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# **Project-Based Learning: What's In It for Me?**

## ***Exploring the What, Why & How of PBL***

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**Session 7: May 1, 2013**

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### **Welcome and Introductions**

Our Own PBL Process and Highlights to Date

Goals for Today

Video Clip(s)—These will be used through the day.

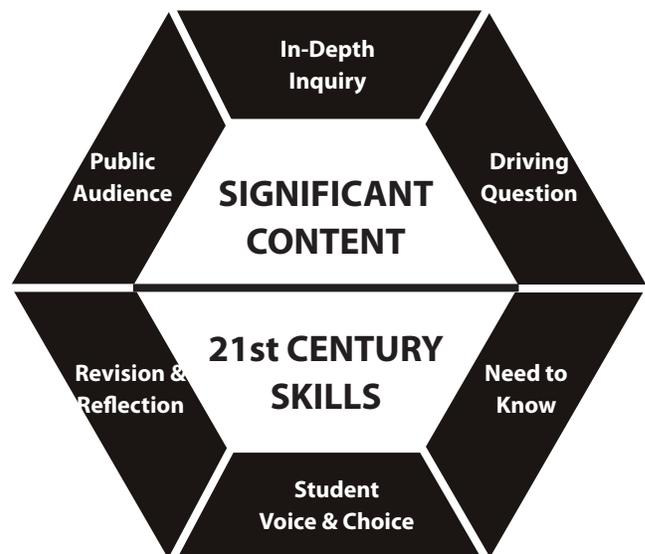
### **Project Sharing/Presentations**

### **Jigsaw Activity—Reflections on PBL Articles**

### **"Why Does This Stuff Work?"—PBL and Brain Research**

### **Next Steps—Envisioning the Future and Making It Happen**

### **Closure and Evaluation**







**TOP 10 WAYS  
SERVICE-LEARNING IS CONNECTED TO  
HOW OUR BRAINS WORK!!**

# TOP 10 WAYS SERVICE-LEARNING IS CONNECTED TO HOW OUR BRAINS WORK!!

## 10. Research indicates that students involved in service-learning are *less likely to use drugs or alcohol*.

- When thinking about the effect of alcohol on an adolescent brain, think of rain on a fully constructed house versus rain on an addition under construction. Alcohol use during adolescence causes severe damage because the brain is still under construction.
- Heavy alcohol use interferes with the encoding of new memories. Alcohol interferes with the glutamate neurotransmitter. Glutamate aids the neurons in storing new memories and in learning. In the adolescent brain if glutamate effectiveness drops even a little bit, it can have a very negative effect. The negative effects persist into the early twenties.
- Any adolescent who is a heavy drinker has a smaller hippocampus, the structure that records new memories. Adolescents who drink a lot of alcohol end up having more memory and learning impairment than adults who drink the same amount because their brains are more susceptible to damage.
- The earlier a youngster starts to drink the higher probability that he will have alcohol problems or alcoholism as an adult. Drinking while the brain is developing encourages the brain to decide that it needs alcohol. Adults would have to drink more heavily to be as likely to write a tendency for alcohol use into their mature brains.
- Adolescents are oversensitive to the damage and undersensitive to the warning signs of too much alcohol. The sedation effects of alcohol are not as pronounced in the adolescent brain. The impairment of motor coordination is also delayed. That means that adolescents don't experience the 2 major warning signals that go off in the adult brain—sedation, or tiredness, and motor problems, like slurring words or stumbling.



- It takes an adolescent drinker a lot more alcohol before these problems take effect. By then they can be dangerously drunk. It is most often adolescents we hear about who die of alcohol poisoning, not adults.

## 9. Research shows that students involved in service-learning are *less likely to use tobacco products*.

- Nicotine influences almost 2 dozen neurotransmitters. Neurotransmitters help the cells connect to one another and carry impulses from one brain cell to another and can affect our moods.
- Nicotine increases the receptors for itself in key brain areas so the brain adapts to the presence of nicotine and reacts negatively when it is absent, resulting in a craving and withdrawal.
- Nicotine increases the production of dopamine. Smokers really do feel good when they have a cigarette and feel down when they don't.
- Nicotine affects the adolescent brain differently than it affects an adult's. Tobacco company research showed that if a young person got to the age of 18 without lighting up, the odds were 5 to 1 that he or she would never use tobacco.
- Because of the different chemical/hormonal make up of the brain, nicotine affects the adolescent brain differently than an adult's. They are more likely to get addicted and will get addicted more quickly.

## 8. Service-learning projects involve student *choice*, and *choice changes the chemistry of the brain, as does working toward a desired goal*.

- When learners choose a task, their stress for performing that task is lower. They feel more positive about the task, look forward to participating, and this positive thinking triggers a release of brain chemicals called *endorphins: dopamine and serotonin*.
- Dopamine is the *feel-good hormone*.
  - Humans are attracted to things that increase levels of dopamine.
  - Drugs and alcohol increase the levels of dopamine in our brains, which is why we crave them—and that is also why illegal drugs are called *dope*!
- Serotonin is the *mood stabilizer*.
  - With proper amounts of serotonin we feel relaxed and confident

- A lack of it causes depression or aggression
- Prozac and Xanax increase our levels of serotonin
- Chocolate increases levels of dopamine and serotonin, which may explain why some people actually crave chocolate.
- In addition, when the *brain is involved in goal-setting*, the brain's attention span is narrowed to the task at hand, providing more hope of attaining the goal.
- The anticipated pleasure that comes from the hope of reaching a goal directs the brain to release more endorphins, such as the ones listed above.

## 7. Service-learning involves individual decision-making which engages the *pre-frontal cortex* and aids in its development.

- The prefrontal cortex (PFC) is the executive center of the brain. Its job is to think ahead to consequences and to control impulses that shoot out of other regions of the brain.
- The PFC is still developing in adolescents. Teens do not have impulse controls like adults.
- Because the PFC wiring is incomplete, the adolescent PFC cannot always distinguish between a good decision and a bad one, no matter how intelligent a student is.
- The pre-frontal cortex develops with increased opportunities to practice this decision-making skill.



## 6. Service-learning put students in novel situations. The brain is wired to find *novelty in events and tasks*. The brain recognizes and reallocates nerve cells to other areas and *stimulates better neuronal connections* when it is faced with a novel situation.

- The mind gravitates toward novelty and it is an essential need of the mind. Novelty means “unknown,” and the brain demands to know the unknown.
- We seek stimulation that comes from novelty, which keeps our attention and interest.
- The brain also seeks a challenge, which is the essence of natural, intrinsic motivation.

## 5. Service-learning requires students to process factual information with *greater depth of meaning*. When students process information thoughtfully, they are *learning*, which causes the growth of dendrites.

- Dendrites provide new pathways with which make more connections and new pathways to other cells.

- The more ways we learn something and in more situations, the more pathways that are created. This allows us to more easily access what was learned easier and much later on.
- In addition, we learn better when what is learned (content) is embedded in our spatial memory with a location (context).
- Context provides dozens of sensory cues that can better trigger memory and recall later on.
- For example, one can read a paragraph in a gardening book about planting OR plant some actual seeds. The more similar the context is, the more difficult the retrieval. For instance, learning all the content of a course in the same setting or classroom is similar to naming all your computer files the same name.
- Location and circumstance provide the brain more identifying clues for better retrieval.

#### 4. The *reflection* element involved in service-learning causes physiological changes to the brain.

- *Learning is acquiring* new knowledge and skills.
- *Memory is retaining* knowledge and skills for the future.
- Learning does not increase the number of brain cells, but it does increase their size, their branches, and their ability to form more complex networks.
- The brain goes through physical and chemical changes when it stores new information as a result of learning.
- Learning occurs when synapses make physical and chemical changes so that the influence of one neuron on another also changes.
- A set of neurons *learns* to fire together. Repeated firings make successive firings easier and eventually, automatic under certain conditions, thus a *memory* is formed. Reflection provides opportunities for new learning to be revisited, assisting in memory creation.

#### 3. Service-learning provides many opportunities for students to ask questions and learn the answers for themselves. The brain is *naturally curious* and is more receptive to questions than to answers.

- Curiosity is a distinct physiological state. It triggers changes in our posture, eye movements, and promotes the chemical reactions that help with better arousal, learning, and recall.
- When we ask a question of ourselves, the brain continues to process it even after we have arrived at an answer.
- To your brain, the process is far more important than the *answer*.



## **2. Service-learning provides opportunities for learning that are connected to *emotion*.**

- Events that stimulate emotion make things meaningful to the brain.
- Also meaningful to the brain are events which impact the learner's personal life.
- Research shows that feelings are critical to the learning process. Our feelings help determine:
  - if we *want* to learn something;
  - how we feel about a topic; and
  - how long we remember the information
- Learning without feelings is incomplete. Learning is not real to the brain until we *feel* it.

## **1. Service-learning experiences produce laughter among students. *Laughter* increases the flow of the brain's neurotransmitters and thus improves learning.**

- Neurotransmitters are needed for alertness and memory.
- Laughter decreases stress and improves the functioning of the immune system.

### **SOURCES FOR THIS INFORMATION: (Developed by Dr. Marjori Krebs, University of New Mexico)**

Jensen, Eric. (1997). *Brain Compatible Strategies*. San Diego, CA: The Brain Store.

Nunley, Kathie F. (2002). "Keeping Pace with Today's Quick Brains." Online Article: [www.help4teachers.com](http://www.help4teachers.com).

Sousa, David A. (2003). *The Leadership Brain: How to Lead Today's Schools More Effectively*. Thousand Oaks, CA: Corwin Press, Inc.

Walsh, David. (2004). *Why Do They Act That Way? A Survival Guide to the Adolescent Brain for You and Your Teen*. New York: Free Press.

# Reflection Guide

- What have I learned today?

- What has moved me/resonated with me?



- Where does PBL “fit” for me?
  - How does it reflect/support my personal beliefs and values?
  - How does it reflect/support my professional beliefs and values?
  - Where does it fit in the legacy I hope to create?



- Where does PBL “fit” for our school?
  - How does it reflect/support our beliefs and values?
  - Where does it fit in the legacy we hope to create?
  - How can we help our students identify and demonstrate their gifts and fascinations through PBL?
  - Which of our existing efforts might we enhance to make them fit the PBL model?
  - What new ideas/possibilities are beginning to emerge?

## Workshop Facilitators

Ellen Erlanger was a teacher and administrator for the Upper Arlington City Schools, Upper Arlington, Ohio, for 27 years and was involved in service-learning, career development, character education, vocational education, guidance, staff development and community education throughout that time. In addition to fulfilling her local program responsibilities, she provided consultation, training and technical assistance to other public and private schools on a regional, statewide and national basis. Ellen retired from the Upper Arlington City Schools in December 2002 after 30 years in the field and is now Vice President of Legacy Consulting Group and a consultant with the Legacy Group of Partnerships Make A Difference, a non-profit corporation providing training and educational materials development.

Ellen has authored a variety of instructional materials and education-related articles as well as other books, works of poetry, and newspaper and magazine articles. She is also active in relevant education organizations at the state and national levels. During her leadership, the Upper Arlington City School District achieved the rare distinction of having all three of their secondary schools selected by the Corporation for National Service as "National Service-Learning Leader Schools." Ellen holds a B.A. and M.A. from the University of Michigan.

Kathy Meyer, an educator for more than 30 years, served as an administrator for the Worthington Schools, Worthington, Ohio, from 1985 to 2000 and supervised service-learning, career development, character education, vocational education, guidance, science, and after-school and summer school programs. Under her leadership, Worthington was selected as a model school district by Learn and Serve Ohio. Kathy retired from the Worthington Schools in December 2000 and is President of Legacy Consulting Group. In addition, she is associated with the Legacy Group of Partnerships Make A Difference.

In these roles, Kathy has authored and published a variety of instructional materials and provided related training programs in many public and private schools throughout Ohio and a number of other states. She has provided expertise in a variety of other settings and is active in many professional organizations. Over the years, she served in a number of leadership positions, including President of the Ohio Career Education Association. Kathy holds a B.A. from Wittenberg University and an M.A. from Wright State University.

Dr. Marjori M. Krebs, an Assistant Professor in Teacher Education at the University of New Mexico, has been involved in service-learning firsthand as a student, teacher, administrator, and researcher. Marjori has presented numerous teacher workshops and graduate-level courses on many aspects of service-learning. She holds a BA from the University of Oklahoma, an MA from The Ohio State University, and an EdD from Bowling Green State University.

### ***For more information, contact:***

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The Legacy Group of Partnerships Make A Difference is a non-profit organization dedicated to providing educators, parents and students with the tools and inspiration to do great things. We are committed and experienced educators whose ultimate vision is to help young people develop a sense of passion and purpose and learn to apply it throughout their lives.

The Growing Together Service-Learning Network utilizes service-learning as an instructional strategy to enrich the teaching/learning process, enhance student success, improve school climate, and actively address a wide range of significant local and global needs and issues. This "community of service-learning practitioners" fosters effective partnerships among schools, community agencies/organizations, higher education partners, and philanthropic sponsors so that desired results can be achieved over time.

**Project-Based Learning Workshop**  
**Gadsden, New Mexico Schools: May 1, 2013**

**Grade Level** \_\_\_\_\_

**Please rate the following by circling the appropriate number:**

	<b>VERY HELPFUL</b>				<b>NOT HELPFUL</b>
<b>1. Workshop Content (overall)</b>					
a. Content was geared to participant needs:	4	3	2	1	○
b. Handouts were helpful and relevant:	4	3	2	1	○
c. Content is applicable to my situation:	4	3	2	1	○
Comments:					
 <b>2. Workshop Process (overall)</b>					
a. Helpful variety of methods and media:	4	3	2	1	○
b. Relevant examples and applications:	4	3	2	1	○
c. Sufficient time for questions and discussions:	4	3	2	1	○
Comments:					
 <b>3. Presenters (overall)</b>					
a. Well-prepared:	4	3	2	1	○
b. Competent:	4	3	2	1	○
c. Interesting, easy to listen to:	4	3	2	1	○
Comments:					

**Complete the following:**

What part(s) of the workshop were most helpful to you? (Be as specific as possible.)

What part(s) of the workshop could be improved? (Be as specific as possible.)

What were the two or three most important ideas/concepts you learned at this workshop that you can take home and apply to your situation?

**Name** (optional): \_\_\_\_\_ **School** (optional): \_\_\_\_\_

On behalf of Partnerships Make A Difference and Gadsden ISD, we thank you for your participation in today's workshop.