

MAKING LEARNING WHOLE

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- So troubling is this trend of approaching things through elements with the whole game nowhere in sight or a minimal presence that I like to name it as a disease: elementitis.
- Now let's consider the other almost universal strategy for approaching complexity learning about something toward learning to do it. Typical history instruction has been characterized as learning "other people's facts." One might well describe the typical study of science as learning "someone else's theories."
- A certain amount of learning about, just like a certain amount of elements first, is fine. The problem is overdoing it, or aboutitis.
- The complaint about elementitis and aboutitis is not that they do not accomplish anything, but that we could accomplish so much more.
- Playing junior versions of games (T-ball) allows students to conceptualize how to approach complexity. It lets learners in on the big picture, that the challenges along the way become meaningful.
- Seven principles of Learning by Wholes
 1. Play the whole game
 2. Make the game worth playing
 3. Work on the hard parts
 4. Play out of town
 5. Uncover the hidden game
 6. Learn from the team...and the other teams.
 7. Learn the game of learning
- Teacher's feedback does not often provide enough information to diagnose effectively exactly what was hard about the hard parts, and no chance to tune them up because we were already continuing on to the next topic.
- Learning to learn has to do with many things: directing one's attention, choosing time and place, relating new ideas and skills to what you already know. The self-managed learner makes a point of practicing the hard parts, even when no coach or teacher imposes a regimen. The self-managed learner makes a point of playing out of town – connecting ideas and skills with other contexts – even when no coach or instructor sends the team out of town.
- Learning by wholes does share with behaviorism the idea that things go better when feedback is immediate and informative and when the incentive structures around an endeavor are largely positive and not deeply threatening.
- Learning by wholes definitely does not say that all learning should be aggressively discovery oriented.
- Learning by wholes takes a strong stance against learning by elements and against extended learning about things when the ultimate idea is to learn to do them.
- Instructional strategy
 - Engage some version of the holistic activity, not just bits and pieces.
 - Make the activity worth pursuing.
 - Work on the hard parts
 - Explore different versions of and settings for the activity

- The world would be a better place if in areas like these (e.g. civic engagement, ecological responsibility, and avoidance of prejudice) most people achieved active mediocrity rather than passive erudition.
- There is a very useful rough distinction between problem solving and problem finding. Problem solving is the art and craft of dealing well with problems that are already reasonably clear. Problem finding concerns figuring out what the problems are in the first place. It also involves coming to good formulations of problems, formulations that make them approachable. Often it also involves redefining a problem halfway through trying to solve it, out of the suspicion that one may not be working on quite the right problem.
- If there is no problem finding in sight, you can be sure that the learners are not playing the whole game.
- A whole game is generally some kind of inquiry or performance. It involves problem solving, explanation, argument, evidence, strategy, skill and craft. Often something gets created – a solution, an image, a story, an essay, a model.
 - It is never just about content. Learners are trying to get better at doing something.
 - It is never just routine. It requires thinking with what you know and pushing further.
 - It is never just problem solving. It involves problem finding
 - It is not just about right answers. It involves explanation and justification.
 - It is not emotionally flat. It involves curiosity, discovery creativity, and camaraderie.
 - It is not in a vacuum. It involves the method purposes, and forms of one or more disciplines or other areas, situated in a social context.
- Learners are often surprised by their new attitudes when they are put in role-playing scenarios where no they occupy such positions. Mindsets are not just the products of the values we hold, but the roles we play.
- In designing whole games,
- It is not just the form, it is the content and thinking. (i.e. what content and skills are they meant to cultivate? What kinds of thinking are they meant to foster – sifting historical evidence, detecting causal influences, adopting different perspectives?)
- It is not just playing the whole game, it is the other six principles.
- It is not just or even particularly discovery learning. Free-form practices do not work very well for beginners in a domain.
- If one wants to advance students' understanding of and engagement with a discipline or some other area of learning it is not just enough to have any old whole game in the neighborhood of the topic. One needs a well-targeted whole game, a whole game that engages learners centrally with generative knowledge and thinking in the discipline or area. Exciting activities are so seductive for teachers and students alike that it is easy to lose track of that goal.
- Academic learning time predicts rather well how much students learn much better than time sitting in class. The four attributes of learning time:
 1. Pace: Is each learner actively involved most of the time?
 2. Focus: Do learner's activities fall within the core game we would like to see the getting better at, rather than taking some other form of busyness?
 3. Stretch: Are learners being optimally challenged?
 4. Stick: Are parts of the unfolding pattern of activity designed specifically to help knowledge understanding and skill stick in place? Stick includes elements such as deliberate rehearsal, reflection, stock taking, and resisting ideas and practices later and then again later.

- Any learning activity as secondary dimensions that require or invite attention. A certain amount of that can be enriching, but it sometimes happens that the secondary dimensions end up gobbling much of the learning time.
- People understand something when they can think and act flexibly with what they know about it, not just rehearse information and execute routine skills.
- Inert knowledge: Most students forget most of what they have been taught. What they remember they often do not understand well. And what sticks with understanding often sees little active use.
- Teaching should focus on generative topics. These are topics that figure centrally in the discipline or practice, resonate with the learners' interests and concerns and, importantly, resonate with the teacher's also. They afford recurring opportunities for insight and application.
- *See Teaching for Understanding, by Martha Stone Wiske*
- It is important not to mix up generative knowledge with what is simply fun or doggedly practical.
- An especially provocative finding from research on learning says that the league of learner you are depends significantly on the learner you are expected to be and expect yourself to be. We tend to think of being a good learner as a matter of ability, but it is also enormously a matter of disposition, learners' confidence in and commitment to learning.
- Rosenthal articulated a four-factor way of looking at how teacher expectancy effects might operate:
 1. Climate (a warmer more welcoming social and emotional climate for students expected to achieve more,
 2. Feedback (more thorough, careful feedback),
 3. Input (attempts to teach more material and more difficult material)
 4. Output (More opportunities to respond)
- Notice that this is not just a matter of practicing the hard parts in the sense of repetition. It involves deconstructing them and reconstructing them so they are executed in new and better ways.
- The hearts and mind theory is the default practice all over the world. Take it to heart, keep it in mind, and do better next time. There is so much wrong with the theory that I hardly know where to begin. For one thing, it assumes that the heart is there, that learners care about improving the performance in question, care even though the class is now moving on to the next topic, care enough to pay attention not just to the grade, but to the feedback, trying to remember it and put it to work when attempting similar tasks in the future. For another, it assumes minds with enough understanding of the topic to make sense of relatively sparse feedback and use it effectively. For yet another, the theory proceeds as though the learners will have an opportunity to try again soon. Very often they do not.
- Often, feedback was not very informative, mostly just a matter of right and wrong; and most of the students were not fluent enough with the subject to learn effectively from this relatively sparse feedback.
- Three styles of feedback
 1. Corrective: Announces what is wrong
 2. Conciliatory: I liked it
 3. Communicative: three key elements
 - Clarification: Questions of clarification
 - Appreciation: Identification of positive features as seen by the evaluator.
 - Concerns and suggestions: How to improve or do better next time
- Research shows that early on in studying a topic, students routinely code problems in terms of surface characteristics rather than underlying principles.
- Negative transfer happens when something someone learns in one context undermines performance or learning in another context.

- Typical institutions of education display a monastic character. They function as closed systems, teaching and testing content much of which touches how people behave outside only in very narrow and limited ways. Transfer of learning has the potential to leap over the walls of the monastic school, but only if we can figure out how to play out of town well.
- We identified two very different mechanisms of transfer called high road transfer and low road transfer. High road transfer is a consequence of reflective abstraction. It occurs when people proceed thoughtfully and make conceptual connections. Low road transfer is a reflexive reaction to the surface characteristics of a situation. It occurs when a new situation spontaneously reminds people of a previous one.
- When transfer failed either the initial learning included very little in the way of reflective abstraction, or the initial learning involved little time and variety.
- Making the most of transfer means teaching whole games in the first place. It means, for instance, looking at the development of the Constitution not just as a unique historical story but as a complex negotiation with lessons for other settings of nation building and other negotiations in general.
- Standards for what makes themes especially “generative”
 - Interdisciplinary significance: Do the ideas have a broad significance within and beyond their own disciplinary context? Do they help us to see the world in a different way?
 - Societal significance: Do the ideas speak to concerns of society at large?
 - Personal significance: Do the ideas resonate with learners’ and teachers’ or mentors’ or parents’ hopes, desires, curiosities, and needs?
 - Charisma: Are the ideas magnetic, alluring, and arresting? Understandings of wide scope can prove technically useful without having a lot of charisma, but charisma helps.
- Alan Schoenfeld five-step self-management process
 1. Analyze the problem to understand it and find ways to simplify it
 2. Plan an overall approach that avoids premature calculations
 3. Exploration
 4. Implementation
 5. Verification
- Students who understand better have strong habits of self-explanation, and students trained in self-explanation come to understand better.
- Two kinds of reading strategies proved especially effective: searching backward and forward in the text to understand puzzling points better, and self-questioning strategies to gauge one’s progress and redirect one’s reading.
- Strategies for uncovering the hidden game of strategies
 - Find or devise a reasonable version of the hidden game, like Polya’s heuristics or reciprocal teaching.
 - Include self-management, not just good moves.
 - Teach the hidden game just like teaching anything else in the spirit of learning by wholes. Find good junior versions, lay them out, involve learners in playing them, show the worth of doing it, pay attention to transfer, practice the hard parts, and so on.
 - Evoke the dispositional side of it all – curiosity, empowerment, what makes the game worth playing and worth playing better.
 - Watch out for complexity and pacing. Burdening learners with too many things to manage at once can defeat the whole purpose.
- The game of inquiry is a largely hidden game. There are at least three sides to the challenge:
 - Final score problem: the theory deemed correct (e.g. court decision, “right” interpretation of the poem, etc.)

- Spectator problem: Things don't get real until the learners are actually playing the game.
- Rules of the game problem: Different disciplines handle matters of description, explanation, and justification in different ways.
- How do games hide?
 - Under the rug of simplicity: "You keep it straightforward, and we'll make an effort to learn it and achieve reasonable results and not complicate your life."
 - Off the track of common sense: Sometimes what is to be learned feels wrong generating a kind of visceral resistance, but the resistance is just transitional. The teaching-learning process needs to uncover the hidden game – not a red light here, just a bump in the road to somewhere worth going.
 - Within the margins of "good enough": first explanation may not apply in all instances
 - Inside the cloak of the tacit: the way things are done around here may not illuminate assumptions, motivations, etc.
 - Beyond the horizon of readiness: Where learners can perform with help but not alone is their zone of proximal development
- Think about what is to be learned in terms of the objects that come into view, objects to which learners were previously simply subject. Indeed, the zone of proximal development and the subject-object shift weave into a single scenario. It is the next available subject-object shift that makes up the zone of proximal development. The new objects define a horizon of curiosity and revealing threshold experiences as we uncover the hidden game.
- Social learning can reinforce mediocrity, as for instance when members of the labor force are "taught" by the group not to work too hard so that they will not end up revealing how productive people can really be.
- In any settings of formal learning, the learners themselves do hardly any of the driving. They do not have very many choices. Authors curriculum designers and teachers set up everything for them – define clearly and fully the game to be learned (whole game or not), motivate them through incentives and arguments for relevance, define the hard parts in advance, and ensure that the hard parts are well exercised. The general rule: Spell it out for them! When we micromanage the entire process for learners, they may learn the targeted content, but they are not so likely to learn how to learn.
- A shallow approach to learning concentrates on getting the facts and skills straight trying to look good, and especially trying not to look bad. The deep approach reaches for comprehensive understanding and cherishes intrinsic motivation rather than looking good. A strategic approach has a little of both: It targets recognition of good performance through grades and other kudos, with an emphasis on managing the work process well.
- Qualities of a natural engaged purposeful learning
 - The endeavor is experienced as immediately meaningful and worthwhile in itself...as well as representative of something larger.
 - Knowledge is woven in here and there from the past as needed...as well as revealed by the unfolding experience.
 - Conflicting knowledge from past experiences converges...and resolutions are negotiated through thought and experiment.
 - Considerable learning occurs automatically...extended by knowledge teased out through underscoring, reflection, and targeted rehearsal.