Letters
EDUC 815: Discussion Board (scaffolding paper)

EDUC 815: Concept Map
Literature Streams
EDUC 815: Group Work & Assignment (scaffolding paper)

Research Topic Description

Researchers and Human Resource Managers have acknowledged the need to learn and understand the values of the Millennial employee. The Millennial generation is defined as those born between 1979 to 1994 (Chaudhur and Ghosh, 2012). The workplace is changing greatly due to the presence of the Millennial and many of the Baby Boomers in or close to retirement. Research shows that comparing the Millennial worker to other generations in the workplace, they have very different values and expect more from their employers. Although the Millennial generation is quite unique, employers must acknowledge the difference within this group. Today, many women still face hitting a “glass ceiling” in their careers which affects women from all generations. While graduation rates for women of color have increased significantly, they still face many roadblocks in striving for career advancement when compared to their male counterparts. The literature review will examine the relationship between Millennials and employers in the workplace.

Self-Introduction and Overview of Research

http://vocaro.com/s/0qE0Pb17v

Definition of Terms

Millenial persons born between 1979 and 1994
Wage and Gender Gap a statistical indicator often used as an index of the status of women’s earnings relative to men’s
Women of Color women not of European descent
Professional Development a wide variety of specialized training, formal education, or advanced professional learning intended to help administrators, teachers, and other educators improve their professional knowledge, competencies, skills, and effectiveness.

Mentoring to advise or train someone
Reverse Mentoring an inverted type of mentoring relationship whereby new junior employees are paired up with more experienced managers or employees to help the experienced worker acquire new learning

Future Vision for This Research

http://vocaro.com/s/DeNMfNHRK

Empowering women isn’t just the right thing to do - it’s the smart thing to do.
— Barack Obama

Overview of Literature

http://vocaro.com/s/1f9Fm29N

Purpose of Research

The purpose of this research is to define the role of leadership and how that impacts Woman of Color in advancing to mid-level and senior-level positions within organizations. Identifying what barriers hold Woman of Color back from advancing in the workplace and how Human Resource Management departments can create programs that can develop and retain this population in the workplace.

Research Questions

1. What role does professional development opportunities such as mentoring programs and leadership training programs, have on career advancement for Millenial Women of Color?
2. What does self-advancement look like for Woman of Color in the workplace?

Next Steps/Future Direction of Research

http://vocaro.com/s/1f9Fm29N

Gaps in the Literature

There are many studies that cover Millennials and their challenges in transitioning to the workplace. The current research on Millennials study the personal and professional values of the Millennial worker as well as the how the Millennial generation compares to other generations such as Baby Boomers, or Generation Xers. There is little research done on...
Reflections: Metacognition & Practice

"Check out this Gami!"
Types of Feedback

Text

Voice &

Video Comments
Research Studies Related to Mind, Brain & Education Science

- **International Study Neuromyths & Evidence-Based Practices**
  - **AY 2017-18**
  - Higher Education: Instructors, Instructional Designers, Administrators-PD

- **Spatial Visualization & Immersive Virtual Reality**
  - **AY 2017-18**
  - BME, SoE, CNHP, CoMAD
  - Spatial Visualization performance using newly developed IVR application

- **Transfer of Learning**
  - **AY 2017-18**
  - SoE: EDUC 802/815
  - High Touch Instruction, Practice, Feedback, Transfer of Learning

- **Longitudinal Study Cognitive & Non-Cognitive Factors**
  - **AY 2017-18/AY 2018-19**
  - SoE Student Success
  - GRIT, Mindset, Creativity, Imposter Phenomenon
School of Education
Factors: Student Success & Attrition

Cognitive Factors
• Grade Point Average
• Test Scores

Non-Cognitive Factors
• GRIT
• Mindset
• Imposter Phenomenon
• Creativity
• Learning Strategies*

*Intellectual Center of Pedagogical Innovation
Data

- 74% first time online enrollment
- 49% novice, beginner, no experience APA
- 29% not used APA in 5-10 years
- 44% highest degree 5 to 15+ years ago
- 63% Moderate/High Anxiety

Writing a Research Paper

Mind, Brain & Education

Practice: APA Activities, Quizzes
Online skills in BB
Feedback: Technology, Badges*
Transfer: Courses, Thesis/Dissertation
Real-World

*Prior to/early enrollment
APA Course: Digital Badges

Early Awareness, Practice & Feedback

May-September 2018
255 current students
35 new admits enrolled

Writing in the APA Style Learning Pathway

01 Learners will complete the APA Overview module learning the basics of APA structure and formatting as part of the APA Mini-MOOC course.

02 Learners will identify and evaluate proper APA sources and demonstrate competencies in using online databases and search tools.

03 Learners will identify and evaluate proper APA sources and demonstrate competencies in using online databases and search tools.

04 Learners will complete the APA Overview module learning the basics of APA structure and formatting as part of the APA Mini-MOOC course.

05 Learners will delineate the difference between paraphrasing and direct quoting and their proper uses in scholarly writing.

06 Learners will be able to demonstrate the different methods for citing sources, along with the proper formats for in text citations.

07 Learners will demonstrate the proper use of voice in scholarly writing and how to identify bias.

As the culminating badge, learners have demonstrated the proficiency in applying APA properly.
**APA Course**

- Fully online, free, open access
- Create APA paper template

<table>
<thead>
<tr>
<th>Structure</th>
<th>Content</th>
<th>Assessment &amp; Badges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 1: APA Basics</td>
<td>• Readings</td>
<td>• Pre-assessment</td>
</tr>
<tr>
<td>Module 2: APA Evaluation</td>
<td>• Lecture</td>
<td>• 8 Quizzes</td>
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<td>Module 3: Plagiarism Identification</td>
<td>• Materials</td>
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<tr>
<td>Module 4: Reference List Development</td>
<td>• Activities</td>
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<td>Module 5: Paraphrasing &amp; Direct Quoting</td>
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<td>Module 6: Text Citation</td>
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<td>Module 7: Scholarly Voice &amp; Avoiding Bias</td>
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<td>Module 8: APA Scholarly Application</td>
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Your “Practice” & Transfer of Learning
Drexel University

CONQUER Collaborative
Drexel University
School of Biomedical Engineering, Science and Health Systems

ACE-Adolescent Comprehension Evaluation Evaluation
School of Education, BME

Center for Neuro-Business
Drexel University
LeBow College

College of Arts & Sciences
Drexel University
TRY NEW TECH

techlend @ Drexel is the best way to play & pilot with new gear.

Microsoft HoloLens
Form 2 3D Printer
GoPro Hero 4
Muse Brain Sensing Headband

Anova Precision Cooker
Lytro Camera
Livescribe Smart Pens
Spro Smart Projector

Leap Motion
Withings - Smarth Body Analyzer
Structure - 3D Scanner for iPad
Think Labs One Digital Stethoscope

Drexel Library &
Drexel University Online

Resource
Virtually Inspired
Showcasing Innovations in Online Learning

First State Online University, Colorado State University Global Campus
General - Innovation Approaches

Artificial Intelligence in Education
Artificial Intelligence

AVR Made Simple at Oral Roberts University
Augmented Reality - Virtual Reality

The Online Classroom of the Future
Exploration of the digital ecosystem with an in-depth focus on the virtual learning environment of the future.

Susan C. Aldridge, Ph.D.
Marci Powell
Take Home Quiz: Correct, Incorrect or Don’t Know-DK

1. Listening to classical music increases reasoning ability. ____
2. Some of us are “left-brained” and some are “right-brained” due to hemispheric dominance and this helps explain differences in how we learn. ____
3. Individuals learn better when they receive information in their preferred learning styles (e.g., auditory, visual, kinesthetic). ____
4. We only use 10% of our brain. ____
5. There are critical periods in human development after which certain skills can no longer be learned. ____
6. Rereading course materials is an effective strategy for learning. ______
7. Human memory works much like a digital recording device or video camera in that it accurately records the events we have experienced. _____
8. Frequent, low stakes tests do not enhance learning. ______
9. Learning should be spaced out over time. ______
10. Repeated practice and rehearsal of learned material or a skill will help to consolidate it in long-term memory. ______
Homework

Slide 12: Debunking Neuromyths, p. 30

Slide 15: Scans Show People Have a Brain 'Fingerprint,' Researchers Say
https://www.nbcnews.com/better/wellness/scans-show-people-have-brain-fingerprint-n442966

Slide 17: Dr. Lara Boyd | TEDxVancouver, After Watching This, Your Brain Will Not be the Same
Brain Behavior Laboratory, The University of British Columbia
https://www.youtube.com/watch?v=LNHBMFCzznE&feature=youtu.be&t=1m33s

Slide 25: Metacognition, Vanderbilt University
https://cft.vanderbilt.edu/guides-sub-pages/metacognition

Slide 28: How to Practice Effectively, NPR Article
https://www.npr.org/sections/deceptivecadence/2017/03/06/518777865/the-most-practical-tips-for-practicing-according-to-science
How to Practice Effectively, NPR Video: https://www.youtube.com/watch?v=f2O6mQkFiiw

Slide 39: Gagne’s 9 Events of Instruction
http://citt.ufl.edu/tools/gagnes-9-events-of-instruction/


Slides 54 & 55: Virtually Inspired: [https://virtuallyinspired.org/](https://virtuallyinspired.org/)
Tech Lending: [https://libguides.library.drexel.edu/techlending](https://libguides.library.drexel.edu/techlending)
Contacts

Virtual Reality:
Nick Jushchyshyn, Program Director, Animation, Visual Effects & Immersive Media, College of Media & Arts Design
PH: 215.895.2401, Email: nickj@drexel.edu
Office: URBN Ctr, 240

CONQUER Lab:
Dr. Kurtulus Izzetoglu, Associate Research Professor
School of Biomedical Engineering, Science & Health Systems
Email: ki25@drexel.edu. PH: 215.895.1579
Office: Monell 131

Dr. Patricia “Trish” Shewokis, Professor
College of Nursing & Health Professions and School of Biomedical Engineering, Science and Health Systems
PH: 267.359.5827. Email: shewokis@drexel.edu
Office: Three Parkway, 1601 Cherry Street, Room 382

Neuroscience & Learning:
Dr. Elisabeth Bockstaele
Dean of the Graduate School of Biomedical Sciences and Professional Studies & Interim Vice Provost of Graduate Education
Email: ejv28@drexel.edu

Center for Neuro-Business, LeBow College:
Dr. Rajneesh Suri
Vice Dean for Research and Strategic Partnerships
Email: surir@drexel.edu PH: 215.895.6980

Virtually Inspired & Drexel University Online:
Dr. Susan Aldridge
Senior Vice President for Online Learning and President of Drexel University Online
Email: sca39@drexel.edu
“Educators are brain changers.”

~ Glenn Whitman & Ian Kelleher, *Neuro Teach*, 2016
Thank you!