Schooling: Essential paradigm shifts

Part One

By Howard Brady and Marion Brady (unpublished)

The conventional wisdom says schooling's main purpose is teaching the "core" subjects—language arts, math, science, and social science. Learning is a simple matter of storing secondhand information in memory.

We say schooling's primary purpose is humankind's survival, and the most direct means to that end is **maximizing learner ability to make sense of complex, ever-changing reality.**

Traditional schooling emphasizes learner *recall* of existing secondhand information delivered primarily by textbook text, teacher talk and technology. Educating for survival emphasizes continuous improvement of kids' ability to, yes, *recall,* but also to *hypothesize, generalize, integrate, synthesize, estimate, relate, extrapolate, predict, imagine, value, and so on through the dozens of thought processes that enable humanness*—thought processes too complex to be evaluated by machine-scored tests.

The switch in emphasis from one simple thought process to all thought processes and combinations of thought processes is radical. Textbook text, teacher talk and technology usually get in the way.

As we've been insisting for years, typical textbooks are collection of conclusions. When there's an inference to be drawn, the author draws it. If there's a significant relationship to be noted, the author points it out. If a generalization seems appropriate, the author generalizes. There are no loose ends, no problems, situations, dilemmas, difficulties, or incomplete analyses. The textbook is as refined as the author is capable of making it. The *author*, *not the kid, does the thinking*. That's like handing kids crossword puzzles to study with all the squares filled in." [1]

That's still true. Go to school. Sit at desk. Read or listen. Try not to forget.

"Internet in the classroom" has the same built-in limitation.*

More than a century ago, Alfred North Whitehead said, "The secondhandedness of the learned world is the secret of its mediocrity."[2] ***There's an intimate link between a focus on first-hand reality and expanding learner thinking skills.*** Get real.

The real world is the basis for most non-school learning from infancy to adulthood, early childhood on into adult life. The "here and now" environment of the learner's school and community offers a resource for unlimited study. *For subjects distant in time or space, the alternative to reality is minimally-processed primary sources.*

---

*Exception: Some useful "unprocessed" learning resources *are* available via internet, but just "looking up answers" is counterproductive.

Project-based learning opens doors. Teachers who develop or adopt "discovery," "inquiry," "active learning," and "constructivist" activities understand the power of firsthand experience, but moving beyond traditional "telling and remembering" requires a major, sometimes-wrenching paradigm shift.

Artificial, arbitrary boundaries between courses and disciplines fade away when reality becomes the source of learning. Motivation climbs when learners become active investigators, helped by the obvious relevance of what's being learned. The skills developed in solving real-world puzzles are essential.

Here are examples of the kinds of assignments that trigger "active" learning:

> Working with others, make a reasonably-accurate approximation of the cost of getting everybody in your classroom to and from your school on a typical day.[3]
>
> A cold front is approaching. Over the next couple of days, work with your team to collect information about changes in clouds, precipitation, wind speed, wind direction, temperature and barometric pressure, then put together a report that describes the changes.
>
> If your community is typical, it includes people with a variety of family backgrounds, with parents or grandparents from other societies. Interview at least one person from a society unlike your own, and identify ideas, beliefs, and ways of acting that differ from yours.[4]
>
> Over the next week, identify at least five possible relationships in your school. For example, is there a relationship between the orientation of different parts of the school and electrical demand? Between sound levels and locations? Is the level of dust in the air different in different locations? If so, why? Where and why do people congregate? Where is the most maintenance required? Why? Is any part of your school creating problems or deteriorating excessively? Identify reasons. Prepare a presentation about relationships you discover.[5]

Reality-based puzzles, problems, and projects that require deep thought expand cognitive skills. Active learning/constructivism has these additional advantages:

- Passively-learned information usually makes little impression and is quickly forgotten. Active learning experiences are much more memorable, motivating and empowering.
- Active learning works well even with learners who ordinarily fail to engage. [6] It's a major way to reduce learning problems in schools short on learning resources.
- Active learning respects what kids know and can do, further motivating them.
- Dealing directly with reality, the relevance of what's being learned isn't questioned. What's useful is remembered.
- Active learning using "un-processed" reality or primary sources reduces the fragmentation of knowledge created by traditional disciplines and subjects. (More on this in Part 2.)

- When budgets are limited, short, inexpensive or free handbooks can guide real-world investigations.[7]
- For kids, sitting is an unnatural act. Think of learning experiences that minimize it.

Active learning/constructivism isn't a "sometimes" thing. Its ability to transform learner performance can't be overstated, but the idea that "learning" means "absorbing information" is so deeply embedded in the minds of politicians, policymakers, parents, kids, and even many teachers, it can make the switch to active learning daunting.

- As long as performance on standardized tests remains the public face of educational success, moving away from conventional passive learning will be opposed by teachers, educational authorities, and others.
- Textbooks are assumed to be the main source of knowledge by most people—including legislators, parents and kids. Alternatives will be resisted. The inertia of "that's the way I learned" blocks progress; people tend to forget the way their education was enhanced and completed by experiences outside school. They mainly remember only what they later used.
- Teachers, authorities in their subjects, sometimes short-circuit the learning process. Impatient to move on, they're too quick to answer rather than question, a problem aggravated by the outsized role played by mandated standardized testing. Resistance comes in, "I'm already doing that," or "That won't work with my kids.
- Learners may also resist change, particularly those accustomed to high marks because they're good "crammers" of "covered" information, able to store a great deal in short-term memory long enough to ace tests. A favorite question: "Why don't you just tell us what you want us to know?"
- When developing complex thinking skills is instruction's purpose, evaluating learner and school performance is, admittedly, difficult. If learners are being asked to hypothesize, do two "good" hypotheses equal four "fair" and seven "poor" hypotheses? What's a "fair" hypothesis? A "poor" one? What's a valid inference? A powerful generalization? *Standardized machined-scored tests can't make value judgments of relative quality*. (But trained teachers *can*.)

Given the present level of institutionalization, change is difficult. Metaphors such as "moving a Jell-O elephant" come to mind. But if the young are to cope with the world they're inheriting, educating must abandon the present paradigm. **We see no alternative to active learning; it's the only way forward.**

(Next: Part Two)

Part Two

In part one, we said our futures, even our survival, depends on equipping the young with the ability to make sense of reality and deal with it effectively. That requires routine use of a full range of thinking skills, skills exercised when learners are engaged in active learning. But more is required. There are deep-seated institutional problems:

Information overload: In the same Whitehead address cited in part 1, he said: "We tend to teach too much."[8]

That's a far greater problem than it was when he called attention to it. Information is multiplying exponentially. Pick up just about any textbook and check the table of contents. In an attempt to "cover" each subject at least as extensively as the competition, learners are flooded with information. Textbook organization by topic helps but doesn't solve the problem. Science and social studies texts are especially prone to offer huge amounts of superficial, quickly forgotten information.

The problem isn't the quantity of information; how much information the human brain can store is unknown. What's missing is adequate organization. Information can be retained and used only if it's intimately linked to related information, and conventional textbooks and instructional activities ordinarily fail to provide the conceptual structure needed to build necessary links. Without those links, what's learned is soon forgotten.

Fragmentation: The traditional dividing of "common core" courses into math, science, social studies, and language arts breaks learning about the real world into pieces, and erects artificial barriers that limit learner ability to make sense. The problem has long been recognized by respected thinkers,[9] but remains inadequately addressed.

To solve the dual problems of fragmentation and overload, learners must acquire a way to organize ideas and information using analytical concepts that show interrelationships and indicate relative importance.

The fundamental elements for organizing sense and meaning are familiar:

Stories

> "Human beings are creatures who tell stories—a point Fisher (1987) makes when he gives us the label *homo narrans*—and those stories serve a function, namely to make meaning of experience. The basic idea has been developed by a number of theorists in recent decades (for example, Polkinghorne, 1988; Bruner, 1990; Irwin, 1996; Sarbin, 1986) all arguing that meaning-making is a narrative process. This makes sense at a very basic level. We're continuously bombarded by varied experience and make sense by storying them—constructing narratives that make information cohere."[10]

Learners gain understanding by generating mental stories—and the stories (and underlying understanding) establish *time frame, actors, action, setting, and plot*, the common analytic categories applied to stories and drama. A story isn't complete until and unless all the elements are present. Learners know this intuitively.

Another expression of necessary story structure is, of course, the news reporter's familiar five "W's:" who, what, where, when and why. *These intuitively-known elements*

of stories, lifted into consciousness and considered in depth, become fundamental organizing concepts for analyzing absolutely anything of significance.

Expanded understanding is gained by elaborating each of the categories with sub-categories: "Setting" subdivides into "primary habitat" and "secondary habitat," and "secondary habitat" expands to "dwellings," "means of transportation," "cities," etc. "Plot" expands to encompass the shared ideas and values that explain and motivate members of societies. Each category and sub-category frames questions that guide productive investigation.

Analytical categories may be hierarchically expanded to any degree of elaboration, giving learners a way of investigating, organizing and classifying what they learn.

Systems Theory

A second, significantly different approach converges on the same set of analytical concepts.

Learners confront a complex world. The most effective way of making sense of complexity is to identify and analyze the *system*s that organize the reality. Learners investigating galaxies, epidemics, the Navaho Nation or Stonehenge are dealing with systems.

Once a significant system is identified, the simple analytical categories that apply identify and define (1) system environment, (2) components and their configuration, (3) interactions between components and between the system and its environment, (4) driving forces, and (5) change over time. If science classes adopted this set of concepts, and used them over and over to analyze phenomena such as protozoa, earthquakes, diesel engines and so on, major improvement in learner comprehension would result.

Applying the five categories to significant sociocultural systems produces the same analytical categories as stories. For example, the forces driving societal patterns of action are the *shared ideas and values* that underlie behavior—the "plot." The most important components are the humans and the sub-groups they form ("actors"). Interactions, writ large, form the familiar subsystems of societies—economic, political, social strata, socialization/learning, etc. Again, hierarchical expansion of the main system categories provides structure for every kind of knowledge.

System-based concepts are the key to organizing, simplifying, and integrating information about reality, essential to constructing learners' mental models of reality. Learning isn't about gathering facts, but about discovering relationships between and among aspects of reality not previously thought to relate. No matter the subject—economic cycles, oil drilling, local bureaucracy, poverty, ecological change, democratic decision-making, to begin a near-infinite list—understanding depends on making sense of systemic relationships. Systems thinking breaks down the artificial, arbitrary walls between disciplines and subjects, modeling the seamlessness of firsthand experience.

Systems-based learning is the second major paradigm shift learners need to improve sense-making and function effectively. Again, **we see no alternative; it's the only**

way forward. The first paradigm shift—studying reality rather than mediated versions of it—is the more difficult of the two; this second one adds challenge.

However, below are links to extensively tested instructional resources that combine active learning with system-based conceptual organization. All may be downloaded at no cost and without obligation by educators to use with their own learners:

E-Book, *What's Worth Learning?* https://www.marionbrady.com/documents/WWL.pdf

A course of study that best illustrates the approach advocated here: Introduction to Systems (marionbrady.com)

Other systems-based courses of study based on conventional course subjects suitable for adolescents and older learners: Systems-Based Learning Courses (marionbrady.com)

---

[1] Marion Brady and Howard Brady, *Investigating American History* (TE), p. 11. http://www.marionbrady.com/documents/AHHandbook.pdf
[2] Alfred North Whitehead, "Presidential Address to the Mathematical Association of England," 1916
[3] Marion Brady and Howard Brady, *Introduction to Systems*, part 3: http://www.marionbrady.com/IntroSystems/3Societies.pdf
[4] Ibid. (Part 3)
[5] Ibid, part 1. http://www.marionbrady.com/IntroSystems/1Intro.pdf
[6] http://www.marionbrady.com/IntroSystems/DrWilliamWebb-Testimonial.pdf
[7] An example: http://www.marionbrady.com/IntroductiontoSystems.asp
[8] Alfred North Whitehead, op cit
[9] http://www.marionbrady.com/documents/QuotesFragmentation.pdf
[10] M. Carolyn Clark, Marsha Rossiter, "Narrative Learning in Adulthood," http://www.olc.edu/~khecrow/webfolder/Research/Clark%20Rossiter.pdf