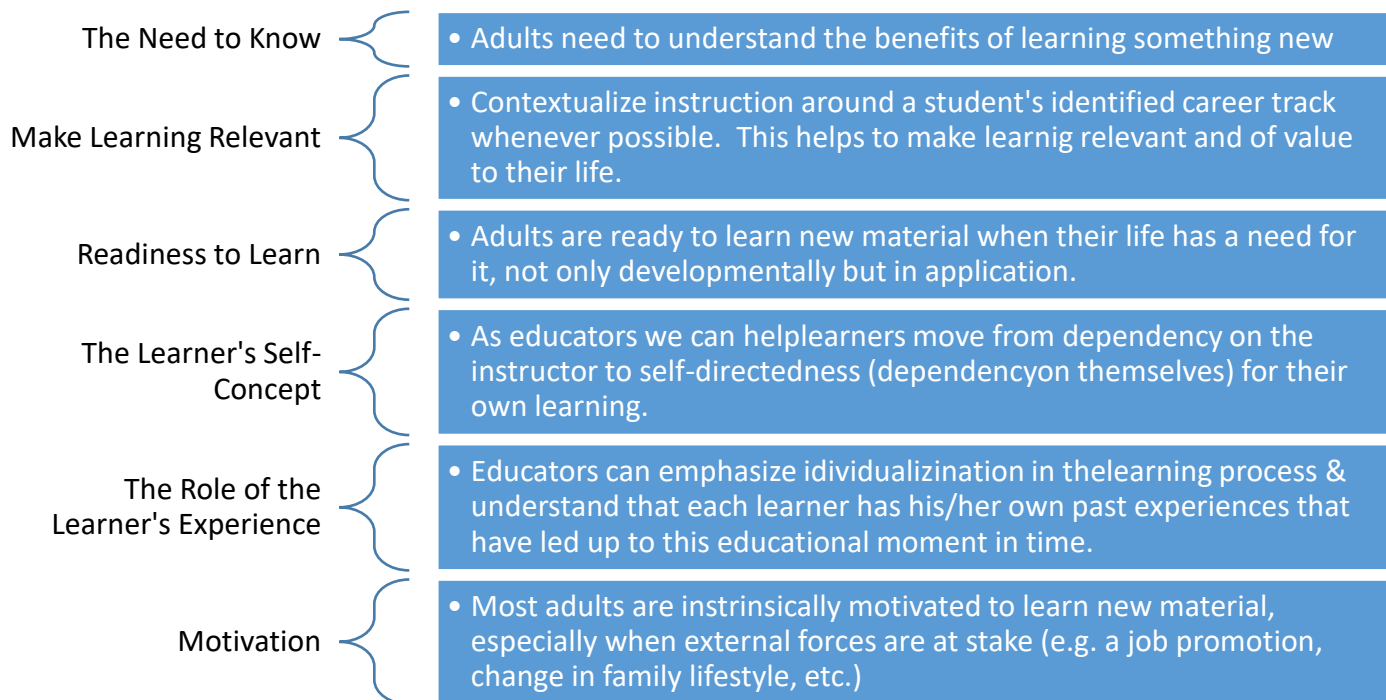**Adult Education New Teacher Training**
Module 6
Learning Theories & Strategies for Adult Education

Helping Adults Learn

As an educator and a professional, you are an adult learner and so are the adults entering your program. The material may change and the learning strategies you apply in the classroom may differ; but it is important to remember that we all bring a unique constellation of learning experiences to the table. Articles and information from the Teaching Excellence in Adult Literacy (TEAL) Project, the Align & Redesign Project, and the Teaching Skills That Matter Project, along with others will help explain the characteristics of adult learners and provide the new instructors with tips and techniques for working with adult learners. A good resource for learning about adult learners is the LINCS website: https://lincs.ed.gov/.

Aspects of an Adult Learner

The Need to Know	• Adults need to understand the benefits of learning something new
Make Learning Relevant	• Contextualize instruction around a student's identified career track whenever possible. This helps to make learnig relevant and of value to their life.
Readiness to Learn	• Adults are ready to learn new material when their life has a need for it, not only developmentally but in application.
The Learner's Self-Concept	• As educators we can helplearners move from dependency on the instructor to self-directedness (dependencyon themselves) for their own learning.
The Role of the Learner's Experience	• Educators can emphasize idividualizination in thelearning process & understand that each learner has his/her own past experiences that have led up to this educational moment in time.
Motivation	• Most adults are instrinsically motivated to learn new material, especially when external forces are at stake (e.g. a job promotion, change in family lifestyle, etc.)

Adult Learning Theories

There are many learning theories when it comes to adult learners, and each theory has unique applications and techniques associated with it. Different theories and techniques will resonate better with students based on their primary learning style. Some of the top learning theories in the adult learning space include Andragogy, Transformative Learning, Experiential Learning, and Project-Based Learning. (https://www.wgu.edu/blog/adult-learning-theories-principles2004.html)

Andragogy

Malcolm Knowles popularized the concept of andragogy in 1980. Andragogy is the "art and science of helping adults learn" and Malcolm Knowles contrasted it with pedagogy, which is the art and science of helping children learn. Knowles and the andragogy theory says that adult learners are different from children in many ways, including:

They need to know why they should learn something. They need internal motivation. They want to know how learning will help them specifically. They bring prior knowledge and experience that form a foundation for their learning. They are self-directed and want to take charge of their learning journey.

They find the most relevance from task-oriented learning that aligns with their own realities.

Andragogy learning theories focus on giving students an understanding of why they are doing something, lots of hands-on experiences, and less instruction so they can tackle things themselves. The andragogy adult learning theory isn't without criticism—some suggest that the andragogy adult learning theory doesn't take other cultures into consideration well enough. While there are pros and cons, many students find andragogy is extremely accurate and helpful as they work to continue their education and learning.

Transformative Learning

Jack Mezirow developed this learning theory in the 1970's. The transformative adult learning theory (sometimes called transformational learning) is focused on changing the way learners think about the world around them, and how they think about themselves. For example, learners studying religions of the world may gain new perspectives on their principles and thoughts about regions and cultures as they learn more about different religions. Their assumptions may change based on what they learn. Sometimes transformative learning utilizes dilemmas and situations to challenge your assumptions and principles. Learners then use critical thinking and questioning to evaluate their underlying beliefs and assumptions, and learn from what they realize about themselves in the process. Mezirow saw transformative learning as a rational process, where learners challenge and discuss to expand their understanding.

There is criticism that transformative learning doesn't account well for relationships, feelings, and cultural contexts, making learners feel unsafe or nervous to share their thoughts with teachers or other learners in an educational setting. There are ups and downs with transformative learning, and many adult learners find that working to change their underlying beliefs can be rewarding and demanding at the same time.

Self-Directed Learning

Self-directed learning is an interesting adult learning theory that has been around for hundreds of years. It became a more formal theory in the 1970's with Alan Tough and is used by teachers in a variety of educational settings to help improve adult learning. Self-directed learning (sometimes called self-direction learning) is the process where individuals take initiative in their learning—they plan, carry out, and evaluate their learning experiences without the help of others. Learners set goals, determine their educational or training needs, implement a plan, and more to enhance their own learning. Self-directed learning may happen outside the classroom or inside of it, with students working by themselves or collaborating as part of their self-directed learning process.

Criticism for this self-directed approach comes from those who say that some adult learners lack the confidence and understanding to do self-directed learning well. Critics also say that not all adults want to pursue self-directed learning. But for many adults, self-directed learning happens naturally without anyone explaining it or suggesting it. Adult learners are more prone to self-directed learning because they are often excited about their education and feel confident in their ability to take it on themselves. For many adult students, self-directed learning is a fantastic way to learn.

Experiential Learning

David Kolb championed this theory in the 1970's, drawing on the work of other psychologists and theorists. Experiential learning theory focuses on the idea that adults are shaped by their experiences, and that the best learning comes from making sense of your experiences. Instead of memorizing facts and figures, experiential learning is a more hands-on and reflective learning style. Adult learners are able to utilize this theory and learn by doing, instead of just hearing or reading about something. Role-play, hands on experiences, and more are all part of experiential learning.

Critics of experiential learning say that there are many benefits to non-experiential learning that can be overlooked with this theory. These critics suggest that there is great value on goals, metrics, decision-making, and details that can be overlooked in experiential learning. Many adult learners find that this more hands-on approach is a great option for them. Instead of reading or memorizing, adult learners can utilize their past life experiences and their current understanding to improve their education.

Project-Based Learning

As early as 1900, John Dewey supported a "learning by doing" method of education. Project-based learning (sometimes called problem-based learning) is similar to experiential and action learning in that the overall idea is to actually do something to help you learn, instead of reading or hearing about it. Project-based learning utilizes real-world scenarios and creates projects for students that they could encounter in a job in the future.

Students can choose their own projects and pursue things they are interested in, which is a great option for adult learners who need real-world applications from their learning.

The major criticism of project based learning is that the outcomes aren't proven. There isn't enough evidence to show that project-based learning is as effective as other learning methods. But many adult learners find that this kind of learning is hugely beneficial for them as they apply what they have been taught to their career, giving them direct access to seeing what they can do with their knowledge.

Each theory provides constructs and/or models for us to consider in determining how our students learn. As our understanding of the principles, assumptions, and theories of adult education are broadened, we deepen the tool kit we use to reach our students.

Research & Evidenced Based Curricula Design for Effective Learning

    A. **Universal Design for Learning** (https://udlguidelines.cast.org/)
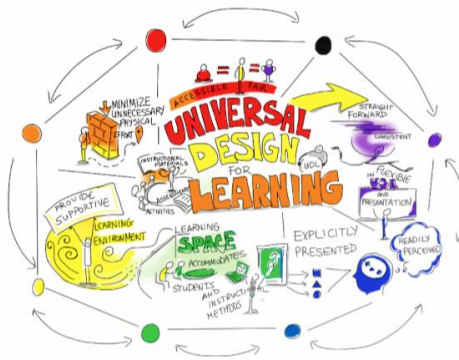
UDL is an approach to curriculum design that can help teachers customize curriculum to serve all learners, regardless of ability, disability, age, gender, or cultural and linguistic background. UDL provides a blueprint for designing strategies, materials, assessments, and tools to reach and teach students with diverse needs.

About UDL

Universal design for learning (UDL) is a set of principles for designing curriculum that provides all individuals with equal opportunities to learn. UDL is de-signed to serve all learners, regardless of ability, disability, age, gender, or cultural and linguistic back-ground. UDL provides a blueprint for designing goals, methods, materials, and assessments, to reach all students including those with diverse needs. Grounded in research of learner differences and effective instructional settings, UDL principles call for varied and flexible ways to
Present or access information, concepts, and ideas (the "what" of learning),
Plan and execute learning tasks (the "how" of learning), and
Get engaged--and stay engaged--in learning (the "why" of learning)

UDL is different from other approaches to curriculum design in that educators begin the design process expecting the curriculum to be used by a diverse set of students with varying skills and abilities.

UDL is an approach to learning that addresses and redresses the primary barrier to learning: inflexible, one-size-fits-all curricula that raise unintentional barriers. Learners with disabilities are the most vulnerable to such barriers, but many students without disabilities also find that curricula are poorly designed to meet their learning needs. UDL helps meet the challenges of diversity by recommending the use of flexible instructional materials, techniques, and strategies that empower educators to meet students' di-verse needs. A universally designed curriculum is shaped from the outset to meet the needs of the greatest number of users, making costly, time-consuming, and after-the-fact changes to the curriculum unnecessary.

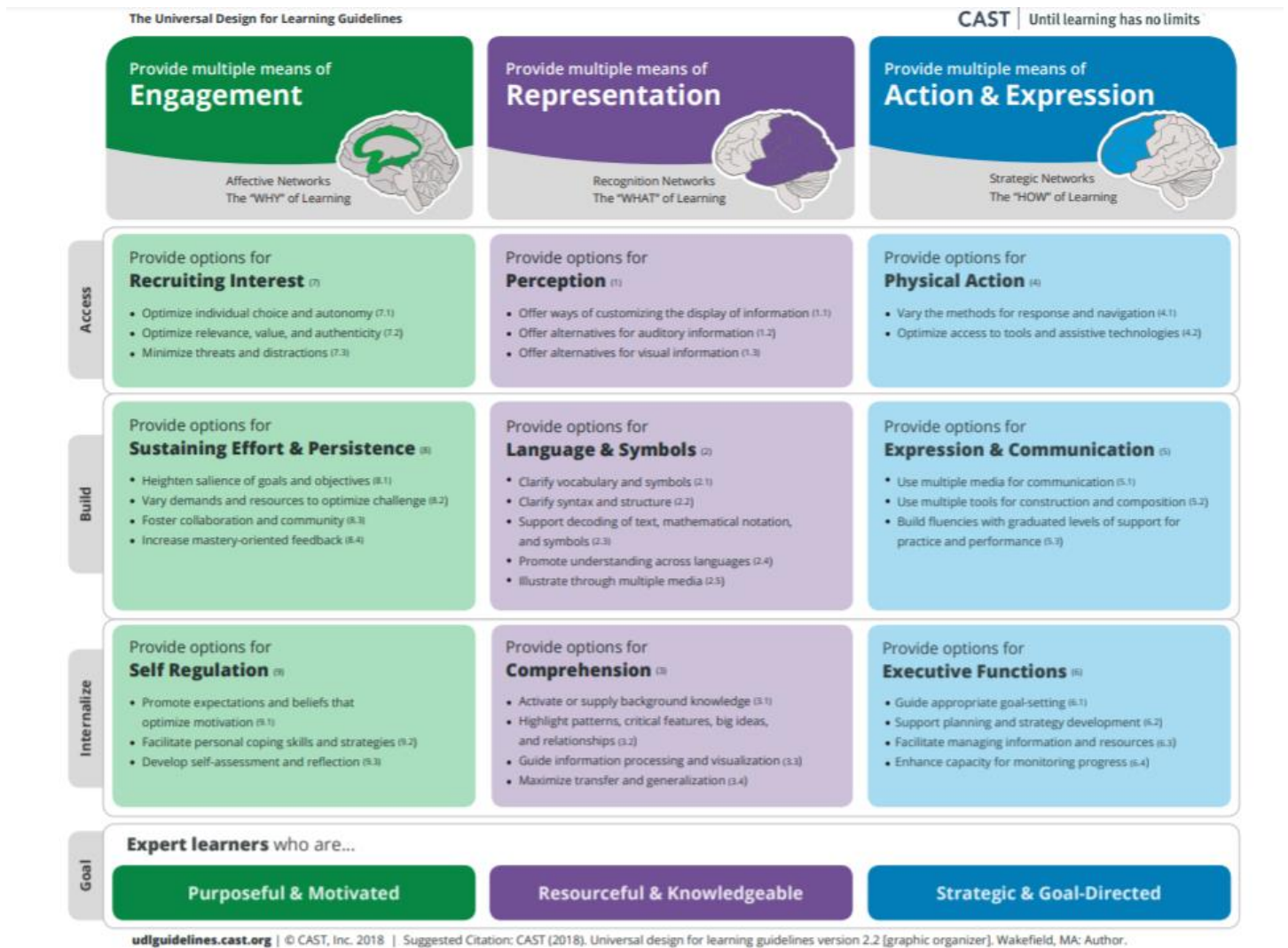**How Can Students Benefit From UDL?**

Adult students benefit from two major aspects of UDL: (1) its emphasis on flexible curriculum, and (2) the variety of instructional practices, materials, and learning activities. All students, including those learning English, older students, and those with disabilities appreciate the multifaceted ways content is presented, as well as options for demonstrating what they know. UDL helps educators meet the challenge of serving those with special needs while enhancing learning for all.

Guidelines

UDL Guidelines are a tool used to improve and optimize teaching and learning for all people based on scientific insights into how humans learn. These guidelines can be used by educators, curriculum developers, researchers, parents, and anyone else who wants to implement the UDL framework in a learning environment.

The Universal Design for Learning Guidelines | CAST | Until learning has no limits

Provide multiple means of **Engagement**	Provide multiple means of **Representation**	Provide multiple means of **Action & Expression**
Affective Networks / The "WHY" of Learning	Recognition Networks / The "WHAT" of Learning	Strategic Networks / The "HOW" of Learning

Access

Provide options for **Recruiting Interest** (7)	Provide options for **Perception** (1)	Provide options for **Physical Action** (4)
• Optimize individual choice and autonomy (7.1) • Optimize relevance, value, and authenticity (7.2) • Minimize threats and distractions (7.3)	• Offer ways of customizing the display of information (1.1) • Offer alternatives for auditory information (1.2) • Offer alternatives for visual information (1.3)	• Vary the methods for response and navigation (4.1) • Optimize access to tools and assistive technologies (4.2)

Build

Provide options for **Sustaining Effort & Persistence** (8)	Provide options for **Language & Symbols** (2)	Provide options for **Expression & Communication** (5)
• Heighten salience of goals and objectives (8.1) • Vary demands and resources to optimize challenge (8.2) • Foster collaboration and community (8.3) • Increase mastery-oriented feedback (8.4)	• Clarify vocabulary and symbols (2.1) • Clarify syntax and structure (2.2) • Support decoding of text, mathematical notation, and symbols (2.3) • Promote understanding across languages (2.4) • Illustrate through multiple media (2.5)	• Use multiple media for communication (5.1) • Use multiple tools for construction and composition (5.2) • Build fluencies with graduated levels of support for practice and performance (5.3)

Internalize

Provide options for **Self Regulation** (9)	Provide options for **Comprehension** (3)	Provide options for **Executive Functions** (6)
• Promote expectations and beliefs that optimize motivation (9.1) • Facilitate personal coping skills and strategies (9.2) • Develop self-assessment and reflection (9.3)	• Activate or supply background knowledge (3.1) • Highlight patterns, critical features, big ideas, and relationships (3.2) • Guide information processing and visualization (3.3) • Maximize transfer and generalization (3.4)	• Guide appropriate goal-setting (6.1) • Support planning and strategy development (6.2) • Facilitate managing information and resources (6.3) • Enhance capacity for monitoring progress (6.4)

Goal — **Expert learners** who are...

Purposeful & Motivated	Resourceful & Knowledgeable	Strategic & Goal-Directed

udlguidelines.cast.org | © CAST, Inc. 2018 | Suggested Citation: CAST (2018). Universal design for learning guidelines version 2.2 [graphic organizer]. Wakefield, MA: Author.

To gain a deeper understanding of the UDL guidelines, instructors are encouraged to watch the video found in the link below.

Watch This Video!

https://www.youtube.com/watch?v=wVTm8vQRvNc&feature=emb_logo

B. **Research-based Writing Instruction** (TEAL Center Fact Sheet No. 1:Research-Based Writing Instruction, 2010)

About Writing Instruction

Recent national research has gathered what we know about effective practices to teach writing. *Writing Next* (Graham & Perin, 2007), and a companion analysis, *What We Know, What We Still Need to Know* (Graham & Perin, 2007), examine the research on writing instruction in grades 4-12, with attention given to those whose writing skills need improvement. *Writing to Read* (Graham & Hebert, 2010), analyzes the re-search on how writing instruction and practice can improve

reading skills. Although these studies focus on students younger than most of the adult education population, they provide direction for instruction with adults. This Fact Sheet provides a thumbnail sketch of these three major studies and the implications for adult educators and learners.

Elements of Writing

Writing is multifaceted and includes a number of skills that must work together. Evaluating writing can be subjective when instructors and learners alike are un-sure of what makes "good" writing. Writing "quality" is defined in *Writing Next* as "coherently organized essays containing well developed and pertinent ideas, supporting examples, and appropriate detail" (Graham & Perin, 2007, p. 14). Sentence structure and vocabulary are other key elements that contribute to the quality of a piece of writing. Learners who find writing difficult may experience challenges in any of these areas as well as in spelling, handwriting, prior knowledge of the topic, and familiarity with models of academic literacies or genres. Because writing is such a complex act, high quality writing depends on this large constellation of skills and abilities. The goal of writing instruction is to help writers become flexible and proficient, able to adapt to various purposes, contexts, and for-mats, and, in so doing, to synergize literacy development in *both* writing and reading.

Why Teach Writing to Adult Learners?

Adults encounter writing tasks on a daily basis, especially informational or expository writing such as notes to children's teachers, grocery lists, work activity logs and forms, e-mails to family and co-workers, online service forms, and so on. The pervasiveness of writing in daily life underscores the need for learners and their instructors to focus on helping adults become flexible, confident writers.

There is plenty of evidence to suggest that many adults of all ages in America are *not* flexible, confident writers. *Writing Next* and *Writing to Read* provide grim statistics showing that poor in-school performance and high drop-out rates from high school lead to a situation in which adults are underprepared for post-secondary education or successful employment. For example, they report that nearly a quarter of community college registrants show the need for develop-mental writing instruction. Similarly, the reports document that the writing demands of most jobs–even at the entry level–is increasing and businesses may have to provide the remedial writing instruction that workers need. Preparing adult students for further education or work advancement requires that adult educators help learners improve their writing skills and increase their confidence in their ability to write.

What's the Research?

Writing Next and *Writing to Read* are meta-analyses, that is, large-scale statistical reviews of studies that compare treatment and control groups. A meta-analysis allows researchers to combine multiple studies of a single instructional intervention and report "effect sizes" as an effectiveness measure. An effect size tells whether statistically significant findings are also educationally meaningful. *Writing Next* analyzed 142 studies and *Writing to Read* analyzed 93 studies. *What We Know* extends the conclusions of *Writing Next* by reviewing articles that did not fit the strict inclusion criteria, including 48 single subject studies of writing, many of which were focused on students who had learning disabilities or were otherwise low achieving. Because there is very little rigorous research on the effectiveness of literacy interventions for adult learners, it is necessary to refer to studies with younger students.
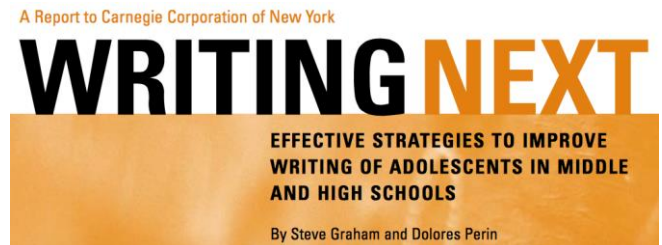
The challenge for the adult education community is to extrapolate from reports on younger students and apply these findings in instructional design for adults. We already know, for example, that many native English speaking adult learners were low-achieving students in K-12 and many have undiagnosed learning disabilities (Corley & Taymans, 2002; National Institute for Literacy, 2009). We also know from adult learning theory that adults show different learning patterns and levels of motivation from adolescents and younger children, and it is necessary to take these differences into account when drawing from work with younger populations to plan for instruction with adults. There are also some

studies of writing development in adults and youth in postsecondary settings that fill in some of the gaps and help us develop approaches to helping adults improve their writing abilities.

Recommended Instructional Strategies

All three reports find that writing instruction should emphasize explicit, direct, and systematic instruction with many opportunities for learners to engage in meaningful, extended writing. Learners who wish to improve their writing skills will benefit from learning strategies, and from assistance given by peers, men-tors, and technology tools.
Writing Next, What We Know, and *Writing to Read* found the following instructional interventions to be effective. Those that are especially helpful for low-achieving writers are noted. This TEAL Center Fact Sheet offers the following suggestions for contextualizing instruction in the adult education setting.

1 *Strategy instruction*, especially self-regulated strategy development (SRSD), and summarization described below, are the most effective approaches identified in these reports. Writers who are explicitly taught strategies that are reinforced in class over time can internalize these strategies and draw on them for support when writing. Strategies replace negative self-talk with positive self-instructions to help students overcome frustration and past failure. *Strategy instruction has been introduced to adult education through the professional development programs,* Bridges to Practice *and* Learning to Achieve*, developed by the National Institute for Literacy to address the needs of students with learning disabilities. It is an instructional approach that requires professional development and practice leading to instruction that is consistent and explicit.*

2 *Summarization*. Explicit teaching of the elements of a summary of a text leads to improved ability and increased confidence in writing summaries. Having learners write summaries about what they read is a key recommendation from *Writing to Read.* In addition, summarization is an increasing-ly common expectation as students advance in their education and are assigned more complex texts to read and comprehend. *Connect this instruction and practice with increasingly complex texts to reinforce learners' comprehension as well as writing skills.*

3 *Collaborative writing*. Making arrangements for students to work together through the entire process of writing–planning, drafting, revising, editing, and publishing–results in higher quality writing products. *Use technology to support and share writing, especially for classes that do not meet daily, or assign writing as an out-of-class activity.*

4 *Setting specific product goals*. Understanding the nature of goals for a written product, setting the goal in advance during planning, and then monitoring and editing one's work for adherence to the goal all result in higher quality final products. Setting specific goals (e.g., "to persuade a voter") are more effective than general goals (e.g., "write a 200-word essay"). *Discuss writing quality with learners and identify areas for improvement. Help learners set explicit goals to guide their writing, and work with them to track progress. For ex-ample, learners may want to write more words during a Quick or Free Write exercise, others may identify that their sentences are all of a similar type and want to focus on adding variety and using combined sentences. Tracking goals works!*

5 *Word processing* and other technology tools are especially supportive for struggling writers, providing the means to move more easily from idea to composition, supporting spelling, revising, and proof reading. Technology-assisted writing also makes collaborative writing (see above) more feasible and productive.

6 *Sentence combining*, that is, practicing how to combine two simple sentences into a compound or complex sentence, has a positive impact on overall writing quality and can boost learners' reading comprehension skills as well. Use this technique in conjunction with other effective writing techniques, such as encouraging peer discussion as part of collaborative writing; this will help reinforce the practice.

| 7 | ***Prewriting activities***, *or* brainstorming before be-ginning to draft a composition, has a positive impact on the final written product. Prewriting activities can be done individually or as a collaborative process. This planning strategy may be particularly important to low-achieving writers for compensating and overcoming documented weak prior knowledge and vocabulary (Graham & Perin, 2007). Engage learners and support vocabulary *development and background knowledge through pre-reading strategies can support writing about the topic, too. Generate lists, word webs, and personal glossaries that can help writers demonstrate what they know.* |

| 8 | ***Inquiry,*** in which learners engage in a focused investigation with "immediate and concrete data" (Graham & Perin, 2007, p. 19) that they gather and analyze, is a springboard to higher quality writing. *Assign authentic activities and materials as inquiry writing, either inquiry in the community (i.e., is there consensus for the public library to expand?) and/or online as a web quest.* |

| 9 | ***Process writing approach*** includes many related activities, including a greatly increased quantity of writing (only some of which is completed to publication) and a focus on writing throughout the course, along with mini-lessons on embedded skills. It is a professional development model as well, and results seen in students' writing are cor-related to teachers' training in the approach. It is worth noting that the instructional activities of sentence combining and inquiry are part of the approach. Another key component is the modeling of writing by instructors. *Model writing and responding to feedback and model applying the strategies you teach. Many adult educators have participated in local National Writing Project chapters; see www.nwp.org for a chapter near you that can offer professional development and a community of writers.* |

| 10 | ***Study of written models with direct, guided practice***, was found to be an effective instruction-al strategy, especially for students with low skills. Many adult education students are not familiar with different types of written genres; the explicit study of formats, styles, tones, vocabularies, sentence structures, etc., can provide new frames and words for their own work. |

A cautionary note about **grammar instruction** emerges from the meta-analyses: Studies of grammar instruction alone or as a primary writing instructional approach produced **negative results** on students' overall writing quality. However, the authors argue that it is important to teach grammar. It seems most helpful to the learner to use grammar approaches that involve active learning (such as sentence-combination) and are integrated with other writing activities.

C. **Self-Regulated Learning** (https://serc.carleton.edu/sage2yc/self_regulated/encouraging.html)

Self-regulated Learning (SRL) refers to one's ability to understand and control one's learning behaviors.
In order for the learner to do this, he or she must set goals, select the strategies to achieve the goals and
monitor progress toward the goals. A key element is not to simply relay content or problem-solving techniques, but to explicitly teach students 'how' to learn. Being explicit about how to use different learning strategies will help students develop a suite of tools they can draw from as they work through a program of study.

Model examples of your own thought process, narrating as you explain how to solve problems. (Zumbrunn et.al, 2011)

Provide ongoing support. Students in an unfamiliar discipline are unlikely to know which strategies to use, and they may lose interest or motivation if not coached and encouraged (Zimmerman 2002).

Ultimately, migrate toward empowering students to become their own managers. In time they will develop the capacity to self-regulate (Zimmerman, 2002).

Many students, particularly those who are the first in their families to attend college, are motivated to master skills that will help them in a career. Point out that self-regulated learning is essential for learning new skills or concepts in the workplace. Motivation and self-satisfaction improve when students have success with the use of effective learning techniques (Zimmerman, 2002; Zumbrunn et al., 2011). Promote students' positive self-perceptions of competence and motivational beliefs. You cannot underestimate the power of belief.

Self-efficacy has been defined as "beliefs about [learners] capabilities to exercise control over their own level of functioning and over events that affect their lives" (Bandura, 1993, p. 118). Perceptions of self-efficacy are critical. Students' perceptions of self-efficacy influence the goals they set, their commitment to those goals, and the learning strategies employed. Low perceptions of self-efficacy undermine students' willingness to invest effort in tasks.

Turning students on to their own capacity to believe in themselves is an incredibly powerful teaching tool. Our students are going to have to put in a lot of effort to improve their writing and other basic skills – help them understand the value of that effort and supply some new self-talk scripts.

Encourage students to ask for help when they need it. Strive to create a two-way, open dialog.

Structuring Feedback to Support Self-Regulated Learning

Feedback helps students understand how their current performance compares to the desired goals. Initially, much of that feedback comes from the instructor, but ultimately students can develop the ability to assess their own learning. Self-regulated learners can generate internal feedback, monitor their engagement, and assess their progress (Nicol and Macfarlane-Dick, 2006). A synthesis by Nicol and Macfarlane-Dick (2006) describes principles of formative assessment and effective feedback, as it specifically relates to self-regulated learning. Key points from this paper are listed below. Effective feedback will:

Clarify what good performance is (goals, criteria, expected standards),
Facilitate the development of self-assessment and reflection in learning,
Deliver high quality information to students about the progress of their learning,
Encourage teacher and peer dialogue around learning,
Encourage positive motivational beliefs and self-esteem,
Provide opportunities to close the gap between current and desired performance.

D. **Differentiated Instruction**

Differentiating instruction is defined as the planning and delivery of classroom instruction that considers the varied levels of readiness, learning needs, and interests of each student in the class. Instructors practice this by using a range of routines and tools to engage learners at varying levels of readiness in multiple ways and by offering students options for demonstrating their understanding and mastery of the material.

Differentiating instruction encompasses an instructors' response to learner differences by adapting curriculum and instruction on six dimensions:

Teacher-dependent:
Content: Ideas to consider for adapting the content, or the 'what' of the lesson should include:
Change lesson complexity

Utilize multiple resources: narrative, informational, multi-media, expert/guest speakers
Lesson context: Classrooms, programs, communities, virtual
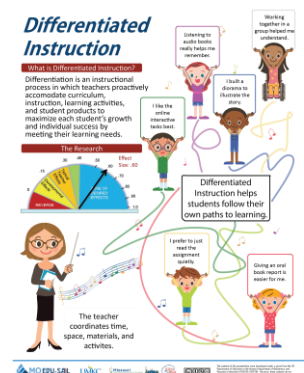
Process: Ideas to consider for adapting the process, or the 'how' of a lesson should include:
Change how you direct instruction: whole group, small group, individual. Chunk and compress material.
Change how you structure cooperative activities: Be flexible, change classroom groupings and peer activities.
Change the way you structure inquiry. Use problem-based learning, service learning, performance, etc.

Product: Ideas to consider for adapting the product, or the 'result' of a lesson should include:
Expect student work that reflects multiple intelligences
Assess completeness through various means: portfolios, rubrics, peer reviews, performance, etc.

Learner-dependent:
Interest: What are your student's interests? Find out by using journals, informal conversations/ice breakers, sharing opportunities with the whole class, community events

Profile-Ideas to consider for accommodating learning profiles (strengths, weaknesses, gaps) by identifying: disability screening results: know how to accommodate learning & attention difficulties, cultural & linguistic factors, health & wellness factors, age & years of school setting, past educational and academic experiences

Readiness: Beyond test scores, what do you know about your learner's readiness as evidenced by past educational achievement, background knowledge, self-efficacy (how do they attribute success & effort)

E. Participatory Learning: Creating a Learning Community (Align & Redesign, by Dr. Laura Weisel)
The Art of Hosting Conversations (http://www.artofhosting.org/wp-content/uploads/2020/07/Article-I-AOH-Participatory-Learning-4.20-4.pdf)

Many educators have wondered how to actively engage students in dialogue; it is never quite as easy as it sounds. Over the past twenty years, the concept of using a set of dialogue-based participatory processes, referred to as The Art of Hosting & Harvesting Conversations That Matter (artofhosting.org), have been successfully used to support the engagement of individuals in organizations, governments, and communities. The Art of Hosting (AOH) has become popular in countries around the world through a network of trained and skilled practitioners. These practices have evolved over time and new processes have been created to enhance the participatory dialogue processes.

As individuals with backgrounds in education have been trained in The Art of Hosting, educators have begun to wonder if these processes could become innovative methodologies for use in professional development settings. In institutions of higher education and in local professional development situations, the feedback from educators and trainers has been extremely positive. Educators responded positively to the conversations with their peers about the new materials and concepts that were being presented. It was only a matter of time before these educators wondered if the participatory processes that were used in training could also be innovative methodologies to enhance learning in classrooms for students of all ages. The use of Art of Hosting Conversations That Matter in education has been called 'AOH Participatory Learning.'

The Art of Hosting (AOH) processes were originally a set of individual methods and practices that, in combination with one another, have been successful in engaging individuals to work together in dialogue on social and organizational issues. Each of the participatory processes has its own author who has published books or manuals describing their approaches to engaging individuals to work collaboratively with peers and constituent groups. The five core participatory methods of AOH are: The Circle, The Café, Open Space, Appreciative Inquiry, and ProAction Café. Each of these learning methodologies are discussed below.

The Circle

The Circle, or council is an ancient form of meeting that has gathered humans in respectful conversations for thousands of years. In some areas of the world this tradition remains intact, but in some societies it has been nearly forgotten. Circling is a modern methodology that calls on this tradition and helps people gather in conversations that fulfill their potential and desire for learning via conversations or dialogues that replenish, engage, excite, and create wisdom-based change…which is real and sustaining learning.

Participatory Learning Circle

Definition

The Circle, or council, is an ancient form of meeting that has gathered humans in respectful conversations for thousands of years. In some areas of the world this tradition remains intact, but in some societies it has been nearly forgotten. Circling is a modern methodology that calls on this tradition and helps people gather in conversations that fulfill their potential and desire for learning via conversations or dialogues that replenish, engage, excite, and create wisdom-based change….which is real and sustaining learning.

"In helping others, we shall help ourselves, for whatever good we give out completes the circle and comes back to us."

Flora Edwards

Materials

CHAIRS ARRANGED INTO A CIRCLE
Participants should be able to view each other without impediments (i.e. tables or desks)

TALKING PIECE

CHIME, BELL, OR GENTLE NOISEMAKER

What is Circle good for?

ADAPTABILITY to a variety of situations, curriculum, and time frames.

BUILDING SOCIAL CAPITAL SKILLS

METHODOLOGY
Use daily to "check-in" and "check-out"
Focus on the positive, build on what is good
Learn through reflection and developing insight
Set intentions and a growth mindset
Build community

| PARTICIPATORY LEARNING | DEFINITION | PURPOSE | METHODS | POWERPATH |

Four Agreements of Circle

LISTEN WITHOUT JUDGMENT (SLOW DOWN AND LISTEN)

WHATEVER IS SAID IN CIRCLE STAYS IN CIRCLE

OFFER WHAT YOU CAN AND ASK FOR WHAT YOU NEED

SILENCE IS ALSO PART OF THE CONVERSATION

Practices of Circle

SPEAK WITH INTENTION
Noting what has relevance to the
conversation in the moment

LISTEN WITH ATTENTION
Respectful of the learning process
of all members of the group

TEND TO THE WELL-BEING OF THE GROUP
Remaining aware of the impact
of our contributions

Flow

WELCOME AND OVERVIEW/REFLECTION

REVIEW THE 4 AGREEMENTS AND 3 PRACTICES

SET STAGE WITH 2 QUESTIONS -
PRESENT, INTENTION AND/OR REFLECTION

OFFER A 'TALKING PIECE'

BE THE GUARDIAN OF THE PROCESS

Principles

ROTATE LEADERSHIP

TAKE RESPONSIBILITY

HAVE A HIGHER PURPOSE

Social Capital Skills Practiced in Circle

SPEAKING IN FRONT OF A GROUP

SPEAKING WITH AND SETTING
INTENTION

TAKING TURNS

KNOWING WHEN TO STOP TALKING
AND PASS

LISTENING WITH ATTENTION

TALKING FROM THE HEART

HOLDING JUDGMENT

OFFERING SUPPORT TO PEERS

Check-in or Check-out starts with an overview (check-in) or review (check-out) of the day or time together. The host then offers two questions. The talking piece is placed in the center and taken by the first person who wants to speak. The talking pieces is passed around the circle as participants respond to the questions. If an individual is not ready to speak, the turn is passed and another opportunity is offered after others have spoken.

Closing the class by checking out provides a formal end to the session, a chance for participants to reflect on what has transpired - content and process.

| PARTICIPATORY LEARNING | DEFINITION | PURPOSE | METHODS | POWERPATH |

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The Café

The World Café is a method for creating a collaborative learning conversation around questions that matter by innovating instruction in the classroom. Café is ideal for administrators to develop collaboration and co-creation with faculty, boards, and community partners.

Participatory Learning
World Café

Definition

The World Café is a method for creating a collaborative learning conversation around questions that matter by innovating instruction in the classroom. Café is ideal for administrators to develop collaboration and co-creation with faculty, boards, and community partners.

What is World Café Good For?

World Café is a great way of fostering interaction and collaboration, sharing learnings or knowledge, generating ideas, and constructing dialogues with both large and small groups. It is particularly effective in surfacing the 'collective wisdom' of groups of diverse participants. The café format is very flexible and adapts to many different purposes – information sharing, relationship building, deep reflection, skill building, project planning.

When planning a café, make sure to leave ample time for moving through the multiple rounds of questions and harvesting.
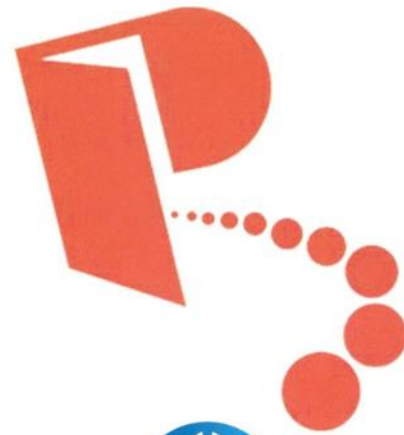
Materials

TABLES AND CHAIRS

TABLECLOTHS OR SOMETHING TO MAKE THE CLASSROOM FEEL 'COMFORTABLE AND INFORMAL'

EASEL-SIZE PAPER TO COVER TABLES AND FOR HARVESTING

MARKERS IN MULTIPLE COLORS

| PARTICIPATORY LEARNING | DEFINITION | PURPOSE | METHODS | POWERPATH |

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For more information, visit www.theworldcafe.com

PowerLine:800.641.3632 | WWW.POWERPATH.COM

7 Operating Principles

1. CREATE HOSPITABLE SPACE
2. EXPLORE QUESTIONS THAT MATTER
3. ENCOURAGE EACH PERSON'S CONTRIBUTION
4. CONNECT DIVERSE PEOPLE AND IDEAS
5. CONNECT ABSTRACT IDEAS IN A GRAPHIC ORGANIZER
6. LISTEN TOGETHER FOR PATTERNS, INSIGHTS, & DEEPER QUESTIONS
7. MAKE COLLECTIVE KNOWLEDGE VISIBILE FOR SHARING
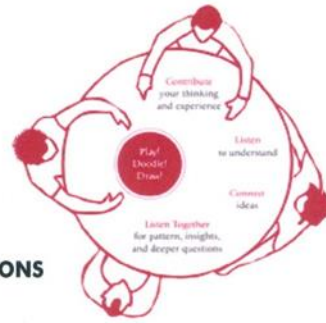
Social Capital Skills Practiced in World Café

- COLLABORATION
- WORKING IN A TEAM
- LISTENING AND DISCUSSING DIVERSE IDEAS/OPINIONS
- BUILDING A COLLECTIVE DIAGRAM OR MODEL
- MANAGING TIME
- TAKING A LEADERSHIP ROLE
- SELF-ADVOCACY
- PUTTING ABSTRACT IDEAS INTO VISUAL MODEL
- ACTIVE LISTENING
- FRAMING POWERFUL LEARNING QUESTIONS
- PEER LEARNING AND COACHING

Assumptions

THE KNOWLEDGE AND WISDOM WE NEED IS PRESENT AND ACCESSIBLE.

COLLECTIVE INSIGHT COMES FROM HONORING UNIQUE CONTRIBUTIONS; CONNECTING IDEAS; LISTENING INTO THE MIDDLE; NOTICING DEEPER THEMES AND QUESTIONS.

INTELLIGENCE EMERGES AS PARTICIPANTS CONNECT IN DIVERSE & CREATIVE WAYS.

Flow

Seat 4-5 participants at café-style tables or in conversation clusters.

Clarify the context of the café and state the question or questions on the specific topic.

Each café-table selects a host; the host selects a time keeper and a lead writer/drawer.

The question(s) are written at the top of the easel paper in the center of the table.

Begin the dialogue and let the conversation continue for 15 - 30 minutes. The conversation is documented using a graphic organizer, mindmap or web.

Begin the second round on the same or a next question by having the host stay at the table and participants move to another table.

Begin the 2nd round by having the host briefly share with new table members the key insights and ideas discussed in the first café, then new members build on what has already been documented and add to the depth and breath on the conversation topic.

Allow time for a whole-group harvest of the conversations.

Set up progressive rounds of conversation, usually of 15-30 minutes each – have some good questions!

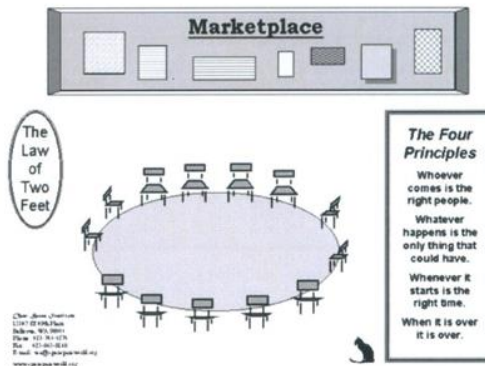| PARTICIPATORY LEARNING | DEFINITION | PURPOSE | METHODS | POWERPATH |

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Open Space

The goal of Open Space is to create time and space for participants to engage, ask questions, and/or share knowledge around issues of concern to them. Using Open Space in classes can result in a transformative experience for the individuals and groups involved. It is a simple and powerful way to catalyze effective working conversations and truly invite participants to thrive and be in the role of leader, knowledge sharer, and questioner.

Participatory Learning
Open Space

Definition

The goal of Open Space is to create time and space for participants to engage, ask questions, and/or share knowledge around issues of concern to them (such as review of an upcoming test, managing a project-based learning experience, planning a 'real life' field trip around a content issue or topic of interest.

Using Open Space in classes can result in a transformative experience for the individuals and groups involved. It is a simple and powerful way to catalyze effective working conversations and truly invite participants to thrive and be in the role of leader, knowledge sharer, and questioner.

Materials

A BLANK WALL THAT WILL BECOME THE MARKETPLACE OF TOPICS OR QUESTIONS

A NEWS WALL FOR RECORDING AND POSTING THE RESULTS OF THE DISCUSSIONS

BREAKOUT SPACES FOR THE SMALL GROUP DISCUSSIONS

EASEL PAPER FOR WRITING SESSION TOPICS/QUESTIONS PLUS MARKERS/PENCILS/PENS

POSTERS OF THE PRINCIPLES, LAW OF TWO FEET, AND ROLES (OPTIONAL)

Marketplace

The Law of Two Feet

The Four Principles

Whoever comes is the right people.

Whatever happens is the only thing that could have.

Whenever it starts is the right time.

When it is over it is over.

What is Open Space good for?

Open Space is useful in almost any context, including pre-test reviews planning outings or managing of curriculum topics, collaboration and deep learning about issues and content.

| PARTICIPATORY LEARNING | DEFINITION | PURPOSE | METHODS | POWERPATH |

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Principals

WHOEVER COMES ARE THE RIGHT PEOPLE

WHENEVER IT STARTS IS THE RIGHT TIME

WHATEVER HAPPENS IS THE ONLY THING THAT COULD HAVE

WHEN ITS OVER ITS OVER

Roles

HOST

PARTICIPANT

BUMBLE BEE

BUTTERFLY

Social Capital Skills Practiced in Open Space

LEADERSHIP

ASKING QUESTIONS

OFFERING SOMETHING OF INTEREST TO OTHERS

ACTIVE LISTENING

ASKING FOR HELP AND OFFERING HELP

DIAGRAMMING AND/OR SUMMARIZING A CONVERSATION

The Law of Two Feet

If you find yourself in a situation where you are not contributing or learning, move somewhere where you can.

Flow

The group convenes in a circle and is welcomed by the host.

The host provides an overview of the process and explains how it works. The host invites people with issues of concern, questions, ideas to share or knowledge to offer to come into the circle, write the issue on a piece of paper or colored index care and announce it to the group.

The people with the issues, questions, ideas or knowledge to offer are "conveners." The convener either identifies their own place to host a conversation or is placed in a location by the host. He/she then places their paper or card with their issue, question or knowledge to offer on the wall, hangs an easel paper under the paper/card on the wall

When several conveners are set-up, the host invites the members of the group to join the conversations they are interested in – again, participants can be a participant, bumble bee or butterfly.

Conversations convene for the balance of the session. The convener captures the important points of the conversation they lead by making a graphic organizer, mind map or web to summarize the conversation. He/She posts their summary on the wall. All of these summaries will be shared as a harvest in some way and returned shared back with the larger group.

PARTICIPATORY LEARNING	DEFINITION	PURPOSE	METHODS	POWERPATH

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Appreciative Inquiry

Appreciative Inquiry is a strategy for intentional change that identifies the best of 'what is' to pursue dreams and possibilities of 'what could be'. It is a cooperative search for strengths, what is known, and what is right. Appreciative Inquiry focuses on the positive and strengths seeking to build on what is currently working as blocks leading to a positive and productive future.

Participatory Learning
Appreciative Inquiry
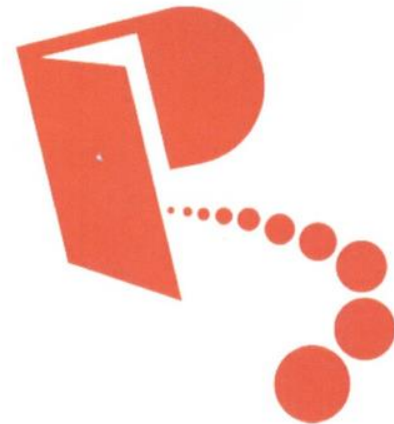
Definition

Appreciative Inquiry (AI) is a strategy for intentional change that identifies the best of 'what is' to pursue dreams and possibilities of 'what could be.' AI is a cooperative search for strengths, what is known, what is right.

AI focuses on the positive and strengths seeking to build on what is currently working as blocks leading to a positive and productive future. This focus on strengths and what is right offers an opportunity for individuals to accept what is known and to build on what works. Research has shown that this approach is the only successful way to bring about long-term change and deep learning.

Problem Solving	Appreciative Inquiry
"Felt need" Identification of the problem	Appreciating & valuing the best of "what is"
Analysis of causes	Envisioning "what might be"
Analysis of possible solutions	Dialoguing "What should be" Innovating "What will be"
Basic Assumption: Learning is a problem to be solved.	Basic Assumption: Learning is a mystery to be embraced.

What is Appreciative Inquiry Good For?

Appreciative Inquiry is useful when a different perspective is needed, or when we wish to begin a new process, set of information, academic or work skills with a fresh, positive vantage point. Appreciative Inquiry can help move a group that is stuck in "what is" toward "what could be." Appreciative Inquiry can be used with individuals, small groups, or large classes.

PARTICIPATORY LEARNING   DEFINITION   PURPOSE   METHODS   POWERPATH

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For more information, visit http://appreciativeinquiry.case.edu/
PowerLine:800.641.3632 | WWW.POWERPATH.COM

Assumptions

IN EVERY LEARNING SITUATION....SOMETHING WORKS

WHAT WE FOCUS ON BECOMES OUR REALITY

REALITY IS CREATED IN THE MOMENT – THERE IS MORE THAN ONE REALITY

THE ACT OF ASKING QUESTIONS INFLUENCES THE COMMUNITY IN SOME WAY

PEOPLE HAVE MORE CONFIDENCE AND COMFORT TO JOURNEY TO THE FUTURE WHEN THEY CARRY FORWARD PARTS OF THE PAST

IF WE CARRY FORWARD PARTS OF THE PAST, THEY SHOULD BE WHAT IS BEST

IT IS IMPORTANT TO VALUE DIFFERENCES

THE LANGUAGE WE USE CREATES OUR REALITY

Social Capital Skills
Practice with Appreciative Inquiry

SEEKING THE POSITIVE.

MANAGING NEGATIVE SITUATIONS LOOKING FOR THE POSITIVES

AND THEN ASKING HOW COULD THIS SITUATION BECOME MANAGEABLE.

LOOKING AT LIFE, PEOPLE, DAILY SITUATIONS FROM A POSITIVE VANTAGE POINT.

What we need

What we already have

Flow

DISCOVER: IDENTIFYING THE EXPERIENCE OR LEARNING PROCESSES THAT WORK WELL.

DREAM: ENVISIONING AN EXPERIENCE OR LEARNING PROCESSES THAT WOULD WORK WELL IN THE FUTURE.

DESIGN: PLANNING AND PRIORITIZING THOSE POSITIVE PROCESSES.

DELIVER: IMPLEMENTING THE PROPOSED DESIGN.

Engage participants in creating the most conducive classroom or place for learning.
Have participants help plan the experience or class to build a positive learning process.

The basic idea is to build learning around what works, rather than trying to fix what doesn't.

Appreciative Inquiry can be used as a way of opening a class or conversation by identifying what already works.

In looking at any work completed by participants or any assessment, always focus on what was is correct/accurate. Then decide the next steps of learning by building the next layer of information or skills on the known layer.

At the center is creating an experience that is positive – is how we ask even the very first question. Incorporate the seeds of change we are looking for in everything we do and say.

| PARTICIPATORY LEARNING | DEFINITION | PURPOSE | METHODS | POWERPATH |

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ProAction Café

The ProAction Café is a space for creative and action-oriented conversations where participants are invited to bring their challenge, project, ideas, questions or whatever they feel called by and need help to create of make happen.

Participatory Learning ProAction Cafe

Definition

The ProAction Cafe is a space for creative and action-oriented conversations where participants are invited to bring their challenge, project, ideas, questions or whatever they feel called by and need help to create or make happen.

These conversations link and build on each other as people move between cafe tables, cross-pollinate ideas, and offer each other new insights into the questions or issues that are most important in their life, school, work, or community.

The concept of ProAction Cafe is a blend of 'World Cafe' and 'Open Space'.

"The purpose of human life is to serve, to show compassion and the will to help others."

Albert Schweitzer

Materials

TABLES WITH 4 CHAIRS

TABLECLOTHS OR SOMETHING TO MAKE THE SPACE FEEL 'COMFORTABLE AND INFORMAL'

EASEL-SIZE PAPER, STICKY NOTES, AND COLORED MARKERS

What is ProAction Cafe good for?

To support colleagues/co-workers/friends to find solutions to a problem, clarifying an idea, or managing a challenge by responding to questions that can give insight and ideas on how to to move forward into action.

BUILDS KEY SOCIAL CAPITAL SKILLS

SUPPORTS SKILLS NEEDED TO SUSTAIN A LEARNING COMMUNITY

| PARTICIPATORY LEARNING | DEFINITION | PURPOSE | METHODS | POWERPATH |

PowerPath
to Education and Employment

6 Operating Principles

1. CREATE HOSPITABLE SPACE
2. FOCUS ON THE HOST'S QUESTIONS/CHALLENGES
3. ASK QUESTIONS - DON'T OFFER ANSWERS OR SOLUTIONS
3. ENCOURAGE EACH PERSON'S CONTRIBUTION
4. HOST CREATES HIS/HER OWN MINDMAP/WEB OF THE CONVERSATION
5. LISTEN TOGETHER FOR PATTERNS, INSIGHTS, & DEEPER QUESTIONS

Social Capital Skills Practiced in a ProAction Cafe

SPEAKING IN FRONT OF A GROUP

OFFERING QUESTIONS RATHER THAN SOLUTIONS

GIVING WHAT YOU CAN AND ASKING FOR WHAT YOU NEED

WITHHOLDING JUDGEMENT AND OPINIONS

TALKING FROM THE HEART

OFFERING SUPPORT TO PEERS

Flow

CREATE a Market Place

DEVIDE the number of participants by 4 - that will determine the number of ProAction Cafes that can be set-up for the ProAction Cafe process: a cafe table for a host and 3 - 4 participants/peer consultants.

HAVE the cafe tables pre-set for the conversations with easel paper, sticky notes, and markers.

OFFER "If you have a question or situation you are struggling with (at home, on the job or in school), write it on a 5x8 card, call a conversation, post your card on the Market Place, and welcome your peer consultants to join you in a ProAction Cafe."

WITH a host and 3-4 consultants at a cafe table, the hosts takes a few minutes to introduce their question/issue/challenge that could use some guidance on ways that could help with an action plan.

TWO questions are used to ignite the conversation:

1. *What is the purpose behind or underneath the call/question/challenge?* This question deepens the reasons for the need and purpose of the call. In other words, it is important to dig under the surface of what we know already.

2. *What is missing?* When the quest has been deepened, a discover question explores what else should be considered to make the resolution more complete and possible.

BETWEEN the two questions, take a quick break. Let the host reflect on the question before the next round begins. For the 2nd round, new peer consultants could come in for the second round...or not.

AT the end of round two, the host takes some time to write some harvest notes by answering the following questions: *What am I greateful for?* *What are my next steps?* After reflection, the host offers their reflections to the group.

| PARTICIPATORY LEARNING	DEFINITION	PURPOSE	METHODS	POWERPATH

F. Brain-based Learning

Brain-based learning refers to teaching methods, lesson designs, and school programs that are **based** on the latest scientific research about how the **brain** learns, including such factors as cognitive development—how students learn differently as they age, grow, and mature socially, emotionally, and cognitively.

Brain-based learning plays a large role in the Career Services courses in Wyoming. To learn more about this theory, instructors are encouraged to read the following articles.
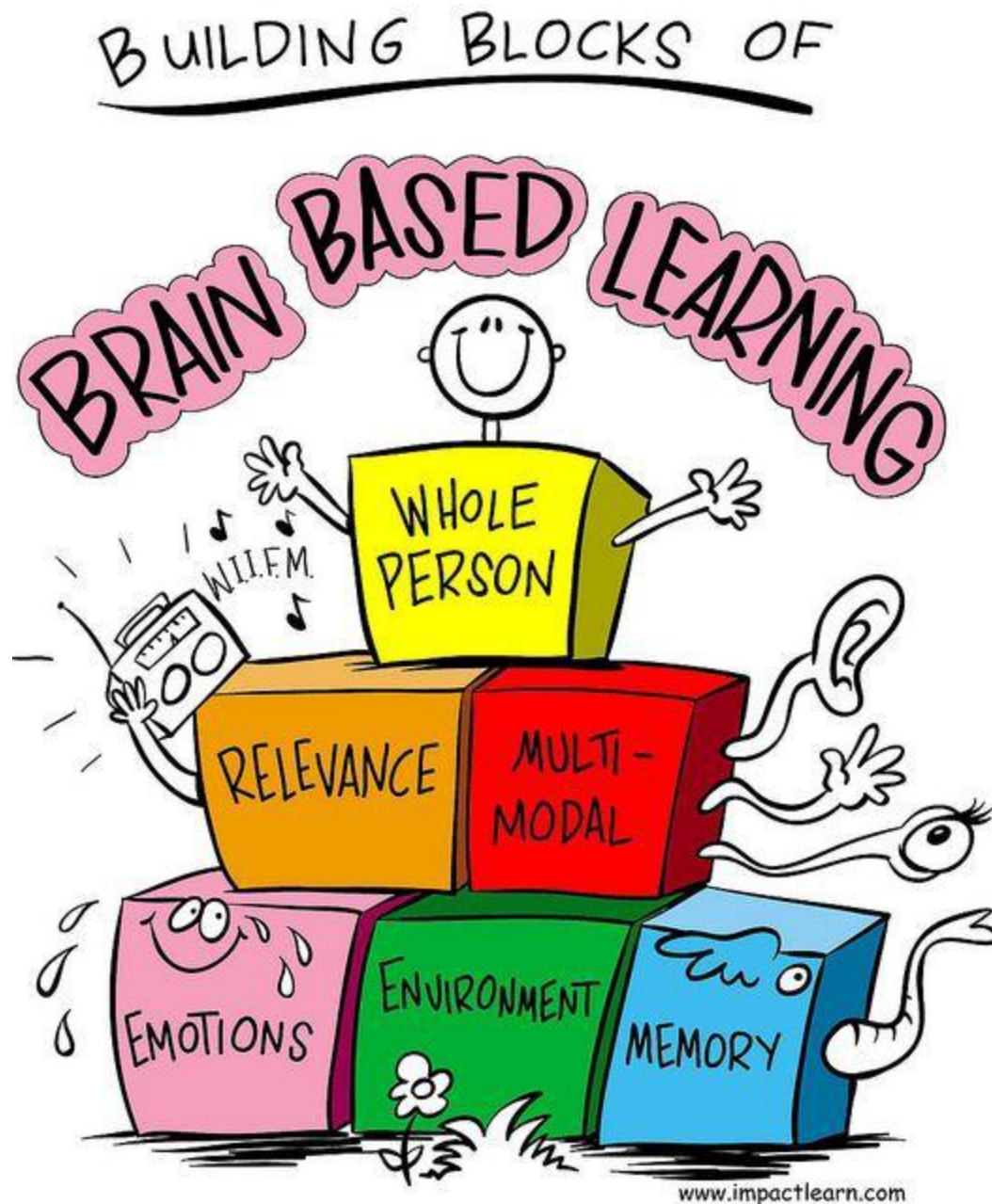
Brain Scientist Shedding Light On Learning, Memory

ScienceDaily (Mar. 28, 2008) — Neurons spoke to Dr. Joe Z. Tsien when he was a sophomore college student searching for some meaningful extracurricular activity.

He had stopped by the lab of a brain researcher at Shanghai's East China Normal University. The room was dark except for a light shining on the brain. "You could hear this pop, pop, pop, pop," says Dr. Tsien, brain scientist who recently came to the Medical College of Georgia from Boston University. "At that moment, I got interested in the brain.

"We study the questions that many people are always curious about – how the brain works, how memory works – then take it down to different levels. What is the molecular basis for the memory process? That means what genes are involved in laying down memory at a very fundamental level?" says the Georgia Research Alliance Eminent Scholar in Cognitive and Systems Neurobiology and co-director of the MCG School of Medicine's new Brain Discovery Institute. "We have been able to identify very critical memory genes and manipulate them in such a way that we can either turn them off, so the memory of mice is impaired, or enhance them."

He's talking about Doogie, a mouse that over-expresses a "smart" gene in the hippocampus, a portion of the brain critical to memory and attacked by Alzheimer's. NMDA receptors are essentially small pores on cell membranes that let ions in and increase neuronal activity and communication. Younger people have higher amounts of a NMDA subunit, NR2B, that keeps communication channels open longer so more information is shared. As people age, they switch to subunit NR2A, presumably because evolution has figured out by then we should have transmitted our genes to offspring, he says. Dr. Tsien and his colleagues made Doogie by over-expressing the NR2B gene and a conditional knockout by eliminating another NMDA receptor subunit.

Doogie was better at remembering and putting things in context, able to quickly recognize something he had seen before and move on to explore something new. He made the cover of Time magazine in 1999 and was one of Science magazines top-10 scientific breakthroughs that year. The "dumb" mouse, on the other hand, couldn't find his way out of a maze.

Dr. Tsien also has found that intelligence requires teamwork, that neurons work in cliques not only to remember specifics but also to generalize knowledge, which essentially defines intelligence.

To get a good handle on the extent of simultaneous neuronal activity, he and his former postdoctoral fellow, Dr. Longnian Lin, first developed a technique to record the activity of up to 200 mouse neurons, rather than the 20 to 30 previously possible. They then identified a small number of neurons in the hippocampus of a mouse that consistently respond to the concept of a bed or nest. Make that nest inaccessible by covering it with glass, for example, and the cells and mouse become disinterested, they showed in research published March 2007 in Proceedings of the National Academy of Sciences.

"Intelligence is really built on memory, your experiences from the past, translating that into guidelines so when you seen a new situation, you know what you need to do," says Dr. Tsien, whose collective contributions to learning and memory were featured on the July 2007 cover of Scientific American. "That helps us not only recognize our bed, for example, but to generally understand what a bed is and to know one when we see it. You check into a hotel, you know where to sleep. When you come to my office, you know where to sit. You don't sit in the floor or on my table. You sit on the chair. The chair may not be exactly like one you have seen before, but you know it's a chair. That is a basic form of intelligence."

His next project, the brain-decoding project, is about putting things in context as well, and is a major reason he came to MCG. "It's really trying to understand the essential rules of how the brain operates," says Dr. Tsien, who brought a research team of 10 with him from Boston and will recruit about eight scientists over the next two years. "It may not be a perfect analogy, but it's similar to the human genome project, where you try to assess the code. By understanding that, you form a basis to not only understand how biology works, but also how therapeutic strategies should be developed. It's a very systematic, large-scale effort to understand the brain."

One goal is understanding biology gone wrong, as it does in Alzheimer's. His lab has generated an animal model of early onset of the disease and is working to find ways to delay it. "If your brain does not kick in Alzheimer's disease until age 90, that is like a cure," he says. Another option, where Doogie may be able to help, is making better use of remaining healthy neurons in someone who already has the disease by increasing smart gene expression. "It may make those neurons work more efficiently, be better at processing information," says Dr. Tsien.

"Once you understand the rules, you can imagine that those design principles can be applied to the development of new-generation computers and robots," he says. "Once you understand the genes, the genetic codes, you can begin to identify the relationship between the mutations in those genes and disease. It gives you a better handle on how to treat it. Right now, for example, there is tremendous difficulty in developing drugs to treat schizophrenia." One problem is the lack of good animal models; it's hard to know when an animal is hallucinating or depressed. More objective measures, such as neurophysiological or other biological markers, could enable such studies, Dr. Tsien says.

Dr. Tsien completed graduate school at the University of Minnesota and a Howard Hughes Medical Institute fellowship at Columbia University and Massachusetts Institute of Technology before joining the Princeton University faculty in 1997. He moved to Boston University in 2004. He is a member of the Neurobiology of Learning and Memory Study Section of the National Institutes of Health and a council member of the Society of Molecular and Cellular Cognition. His research is funded by the NIH.

Adapted from materials provided by Medical College of Georgia.
Medical College of Georgia (2008, March 28). Brain Scientist Shedding Light On Learning, Memory.

ScienceDaily. Retrieved March 30, 2008, from http://www.sciencedaily.com= /releases/2008/03/080326103541.htm

Memory Issue 'Hits 10% of Pupils'

The researchers say teaching strategies can be adjusted. Research suggests that one in 10 children might have a "working memory" impairment that causes them to do less well than expected at school.

A Durham University team identified the problem in 10% of more than 3,000 schoolchildren, across all ages. They say teachers rarely identify it, tending to label pupils as being unmotivated daydreamers.

Working memory involves such things as remembering verbal instructions, new names or telephone numbers. The researchers say that if the finding of 10% of children having the problem held true for all children, then almost 500,000 in primary education alone would be affected.

COMMON CLASSROOM CHARACTERISTICS
- Low abilities in literacy and numeracy
- Frequent failure to complete learning activities
- Frequent failure to remember instructions
- Normal social integration with other children, but
- Very reserved in groups, rarely volunteer information

The researchers believe that early assessment - which they say can be done reliably from the age of four - would enable schools to adopt new teaching methods. As things stand, they say misdiagnosis commonly results in children being labeled as inattentive or lacking in motivation.

Their diagnostic tools have been piloted in 35 schools across the UK and translated into 10 foreign languages.

Lead researcher Dr Tracy Alloway, from Durham's school of education, said: "Working memory is a bit like a mental jotting pad, and how good this is in someone will either ease their path to learning or seriously prevent them from learning.

"From the various large-scale studies we have done, we believe the only way children with poor working memory can go on to achieving academic success is by teaching them how to learn despite their smaller capacity to store information mentally."

A teacher's hunch that something is wrong can be followed up by getting the child to do a computerised assessment.

The team's recommendations for coping with the problem include repetition of instructions, talking in simple, short sentences and breaking down tasks into smaller chunks.

STUDENTS AT THE CENTER
TEACHING AND LEARNING IN THE ERA OF THE COMMON CORE
A JOBS FOR THE FUTURE PROJECT

MIND, BRAIN, AND EDUCATION

MARCH 2012

By Christina Hinton, Kurt W. Fischer, and Catherine Glennon

EXECUTIVE SUMMARY
THE EDITORS, *STUDENTS AT THE CENTER* SERIES

Recent technological breakthroughs make research in human biology and cognitive science more relevant for education than ever before. With powerful brain imaging tools, neuroscientists can for the first time study the learning brain in action. New technologies in genetics are revealing the complex interactions between a learner's genetic makeup and the external environment, while cognitive scientists are tracking the development of alternative learning pathways. Such advancements have led to the emergence of the field of mind, brain, and education. Christina Hinton, Kurt W. Fischer, and Catherine Glennon consider student-centered approaches to learning in light of important findings from this trans-disciplinary field. The authors suggest that such approaches support learning in the brain, giving them the potential to support academic achievement and close achievement gaps, particularly for underserved youth. Ultimately, student-centered programming could lead to a more effective and equitable education system for all students.

The authors point to a number of significant implications of findings about the brain for student-centered approaches to learning (*see table*

FINDINGS ABOUT THE BRAIN	IMPLICATION FOR STUDENT-CENTERED APPROACHES TO LEARNING
The brain is continually changing, as learning experiences shape its architecture; students' abilities are always developing.	Student-centered approaches to learning use a variety of ongoing assessments to monitor learning and tailor instruction to promote learning.
The brain is learning virtually all the time, in both formal and informal contexts.	Student-centered approaches can capitalize on this through a range of nontraditional learning experiences, such as afterschool enrichment, internships, and community programs.
The brain changes that underlie learning occur when experiences are active, not passive.	Student-centered approaches empower students to engage in active learning experiences that are relevant to their lives and goals.
Learning and emotion work together in the brain.	Student-centered approaches address emotion's central role in education by nurturing positive relationships, teaching emotional regulation skills, and providing shelter from harmful stresses.
Each student has a complex profile of strengths and limitations and learns best through experiences tailored to his or her needs and interests.	Student-centered approaches customize instruction in each subject to each individual.
Underserved students, including low-income youth and English language learners, sometimes thrive with different instructional techniques than their middle-class peers.	Student-centered approaches have the flexibility to focus on their particular needs.

DIVERSE, ONGOING ASSESSMENTS

Arguably the most important insight for education from the field of neuroscience is that the brain is highly adaptive, a property called plasticity. As a result of experiences in different environments, students' brains change continuously, from preschool through high school and beyond. Students learn not only at school but also at home, at work, in community centers, and in other settings.

As students engage in various activities—from mastering reading to playing online chess to practicing word processing—these experiences gradually sculpt the physical architecture of their brains. The brain is made up of networks of interconnecting nerve cells, called neurons, and supportive glial cells, which nourish the neurons. Learning experiences are translated into electrical and chemical signals, which cascade among many neurons in many areas of the brain. Gradually, the signals modify connections among neurons in certain areas of the brain and those areas are reorganized. Over time, the connections are affected in a "use it or lose it" way: the ones used the most are strengthened, while the less active are weakened or eliminated.

A significant body of research now contradicts the longstanding notion that individual abilities are fixed at birth. Indeed, the brain's plasticity means that individual abilities develop continuously. The more a student learns in a particular area, the more intelligent the brain becomes in that area.

The brain's adaptability also helps students overcome many learning challenges, as alternative pathways develop to compensate for biological limitations. For example, students with dyslexia, a reading difficulty typically involving impaired phonological processing, often can develop alternative neural circuitry to support reading if they receive appropriate instruction.

The continually changing nature of the brain underscores the potentially negative effects of certain traditional educational practices, such as tracking. Sorting students into rigid tracks based on their current levels of ability could deny lower-tracked students the rich learning experiences their brains need to reach their full potential. By contrast, a central aspect of student-centered approaches to learning—flexible and meaningful learning experiences provided with ongoing guidance—can enable students at all levels to build toward mastery of a common set of core skills.

A powerful tool for guiding each student toward mastery is formative assessment, which plays an integral role in student-centered approaches to learning. It involves frequent, ongoing assessments using a variety of methods, ranging from examining work samples, to monitoring classroom discussions for signs of understanding, to checking in with individual students about the lesson. This constant stream of feedback helps educators tailor instruction, sometimes within moments, to meet each student's immediate needs. It also helps students gain a sense of their strengths and weaknesses, which can inform their continued efforts to learn.

A VARIETY OF NONTRADITIONAL LEARNING EXPERIENCES

Research on brain plasticity indicates that the brain is learning virtually all the time, in both formal and informal contexts. Traditional schooling, where a teacher stands in front of a classroom and delivers content through lecturing, is only one of many potential learning experiences. Student-centered approaches to learning value a variety of student-driven activities, both within the classroom and in other school spaces. Nor is learning restricted to the confines of the school building or the typical school day. The idea of "anywhere, anytime" learning is central: education can occur far beyond a school's walls, at any hour, on any day.

Student-centered approaches encourage a wide range of nontraditional learning experiences, such as afterschool enrichment, internships, and community programs. Learning can occur in settings ranging from local businesses to community centers to cyberspace. Educators can include teachers, professionals, parents, and community members. With a student-centered approach to learning, these are not just "extracurricular" activities. Schools would formally recognize them—and award credit for them—provided that students are working toward core skills and can demonstrate their proficiency in them.

LEARNING THROUGH ACTIVE, RELEVANT EXPERIENCES

Neuroscience research shows that the brain's active engagement is a prerequisite for learning. Changes in the brain's neuronal connections that underlie learning occur only when experiences are active; passive activities do not affect the brain the same way. In educational terms, this suggests that sitting in a classroom listening to a lecture will not necessarily lead to learning.

Student-centered approaches empower students to engage in active learning experiences that are relevant to their lives and goals, both inside and outside the classroom. Brain research is consistent with the student-centered principle of giving credit for mastery of core skills in formal and informal contexts, rather than awarding credit just for spending time in a classroom.

POSITIVE RELATIONSHIPS AND EXPERIENCES

Learning and emotion are integrated in the brain. In fact, strong skills in emotional regulation strongly predict academic achievement. Emotion acts as a rudder to guide learning. The emotions students feel during an experience become salient labels that steer future learning and decision making. People gravitate toward situations they have tagged positive and away from situations they have tagged negative or worth avoiding.

Neuroscience research shows that emotion and learning are integrated in the brain. This research settles longstanding ideological debates about whether educators should be

responsible for emotional development because if educators are involved in intellectual development, they are inherently involved in emotional development. Students are still developing emotional skills and learning to regulate their emotions in childhood and adolescence. Education can support the development of emotional regulation skills. Indeed, this should be a priority, given their critical role in academic performance.

Students are more likely to thrive academically when educators provide a positive learning environment, nurture teacher-student relationships, encourage a sense of community, teach emotional regulation strategies, and provide shelter from toxic stress. Student-centered learning approaches recognize the importance of emotion, calling for a supportive community of educators that can help reduce student stress and apply a knowledge of individual differences in motivation to engage each student.

Emotion is also physically integrated in the brain with executive functioning, a set of mental processes that are critical to learning. Executive function skills connect past experience with present action and include planning, selecting learning strategies, and assessing outcomes. The brain's prefrontal cortex, which regulates executive functioning and some emotional processing, is maturing during adolescence and into early adulthood. It is important for educators to support this development.

Student-centered approaches to learning require students to be self-directed and responsible for their own learning, including goal setting, planning, and monitoring progress. Student-centered approaches teach students the necessary executive function skills to do these tasks, initially offering significant support, then gradually removing it as students become more self directed.

CUSTOMIZED INSTRUCTION TO ADDRESS DIFFERENCES

Mind, brain, and education research on individual differences contradicts the simplistic notion that each student is either intelligent or not. It points to a more nuanced perspective that recognizes that each student has a complex profile of strengths and limitations. A student may struggle in one area, such as mathematics, yet thrive in another, such as linguistic ability or interpersonal intelligence. Even within single domains, students can have both strengths and weaknesses.

The wide range of individual differences result from an interaction of each student's genetic tendencies and experiences. Experiences can reinforce or counteract genetic inclinations. This explains, for example, why someone born with a genetic predisposition for shyness can grow into a gregarious person.

Mind, brain, and education research on individual differences, language learning, literacy, and mathematics suggests that students can follow different learning pathways to master the same core skills. Each individual learns most effectively through experiences tailored to his or her needs and interests. Traditional instruction and standard curriculum most often do not accommodate individual differences. Uniform approaches lose

a host of students because they fail to take into account their different ways of learning—or the different languages, cultures, values, goals, and interests they bring to school. Adjusting instruction to meet each student's particular needs often can move students from failure to proficiency.

Without such instructional flexibility, difficulties in a certain domain may unnecessarily interfere with learning in another. For example, students with limited English proficiency in a traditional math class would struggle to access knowledge from a typical textbook or demonstrate their understanding on a written test. However, if given alternatives, such as a computer program that can translate English instructions into their native language, they would be far less likely to fall behind in math while their language skills were developing.

A FOCUS ON THE NEEDS OF UNDERSERVED STUDENTS

While all students can benefit from student-centered approaches to learning, it is important to note how underserved students in particular may thrive with different instructional techniques than their middle-class peers. For example, neuroscience research on literacy shows that English language learners use a somewhat different brain network for reading than native English readers, because of differences between the rules of English and other languages. This suggests that ELL students may require alternative means of reading instruction. Many of the practices associated with student-centered learning provide a flexible framework for education that can accommodate these types of individual differences through differentiated instruction.

Neuroscience research also indicates that there are sensitive periods early in life for learning certain aspects of language, including grammar and accent. Students who receive non-native language instruction in preschool or primary school have a biological advantage for mastering those aspects of the language. Since proficiency in the language of instruction strongly predicts academic achievement among immigrants, teaching ELL students English as early as possible, with complementary instruction in their native tongue, gives them a critical advantage for learning the language and, ultimately, academics.

Recent research highlights a key difference between disadvantaged students who succeed in school and those who do not: their emotional skills. Resilient disadvantaged students tend to have more self-confidence and higher motivation than non-resilient peers. Therefore, using an educational approach that nurtures emotional development is especially important for underserved students. As noted, student-centered approaches pay particular attention to emotional development and motivation.

Sheltering students from major stresses is important to these efforts. Research suggests that students from disadvantaged backgrounds are more likely to experience toxic stressors—poverty, abuse, bullying, trauma—but receive little support in

dealing with them. Toxic stress can disrupt brain circuitry and cause learning problems. It also can change an individual's stress system such that situations that might not threaten most students can trigger a stress response, which can interrupt learning and manifest in problematic aggressive attitudes that damage students' relationships with teachers and peers.

Fortunately, supportive school environments can buffer students' brains from the impacts of unhealthy levels of stress. Recent research on students of low- and middle-socioeconomic status reveal that low-SES students typically come to school with higher levels of the stress hormone cortisol. However, when students from disadvantaged backgrounds are in high-quality schools, their cortisol levels decrease during the day. The better the school, the greater the drop. This suggests that a quality learning environment can lead to better emotional regulation and more favorable learning outcomes. This research underscores the need for child-friendly learning spaces that promote students' intellectual, emotional, and physical well-being both during and outside of regular school hours.

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Plastic Brain Outsmarts Experts: Training Can Increase Fluid Intelligence, Once Thought To Be Fixed At Birth

Fluid intelligence, an aspect of a person's IQ, allows people to solve unfamiliar problems by understanding relationships between various concepts independent of previous knowledge or skills. Research shows that training short-term, or working memory, can improve fluid intelligence, which was once thought to be extremely difficult.

ScienceDaily (Jun. 6, 2008) — Can human beings rev up their intelligence quotients, or are they stuck with IQs set by their genes at birth? Until recently, nature seemed to be the clear winner over nurture.

But new research, led by Swiss postdoctoral fellows Susanne M. Jaeggi and Martin Buschkuehl, working at the University of Michigan in Ann Arbor, suggests that at least one aspect of a person's IQ can be improved by training a certain type of memory.

Most IQ tests attempt to measure two types of intelligence--crystallized and fluid intelligence. Crystallized intelligence draws on existing skills, knowledge and experiences to solve problems by accessing information from long-term memory.

Fluid intelligence, on the other hand, draws on the ability to understand relationships between various concepts, independent of any previous knowledge or skills, to solve new problems. The research shows that this part of intelligence can be improved through memory training.

"When it comes to improving intelligence, many researchers have thought it was not possible," says Jaeggi. "Our findings clearly show this is not the case. Our brain is more plastic than we might think."

Jaeggi, Buschkuehl and Walter Perrig from Bern University, Switzerland, along with Jon Jonides, their National Science Foundation-supported colleague from the University of Michigan, reasoned that just as crystallized intelligence relies on long-term memory, fluid intelligence relies on short-term memory, or "working memory," as it is more accurately called. This is the same type of memory people use to remember a phone number or an e-mail address for a short time, but beyond that, working memory refers to the ability to both manipulate and use information briefly stored in the mind in the face of distraction.

Researchers gathered four groups of volunteers and trained their working memories using a complex training task called "dual n-back training," which presented both auditory and visual cues that participants had to temporarily store and recall.

Participants received the training during a half hour session held once a day for either eight, 12, 17 or 19 days. For each of these training periods, researchers tested participants' gains in fluid intelligence. They compared the results against those of control groups to be sure the volunteers actually improved their fluid intelligence, not merely their test-taking skills.

The results were surprising. While the control groups made gains, presumably because they had practice with the fluid intelligence tests, the trained groups improved considerably more than the control groups. Further, the longer the participants trained, the larger were their intelligence gains.

"Our findings clearly show that training on certain memory tasks transfer to fluid intelligence," says Jaeggi. "We also find that individuals with lower fluid intelligence scores at pre-test could profit from the training."

The results are significant because improved fluid intelligence scores could translate into improved general intelligence as measured by IQ tests. General intelligence is a key to determining life outcomes such as academic success, job performance and occupational advancement.

Researchers also surmise that this same type of memory training may help children with developmental problems and older adults who face memory decline. But, that remains to be seen, because the test results are based on assessments of young, healthy adult participants.

"Even though it currently appears very hard to improve these conditions, there might be some memory train- ing related to intelligence that actually helps," says Jaeggi. "The saying 'use it or lose it' is probably appropri- ate here."

Since it is not known whether the improvements in fluid intelligence last after the training stops, researchers currently are measuring long-term fluid intelligence gains with both laboratory testing and long-term field work. Researchers say it will be some time before a complete data set is available to draw any conclusions.

University of Bern professor Walter J. Perrig also co-authors this study along with University of Michigan professor John Jonides. The Swiss National Science Foundation funds Jaeggi and Buschkuehl's visiting scholar status.

Adapted from materials provided by National Science Foundation.
Need to cite this story in your essay, paper, or report? Use one of the following formats:

National Science Foundation (2008, June 6). Plastic Brain Outsmarts Experts: Training Can Increase Fluid Intelligence, Once Thought To Be Fixed At Birth. ScienceDaily. Retrieved June 10, 2008, from http://www. sciencedaily.com /releases/2008/06/080605163804.htm

Students with Learning Disabilities Construct Meaning Through Graphic Organizers: Strategies for Achievement in Inclusive Classrooms

Eileen D. Sabbatino

Students with learning disabilities are being placed with their peers in inclusive classrooms for content area subjects in greater numbers than ever before. In many cases, these students are being held to the same standards as their general education peers. Many students with learning disabilities have deficits in a very essential skill area needed for success, reading comprehension. This article familiarizes teachers with the concept of graphic organizers as an effective comprehension strategy, presents a research-based rationale for their use with students with learning disabilities, and introduces graphic organizers as a tool for helping students with learning disabilities make sense of a wide variety of textual information.

The number of students with learning disabilities receiving special education services has increased dramatically over the past decades. The National Center for Educational Statistics (NCES) (2001) reported that children with disabilities receiving services in 2000 constituted 13% of all students enrolled in a public school (grades K-12), which is up from 8% in 1977. Between 1977 and 2000, the percentage of children with specific learning disabilities as a percentage of total public school enrollment rose from 2% to 6%.

As a result of federal and state policies, students with learning disabilities have increasingly been placed in their least restrictive environments. In many cases that least restrictive environment is a general education classroom. No Child Left Behind Act of 2001 (NCLB) has increased the emphasis on the general education curriculum, and as a result, students with learning disabilities who are included in general education classes are expected to achieve at the same rigorous pace as their peers. This situation offers new challenges to general education teachers as well as special education teachers.

Inclusive Education as the Least Restrictive Option

Once a student is identified as having a learning disability, the Individual Education Program (IEP) team faces the responsibility of choosing a placement for instruction of the student in the least restrictive environment to receive his or her educational services. Increasingly, that placement is with his or her peers in inclusive classrooms for content area subjects. Whether the placement option is a general education class, a general education class with consultation, or a general education class with the support of a special education teacher, the major focus for students with learning disabilities is to understand the content being taught. Unfortunately, making sense of information from readings, lectures, and homework as typically assigned in the general

education class can be a daunting task for students with learning disabilities (Heward, 2003).

The Needs of Students with Learning Disabilities

A variety of deficits may be present in children with learning disabilities including: impulsiveness, low tolerance for frustration, difficulties with reading, writing and spelling, and all aspects of organization skills. Any of these deficits may impact upon an individual student's ability to succeed in inclusive classrooms. As a result, students with learning disabilities often feel overwhelmed, disorganized, and frustrated. In order for these students to be successful in today's schools, they need to learn to use strategies, which enable them to make sense of the textual materials used to teach the general education curriculum. A strategy that has been used successfully is that of graphic organizers (Lovitt & Horton, 1994; NICHCY, 1996; Sturomski, 1997).

Defining Graphic Organizers

Graphic organizers are visual representations of concepts that aid students in learning, remembering and organizing important information they are reading or have read. Graphic organizers make visually explicit the organizational patterns of text. They can represent students' background knowledge and provide a framework for what is about to be taught, or can be used to organize and reflect on newly acquired information. (Bromley, Irvin-DeVitis, & Modlo, 1995; Quist, 1995). Graphic organizers are visual aids that can help depict the relationships among concepts in a text and also reflect the organization of the text, therefore helping to improve students' comprehension by requiring them to use prior knowledge to think about and picture the relationships among concepts and organization of a text (Brown, 1988).

What Does the Research Say?

A review of the research reveals positive results for the use of graphic organizers with students with learning disabilities. Researchers found that graphic organizers can accommodate students with learning disabilities' need for structure, organization, and a clear format, as well as their need to relate information to personal experience. Graphic organizers were also found to encourage higher order thinking. Researchers suggest that explicitly detailed instruction, intensive practice of key concepts, and a schema to help students with learning disabilities organize key information can facilitate short-term memory (Darch & Eaves, 1986; Quist, 1995).

A study conducted by Horton and Lovitt (1989) revealed that the use of graphic organizers allowed students with learning disabilities to participate meaningfully in mainstreamed content area classes. Summaries written at the end of a unit of study demonstrated students' heightened awareness of the hierarchy of concepts represented in their graphic organizers. Follow-up summaries revealed evidence that the skills were being maintained over time (Scanlon, Duran, Reyes, and Gallego, 1992).

Some middle school students with learning disabilities lack the skills necessary to read and identify key concepts in textbooks. The same students may also lack the writing and organizational skills necessary for success in content area classes. In addition, they may have difficulty paying attention during lessons. Middle school students with learning disabilities experienced success utilizing graphic organizers (Marchand-Martella, Miller, & MacQueen, 1998).

DiCecco and Gleason (2002) conducted a study of students in grades 6-8 to investigate the effects of explicit instruction and graphic organizers on students' ability to gain and apply relational knowledge from social studies material. Their results support the use of graphic organizers to aid students in their recall of relational knowledge.

Although all of the studies reported concerning graphic organizers were conducted with students with learning disabilities, each study varied with regard to the type of graphic organizers used, age level of the participants, the length of instructional time, type and length of reading material, and the educational setting. However, the research indicates that there were some gains in the level of reading comprehension by the participants throughout the studies following the introduction of and/or instruction through the use of graphic organizers (DiCecco & Gleason, 2002; Horton & Lovitt, 1989; Marchand-Martella, et al., 1998; Quist, 1995; Robinson, 1998; Scanlon, et. al, 1992).

Applying Graphic Organizers to Lessons

IDEA requires that students with disabilities be educated in the least restrictive environment, which meets the students' special educational needs. The least restrictive environment for most students with learning disabilities ranges from placement in a general education classroom, where students receive a prescribed program under the direction of a general education teacher, to placement in an inclusive classroom, where students receive instruction by both a general education teacher and a special education teacher (Heward, 2003).

Instruction of students with learning disabilities receiving instruction in general education classrooms can be enhanced through the use of graphic organizers. The general education teacher supports the comprehension by all students, especially students with learning disabilities, by modeling the use of graphic organizers for the class during lessons. The organizers are used to introduce or reinforce key concepts as well as the relationships between the concepts (DiCecco & Gleason, 2002; Hill, 1994).

The next placement along the continuum of services is a regular classroom with consultative services from a special education teacher. In this situation, the special education teacher supports lessons taught by the general education teacher by developing graphic organizers that present visual displays of the content. The general education teacher introduces the graphic organizer to the entire class and then refers back to it to as new concepts are introduced. This is to ensure that students with learning disabilities make connections between the important concepts in the material (Heward, 2003; Hill, 1994; Quist, 1995).

A regular education classroom with supplementary instruction and services is the placement option chosen for some students with learning disabilities. In this team-teaching model the general education teacher takes the role of the content area teacher while the special educator adapts the instruction to meet the needs of the special education students. In order to aid in comprehension, the special education teacher presents a graphic organizer that concretely displays the concepts being taught. This allows for monitoring of students and to check for understanding (Heward, 2003; Horton & Lovitt, 1989).

It is important to note that the purpose of graphic organizers is to organize, rather than to simply list concepts. They should be constructed so students viewing them will readily see the relationships between concepts. Graphic organizers should be utilized as a structured part of a lesson along with modeling, guided practice, and follow-up reviews in order to achieve positive results (DiCecco & Gleason, 2002; Robinson, 1998).

Graphic organizers provide students with strategies or structure in order to become information seekers and active learners. Teachers should find creative ways to integrate graphic organizers into their lessons and use them consistently across subject areas. It is imperative that the organizers remain visible throughout the time the students are working on an assigned task. By referring back to the orga-

nizer, the teacher helps the students become aware of what information is considered necessary for comprehension of the assigned task (Baxendell, 2003; Hill, 1994; Pappas, 1996).
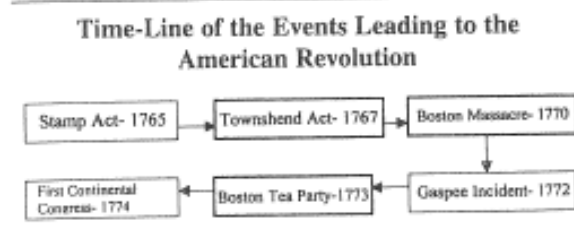
There are many standard forms of graphic organizers from which to choose, or teachers can design their own, depending on the material being introduced to their students. Graphic organizer development should begin at the content analysis stage of lesson planning. After an organizer has been developed, it should then be modified to meet the needs of the diverse learners in the classroom. Teachers should keep in mind that it is necessary to provide links between previous learning and the current content. The lessons then lend themselves to systematic instruction with numerous opportunities to check for student comprehension (Horton & Lovitt, 1989; Marchand-Martella, et al., 1998).

Graphic organizers can be classified into four basic formats: sequential, conceptual, hierarchical, and cyclical (Baxendell, 2003; Beissner, Jonassen, & Grabowski, 1994; Ekhaml, 1998). The common attribute underlying all types of graphic organizers is the visual-spatial arrangement of information containing words or phrases that are connected in meaningful ways (Horton & Lovitt, 1989).

Sequential. This format organizes events in chronological order. They are usually linear in fashion. Examples include time lines and T-charts, which can show cause and effect or problem and solution. Figure 1 is an example of a sequential organizer, a time line, which displays the events leading up to the American Revolution. While reading a chapter in their text about American History, students can place the events in the order of occurrence. Another organizer, a T-chart, is a way to organize information to depict cause and effect as seen in Figure 2. The teacher and students list the causes of the American Revolution to the left of the T and identify the effects of those actions to the right.

develop a semantic map about mammals in their science class. The central theme, mammals, is written in the center. Concepts that are related to the main idea are identified and connected around the main topic in a web-like fashion with unlabeled lines. Figure 4 demonstrates the use of a comparison/contrast organizer, a Venn diagram, which can be used during a science lesson to compare and contrast characteristics of mammals and reptiles. As students read about and discuss animals, they list the unique characteristics under the appropriate titles. Characteristics in common would be listed under the heading, both.

Figure 2

Teacher and students identify the causes and effects of the American Revolution on a sequential map.
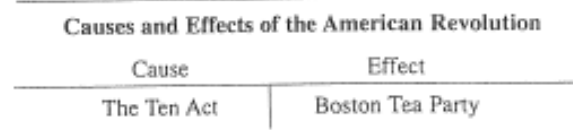
Causes and Effects of the American Revolution

Cause	Effect
The Ten Act	Boston Tea Party

Figure 3

Teacher and students complete a conceptual map concerning mammals.

Semantic Map of Mammals

Figure 1

Teacher and students complete a sequential map of the events leading up to the American Revolution.

Time-Line of the Events Leading to the American Revolution

Conceptual. This format involves a central theme, category, or idea with supporting facts such as characteristics or attributes. Examples include semantic maps and comparison and contrast organizers. In Figure 3 the teacher and students
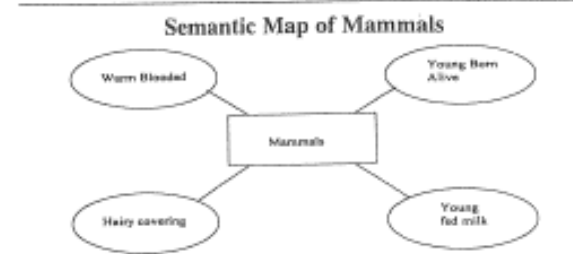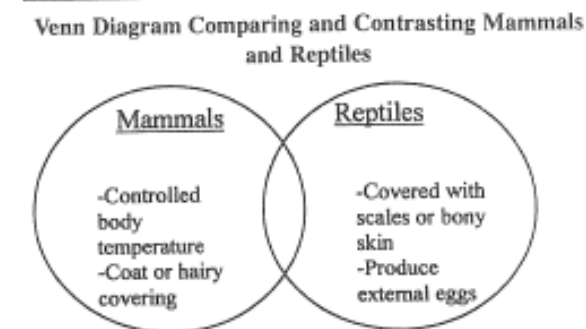
Figure 4

Teacher and students compare and contrast the characteristics of mammals and reptiles on a conceptual map.

Venn Diagram Comparing and Contrasting Mammals and Reptiles

Hierarchical. This form uses a linear, matrix, or web-like representation. The forms may vary in appearance, but all include an identified main concept along with important subtopics, and then further subtopics for each presented next. Structured overviews and spider maps are examples of hierarchical organizers. In Figure 5 students complete an hierarchical map about glaciers while learning about global warming. The central theme of the organizer is in a box at the top of the organizer, linked by lines to boxes containing subtopics, which are in turn linked to boxes of subordinate information about each subtopic. Figure 6 presents a spider map for a study of Africa. In this instance, the central theme of the map is placed in a box in the center of the map. The subtopics are written on lines that extend out from the center. Information about each of the subtopics is written on lines that extend from each of them.

Cyclical. This format includes a series of events within a process in a circular motion. This type of organizer has no beginning and no end, just a continuous stream of events. Figure 7 is an example of a cyclical organizer for students to complete as they read and learn about the ways in which Americans can conserve resources.

Figure 5

Teacher and students complete a hierarchical map while studying about the effect of global warming on glaciers.
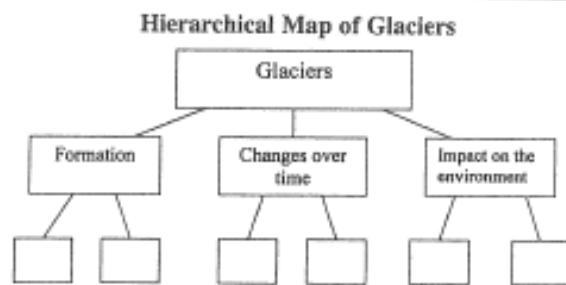

Hierarchical Map of Glaciers

Figure 6

Teacher and students complete a hierarchical map while studying about Africa.
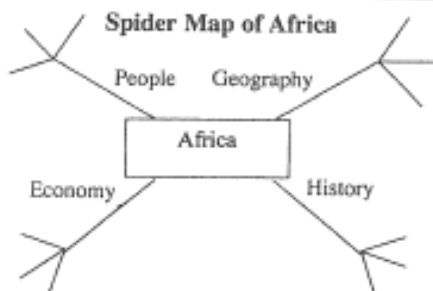

Spider Map of Africa

Figure 7

Teacher and students study recycling using a cyclical organizer. Pictures could be drawn for added effect.

A Cyclical Organizer Depicting Recycling

Summary

Today's educators face increasing demands on their time and expertise. Classrooms are becoming more diverse than ever before. In response to federal legislation, students with learning disabilities are being placed in regular education classes for content area instruction as their least restrictive environment. As a result, teachers and students alike need to learn to use strategies that will help all of their students achieve. Graphic organizers have been shown to aid in that effort by improving reading comprehension for students with learning disabilities. Researchers have demonstrated that students with learning disabilities can enhance their reading comprehension through the use of graphic organizers by reflecting the organization of material and depicting relationships among concepts. A wide variety of standard formats, along with teacher creativity, allow graphic organizers to be used across the curriculum to allow teachers to complete this most important task, ensuring that every student receives the best education possible (Smith, 1989).

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We're Wired to Connect

Our brains are designed to be social, says
bestselling science writer Daniel Goleman—and they
catch emotions the same way we catch colds

Have you ever wondered why a stranger's smile can transform your entire day? Why your eyes mist up when you see someone crying, and the sight of a yawn can leave you exhausted? Daniel Goleman, Ph.D., has wondered, too, and just as he helped revolutionize our definition of what it means to be smart with his 1995 blockbuster, *Emotional Intelligence*, the two-time Pulitzer nominee and former science reporter for *The New York Times* has dropped a bombshell on our understanding of human connection in his startling new book, *Social Intelligence* (Bantam).

For the first time in history, thanks to recent breakthroughs in neuroscience, experts are able to observe brain activity while we're in the act of feeling—and their findings have been astonishing. Once believed to be lumps of lonely gray matter cogitating between our ears, our brains turn out to be more like interlooped, Wi-Fi octopi with invisible tentacles slithering in all directions, at every moment, constantly picking up messages we're not aware of and prompting reactions—including illnesses—in ways never before understood.

"The brain itself is social—that's the most exciting finding," Goleman explains during lunch at a restaurant near his home in Massachusetts. "One person's inner state affects and drives the other person. We're forming brain-to-brain bridges—a two-way traffic system—all the time. We actually catch each other's emotions like a cold."

The more important the relationship, the more potent such "contagion" will be. A stranger's putdown may roll off your back, while the same zinger from your boss is devastating. "If we're in toxic relationships with people who are constantly putting us down, this has actual physical consequences," Goleman says. Stress produces a harmful chemical called cortisol, which interferes with certain immune cell functions. Positive interactions prompt the body to secrete oxytocin (the same chemical released during lovemaking), boosting the immune system and decreasing stress hormones. As a doting grandparent himself (with author-therapist wife Tara Bennett-Goleman), the author often feels this felicitous rush. "I was just with my two-year-old granddaughter," he says. "This girl is like a vitamin for me. Being with her actually feels like a kind of elixir. The most important people in

C.J. BURTON

our lives can be our biological allies."

The notion of relationships as pharmaceutical is a new concept. "My mother is 96," Goleman goes on. "She was a professor of sociology whose husband—my father—died many years ago, leaving her with a big house. After retiring at 65, she decided to let graduate students live there for free. She's since had a long succession of housemates. When she was 90, a couple from Taiwan had a baby while they were living there. The child regarded her as Grandma and lived there till the age of two. During that time, I swore I could see my mother getting younger. It was stunning." But not, he adds, completely surprising. "This was the living arrangement we were designed for, remember? For most of human history there were extended families where the elderly lived in the same household as the babies. Many older people have the time and nurturing energy that kids crave—and vice versa. If I were designing assisted-living facilities, I'd put daycare centers in them and allow residents to volunteer. Institutions are cheating children," he says. "And we older people need it, too."

Young or old, people can affect our personalities. Though each of us has a distinctive temperament and a "set

for frowning and other reactions). This is why, when you're smiling, the whole world does indeed seem to smile with you. It also explains the Michelangelo phenomenon, in which long-term partners come to resemble each other through facial-muscle mimicry and "empathic resonance." If you've ever seen a group with a case of the giggles, you've witnessed mirror neurons at play. Such mirroring takes place in the realm of ideas, too, which is why sweeping cultural ideals and prejudices can spread through populations with viral speed.

This phenomenon gets to the heart of why social intelligence matters most: its impact on suffering and creating a less crazy world. It is critical, Goleman believes, that we stop treating people as objects or as functionaries who are there to give us something. This can range from barking at telephone operators to the sort of old-shoe treatment that long-term partners often use in relating to each other (talking at, rather than to, each other). We need, he says, a richer human connection.

Unfortunately, what he calls the "inexorable technocreep" of contemporary culture threatens such meaningful connection. Presciently re-

being experienced—which is basically what each of us wants more than anything. Scientists agree that such connection—or lack of it—will determine our survival as a species: "Empathy," writes Goleman, "is the prime inhibitor of human cruelty."

And our social brains are wired for kindness, despite the gore you may see on the nightly news. "It's an aberration to be cruel," says Goleman. Primitive tribes learned that strength lay in numbers, and that their chances of surviving a brutal environment increased exponentially through helping their neighbors (as opposed to, say, chopping their heads off). Even young children are wired for compassion. One study in Goleman's book found that infants cry when they see or hear another baby crying, but rarely when they hear recordings of their own distress. In another study, monkeys starved themselves after realizing that when they took food, a shock was delivered to their cage mate.

Perhaps the most inspiring piece of the social-intelligence puzzle is neuroplasticity: the discovery that our brains never stop evolving. "Stem cells manufacture 10,000 brain cells every day till you die," says Goleman. "Social interaction helps neurogenesis. The brain rises to the occasion the more you challenge it." ∎

Mark Matousek's The Art of Survival *(Bloomsbury) will be published next year.*

> **Positive interactions can boost the immune system: "The most important people in our lives can be our biological allies."**

point of happiness" modulating our general mood, science has now confirmed that these tendencies are not locked in. Anger-prone people, for example, can "infect" themselves with calmness by spending time with mellower individuals, absorbing less-aggressive behavior and thereby sharpening social intelligence.

A key to understanding this process is something called mirror neurons: "neurons whose only job is to recognize a smile and make you smile in return," says Goleman (the same goes

marking on the TV set in 1963, poet T.S. Eliot noted that this techno-shredder of the social fabric "permits millions of people to listen to the same joke at the same time, and yet remain lonesome." We can only imagine what the dour writer would have made of Internet dating. And as Goleman points out, this "constant digital connectivity" can deaden us to the people around us. Social intelligence, he says, means putting down your BlackBerry, actually paying full attention—showing people that they're

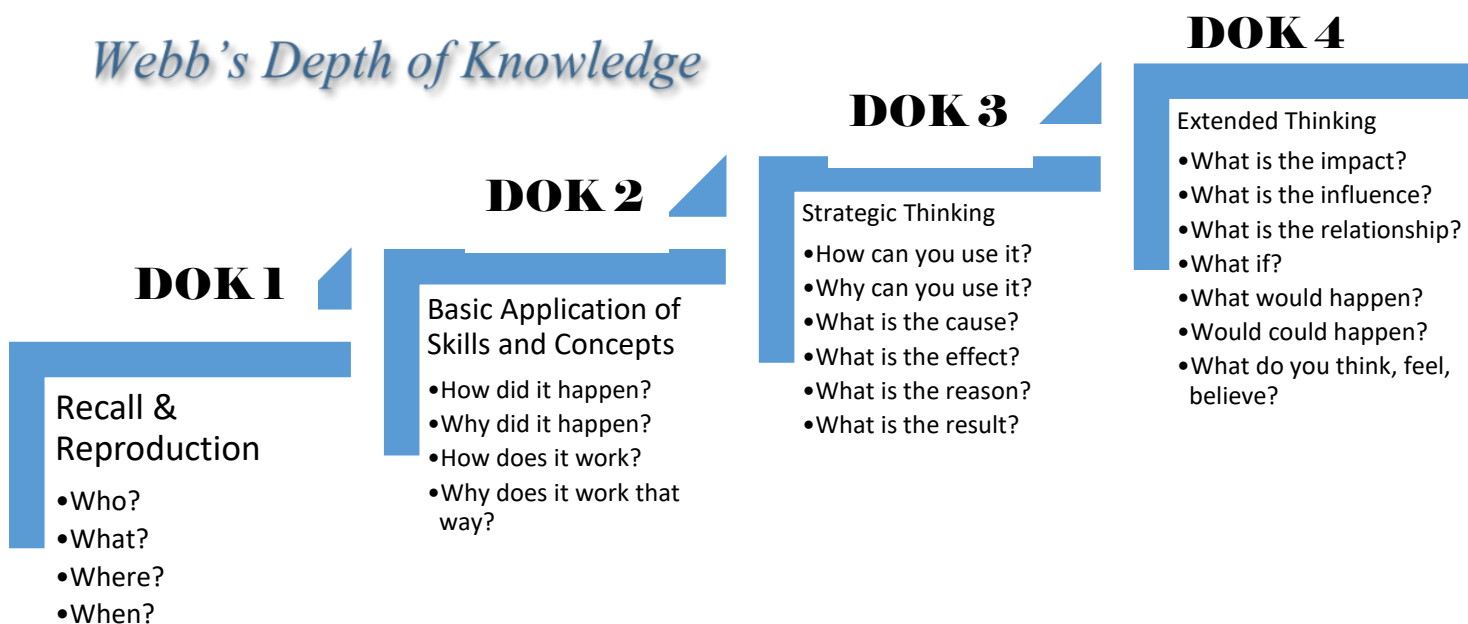### G. Webb's DOK (Webb's Depth of Knowledge Guide, 2009)

Webb (1997) developed a process and criteria for systematically analyzing the alignment between standards and standardized assessments. Since then the process and criteria have demonstrated application to reviewing curricular alignment as well. This body of work offers the Depth of Knowledge (DOK) model employed to analyze the cognitive expectation demanded by standards, curricular activities and assessment tasks (Webb, 1997). The model is based upon the assumption that curricular elements may all be categorized based upon the cognitive demands required to produce an acceptable response. Each grouping of tasks reflects a different level of cognitive expectation, or depth of knowledge, required to complete the task. It should be noted that the term knowledge, as it is used here, is intended to broadly encompass all forms of knowledge (i.e. procedural, declarative, etc.). The following table reflects an adapted version of the model.

DOK Level	Title of Level
1	Recall and Reproduction
2	Skills and Concepts
3	Short-term Strategic Thinking
4	Extended Thinking

DOK levels are assigned to each course objective the following served as general guidelines for developers:

➢ The DOK level assigned should reflect the level of work students are most commonly required to perform in order for the response to be deemed acceptable.

➢ The DOK level should reflect the *complexity* of the cognitive processes demanded by the task outlined by the objective, rather than its *difficulty*. Ultimately the DOK level describes the kind of thinking required by a task, not whether or not the task is "difficult".

➢ If there is a question regarding which of two levels a statement addresses, such as Level 1 or Level 2, or Level 2 or Level 3, it is appropriate to select the higher of the two levels.

➢ The DOK level should be assigned based upon the cognitive demands required by the central performance described in the objective.

➢ The objective's central verb(s) alone is/are not sufficient information to assign a DOK level. Developers must also consider the complexity of the task and/or information, conventional levels of prior knowledge for students at the grade level, and the mental processes used to satisfy the requirements set forth in the objective.

Webb's Depth of Knowledge

DOK 1

Recall & Reproduction

- Who?
- What?
- Where?
- When?

DOK 2

Basic Application of Skills and Concepts

- How did it happen?
- Why did it happen?
- How does it work?
- Why does it work that way?

DOK 3

Strategic Thinking

- How can you use it?
- Why can you use it?
- What is the cause?
- What is the effect?
- What is the reason?
- What is the result?

DOK 4

Extended Thinking

- What is the impact?
- What is the influence?
- What is the relationship?
- What if?
- What would happen?
- Would could happen?
- What do you think, feel, believe?

Level 1-Recall & Reproduction

Curricular elements that fall into this category involve basic tasks that require students to recall or reproduce knowledge and/or skills. The subject matter content at this particular level usually involves working with facts, terms and/or properties of objects. It may also involve use of simple procedures and/or formulas. There is little transformation or extended processing of the target knowledge required by the tasks that fall into this category. Key words that often denote this particular level include: list, identify and define. A student answering a Level 1 item either knows the answer or does not; that is, the answer does not need to be "figured out" or "solved."

Possible Products				
Quiz	List	Collection	Podcast	Social Bookmarking
Definition	Workbook	Explanation	Categorizing/Tagging	Searching
Fact	Reproduction	Show & Tell	Commenting	Googling
Worksheet	Vocabulary Quiz	Outline	Bullet\ting	Test
Recitation	Blog	Highlighting	Label	Example
Wiki	Social Networking			

Roles			
Instructor		**Student**	
Directs	Tells	Responds	Absorbs
Shows	Examines	Remembers	Recognizes
Questions	Evaluates	Memorizes	Describes
Demonstrates	Listens	Explains	Translates
Compares	Contrasts	Restates	Demonstrates
Examines		Interprets	

Potential Activities

- Develop a concept map showing a process or describing a topic.
- Make a timeline
- Write a list of keywords you know about…
- Make a chart showing…
- Recite a fact related to…
- Write in your own words…

- Cut out, or draw a picture that illustrates an event, process, or story.
- Report or present to the class.
- Make a cartoon strip showing the sequence of an event, process, or story.
- Write and perform…
- Write a brief outline and explain the event, process, or story.
- Write a summary report of the event
- Prepare a flow chart that illustrates the sequence of events.
- Paraphrase a chapter in the book
- Retell in your own words
- Outline the main points
- Recall, restate, remember, or recognize a fact, term, or property(Recognizing, listing, describing, identifying, retrieving, naming, locating, finding)
- Using basic calculation tasks involving only one step (i.e. addition, subtraction, etc), complete the following…
- Locate or retrieve information in verbatim form.
- Straight-forward recognition tasks related to identifying features, objects and/or steps that don't vary greatly in form (i.e. recognizing features of basic tools).
- Writing tasks that involve applying a standard set of conventions and or criteria that should eventually be automated (i.e. using punctuation, spelling, etc)
- Basic measurement tasks that involve one step (i.e. using a ruler to measure length)
- Use this simple formula where at least one of the unknowns are provided to…
- Locating information in maps, charts, tables, graphs, and drawing

Level 2-Working with Skills and Concepts

Level 2 includes the engagement of some mental processing beyond recalling or reproducing a response. This level generally requires students to contrast or compare people, places, events and concepts; convert information from one form to another; classify or sort items into meaningful categories ; describe or explain issues and problems, patterns , cause and effect, significance or impact, relationships, points of view or processes. A Level 2 "describe or explain" would require students to go beyond a description or explanation of recalled information to describe or explain a result or "how" or "why." The learner should make use of information in a context different from the one in which it was learned.

Elements found in a curriculum that fall in this category involve working with or applying skills and/or concepts to tasks related to the field of study in a laboratory setting. The subject matter content at this particular level usually involves working with a set of principles, categories, heuristics, and protocols. At this level students are asked to transform/process target knowledge before responding. Example mental processes that often denote this particular level include: summarize, estimate, organize, classify, and infer.

Possible Products			
photograph	Presentation	Reverse-engineering	Blog commenting
Illustration	Interview	Cracking codes	Blog reflecting
Simulation	Performance	Linking	Moderating
Sculpture	Dairy	Mashing	Testing(Alpha/Beta)
Demonstration	Journal	Relationship Mind Maps	Validating

Roles				
Instructor			**Student**	
Shows	Facilitates		Solves problems	Demonstrates use of knowledge
Observes	Evaluates		Calculates	Compiles
Organizes	Questions		Completes	Illustrates
			Constructs	

Potential Activities

- Classify a series of steps
- Construct a model to demonstrate how it looks or works
- Practices a play and perform in class
- Make a diorama to illustrate an event
- Write a diary/blog entry
- Make a scrapbook about the area of study
- Make a topographic map
- Make up puzzle or game about the topic
- Write an explanation about this topic for others
- Make a model
- Routine application tasks (i.e. applying a simple set of rules or protocols to a laboratory situation the same way each time)
- Explaining the meaning of a concept and/or explaining how to perform a particular task

- Stating relationships among a number of concepts and or principles
- More complex recognition tasks that involve recognizing concepts and processes that may vary in how they "appear"
- More complex calculation tasks (i.e. multi-step calculations such as standard deviation)
- Research projects and writing activities that involve locating, collecting, organizing and displaying information (i.e. writing a report with the purpose to inform; meeting all steps of the writing process)
- Measurement tasks that occur over a period of time and involve aggregating/organizing the data collected in to basic presentation forms such as a simple table or graph

Level 3-Short-term Strategic Thinking

Items falling into this category demand a short-term use of higher order thinking processes, such as analysis and evaluation, to solve real-world problems with predictable outcomes. Stating one's reasoning is a key marker of tasks that fall into this particular category. The expectation established for tasks at this level tends to require coordination of knowledge and skill from multiple subject-matter areas to carry out processes and reach a solution in a project-based setting. Key processes that often denote this particular level include: analyze, explain and support with evidence, generalize, and create.

Possible Products				
Graph	Survey	Debate	Conclusion	Podcast
Spreadsheet	Database	Panel	Program	Publishing
Checklist	Mobile	Report	Film	Wiki-ing
Chart	Abstract	Evaluating	Animation	
Outline	Report	Investigation	Video cast	

Roles					
Instructor			**Student**		
Probes	Guides		Discusses	Uncovers	Argues
Observes	Evaluates		Debates	Thinks deeply	Tests
Acts as a resource	Questions		Examines	Questions	Calculates
Organizes	Dissects		Judges	Disputes	Compares
Clarifies	Accepts		Assesses	Decides	Selects
Guides			Justifies		

Potential Activities:

- Use a Venn Diagram that shows how two topics are the same and different
- Design a questionnaire to gather information
- Survey classmates/industry members to find out what they think about a particular topics
- Make a flow chart to show the critical stages.
- Classify the actions of the characters in book

- Prepare a report about an area of study
- Conduct an investigation to produce information to support a view
- Write a letter to the editor after evaluation product
- Prepare and conduct a debate
- Prepare a list of criteria to judge
- Write a persuasive speech arguing for/against…

- ➢ Make a booklet about five rules you see as important. Convince others.
- ➢ Form a panel to discuss viewpoints on…
- ➢ Write a letter to… advertising on changes needed
- ➢ Prepare a case to present your view about
- ➢ Short-term tasks and projects placing a strong emphasis on transferring knowledge to solve predictable problems
- ➢ Explaining and/or working with abstract terms and concepts
- ➢ Recognition tasks when the environment observed is real-world and often contains extraneous information which must be sorted through

- ➢ Complex calculation problems presented that draw upon multiple processes
- ➢ Writing and or explaining tasks that require altering a message to "fit" an audience
- ➢ Creating graphs, tables and charts where students must reason through and organize the information with instructor prompts
- ➢ Identifying a research question and/or designing investigations to answer a question
- ➢ Tasks that involve proposing solutions or making predictions

Level 4-Extended Strategic Thinking

Curricular elements assigned to this level demand extended use of higher order thinking processes such as synthesis, reflection, assessment and adjustment of plans over time. Students are engaged in conducting investigations to solve real-world problems with unpredictable outcomes. Employing and sustaining strategic thinking processes over a longer period of time to solve the problem is a key feature of curricular objectives that are assigned to this level. Key strategic thinking processes that denote this particular level include: synthesize, reflect, conduct, and manage.

Possible Products			
Film	Project	New game	Newspaper
Story	Plan	Song	Media product

Roles					
Instructor			**Student**		
Facilitates	Extends		Designs	Formulates	Plans
Reflects	Analyses		Takes risks	Modifies	Creates
Evaluates			Proposes		

Potential Activities
- ➢ Applying information to solve ill-defined problems in novel situations
- ➢ Tasks that require a number of cognitive and physical skills in order to complete
- ➢ Writing and/or research tasks that involve formulating and testing hypotheses over time
- ➢ Tasks that require students to make multiple strategic and procedural decisions as they are presented with new information throughout the course of the event
- ➢ Tasks that require perspective taking and collaboration with a group of individuals

- ➢ Creating graphs, tables, and charts where students must reason through and organize the information without instructor prompts
- ➢ Writing tasks that have a strong emphasis on persuasion
- ➢ Devise a way to…
- ➢ Develop a menu for a new restaurant using a variety of healthy foods
- ➢ Sell an idea
- ➢ Write a jingle to advertise a new product
- ➢ Conduct an internship in industry where students are faced with real-world, unpredictable problems