

The Ten Principles of Changing Wisdoms

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Our language and sciences of wisdom rival Babel. We misunderstand each other, learn slowly and tediously, and our scientists often fail even to replicate their carefully designed studies.ⁱⁱ The purpose of this short article is to summarize a half-century of research aimed at solving these problems.

Wisdom in the Bible was a single quality, identified by the actions of people who had expertise in a specific area of knowledge or craft. In today's complex world, each area of expertise is made up of numerous components or dimensions. Thinking of wisdom as a unifying trait has turned it into a mystery across the ages. We can begin

to demystify wisdom by viewing it as organized into a myriad of possible wisdoms, each one performed by a person who is becoming expert in a particular area.

Thinking of wisdom as comprised of a myriad of wisdoms helps us to unravel ways to learn wisdoms more efficiently, to improve our understanding of people with different expertise from ours, and to create a more reliable science of the development of wisdom. The ten principles that follow contribute to these goals.

Dimensions

The *dimensions* principle of changing wisdoms is that each area of expertise is divided into numerous dimensions.

We use dimensions to evaluate our practices so much that we often fail even to notice when we do it. Teaching and

learning a new task, however, becomes more efficient and effective after we identify the dimensions of the task.

A good sign that we are using dimensions is when we think, “I did this part of the task well, but not that.” One well-known example is when Benjamin Franklin decided to improve his conduct in his twenties by working on thirteen virtues. They were Temperance, Silence, Order, Resolution, Frugality, Industry, Justice, Sincerity, Moderation, Cleanliness, Tranquility, Chastity, and Humility. Each virtue is an example of a dimension of social expertise.

If Franklin had focused on his printing expertise, his list would have been quite different, consisting of dimensions such as loading type, selecting paper, preparing ink, maintaining the press, etc.

Our development occurs through separate dimensions. Each

developmental dimension has at least one simple way of doing things and one more complex way. Since complex practices are more difficult to acquire than simple ones, there is usually a big advantage of using the complex way.

Experts often intuitively know how important each dimension of a task is for a particular situation. For example, one printing task might call for highly durable paper which would not matter for another task. A course like anatomy calls for memorizing terms, while a course in writing might emphasize applications to experience.

We can learn a complex way of practicing one dimension of a task even when we neglect other dimensions. This fact is important because it tells us when two components of a task are really two dimensions of it. In general, we know two components of performance are

from different developmental dimensions when it makes sense for a complex way of performing in one dimension to occur along with a primitive level in the other and vice versa. Each dimension of an area of expertise is learned independently from the other dimensions.

Modes of Practice

The *modes-of-practice* principle is that learning progresses through five levels of complexity.

Often, we simplify dimensions too much into just a simple and a complex way of doing it. This not only slows down learning, but it can also have long term negative consequences for remembering and using the dimension.

Learning how to type is an example familiar to most of us. One dimension of learning involves the amount of text we

type as a unit. Some of us avoid typing altogether. Beginners type letters one at a time, hunt-and-peck style. Learners soon acquire the next mode of typing whole words. After a few years of experience, we can type whole phrases. One study of expert copy typists pulled the source from their desks only to find them typing a dozen more words. This showed that the experts were typing whole sentences rather than just phrases. So, these are five modes of practice: avoiding, typing letters, words, phrases, and sentences. After these five modes, the activity becomes too complex for our brains to produce in a single instance.

Two-finger typists are good examples of thinking about a task as having only a simple (letter finding) and a complex (sentence typing) level. Touch typing enables learning to type whole words and whole phrases. Five modes of

practice allow us to engage in the full potential of a dimension.

To learn about wisdoms, we need more than one dimension of an expertise and more than two levels of complexity. To make such a study practical, we need to see whether our results generalize to a wide variety of areas of expertise.

Description

The *description* principle is that we can obtain an adequate theory of an area of expertise by conducting “developmental interviews,” in which we ask experts to describe the dimensions of their areas of expertise and the modes within them.

Developmental interviews of more than three-hundred experts from nearly one-hundred areas of expertise revealed that the five modes of practice for dimensions occurred in widely diverse areas of expertise.

The areas of the experts in those interviews ranged from architecture to music, game design to rabbinics, and auto sales to teaching, as well as 20 areas of design and 30 of liberal arts. Labels for the five modes evolved as we conducted interviews over the decades:

1. *Avoid*: It takes only seconds to avoid a dimension of practice.
2. *Begin*: It takes a few minutes to try a dimension for the first time.
3. *Explore*: Learners explore a dimension of practice, often for a few weeks or months using modes of practice that are learned quickly and performed ineptly.
4. *Sustain*: It takes years of experience before people acquire modes of practice that can be performed well enough to be socially acceptable over time in most situations.
5. *Inspire*: Ultimately a few learners make discoveries or innovations

about the dimension of practice.
When other people copy these, we
call them “inspiring.”

Praxomics

The *praxomics* principle is that we can measure the development of a mode of practice by counting the frequency of its usage over time in people with different amounts of experience.

When we can study a large sample of people with different amounts of experience in an area of expertise, it is possible to see gradual changes in how often each mode of practice is used.

Praxomics provides the science behind changing wisdoms, but even without its exact results, practical users can learn much from it about recognizing, learning, using, and evaluating modes of practice.

The Succession Equation

The *succession principle* is that for every dimension, an equation based on four parameters describes how often each of its modes of practice is used at different points in development.

The genomes of all living species use the same four bases. The entire genomes vary from a few hundred thousand base pairs in some bacteria to a few hundred billion in some plants. This creates amazing diversity from a few chemicals.

Similarly, the succession equation for all dimensions includes the same four parameters, but the values for each mode of practice are unique. This means that the way a dimension of practice grows will rival the complexity of life.

The first parameter is the mode's *initial frequency* when we began to learn it. The second is its *growth rate*. Third,

more complex modes suppress the use of simpler ones. The extent of this suppression is a mode's *competitive strength*. Finally, modes exist among a milieu of other modes. Each has an *equilibrium level* of use often determined by the acceptance of others.

The initial frequency does not matter as much as the growth rate of the exploratory mode and the competitive strength of the modes that follow. For example, a hallmark of knowledge development is collaboration. Explorers try to dominate, sustainers use a division of labor, and only inspiring collaborators put their ideas together to invent something neither could have invented by themselves. Since exploring has no competitive strength, being able to tell when a learner is just exploring from when they are using a more complex mode is important.

The equilibrium frequency is also important. For example, telling a child, she can't practice her violin during her parents' working hours lowers the acceptance of practicing and thus its equilibrium frequency. Using that example, shows that the equilibrium frequency can change with different modes of practice. The frequency that any audience could accept for a concert violinist is much higher than that for a child just exploring the instrument.

Scale

The *scale* principle is that the succession equation applies to different durations and dispersions of modes of practice.

The modes can be as short-lived as hitting one's thumb with a hammer or as enduring as practicing a religion. They can exist only at Yellow Stone's Old Faithful or be spread around the globe like eating with utensils. Therefore, the

mode's scale lasts from minutes to millennia and can be found everywhere from contact to continents.

My colleagues and I studied thousands of instances of drawing, writing, and developmental research articles. For all three areas of expertise, the succession equation described how often each mode of practice was used over time. Less rigorous observations suggest that they are likely also to apply as well to conversations to whole disciplines.

The scale principle means that the other nine principles of changing wisdoms can be useful for observing, reflecting on, learning, or performing vastly different modes of practice in vastly different places and times.

Transformative Learning

The *transformative learning* principle is that to replace one mode of practice with

the next involves a special learning process that is much more complex than iterative learning.

Distinguishing transformative from iterative learning is one of the most practical changing wisdoms principles. Expertise in ten-thousand hours of deliberate learning has been well publicized. The need to change the type of learning several times is more important for speeding up learning and identifying what others know.

Jack Mezirow invented the term “transformative learning” and identified ten activities within it. My colleagues and I did a detailed study of over 500 learning sessions and found some activities usually occurred in the same sessions. This resulted in just four different types of resolutions.

DEEP resolutions

The *DEEP resolutions* principle is that transformative learning requires four resolutions called Discern, Examine, Enable, and Perform.

- *Discern dilemmas*: Recognize any increasingly frequent accumulation of problems with a current mode.
- *Examine*: Reflect, assess one's own role, discuss with trusted others, and identify a next mode of practice.
- *Enable*: Plan, get help from someone with more advanced experience, and rehearse.
- *Perform*: Introduce in public and then use regularly.

Transformative learning at simple modes of practice involves the same first three resolutions as for complex modes. Nevertheless, the “public” grows more complex as we perform later modes of practice, being absent for

avoiding, then a mentor, companions doing the same thing, collaborators adding different skills, and ultimately collaborators from different disciplines.

Deliberately using the 4 resolutions speeds up the transformative process by helping to avoid delays and setbacks. Not only academic learning benefits from knowing the resolutions, but so do the processes of dealing with loss, traumatic events, and life-cycle events.

Precluded Learning

The *precluded learning* principle is that when we curtail transformative learning for any reason, there are different effects for each mode of practice and resolution involved.

Though the resolutions are similar for all five modes of practice, learning is precluded for unique reasons within each mode.

Decisions to try or preclude transformative learning have such long-range social consequences that creative writers turn them into great stories.

As most parents of teenagers can attest, exploratory modes not only grow very quickly but can even be life threatening. Drugs, crime, and other forms of self-injury start as explorations. Such evils often result when we preclude the enabling of sustainable practices.

The extremely fast growth of exploratory practices eventually results in their exceeding the equilibrium level of the mode. The succession equation reveals that when this happens, the use of the entire dimension collapses. For example, a child who makes exploratory drawings with stick people on base lines will be rewarded in kindergarten but possibly even ridiculed for them by fifth grade, where other children are using

curved outlines for people, animals, and plans and putting them on base planes. When acceptance fails, either the child will quit drawing altogether (claiming as adults “I can’t draw”) or they do the transformative learning necessary to use more sustainable drawing practices.

We sometimes preclude transformative learning by curtailing an exploratory or sustaining mode to immediately engage in its successor. The succession equation predicts that when learners do this, they risk destroying their use of the dimension unless they slow down the acquisition of the successor mode.

The table below identifies how the effects of precluding a resolution change from one transformation to the next. More research is needed to determine if these are the only effects.

Transformative Learning for Dimensions

Mode	Try	Preclude
Avoid	Dilemmas	<i>Indifferent</i>
	Examine	<i>Reject</i>
	Enable	<i>Mistrust</i>
	<i>Ignore and leave the situation</i>	
Begin	Dilemmas	<i>Continue to avoid</i>
	Examine	<i>Embarrassed</i>
	Enable	<i>Procrastinating</i>
	<i>Perform after being shown</i>	
Explore	Dilemmas	<i>Start over at beginning</i>
	Examine	<i>Wishful thinking</i>
	Enable	<i>Caution and evil</i>
	<i>Perform with a companion</i>	
Sustain	Dilemmas	<i>Explore to excess</i>
	Examine	<i>Frustrated</i>
	Enable	<i>Dissociate</i>
	<i>Perform with division of labor</i>	
Inspire	Dilemmas	<i>Acquiesce to sustain</i>
	Examine	<i>Overspecialized</i>
	Enable	<i>Stagnated</i>
	<i>Perform with multi-disciplinary integration</i>	

Wisdoms

Finally, the *wisdoms* principle is that a single performance of a wisdom in an area of expertise includes one mode of practice from each dimension of the expertise.

When we create curriculum or assess learning in any area of expertise, we first identify its dimensions. Each expert in the entire set of interviews identified between 5 and 20 dimensions (so, Ben Franklin's 13 virtues were a typical number). Expert curriculum designers and program assessors give each mode of practice in each dimension a unique name. This resulted in needing 25 to 100 terms for labelling all the modes of practice in each area of expertise. We define each mode so that any single performance can have only one mode of practice from each dimension. If we identified all five modes of practice in

Ben Franklin's virtues, we would label them using 65 different terms, but these can distinguish 5^{13} (just over a billion) possible patterns of performances.

The extreme classification power of such praxomic systems is revealed in one memorable fact: though it takes decades to master 13 dimensions, a disciplinary expert can describe in detail any performance of them in 5 or 10 seconds. Thus, the ten principles make it possible for a small number of terms to distinguish quickly all the enormous variety of wisdoms humanly possible in any area of expertise.

Modern biologists would not think of studying a cell without identifying what species and organ it came from. Their well-developed classification system enables clear communication. To scientifically study wisdom, scientists need to develop the language and

classification of wisdoms as carefully as they have for organisms. The principles of changing wisdoms inspire us to explore a common nomenclature for dimensions and modes of practice.

Whether we need to develop social virtues, professional skills, educate others, counsel, inspire our communities, or conduct research, the principles of changing wisdoms can make our efforts more efficient, powerful, reliable, and productive.

ⁱ Michael Stevens, Elise Ching, and Marilyn Silberstein made important contributions to the clarity of this article.

ⁱⁱ For details, see Dirlam, D. K. (2017). *Teachers, learners, nodes of practice: Theory and methodology for identifying knowledge development*. Routledge Explorations in Developmental Psychology, New York: Routledge.