Barriers to Achievement and Life-long Learning: the Impostor Phenomenon, Self-efficacy, and Anxiety

Sujata Ives, PhD
MAACCE Conference
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GOALS

- Understand the impostor phenomenon, self-efficacy, and anxiety as barriers.
- Understand the learning brain and demonstrate effective strategies to:
  - Decrease Impostor Phenomenon feelings
  - Increase self-efficacy feelings
  - Decrease anxiety feelings
The Impostor Phenomenon

- Pauline Rose Clance and Suzanne Imes (1978) discovered a dispositional barrier to achievement.
  - Attribution of success to external factors
  - Inability to internalize success
The Impostor Phenomenon (IP)

• The Impostor Phenomenon refers to someone who experiences feelings of self-doubt that become a barrier to achievement and life-long learning.

• The individual believes something about him/herself, that prevents him/her from achieving.
"Impostor"

- The word "impostor", here, does not refer to a person who intentionally deceives others.
The Impostor Phenomenon

1. They dismiss evidence of success.
2. They do not believe they are as capable as others think they are, therefore believe they are fraudulent, because they believe they have fooled others.
3. They attribute success to external factors such as luck, charm, wit, personality, good looks, right timing.
Barriers

- Imposter Phenomenon (and relationship to...)
- Self-efficacy
- Anxiety
The Impostor Phenomenon

- IP hinders the learning process by keeping students from being *active* participants in the learning process.
- Students are reluctant to ask questions, participate in class discussions, and pursue educational goals.
- High IP feelings are a barrier to learning.
Students tend to score higher on the IP Test than any other group.

~Dr. Pauline Rose Clance~
The Impostor Phenomenon is not:

- A DSM IV diagnosis. It is not a disorder or disease.
- A life-time experience.
- Experienced in the same manner by each individual.
IP is affected by self-efficacy

- Self-efficacy is one’s own belief regarding one’s ability to succeed in specific situations.
IP is affected by Anxiety

• Anxiety is an irrational or excessive fear regarding an external stimulus or situation.
• Academic anxiety is a main factor in student adjustment and retention.
• Anxiety affects persistence and drive necessary for achievement.
Anxiety

- Anxiety floods the body with **adrenaline** and creates a “fight or flight” response.
- Anxiety interferes with memory; learning suffers.
Anxiety results in...

- Lower comprehension
- Lower performance
- Lower self-confidence
- Lower cognition
- Lower problem-solving
- Lower task analysis
- Lower processing
- Lower task completion
Correlation studies show...

- When IP is high,
  - self-efficacy is low, anxiety is high.
- When IP is low,
  - self-efficacy is high, anxiety is low.
My Students – what stops you from achieving?

- “People are going to find out I’m not smart”.
- “I’m not that capable”.
- “I’m a good faker”.

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1. Emotions are critical in learning.
2. Learning is inhibited by emotions—high anxiety, low self-efficacy, and high IP.
3. The search for meaning occurs through pattern-seeking.
Which part of the brain holds these types of feelings?

Limbic system
Say the Color and not the word

Yellow, blue, orange, red, green, black, purple, orange, blue, red, purple, green, blue, orange

Left – Right Conflict
How can we teach in order to remove barriers?

- We need to turn to Brain-Based Learning.
- Using neuroscience to connect and excite students’ desire to learn.
Judy Willis, "IGNITE": 2006

Linking neuroscience and instruction

“Because advances in technology enables us to view the working brain as it learns, educators can now find evidence-based studies to determine the most effective ways to teach”.

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Brain Research:

- Validates what experienced educators have long known and *intuitively* used in their classrooms.

- Shows why certain strategies work so educators can explain the rationale for what is done in the classroom, without using intuition alone.

- Must be used as a foundation for what is done in classrooms.
Educators and others who are making decisions in the field of education need to...

1. Consider neuroscience in their decision-making.
2. Consider research findings in curriculum development.
3. Incorporate strategies that complement brain research.
A stimulus to the brain starts the learning process.

The stimulus is sorted and processed at several levels.

Results in formation of memory.
  - How important is memory? Without memory there is no learning.

*Learning something new – lights up the brain scan.*

Once a task is learned, the brain lights up less.
Scott Grafton, M.D. - Dept. of Neurology and Dept. of Radiology - University of Southern California
John Mazziotta, M.D., Ph.D. - Dept. of Molecular and Medical Pharmacology and Dept. of Neurology - UCLA School of Medicine
Brain Development

Until puberty, neurons increase their connections. At adolescence, selective pruning of the neurons begins. Unused neuronal connections are lost to make other pathways more efficient.
The Neuron

A nerve cell, or a neuron, consists of many different parts.

- **Dendrites** (receive messages from other cells)
- **Terminal branches of axon** (form junctions with other cells)
- **Axon** (passes messages away from the cell body to other neurons, muscles, or glands)
- **Myelin sheath** (covers the axon of some neurons and helps speed neural impulses)
- **Cell body** (the cell’s life-support center)
- **Neural impulse** (action potential) (electrical signal traveling down the axon)
Synapse

Synapse: a junction between the axon tip of the sending neuron and the dendrite or cell body of the receiving neuron. This tiny gap is called the synaptic gap or cleft.

1. Electrical impulses (action potentials) travel from one neuron to another across a tiny junction known as a synapse.
Some neurotransmitters (chemicals) and their function

<table>
<thead>
<tr>
<th>Neurotransmitter</th>
<th>Function</th>
<th>Examples of Malfunctions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetylcholine (ACh)</td>
<td>Enables muscle action, learning, and memory.</td>
<td>With Alzheimer’s disease, ACh-producing neurons deteriorate.</td>
</tr>
<tr>
<td>Dopamine</td>
<td>Influences movement, learning, attention, and emotion.</td>
<td>Excess dopamine receptor activity linked to schizophrenia. Starved of dopamine, the brain produces the tremors and decreased mobility of Parkinson’s disease.</td>
</tr>
<tr>
<td>Serotonin</td>
<td>Affects mood, hunger, sleep, and arousal.</td>
<td>Undersupply linked to depression; Prozac and some other antidepressant drugs raise serotonin levels.</td>
</tr>
</tbody>
</table>
Hearing

Scott Grafton, M.D. - Dept. of Neurology and Dept. of Radiology - University of Southern California
John Mazziotta, M.D., Ph.D. - Dept. of Molecular and Medical Pharmacology and Dept. of Neurology - UCLA School of Medicine
Thinking task

Scott Grafton, M.D. - Dept. of Neurology and Dept. of Radiology - University of Southern California
John Mazziotta, M.D., Ph.D. - Dept. of Molecular and Medical Pharmacology and Dept. of Neurology - UCLA School of Medicine
Recall

Scott Grafton, M.D. - Dept. of Neurology and Dept. of Radiology - University of Southern California

John Mazziotta, M.D., Ph.D. - Dept. of Molecular and Medical Pharmacology and Dept. of Neurology - UCLA School of Medicine
Where are feelings and emotions?

- The Limbic System
The Limbic System Emotional Center

- **Amygdala** controls major affective activities like friendship, love and affection, moods, fears, rage, aggression.

- **Hippocampus** - memory, specially with the formation of long-term memory.

- **Hypothalamus** - expression of emotions

- **Brain Stem** - emotional reflex reactions
Hippocampus

Hippocampus – a neural center in the limbic system that processes explicit memories.
When individuals experience high emotions (i.e. high anxiety, high IP)

- The **Amygdala** becomes *over activated* and prevents new information from passing through to memory circuits.
- Information must get through the **Amygdala** to get to the **Hippocampus** so it can be sent to memory storage and reasoning parts of the brain.
1. Attention
2. Move students to higher regions of the brain
3. Understand the cerebellum
4. Neuroplasticity
ATTENTION

In order for learning to begin, you must capture attention.
The best ways to get attention is through:

Novelty
Humor
Surprise

Capturing attention gives students a reprieve and diverts from experiencing anxious feelings.
Even if students understand what is being taught and they complete their assignments, if the information is not *relevant* and does not *connect* to their past experiences it is unlikely it will be sent to *long-term storage* for *recall*. 
To Make Information Meaningful We Must..

- Use past experiences to link new information
  OR
- Create a new experience with them
“IP, self-efficacy, anxiety, and learning are linked”

<table>
<thead>
<tr>
<th>Emotions can be managed in two distinct ways:</th>
<th>Emotions and feelings drive attention, create meaning, and have their own memory pathways.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional climate of classroom.</td>
<td></td>
</tr>
<tr>
<td>Emotions associated with the learning content.</td>
<td></td>
</tr>
</tbody>
</table>
Second: we have to move students to higher regions of the brain on a daily basis.
Higher levels of Thinking

There is a difference between **complexity** and **difficulty**.

**Complexity**...is the thought processes the brain uses to manage information.

**Difficulty**...is the amount of effort the learner must expend within a level of complexity.
Hierarchy

*Complex* information broken down into broad concepts and further subdivided into categories and subcategories.
Bloom’s Taxonomy

Levels of Bloom’s Revised Taxonomy

**Creating**: Can the student create new product or point of view?

**Evaluating**: Can the student justify a stand or decision?

**Analysing**: Can the student distinguish between the different parts?

**Applying**: Can the student apply information to their situation?

**Understanding**: Can the student explain ideas or concepts?

**Remembering**: Can the student recall or remember the information?
Higher Order Thinking Increases Understanding and Retention

“David Sousa; How the Brain Learns: 2006”

Our ability to learn, remember, and recall is dependent largely on the number of connections between neurons. PET scans show that elaborative rehearsal, involving higher-order thinking skills, engages the brain’s frontal lobe.

This helps ALL learners make connections between past and new learning, create new pathways, strengthen existing pathways, and increase the likelihood that the new learning will be stored for future retrieval.
The Brain is “Pattern Seeking”

The brain seeks to make order out of chaos.

- Gestalt psych
- Critical thinking patterns
- Dialectical thinking patterns
The Brain Needs Time

Give time to complete tasks!
The Cerebellum

Third: is to understand the power behind the cerebellum.
Cerebellum

- The “little brain” attached to the rear of the brainstem.
- It helps coordinate voluntary movements and balance.
- Implicit (procedural) memory.
Cerebellum

- Cerebellum, contains more neurons than all of the rest of the brain put together.
  - Movement
  - Memory of automatic movements such as tying shoes, typing.
  - Rehearsal
The brain can only do one thing at a time!

The mind can only pay conscious attention to one thought at a time.

You can only do two things at once if one of them is automatic.
Implications for Learners

- Comprehension
- Recall of information
- Removal of barriers

If a student is not attending to the task of learning then no learning is taking place.

If the teacher is not making an effort to remove barriers to learning, then no learning is taking place.
Brain Plasticity

Fourth: is Neuroplasticity
Brain Plasticity

“Neuroplasticity is simply the ability of the brain to change as a result of daily learning.”  David Sousa

The brain is sculpted by genes and experiences. Plasticity is the brain’s ability to modify itself after injury, illness, or trauma.
Brain plasticity is good news for our students

- Experiences give the brain a chance to make new connections!
Our students

- High anxiety: “I’m so scared”. “I’m not like everyone else”.
- Low self-efficacy: “I don’t know if I can do it”.
- High IP feelings: “I fooled you”. “It’s because you’re nice that I got a good grade”.

Dr. Ives
Types of Memory - affected by emotions

MEMORY

SHORT TERM MEMORY
  Working Memory

LONG TERM MEMORY

DECLARATIVE MEMORY
  (consciously processes facts and events)

PROCEDURAL MEMORY
  (Unconscious processing of skills; motor (riding a bike) and cognitive (reading))

EPISODIC MEMORY
  (Knowledge of events in personal history to which we have conscious access; No control)

SEMANTIC MEMORY
  (store intentionally learned information Generally complete control)
Methods that increase retention

Retention varies with teaching method

Learning Pyramid

- **Lecture**: 5%
- **Reading**: 10%
- **Audio-Visual**: 20%
- **Demonstration**: 30%
- **Discussion Group**: 50%
- **Practice by Doing**: 75%
- **Teach Others / Immediate Use**: 90%

National Training Laboratories
Bethel, Maine
Rehearsal

Elaborative Rehearsal:

- More complex thinking
- Used when it is important to associate the new learning with prior learning to detect relationships
- Reprocesses information several times to make connections to previous learning
- Assign meaning
The goal of learning is not just to acquire knowledge, but to be able to use that knowledge in a variety of different settings.
Primacy-Recency Effect

During a learning episode, we remember best that which comes first, second best that which comes last, and least that which is in the middle.

There are 3 limits to our power of reasoning and thinking:

- limited attention span
- working memory
- long term memory
Chunking

**CHUNKING** is an effective way of enlarging working memories capacity and for helping the learner make associations that establish meaning.

Acronyms are another way of chunking information to remember it.

**HOMES** = Huron, Ontario, Michigan, Erie, Superior

**ROY G. BIV** = Red, Orange, Yellow, Green, Blue, Indigo, Violet


FBI TWA CIA IBM

4 chunks
Any activity through which the brain *recalls* a concept, skill, or process. *Reflection* activities prompt the brain to re-stimulate the new connections among neurons, which helps strengthen them.

*(Recognition is easier than recall).*
“Nothing entertains the brain more than the study of the human brain.”

Kathie F. Nunley
Plasticity of Learning and Memory

- The brain never stops changing and adjusting.
- Memory is the process by which knowledge is retained over time.
Self-efficacy on Memory

- Human memory is an active constructive process in which information is semantically intricate, altered, and restructured into meaning memory.
- The self-belief of efficacy can augment or impair performance through effects on cognition and motivation.
- Bandura: self-efficacy affects thinking and psychological processes.
- People who believe strongly in their capabilities remain highly efficient in their thinking patterns. Those who are overwhelmed by IP and self-doubt are inconsistent in their thinking.
LEARNING

- The capacity of the brain to *change* with learning is *plasticity*.
- So how does the brain change with learning?
- According to Durbach (2000), there appears to be at least two types of modifications that occur in the brain with learning:

  1. A change in the internal structure of the neurons, the most notable being in the area of synapses.
  2. An increase in the number of synapses (more dendrites) between neurons.
Dendrites

Our goal is to grow dendrites!

Growing dendrites (size and numbers) physically increases the weight of the brain.

New growth forms on neurons that are frequently used.

Introducing and reviewing information creates more dendrite pathways and synaptic connections.

The more they are used the stronger they become.

The more complex the skills required in occupations, the more dendrites are found on neurons.
Into Adulthood...

- The brain continuously remodels itself---even into adulthood.
- Synaptic growth continues to be formed in the brain.
- Lifelong enrichment experiences are important for continued dendrite growth and healthy functioning brains.
Adult Learners – Overcoming Barriers

- Adults have something tangible to lose in a classroom: self-esteem is on the line as they try new behaviors in front of peers. Poor experiences and negative feelings can leave a void.

- Balance new material, debate, discussion, sharing, protect minority opinion, keep disagreements civil.
Remember

1. The Impostor Phenomenon, self-efficacy, and anxiety feelings are connected to the Limbic System.
2. Decrease IP feelings by linking positive emotions to learning.
3. Reduce anxiety by understanding how the brain works and implement effective strategies.
4. High IP, high anxiety, and low self-efficacy can minimize the brain’s capabilities.
Responsibility

• Educators have a responsibility to:
  • Alleviate dispositional barriers.

• Policy makers have a responsibility to:
  • Utilize the principles of neuroscience in decision-making.
  • Properly sequence curriculum
  • Create relevant curriculum
Vygotsky said:

“All reality is a construction in the imagination of the individual”.
Maslow’s Hierarchy of Needs

Meet your students’ needs!

- **Self-actualization**
  - morality, creativity, spontaneity, acceptance, experience purpose, meaning and inner potential

- **Self-esteem**
  - confidence, achievement, respect of others, the need to be a unique individual

- **Love and belonging**
  - friendship, family, intimacy, sense of connection

- **Safety and security**
  - health, employment, property, family and social stability

- **Physiological needs**
  - breathing, food, water, shelter, clothing, sleep
Dr. Fisk, may I be excused? My brain is full.
References

- Clance and Imes, The Impostor Phenomenon
- Ives, S. (2011), The impact of an online orientation program on the impostor phenomenon, self-efficacy, and anxiety, Walden University

http://www4.insinc.com/interactiveinnovations2007/davidsousa/player.html DAVID SOUSA

- Smart Girls (Revised Edition), A New Psychology of Girls, Women, and Giftedness Barbara A. Kerr, PHD
- Smart Girls Two, A New Psychology of Girls, Women, and Giftedness Barbara A. Kerr, PHD
- Nurturing the Gifted Female, A Guide for Educators and Parents, Joy L. Navan
- Work Left Undone: Choices and Compromises of Talented Women by Sally M. Reis
  ~ Kathie Nunley
  ~ Donna Anderson
  ~ Tammy Reynolds
Letha Barnes, Director of the Career Institute
http://emarkeeting.delmarlearning.com/milady/whats_the_buzz_fall05.html
National Institute for Staff and Organizational Development, community college leadership program, department of educational administration, college of education, the university of Texas at Austin.
Evaluation Questions for Dr. Ives Presentation

Use:
- 5 Strongly agree
- 4 Agree
- 3 Disagree
- 2 Strongly disagree
- 1 Don’t know

1. I attended the session because I knew a little about the subject.
2. I attended the session because I wanted to know more about the subject.
3. I found the presentation of material easy to understand.
4. The session increased my knowledge on the subject presented.
5. I will be able to use some of the information from this session in the future.
6. The presenter was prepared for this session.
7. This presentation should be repeated in future.