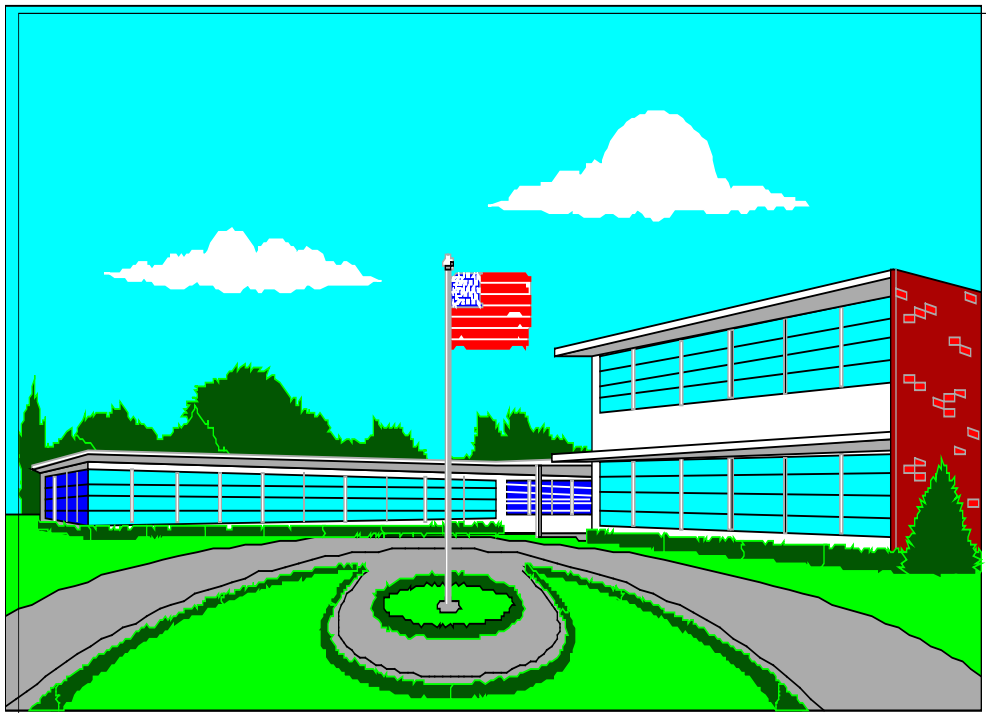
Schooling by Design:

Identifying School-Wide Principles of Learning



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Schooling by Design

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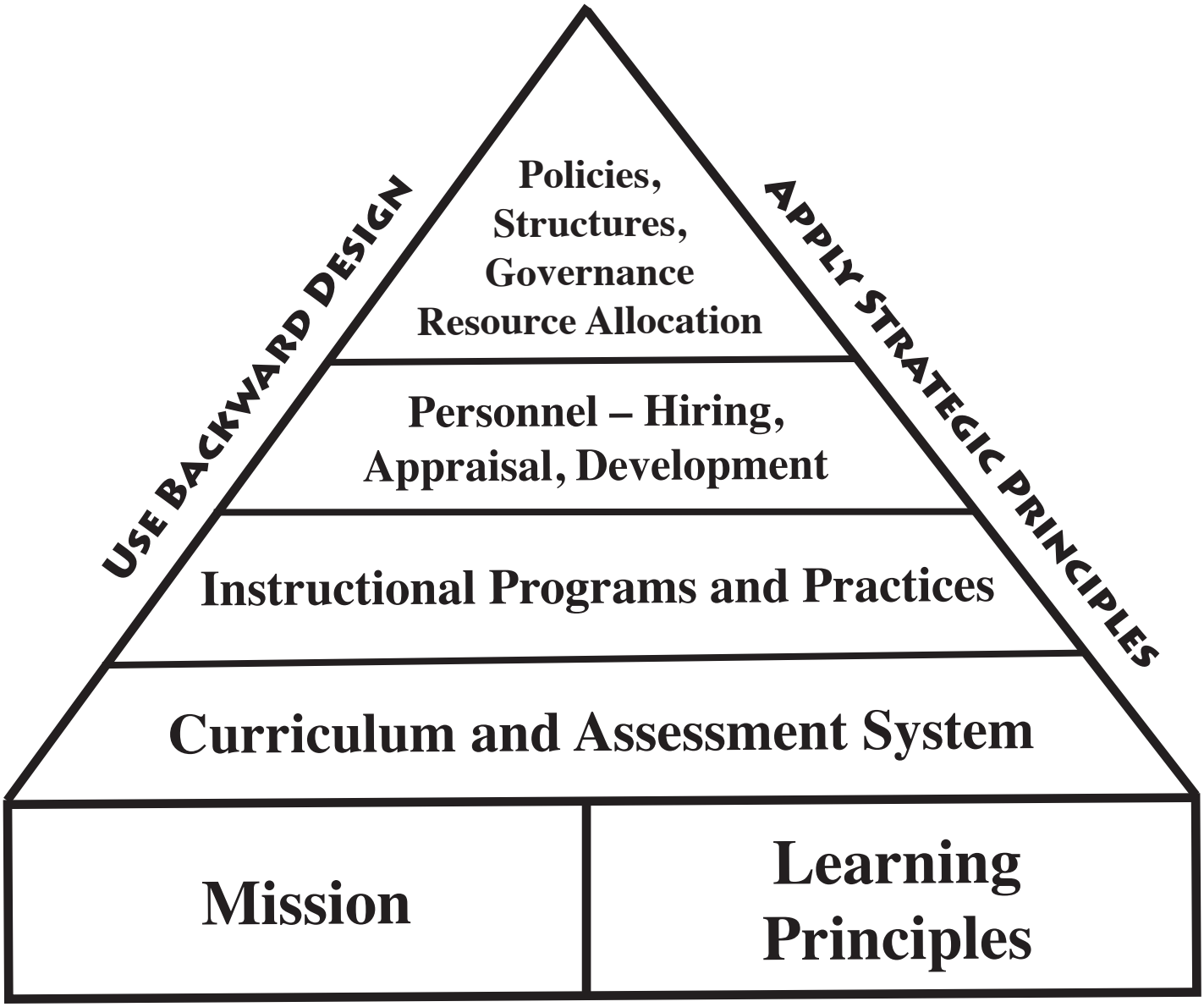

Conditions for Powerful Learning

Dr. Ronald S. Brandt

In general, we can say that people learn well when:

Ideas, Examples, Implications

What They Learn

1. What they learn is personally meaningful; they feel a need to learn it.

2. What they learn is challenging and they accept the challenge.

3. What they learn is appropriate for their developmental level.

How They Learn

4. They can learn in their own way and have some degree of choice and control.

5. They use what they already know as they construct new knowledge.

6. They have opportunities for social interaction.

7. They get helpful feedback.

8. They acquire and use strategies.

The Setting in Which They Learn

9. They experience a positive emotional climate.

10. Their environment supports the intended learning.

Source: Brandt, R. (1998). *Powerful Learning*. Alexandria, VA: ASCD

Identifying School-wide Principles of Learning

Goal

An agreed-upon set of Principles of Learning for the school

Intent

Since the Learning Principles reflect research and best practice, they serve to guide curriculum planning, instruction and assessment. They provide a common language for conversations about teaching and learning, and function as criteria for a variety of school actions, (e.g., textbook selection, classroom observations).

Process

In order to build understanding and ownership, school staff should be actively involved in the process of identifying the shared Principles of Learning. One such process is outlined below:

Step 1 – Discuss the goal and intent of agreeing on a common set of Principles of Learning for the school.

Step 2 – Engage staff in the "Best Learning" exercise. Collect and compile a draft set of responses. (Note: Parents and students could also be involved in this exercise.)

Step 3 – Circulate the draft list of responses to the "Best Learning" exercise to staff groups (e.g., grade level teams, Departments, Division levels, etc.) for their review and recommendations. Questions for consideration by the groups:

- *Does the list reflect all the important Principles of Learning?*
- *Are the principles clearly stated and understandable?*
- *What does each principle imply for our work? Would some established practices need to be changed to better align with a stated principle?*

Note: Additional examples of developed Learning Principles can also be reviewed at this time.

Step 4 – Each group submits suggested edits, additions, deletions, etc. to a designated team, which reviews the recommendations of the various groups and complies a synthesized and edited list.

Step 5 – The edited list of Learning Principles is circulated for a second review. (If major edits are proposed, the process continues until a generally-agreed upon set of Learning Principles is produced.)

Step 6 – The final list of Learning Principles is presented for staff review and sign off. By signing, staff members commit to accepting and agreeing to acting on the agreed-upon Principles of Learning.

Note: The Learning Principles should not be "set in stone." They can (and should) be periodically revisited and refined to reflect emerging research and staff insights from their application.

What Is Exemplary Design for Learning?

1. Think back to your many prior experiences with well-designed learning, *both in and out of school*. What was the most **well-designed learning experience** you have ever encountered as a learner? What features of the design - *not* the teacher's style or your interests - made the learning so **engaging and effective**? (Design elements include: challenges posed, sequence of activities, resources provided, assignments, assessments, groupings, teacher's role, etc.).
   Briefly describe the design, below:

2. In sharing your recollections and analyses with your colleagues, build **a list of generalizations that follow** from the accounts. What do well-designed learning experiences have in common? In other words, what must be built in "by design" for any learning experience to be maximally e**ffective** *and* **engaging** for students?

The best designs for learning...

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Schooling by Design: Key Learning Principles

1. Learning is purposeful and contextual.
Therefore, students should be helped to see the purpose in what they are asked to learn. Learning should be framed by relevant questions, meaningful challenges, and authentic applications.

2. Experts organize or chunk their knowledge around transferable core concepts ("big ideas") that guide their thinking about the domain and help them integrate new knowledge.
Therefore, content instruction should be framed in terms of core ideas and transferable processes, not as discrete facts and skills.

3. Different types of thinking, such as classification and categorization, inferential reasoning, analysis, synthesis, and metacognition, mediate and enhance learning.
Therefore, learning events should engage students in complex thinking to deepen their learning.

4. Learners reveal and demonstrate their understanding when they can apply, transfer, and adapt their learning to new and novel situations and problems.
Therefore, teachers should teach for transfer, and students should have multiple opportunities to apply their learning in meaningful and varied contexts.

5. New learning is built on prior knowledge. Learners use their experiences and background knowledge to actively construct meaning about themselves and the world around them.
Therefore, students must be helped to actively connect new information and ideas to what they already know.

6. Learning is social.
Therefore, teachers should provide opportunities for interactive learning in a supportive environment.

7. Attitudes and values mediate learning by filtering experiences and perceptions.
Therefore, teachers should help students make their attitudes and values explicit and understand how they influence learning.

8. Learning is nonlinear; it develops and deepens over time.
Therefore, students should be involved in revisiting core ideas and processes so as to develop deeper and more sophisticated learning over time.

9. Feedback enhances learning and performance.
Therefore, ongoing assessments should provide learners with regular, timely, and user-friendly feedback, along with the opportunity to use it to practice, retry, rethink, and revise.

10. Effectively accommodating a learner's preferred learning style, prior knowledge, and interests enhances learning.
Therefore, teachers should pre-assess to find out students' prior knowledge, learning preference, and interests; then differentiate their instruction to address the significant differences they discover.

L.R.D.C. Principles of Learning

1. Learning is an active process in which the learner uses sensory input and constructs meaning out of it. The more traditional formulation of this idea involves the terminology of the active learner (Dewey's term) stressing that the learner needs to do something; that learning is not the passive acceptance of knowledge which exists "out there" but that learning involves the learner s engaging with the world.

2. People learn to learn as they learn: learning consists both of constructing meaning and constructing systems of meaning. For example, if we learn the chronology of dates of a series of historical events, we are simultaneously learning the meaning of a chronology. Each meaning we construct makes us better able to give meaning to other sensations which can fit a similar pattern.

3. The crucial action of constructing meaning is mental: it happens in the mind. Physical actions, hands-on experience may be necessary for learning, especially for children, but it is not sufficient; we need to provide activities which engage the mind as well as the hands.

4. Learning involves language: the language we use influences learning. On the empirical level. researchers have noted that people talk to themselves as they learn. On a more general level. there is a collection of arguments, presented most forcefully by Vigotsky, that language and learning are inextricably intertwined.

5. Learning is a social activity. Our learning is intimately associated with our connection with other human beings.

6. Learning is contextual. We do not learn isolated facts and theories in some abstract ethereal land of the mind separate from the rest of our lives: we learn in relationship to what else we know, what we believe, our prejudices and our fears.

7. One needs knowledge to learn. It is not possible to assimilate new knowledge without having some structure developed from previous knowledge to build on. The more we know, the more we can learn. Therefore any effort to teach must be connected to the state of the learner, must provide a path into the subject for the learner based on that learner's previous knowledge.

8. It takes time to learn: learning is not instantaneous. For significant learning we need to revisit ideas, ponder them, try them out, play with them and use them. If you reflect on anything you have learned, you soon realize that it is the product of repeated exposure and thought. Even, or especially, moments of profound insight, can be traced back to longer periods of preparation.

9. Motivation is a key component in learning. Not only is it the case that motivation helps learning, it is essential for learning. This ideas of motivation as described here is broadly conceived to include an understanding of ways in which the knowledge can be used. Unless we know "the reasons why," we may not be very involved in using the knowledge that may be instilled in us, even by the most severe and direct teaching.

Source: Lauren Resnick, Director Learning Research and Development Center University of Pittsburgh

Learner-Centered Psychological Principles: A Framework for School Redesign and Reform

Cognitive and Metacognitive Factors

1. Nature of the learning process.....The learning of complex subject matter is most effective when it is an intentional process of constructing meaning from information and experience.

2. Goals of the learning process..... The successful learner, over time and with support and instructional guidance, can create meaningful, coherent representations of knowledge.

3. Construction of knowledge..... The successful learner can link new information with existing knowledge in meaningful ways.

4. Strategic thinking..... The successful learner can create and use a repertoire of thinking and reasoning strategies to achieve complex learning goals.

5. Thinking about thinking..... Higher order strategies for selecting and monitoring mental operations facilitate creative and critical thinking.

6. Context of learning..... Learning is influenced by environmental factors, including culture, technology, and instructional practices.

Motivational and Affective Factors

7. Motivational and emotional influences on learning..... What and how much is learned is influenced by the learner's motivation. Motivation to learn, in turn, is influenced by the individual's emotional states, beliefs, interests, and goals, and habits of thinking.

8. Intrinsic motivation to learn..... The learner's creativity, higher order thinking, and natural curiosity all contribute to motivation to learn. Intrinsic motivation is stimulated by tasks of optimal novelty and difficulty, relevant to personal interests, and providing for personal choice and control.

9. Effects of motivation on effort..... Acquisition of complex knowledge and skills requires extended learner effort and guided practice. Without learners' motivation to learn, the willingness to exert this effort is unlikely without coercion.

Developmental and Social Factors

10. Developmental influences on learning..... As individuals develop, there are different opportunities and constraints for learning. Learning is most effective when differential development within and across physical, intellectual, emotional, and social domains is taken into account.

11. Social influences on learning..... Learning is influenced by social interactions, interpersonal relations, and communication with others.

Individual Differences

12. Individual differences in learning..... Learners have different strategies, approaches, and capabilities for learning that are a function of prior experience and heredity.

13. Learning and diversity..... Learning is most effective when differences in learners' linguistic, cultural, and social backgrounds are taken into account.

14. Standards and assessment..... Setting appropriately high and challenging standards and assessing the learner as well as the learning progress--including diagnostic, process, and outcome assessment-are integral parts of the learning process.

Source: American Psychological Association (1995). *Learner-centered psychological principles: A framework for school redesign and reform. Washington, D. C.: American Psychological Association. (12 p.)*

Seven Principles of Learning*

1. Learning with understanding is facilitated when new and existing knowledge is structured around the major concepts and principles of the discipline.
2. Learners use what they already know to construct new understandings.
3. Learning is facilitated through the use of metacognitive strategies that identify, monitor, and regulate cognitive processes.
4. Learners have different strategies, approaches, patterns of abilities, and learning styles that are a function of the interaction between their heredity and prior experiences.
5. Learners' motivation to learn and sense of self affects what is learned, how much is learned, and how much effort will be put into the learning process.
6. The practices and activities in which people engage while learning shape what is learned.
7. Learning is enhanced through socially supported interactions.

Principles of Instruction for Understanding*

Teaching for conceptual understanding in advanced mathematics and science courses:

1. Maintains students' focus on the central organizing themes and underlying concepts of the discipline.
2. Is based on careful consideration of what students already know, their ideas and ways of understanding the world, and the patterns of practice they bring into the classroom.
3. Focuses on detecting, making visible, and addressing students' often fragile, underdeveloped understandings and misconceptions.
4. Reflects an understanding of differences in students' interests, motivations, preferences, knowledge, and abilities.
5. Is designed to provide the appropriate degree of explicitness for the situation and the abilities of the learners.
6. Recognizes students' preferences for and varying abilities to process different symbol systems, such as language (written and spoken), images, and numerical representations, by employing multiple representations during instruction.
7. Engages students in worthwhile tasks that provide access to powerful mathematical and scientific ideas and practices; moves students to see past the surface features of problems to the deeper, more fundamental principles; and develops their conceptual understanding.
8. Structures learning environments in which students can work collaboratively to gain experience in using the ways of thinking and speaking used by experts in the discipline.
9. Orchestrates classroom discourse so that students can make conjectures, present solutions, and argue about the validity of claims, thus helping them explore old understandings in new ways, reveal misconceptions, and generalize and transfer their learning to new problems or more robust understandings.
10. Provides explicit instruction in metacognition as part of teaching in the discipline.
11. Uses various kinds of formal and informal formative assessments to monitor students' understanding and target instruction effectively.
12. Creates expectations and social norms for the classroom that allow students to experience success and develop confidence in their abilities to learn.

*Source: Committee on Programs for Advanced Study of Mathematics and Science in American High Schools

Characteristics of the Best Learning Designs...

(based on surveys of K-16 faculty throughout the nation)

Expectations ***the best learning designs...***

- provide clear learning goals and performance expectations.
- cast learning goals in terms of genuine/meaningful performance.
- frame the work around genuine questions & meaningful challenges.
- show models/exemplars of expected performance.

Instruction ***in the best learning designs...***

- the teacher serves as a facilitator/coach to support the learner.
- targeted instruction and relevant resources are provided to "equip" students for expected performance.
- the textbook serves as one resource among many (i.e., text is resource, not syllabus).
- the teacher "uncovers" important ideas/processes by exploring essential questions and genuine applications of knowledge and skills.

Learning Activities ***in the best learning designs...***

- individual differences (e.g., learning styles, skill levels, interests) are accommodated through a variety of activities/methods.
- there is variety in work, methods and students have some choice (e.g., opportunities for both group and individual work).
- learning is active/experiential to help students "construct meaning".
- cycles of *model-try-feedback-refine* anchor the learning

Assessment ***in the best learning designs...***

- there is no mystery as to performance goals or standards.
- diagnostic assessments check for prior knowledge, skill level, and misconceptions.
- students demonstrate their understanding through "real world" applications (i.e., genuine use of knowledge and skills, tangible product, target audience).
- assessment methods are matched to achievement targets.
- on-going, timely, and descriptive feedback is provided.
- learners have opportunities for trial and error, reflection and revision.
- self-assessment is expected.

Sequence & Coherence ***the best learning designs...***

- start with a "hook", immerse the learner in a genuine problem/issue/challenge.
- move back and forth from whole to part, with increasing complexity.
- scaffold learning in "do-able" increments.
- teach as needed; don't over-teach all of the "basics" first.
- revisit ideas – have learners rethink and revise earlier ideas/work.
- are flexible (e.g., respond to student needs; revise plan to achieve goals).

Analyzing Current Practices Against Best Learning Designs

3 = consistently 2 = sometimes 1 = rarely/never

	3	2	1
Expectations *To what extent does my/our designs…*			
• provide clear learning goals and performance expectations (i.e., no mystery for learners)?	❑	❑	❑
• cast learning goals in terms of genuine/meaningful performance?	❑	❑	❑
• frame the work around genuine questions & meaningful challenges?	❑	❑	❑
• show models/exemplars of expected performance?	❑	❑	❑
Instruction *To what extent does my/our teaching…*			
• provide targeted instruction and relevant resources to "equip" students for expected performance?	❑	❑	❑
• use the textbook as one resource among many (i.e., the textbook is a resource, *not* the syllabus)?	❑	❑	❑
• help "uncover" important ideas/processes by exploring essential questions?	❑	❑	❑
Learning Activities *To what extent does my/our learning activities…*			
• address individual differences (e.g., learning styles, skill levels, interests) through a variety of activities/ methods (vs. "one size fits all")?	❑	❑	❑
• provide variety in work, methods and students have some choice (e.g., opportunities for both group and individual work)?	❑	❑	❑
• include inquiry/experiential opportunities to help students "make meaning" for themselves?	❑	❑	❑
• incorporate cycles of *model-try-feedback-refine* learning experiences?	❑	❑	❑
Assessment *To what extent does my/our assessments…*	❑	❑	❑
• provide appropriate measures of *all* of the learning goals?	❑	❑	❑
• ask students to demonstrate their understanding through "real world" applications?	❑	❑	❑
• provide on-going, timely, and descriptive feedback to learners?	❑	❑	❑
• include opportunities for trial and error, reflection and revision?	❑	❑	❑
• allow self-assessment by the learners?	❑	❑	❑
Sequence & Coherence *To what extent does my/our designs…*			
• include pre-assessments to check for prior knowledge, skill level, and misconceptions?	❑	❑	❑
• begin with a "hook" (e.g., immerse the learner in a genuine problem/issue/challenge)?	❑	❑	❑
• move back and forth from whole to part, with increasing complexity?	❑	❑	❑
• scaffold learning in "do-able" increments?	❑	❑	❑
• revisit important ideas/questions and allow learners to rethink and revise earlier ideas/work?	❑	❑	❑
• remain flexible (e.g., to respond to student needs; allow revisions to achieve goals)?	❑	❑	❑

Analyzing Current Practices Against Learning Principles

To what extent do our actions reflect each learning principle? **3 = consistently 2 = sometimes 1 = rarely/never**

Learning Principles	3	2	1	Implications
_____	❑	❑	❑	_____
_____	❑	❑	❑	_____
_____	❑	❑	❑	_____
_____	❑	❑	❑	_____
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