Letter from Industry

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Story Thinking Compared with 50 Change Models

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Abstract

Given that neuroscience has found evidence that we are wired for stories, there should also be evidence of our inherent connection to stories outside neuroscience, within the models we have created to guide transformational change. In seeking this external evidence, we first consider several story patterns to be used in this comparison. Then 50 popular change models are compared with a story pattern to look for evidence of alignment. The findings provide evidence of alignment between a cyclic story pattern and many professional change models, and we also find some change models which do not align to a story pattern, indicating a profession that is not well understood. We conclude with some implications and recommendations for current professional change models related to healthcare, policy-making, education, innovation, and AI.

Keywords: story; storytelling; story thinking; narrative; cognitive narratology; neuroscience; change.

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1 Introduction

Cognitive narratology is the study of how people view events as a story narrative to help them understand and structure their experiences (Herman 2007). It studies the theory of stories and storytelling and involves efforts to connect the study of the mind with the study of story narratives, and how story patterns can support various research areas and professional fields.

Research in cognitive narratology has become more important since the field of neuroscience has discovered that our brains are wired for stories as our common mental model used towards sensemaking and understanding. "We think in story. It's hardwired in our brain. It's how we make strategic sense of the otherwise overwhelming world around us" (Cron, 2012, p. 8). Perhaps most importantly, "storytelling is central to meaning-making and sense-making. It is through story that our minds form and examine our own truths and beliefs, as well as discern how they correlate with the truths and beliefs of others" (Peterson, 2017). Beyond having just facts and rules to remember, it is the story which "activates the cortical, parietal, subcortical, and frontal portions of the brain leading to better retention and recall of complex concepts and abstract ideas" (Gupta and Jha, 2022, p. 607).

Researchers found that "regions that are not traditionally thought to be part of a 'language network' in the brain become consistently activated when people listen to narratives" (Martinez-Conde et al., 2019, p. 8286). Our brains are "built to process stories more quickly and retain the information in them longer" (Kelly, 2016, p. 88). Not only is the story narrative central to meaning-making, it also releases cortisol, dopamine, and oxytocin in the brain. Cortisol helps us remember the point of the story, while dopamine keeps us engaged. Oxytocin is associated with empathy, which is important for building and maintaining good relationships (Peterson, 2017).

Given this internal evidence that neuroscience has found related to the importance of stories, there should be some evidence through cognitive narratology that we have externalized and integrated story patterns within professional fields for how work is modeled and understood. Can we find examples of specific transformational change models where the prescriptive steps are aligned with a story pattern? If we find examples where professional models are not aligned with a story pattern, will it indicate professions that are not well understood? To answer these questions, we will first need to choose a comprehensive story pattern to be used in these comparisons.

When watching a movie or listening to someone tell their story, there is a general pattern for how the story starts, how it evolves, and how it ends. This basic pattern, with a *beginning*, *middle*, and *ending*, has been known since Aristotle pointed it out to us about two thousand years ago in his book, *Poetics*. At the beginning of the story, there is a normalcy that becomes disrupted. This is followed by a discovery of the real issue and a plan for how to deal with it. Then the plan is hit with obstacles which are eventually overcome, providing a resolution, but also some transformation in the main character. The ending provides closure with new normalcy, at least until the sequel arrives, and a new story, adventure, or work project begins.

Over time, this linear pattern with a *beginning*, *middle*, and *ending*, has been expanding into several variations, including the story arc: *exposition*, *rising action*, *climax*, *falling action*, and *resolution*. But a *linear* and *arc* pattern do not provide the detail found within a *cyclic* representation, which will be necessary when comparing the most popular transformational models. Figure 1 shows an example of a cyclic story pattern with the key steps found in The Hero's Journey.

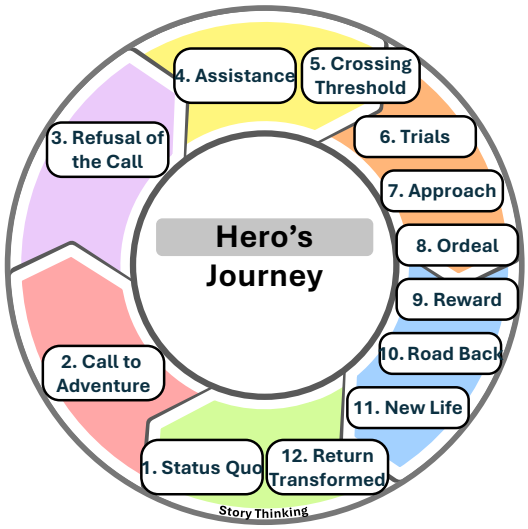


Figure 1. The Hero's Journey represented in a cyclic story pattern.

The Hero's Journey, popularized by Joseph Campbell, provides the transformational steps involved in a classic story, where we begin and end in a state of routine. In this cyclic story pattern, the routine of normalcy is at the bottom, representing the idea of gravity where we settle into a routine and status quo, and it takes energy to overcome before returning to normalcy, having transformed.

2 Story Thinking

The narratives within storytelling represent a "communication" strategy based on the knowledge that our brains are wired for stories. But the field of cognitive narratology is not just about using stories as a *communication* strategy. It is about using stories as an *operational* strategy, where we are engaged in the models of working environments, not just listening to entertaining stories.

Carl Jung said, "You are IN a story, whether you know it or not." The problem with the term *storytelling* within the field of cognitive narratology is that there is an expectation that every organizational activity will appear as a transformational event, when in most cases, while still within a story, most activities will be transactional or simply reactionary, resting within a routine until the sequel or new project emerges. The author makes this distinction by referring to the operational strategy of cognitive narratology as *Story Thinking*, instead of *storytelling*.

More specifically, Story Thinking expands Aristotle's three-part description of stories (beginning, middle, and ending) into six phases of the cycle (see Figure 2): Automation, Disruption, Investigation, Ideation, Expectation, and Affirmation (ADIIEA). "Starting from our normal reactive routine (Automation), we encounter something out of the ordinary (Disruption) and begin to look deeper into the situation (Investigation). Then we think of some ideas (Ideation) and put a plan into action (Expectation). With a sound plan, we eventually see positive results (Affirmation), and over time, we settle into a new routine (Automation), operating on autopilot and status quo" (Lewis, 2019, p. 9).

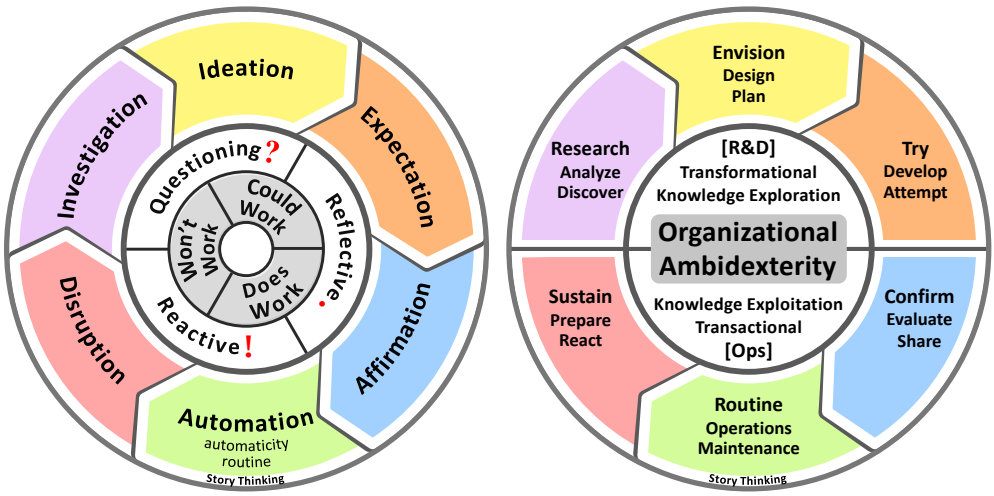


Figure 2. Psychological states of a story compared with organizational activities.

There are underlying mental states inside the story, which are producing the six phases represented in Story Thinking, based on workability beliefs (won't work, could work, does work) and response modes (reactive, questioning, reflective). For example, Automation is the phase in the story where we believe that our actions do work and we perform them reactively, without thinking, either from training and repetition or with AI/mechanical automation technology. And Ideation is the phase in the story where we believe that questioning will produce ideas that could work (Lewis, 2014).

When comparing Story Thinking with organizational activities (see Figure 2), we find the bottom half of the story is related to operations, transactional change, and knowledge exploitation.

And the top half is related to research and development, transformational change, and knowledge exploration. Organizational ambidexterity requires remaining both productive and innovative.

Large organizations may have separate groups specifically for Research & Development versus Operations. Or they may focus on operations yet have a small group of people dedicated to continuous improvement. Or, with no organizational ambidexterity, they could just focus on operations with a factory mentality, or just focus on new ideas with a think tank mentality.

Individuals, like organizations, can focus on the top or bottom of the story, or try to preserve individual ambidexterity (see Figure 3). Individuals know when they are working on a project versus working in routine. They know when they are being creative versus compliant. They may know when their thinking is from analyzing versus association. And they may also notice when they are thinking slow versus thinking fast (Kahneman, 2011), which are not two separate and disconnected systems of thinking, but as Story Thinking shows, they are part of the same story.

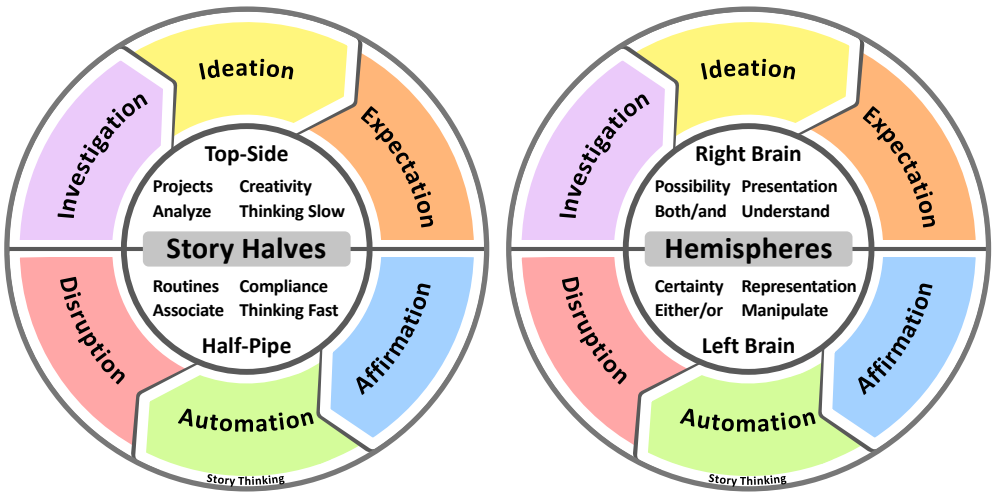


Figure 3. Story halves in mind and brain.

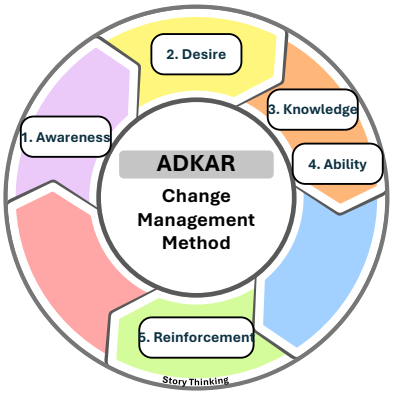
Work preferences may profile an individual as being a right-brain or left-brain person, based on the key functions of the brain's right and left hemisphere (McGilchrist, 2012). The right hemisphere of the brain is focused on possibility, presentation, both/and logic, and understanding. The left hemisphere of the brain is focused on certainty, representation, either/or logic, and manipulation.

3 Comparing 50 Change Models with Story Thinking

With the internal evidence from neuroscience that we are wired for stories, this paper is seeking external evidence by reviewing popular change models to see if there is alignment with a story pattern. We will be using the Story Thinking cycle as the story pattern based on the research provided above.

When reviewing each of the 50 change models, we anticipate that most will be presented as prescriptive steps, which we will logically align with the Story Thinking cycle, given the psychological states within this cycle provided in Figure 2. We will also identify each change model as primarily describing, facilitating, or persuading change. The 50 change models are compared under limited fair use copyright law.

3.1 ADKAR

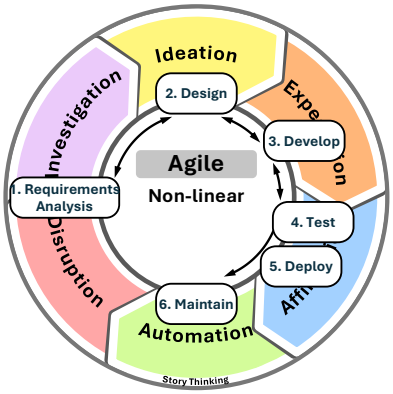


The ADKAR model focuses on how to influence change, and the importance of someone's awareness, desire, knowledge, and ability towards the change. Reinforcement measures help sustain the change over time.

Primary Model Type:

- Describing Change
- Facilitating Change
- ▹ Persuading Change

3.2 Agile Methodology



Agile is a non-linear approach to working based on fluid requirements and multiple stages of development with two-way stage-gates.
Compare: Waterfall Methodology

Primary Model Type:

- Describing Change
- ▹ Facilitating Change
- Persuading Change

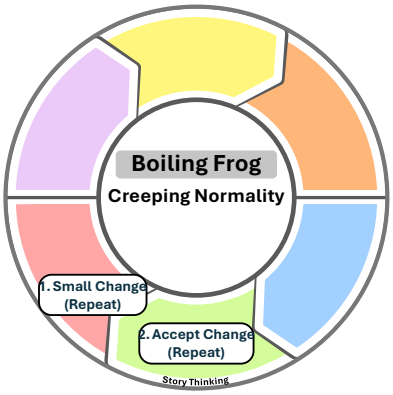
3.3 Appreciative Inquiry

Instead of focusing on current problems, appreciative inquiry asks us to focus on the possible opportunities in the future.
Instead of starting by assuming we have a problem, we can start by asking what works and what gives us energy.

Primary Model Type:

- Describing Change
- ▹ Facilitating Change
- Persuading Change

3.4 Boiling Frog

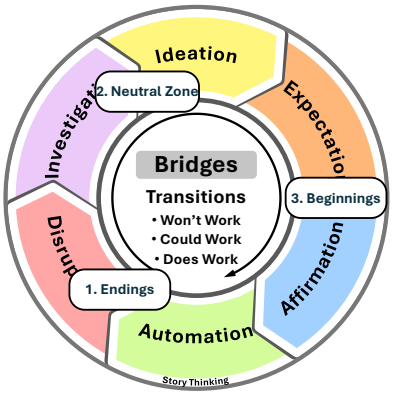


This metaphorical expression is about small changes over time, going unnoticed until it is too late to recover. Creeping normality is not necessarily bad, but the boiling frog analogy describes a frog being slowly boiled alive, without the perceived danger to jump out in time.

Primary Model Type:

- Describing Change
- Facilitating Change
- ▹ Persuading Change

3.5 Bridges' Model



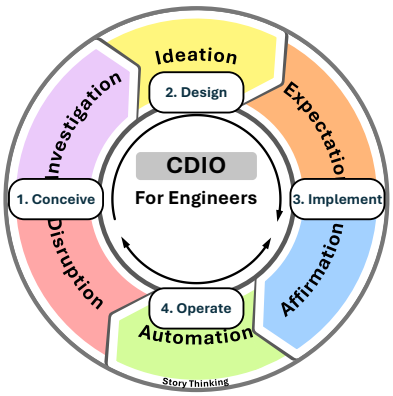
Bridges' 3-step model is a way to think about transformational change, with three key locations where transitions occur:

1. Endings
2. Neutral Zone
3. Beginnings

Primary Model Type:

- ▹ Describing Change
- Facilitating Change
- Persuading Change

3.6 CDIO



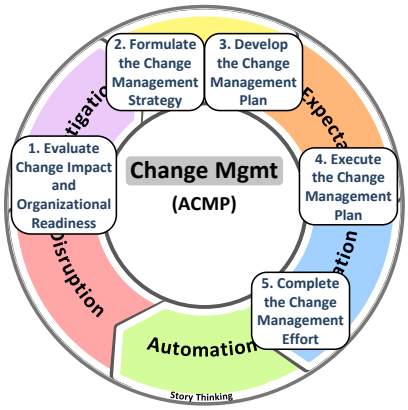
CDIO is an educational framework for engineering students. It uses a project-based 4-step approach: Conceive, Design, Implement, and Operate.

Compare: Memorizing/Training

Primary Model Type:

- Describing Change
- ▹ Facilitating Change
- Persuading Change

3.7 Change Management

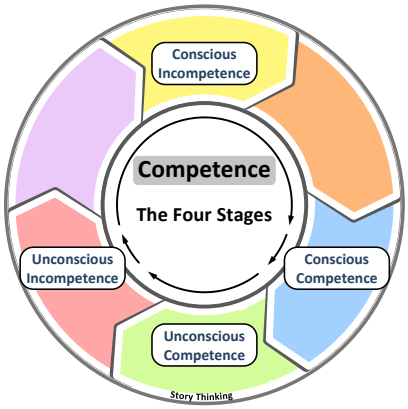


The five main components of change management, from the Association of Change Management Professionals (ACMP), start with evaluating the change impact and organizational readiness.

Primary Model Type:

- Describing Change
- Facilitating Change
- ▹ Persuading Change

3.8 Competence

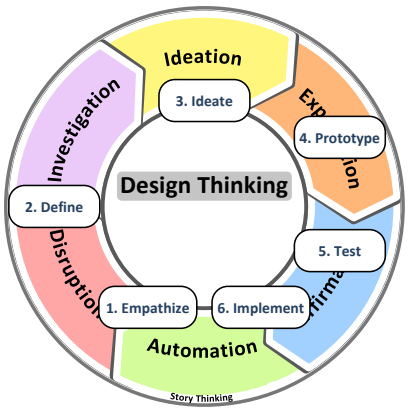


The four stages of competence move through Unconscious Competence (Automation routine), Unconscious Incompetence (Disruption), Conscious Incompetence (Investigation, Ideation, and Expectation), and Conscious Competence (Affirmation).

Primary Model Type:

- ▹ Describing Change
- Facilitating Change
- Persuading Change

3.9 Design Thinking



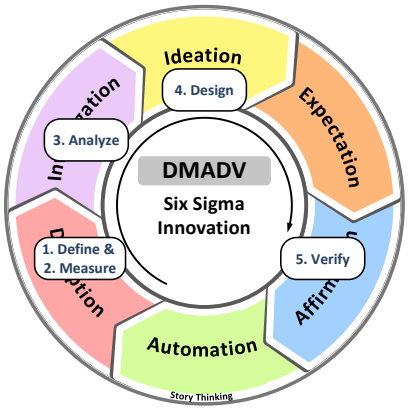
Design thinking is a change approach that begins with empathy for workers and users for issues within routine.

The new routine is created through specific steps: Empathize, Define, Ideate, Prototype, Test, and Implement.

Primary Model Type:

- Describing Change
- ▹ Facilitating Change
- Persuading Change

3.10 DMADV Innovation

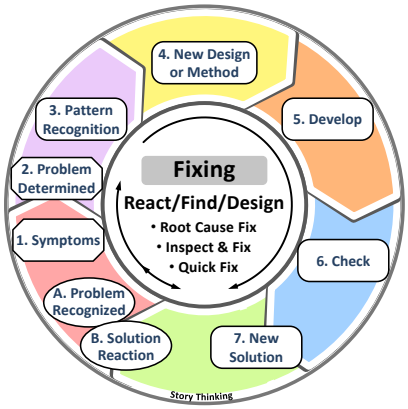


DMADV is a Six Sigma model for new products, services, or processes, with five steps: Define, Measure, Analyze, Design, and Verify.
Compare: Six Sigma DMAIC

Primary Model Type:

- Describing Change
- ▹ Facilitating Change
- Persuading Change

3.11 Fixing Progression

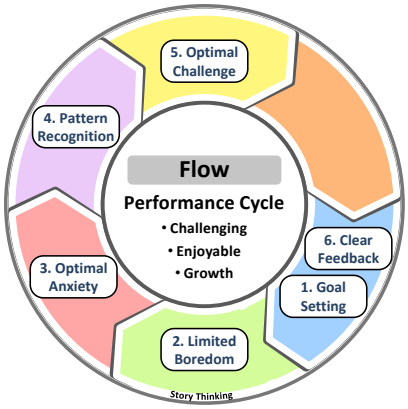


People want to react to disruptions quickly and get back into their routine. Many business models are based on providing a quick solution. But some problems require more investigation into causes, within the current model specs or towards a new model in design or method innovation.

Primary Model Type:

- Describing Change
- ▹ Facilitating Change
- Persuading Change

3.12 Flow

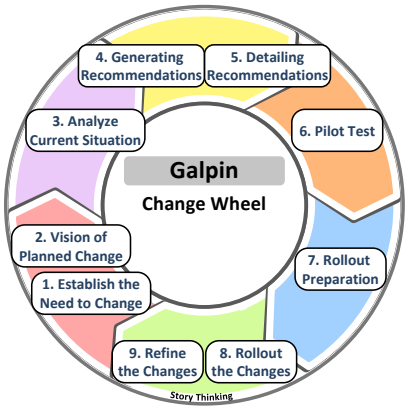


Mihaly Csikszentmihalyi recognized the concept of *flow*, in seeking peak performance by "staying in the zone".
Flow involves goal setting, limited boredom, optimal anxiety, pattern recognition, optimal challenges, and clear feedback.

Primary Model Type:

- Describing Change
- ▹ Facilitating Change
- Persuading Change

3.13 Galpin Change Wheel

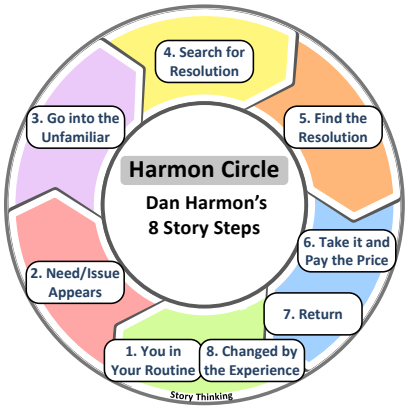


This model has nine segments for influencing change, starting with establishing the need to change.
Key to each segment of the model is the need to understand the culture of the organization, driven by the executives and grassroots.

Primary Model Type:

- Describing Change
- Facilitating Change
- ▹ Persuading Change

3.14 Harmon Circle



Dan Harmon's story circle lists 8 steps for storytelling. Like the Hero's Journey, the character achieves what they desire, at a cost, and ultimately returns transformed from the experience.
His steps show that stories begin and end in routine.

Primary Model Type:

- Describing Change
- ▹ Facilitating Change
- Persuading Change

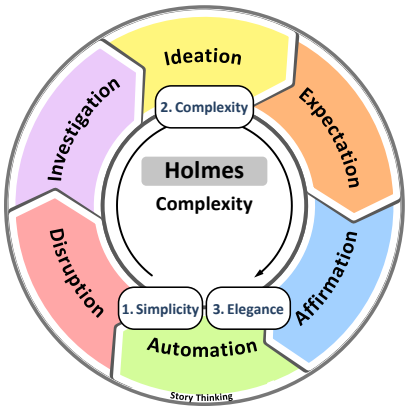
3.15 Hero's Journey

Popularized by Joseph Campbell, the narrative of the Hero's Journey is the common template of stories that involve a hero who goes on an adventure, is victorious in a decisive crisis, and comes home changed or transformed. His steps show that stories begin and end in routine.

Primary Model Type:

- Describing Change
- ▹ Facilitating Change
- Persuading Change

3.16 Holmes' Complexity

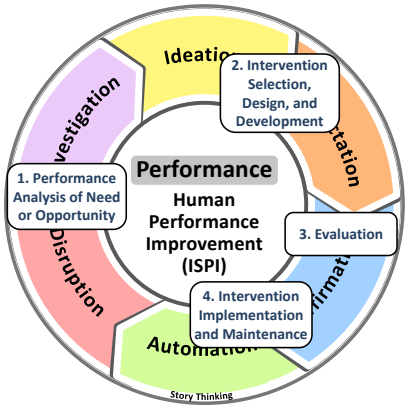


"I wouldn't give a fig for the simplicity on this side of complexity, but I would give my right arm for the simplicity on the far side of complexity."
—Oliver Wendell Holmes
Memorizing steps is not the same as also knowing the tradeoffs involved when creating the steps.

Primary Model Type:

- ▹ Describing Change
  Facilitating Change
  Persuading Change

3.17 Human Performance

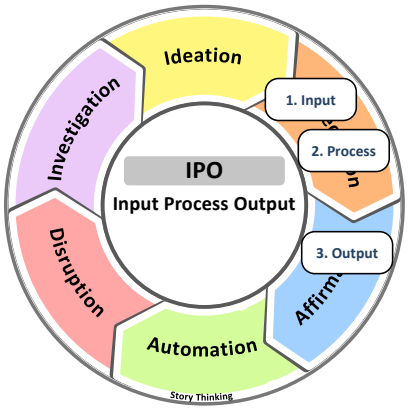


The Human Performance Improvement steps, from the International Society for Performance Improvement (ISPI), start with a performance analysis of a given need or opportunity.

Primary Model Type:

  Describing Change
- ▹ Facilitating Change
  Persuading Change

3.18 IPO

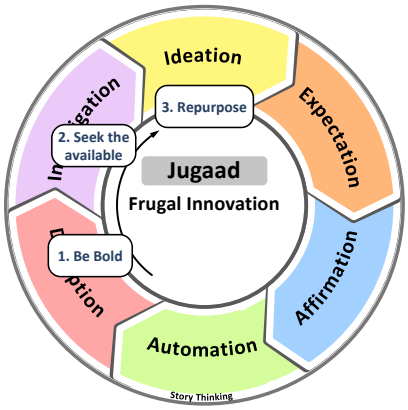


IPO is a simplified production model of change with three steps: Input, Process, and Output. The expectation is that with certain input and process, a desired outcome is achieved.
A variation of this model adds a supplier to the beginning and a customer to the end (SIPOC).

Primary Model Type:

- ▹ Describing Change
  Facilitating Change
  Persuading Change

3.19 Jugaad Innovation



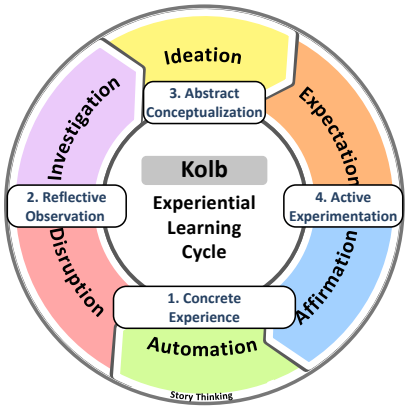
Jugaad is about finding more value while using less resources (Frugal Innovation):

1. Be Bold: Find large issues.
2. Seek the Available: Low-cost, high-access items.
3. Repurpose: The idea's ingenuity is based on reuse, not creation.

Primary Model Type:

Describing Change
▹ Facilitating Change
Persuading Change

3.20 Kolb's Learning Model



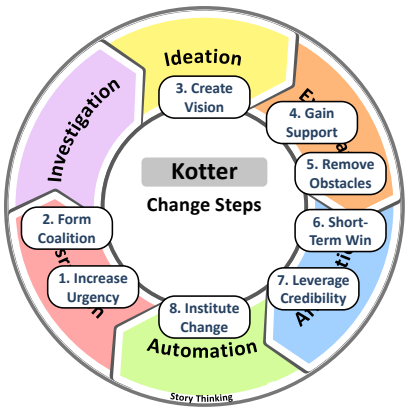
David A. Kolb is known for his experiential learning process. The cycle starts with concrete experiences, which lead to reflective observations, which produce abstract concepts, which can be actively tested via experimentation.

Compare: Memorizing/Training

Primary Model Type:

▹ Describing Change
Facilitating Change
Persuading Change

3.21 Kotter's Change Steps

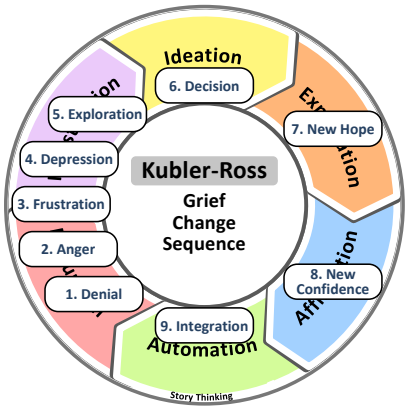


This model lists the eight steps to influence a change within an organization, starting with increasing the sense of urgency and emotional state.

Primary Model Type:

Describing Change
Facilitating Change
▹ Persuading Change

3.22 Kubler-Ross' Model

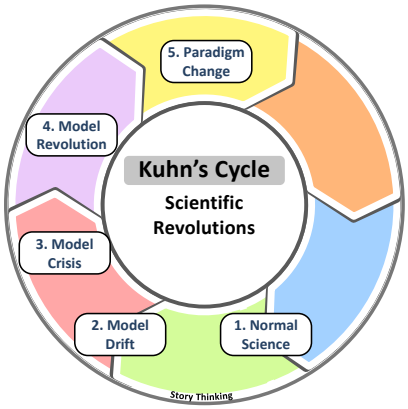


The Grief Change Sequence was published in the book, "On Death and Dying".
The model starts with denial, anger, frustration, and even depression, until exploration leads to a decision which finally brings new hope, new confidence, and integration with new routines.

Primary Model Type:

- ▹ Describing Change
  Facilitating Change
  Persuading Change

3.23 Kuhn's Revolutions

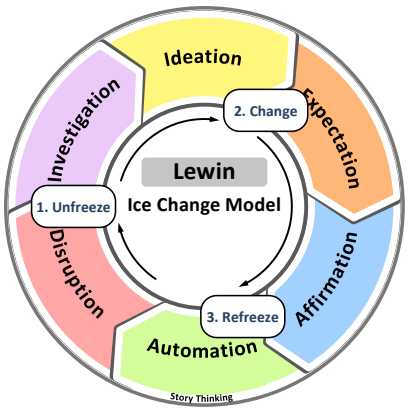


In his book, "The Structure of Scientific Revolutions," Thomas Kuhn challenged the scientific community with a new model for how learning occurs. Learning involves periodic "revolutions" when the current model cannot be maintained, resulting in a "paradigm shift".

Primary Model Type:

- ▹ Describing Change
  Facilitating Change
  Persuading Change

3.24 Lewin's Model



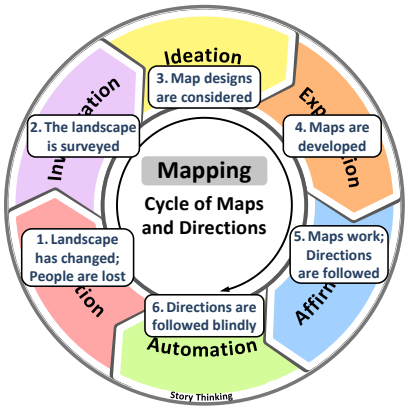
Lewin's model is an analogy based on changing the shape of a block of ice:

1. Unfreeze: From Reactive to Questioning
2. Change: From Could Work to Does Work
3. Refreeze: From Reflective to Reactive

Primary Model Type:

- ▹ Describing Change
  Facilitating Change
  Persuading Change

3.25 Mapping Cycle



The mapping cycle describes the process of changing landscapes, map-making, and following directions.
Disruption occurs when the landscape has changed while directions are being followed blindly (reactively).

Primary Model Type:

- ▹ Describing Change
  Facilitating Change
  Persuading Change

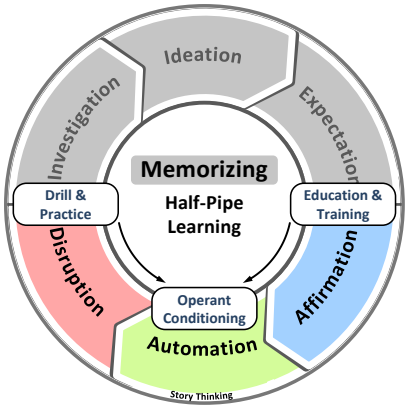
3.26 Marketing Funnel

The marketing funnel is designed to move people from awareness towards purchasing, through expected key steps.
Loyalty programs then keep customers in a routine state for repeat business. And their advocacy supports awareness for new customers.

Primary Model Type:

  Describing Change
  Facilitating Change
- ▹ Persuading Change

3.27 Memorizing / Training

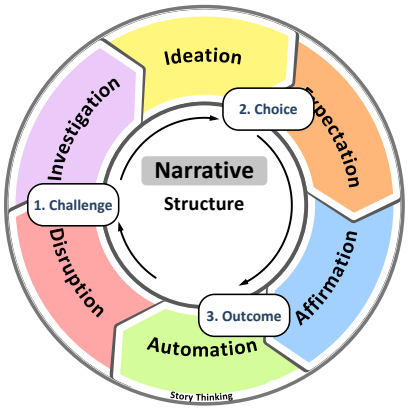


B.F. Skinner is known for his "Programmed Instruction" and "Operant Conditioning" which produce "Half-Pipe" learning (bottom half of the story). After proving with rats and pigeons that learning can simply mean a change in behavior, his method was adopted by many educators.

Primary Model Type:

  Describing Change
  Facilitating Change
- ▹ Persuading Change

3.28 Narrative Structure

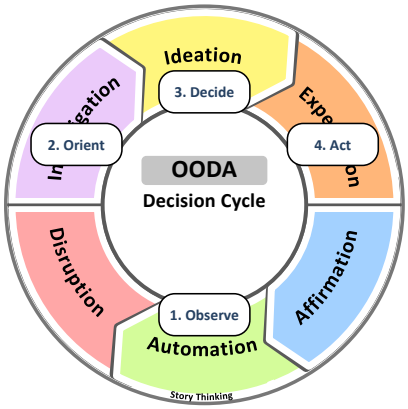


Challenge-Choice-Outcome is a narrative structure that can be used to tell a compelling story, with difficult choices and lessons learned. Challenge is an unexpected event requiring action. Choice is a difficult option requiring courage. Outcome is the result of the choice and action taken.

Primary Model Type:

Describing Change
▹ Facilitating Change
Persuading Change

3.29 OODA

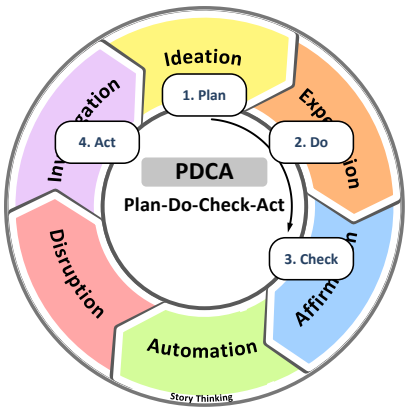


OODA is a reflective decision cycle that aligns with story structure, and can also be used within each phase of the story thinking cycle. The cyclic steps are, Observe, Orient, Decide, and Act.

Primary Model Type:

Describing Change
▹ Facilitating Change
Persuading Change

3.30 PDCA

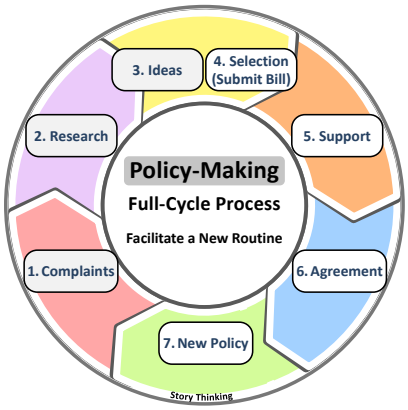


PDCA is an iterative 4-step management method for continuous improvement, which begins with Plan, Do, and Check.
The last step, to "Act," investigates reasons why results were not as expected.

Primary Model Type:

Describing Change
▹ Facilitating Change
Persuading Change

3.31 Policy-Making (Facilitate)

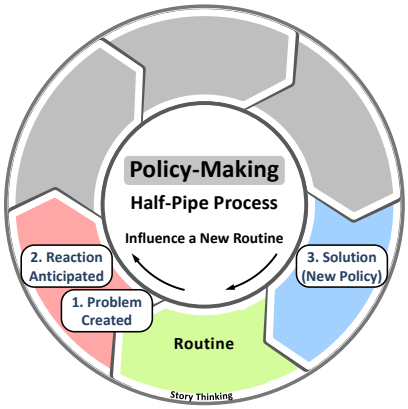


Policy-making is the process for creating a new mandated routine or policy (not politics). The selection and submission of an improvement idea is sometimes taught as Step 1. But Step 1 is knowing who is dissatisfied with the current status quo.

Primary Model Type:

- Describing Change
- ▹ Facilitating Change
- Persuading Change

3.32 Policy-Making (Persuade)

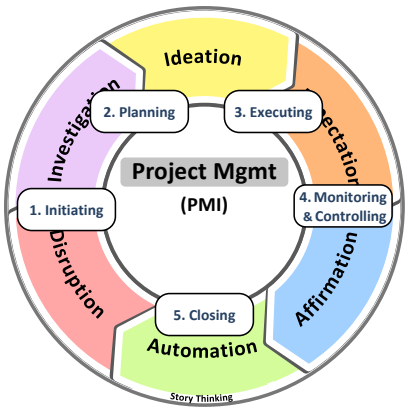


The German philosopher Georg W. F. Hegel described an abbreviated logic process, now known as the "Hegelian Dialectic," for establishing a new policy (mandated routine). It can be used to "manufacture consent" by initiating problems and using reactions to justify a predetermined solution.

Primary Model Type:

- Describing Change
- Facilitating Change
- ▹ Persuading Change

3.33 Project Management



The five phases of project management, from the Project Management Institute (PMI), are initiating, planning, executing, monitoring & controlling, and closing.

Primary Model Type:

- Describing Change
- Facilitating Change
- ▹ Persuading Change

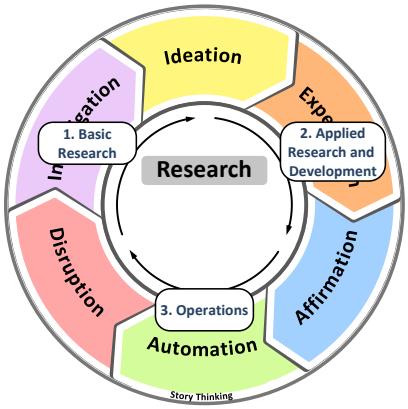
3.34 Propaganda

The purpose of propaganda is to influence agreement. Reactive agreements are conditioned by emotional prejudice and fear. Mental associations influence reflective agreements, and repetition produces familiarity and loyalty agreement.

Primary Model Type:

- Describing Change
- Facilitating Change
- ▹ Persuading Change

3.35 Research

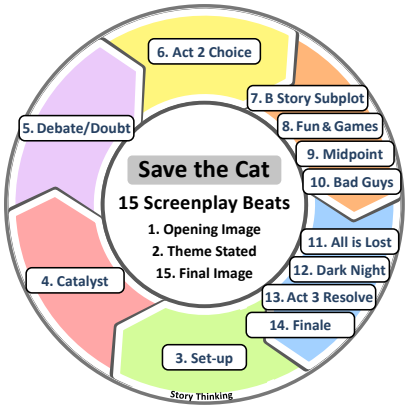


Research is generally separated, in funding, expected timeframes, and company cultures, into Basic Research, Applied Research and Development, and then Operations. Innovation requires all three and may involve separate organizations for each.

Primary Model Type:

- ▹ Describing Change
- Facilitating Change
- Persuading Change

3.36 Save the Cat

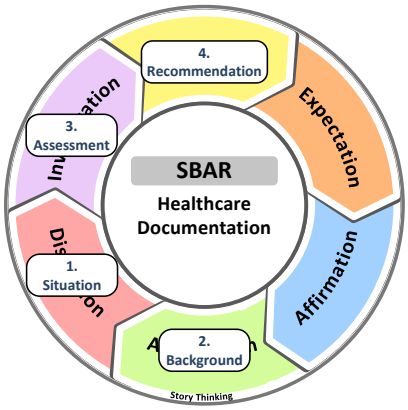


This method of storytelling, developed by Blake Snyder, has 15 beats or checkpoints within the plot structure which support the scriptwriting process.

Primary Model Type:

- Describing Change
- ▹ Facilitating Change
- Persuading Change

3.37 SBAR

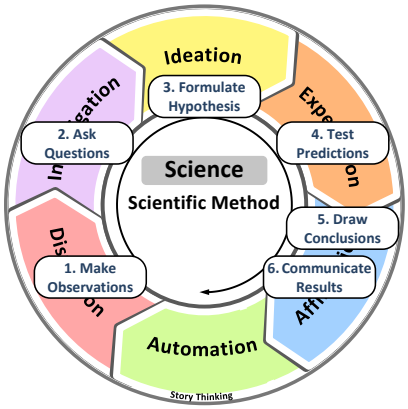


Within healthcare, particularly nursing, the SBAR model helps healthcare professionals communicate elements of a patient's condition. SBAR stands for Situation, Background, Assessment, and Recommendation.

Primary Model Type:

- Describing Change
- ▹ Facilitating Change
- Persuading Change

3.38 Scientific Method

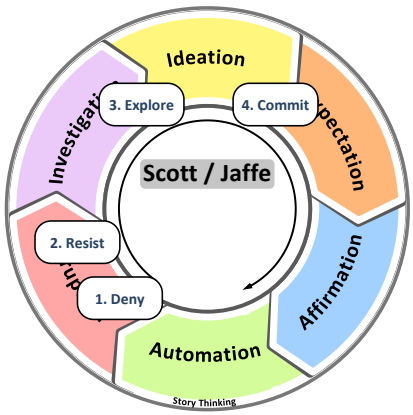


The scientific method of research requires that we make observations, ask questions, formulate a hypothesis, test predictions for empirical replicability, draw conclusions, and communicate the results for further study.

Primary Model Type:

- Describing Change
- ▹ Facilitating Change
- Persuading Change

3.39 Scott-Jaffe's Model

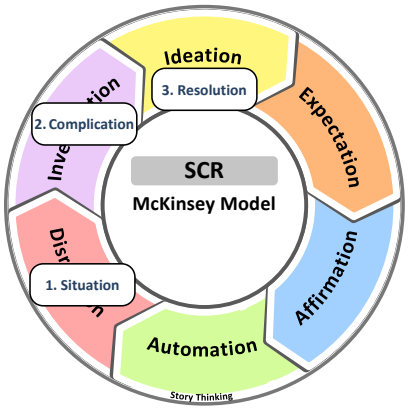


Scott-Jaffe's model describes a typical pattern of mental activities for those who are unprepared for a given change:
Deny, Resist, Explore, Commit.

Primary Model Type:

- ▹ Describing Change
- Facilitating Change
- Persuading Change

3.40 SCR



SCR is a consulting model that focuses on:

1) Framing the importance of the current situation
2) Complications that show the reasons for taking action
3) Actions required to resolve a problem or capture an opportunity

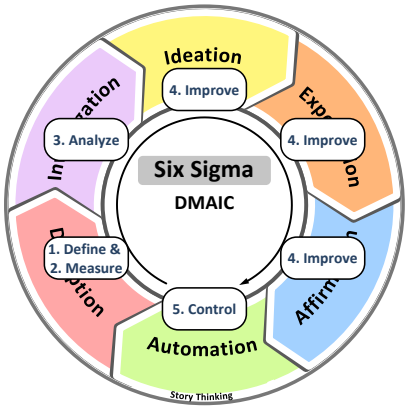
Primary Model Type:

Describing Change

▹ Facilitating Change

Persuading Change

3.41 Six Sigma DMAIC



Six Sigma DMAIC is a thinking model designed to reduce defects in manufacturing processes. The goal is to reduce and control production variations to less than three defects per million units (six sigma measurement).

Compare: DMADV Innovation

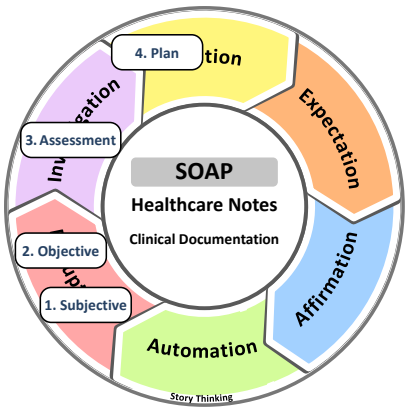
Primary Model Type:

Describing Change

▹ Facilitating Change

Persuading Change

3.42 SOAP



SOAP is a model to help healthcare professionals document and communicate elements of a patient's condition and interactions.

SOAP stands for Subjective, Objective, Assessment, and Plan.

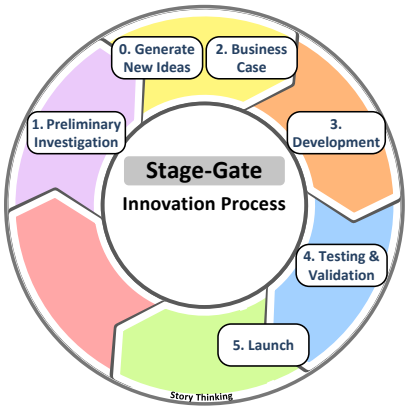
Primary Model Type:

Describing Change

▹ Facilitating Change

Persuading Change

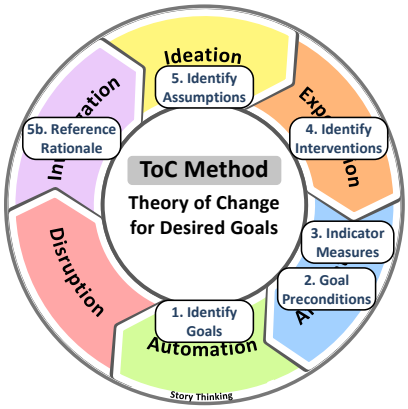
3.43 Stage-Gate Innovation



Stage-Gate is an innovation model that begins by generating new ideas.
This approach uses steps as "gates" where decisions are made for continuing with an idea, changing the idea, or dropping the idea.
Primary Model Type:

- Describing Change
- ▹ Facilitating Change
- Persuading Change

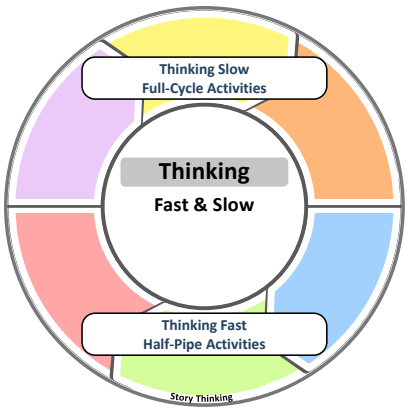
3.44 Theory of Change Method



The ToC Method is used for planning how to influence a desired change by starting at the end of the story with a vision of long-term goals.
Measurable preconditions for the goals are supported by identified interventions, based on underlying assumptions and optional rationale.
Primary Model Type:

- Describing Change
- Facilitating Change
- ▹ Persuading Change

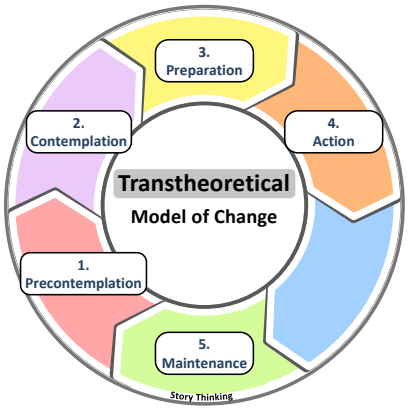
3.45 Thinking Fast & Slow



Based on Daniel Kahneman's book, "Thinking Fast and Slow," individuals and organizations have two modes of thinking.
Thinking Fast (System 1) refers to Half-Pipe activities and associations while Thinking Slow (System 2) uses the Full-Cycle of story structure.
Primary Model Type:

- ▹ Describing Change
- Facilitating Change
- Persuading Change

3.46 Transtheoretical Model

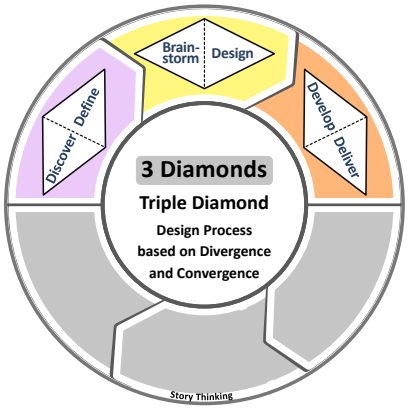


The Transtheoretical model is based on analysis and use of different theories of psychotherapy. It is commonly used in behavioral change modeling, with emphasis on intervention for patients with chronic diseases.

Primary Model Type:

- Describing Change
- ▹ Facilitating Change
- Persuading Change

3.47 Triple Diamond Design Process

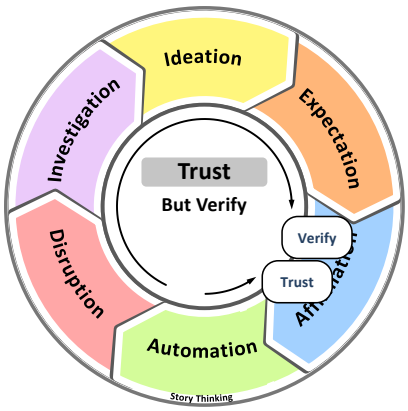


Each phase in the top half of the Story Thinking cycle begins with a divergence of ideas and ends with a convergence of ideas.
The three diamonds, and the two sides of each diamond, are connected in an agile and iterative process.

Primary Model Type:

- Describing Change
- ▹ Facilitating Change
- Persuading Change

3.48 Trust but Verify

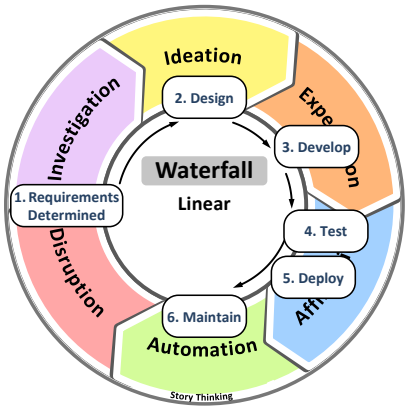


We can reach Affirmation quickly in the bottom half-pipe by simply ceding to some authority, citing an answer, and trusting the source and answer. But verification requires the full story cycle. Affirmation is where we *affirm* (trust/find answer) & *confirm* (verify/figure out answer).

Primary Model Type:

- ▹ Describing Change
- Facilitating Change
- Persuading Change

3.49 Waterfall Methodology



Waterfall is a linear approach to working based on fixed requirements and development with one-way stage-gates.
Compare: Agile Methodology
Primary Model Type:
Describing Change
▹ Facilitating Change
Persuading Change

3.50 Yin and Yang

This is one of the oldest representations of change. Complementary opposite forces create and control each other. The seeds of one are found within the other. The seeds of transformational change (chaos) are found within transactional change (order) and vice versa.
Primary Model Type:
▹ Describing Change
Facilitating Change
Persuading Change

4 Findings and Implications

Given the internal evidence that neuroscience has found, that we are wired for story, we sought to find external evidence embedded within the change models that humans have created. After reviewing the above 50 change models, there is external evidence that we are wired for story. As we saw with several of the models above, the last step uses terms like *maintain*, *endings*, *operate*, *implement*, *refreeze*, *outcome*, and *closing*. Being IN a story does not mean we are always in a state of transformational change. Yet, the term *storytelling* leads us towards this idea, making it difficult for some to understand that we are wired for story, even when just describing the routine of transactional activities. With enough disruption, we will enter the transformational side of the story.

In reviewing the above change models, we also found three primary model types, based on either how the model was designed or how it is primarily used:

- Describing Change: For example, Lewin's model of change is like unfreezing a block of ice, changing the shape, and then refreezing it (see 3.24).

- Facilitating Change: For example, the steps of the scientific method help facilitate a change in understanding (see 3.38).
- Persuading Change: For example, the Theory of Change method starts with identified goals and works backwards into the story requirements to make it happen (see 3.44).

Additional findings and implications are provided in the sections below.

4.1 Agile Navigation

The idea of agile navigation within the story just means that we can move back and forth between story phases (see Agile Methodology 3.2), as compared to moving in a linear path (see Waterfall Methodology 3.49). In reviewing the above change models with prescriptive steps, their linear approach to describing a story visually misses the representation of agile navigation. For example, in moving between the development, testing, and operational environments, we found change models representing the steps like this:

- Design-Implement-Operate
- Ideate-Prototype-Test-Implement
- Develop-Test-Launch
- Develop-Test-Deploy-Maintain

With Story Thinking, the cyclic approach provides a more complete representation of the agile steps, for example, showing that testing occurs throughout the entire creative process (see Figure 4).

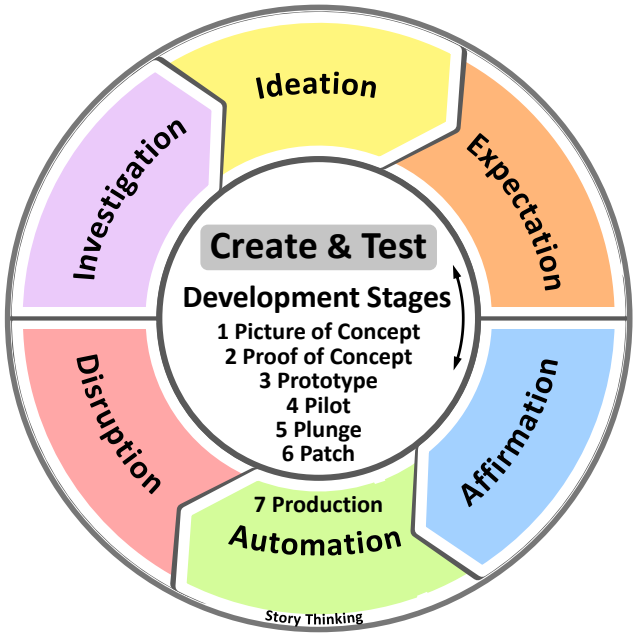


Figure 4. Creative development stages.

Projects should consider an evaluation at each of these developmental stages (Lewis, 2019):

1. Picture of Concept – Think it (thought experiment)
2. Proof of Concept – Test it (verify idea)
3. Prototype – Try it (verify design)
4. Pilot – Try it on (on a trial basis)
5. Plunge – Take it (devote yourself fully)
6. Patch – Tweak it (course corrections)
7. Production – Trust it (abate full evaluation)

Current change models are visually represented with prescriptive steps in a linear approach, and struggle to adequately represent the agile story nature of projects.

4.2 Quad-Loop Learning

A *goal* is created by starting the story at the end, in Affirmation (see Figure 5). From here, four types of feedback can be provided for the rest of the Story Thinking cycle. Here are examples of each type:

- *Compliant* feedback says learn to properly swing the axe.
- *Productive* feedback says it may be time to sharpen the axe.
- *Inventive* feedback says it may be time to invent a chain saw.
- *Perceptive* feedback says it may be time to find another form of energy beyond wood.

Figure 5. Goals and four feedback types within stories.

Quad-Loop Learning is a representation of Story Thinking that shows four different types of feedback loops based on the story phase involved (see Figure 6). The first loop provides compliant feedback towards maintaining the current system. The second loop provides productive feedback towards optimizing the current system. The third loop provides inventive feedback towards designing new systems. The fourth loop provides perceptive feedback towards reframing a new system.

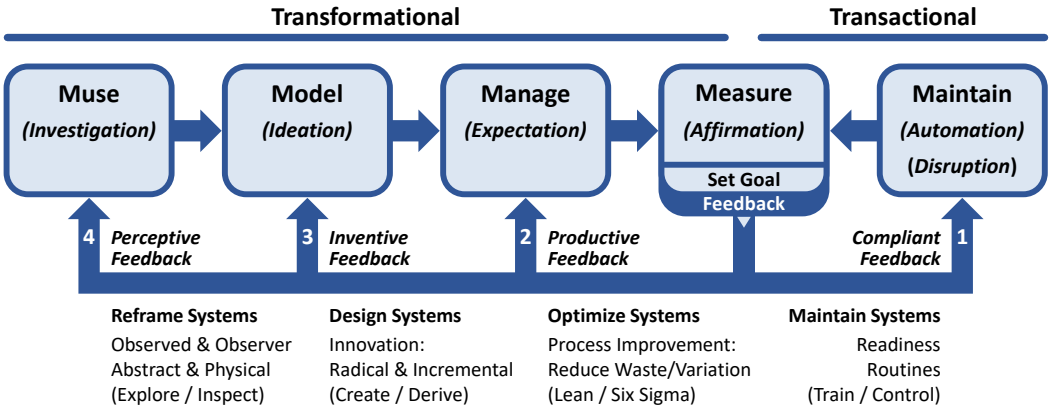


Figure 6. Quad-Loop learning.

Organizations that have individuals assigned to continuous improvement projects usually focus on optimizing the current system (Loop 2), using methods like Lean/Six Sigma to reduce waste/variation. To expand an organization's innovation portfolio, Loop 3 and Loop 4 offer additional and alternative ways to creatively approach continuous improvement, where underlying models and perspectives are reviewed and challenged (Lewis, 2019).

Quad-Loop Learning expands on the Double-Loop Learning concept from Chris Argyris. With Double-Loop Learning, the first loop is the feedback loop between results and actions, and the second loop is the feedback loop between results and the underlying variables driving the actions. When put into practice, "we soon learned that the double-loop learning model was useful primarily at an abstract level of discourse and for single-loop learning. When we attempted to help individuals unfreeze the old in order to produce double-loop learning, we found that there were several crucial gaps in the model" (Argyris, 1999, p. 69). "These gaps suggest that the differences in complexity between single and double-loop learning may be more profound than previously anticipated. If so, the programs for organizational double-loop learning may require more effort than those designed for single-loop learning" (Argyris, 1999, p. 71).

Quad-Loop Learning is an approach to identify and solve the "gaps" in complexity beyond single-loop learning, by providing direct alignment with Story Thinking, and targeted feedback for specific phases of the Story Thinking cycle.

4.3 Story Misalignment and Implications

In our comparison with 50 change models, we found three which were misaligned with the Story Thinking cycle, indicating a profession that is not well understood, and these models are related to public service: Healthcare, Policy-making, and Education (see Figure 7).

With Healthcare, the SOAP model (Subjective, Objective, Assessment, Plan) is incomplete in that it stops at Ideation with a plan, but without treatment. The SOAP model was never intended to be the entire Clinical Process Model. When Lawrence Weed saw the need for more structure within healthcare, he created SOAP just to support data collection: "Among physicians there has been uncritical adherence to tradition in the first phase of medical action, which is the collection of data, upon which complete formulation and management of all the patient's problems depends" (Weed, 1968, p. 5). Without a complete Clinical Process Model, we see medical and

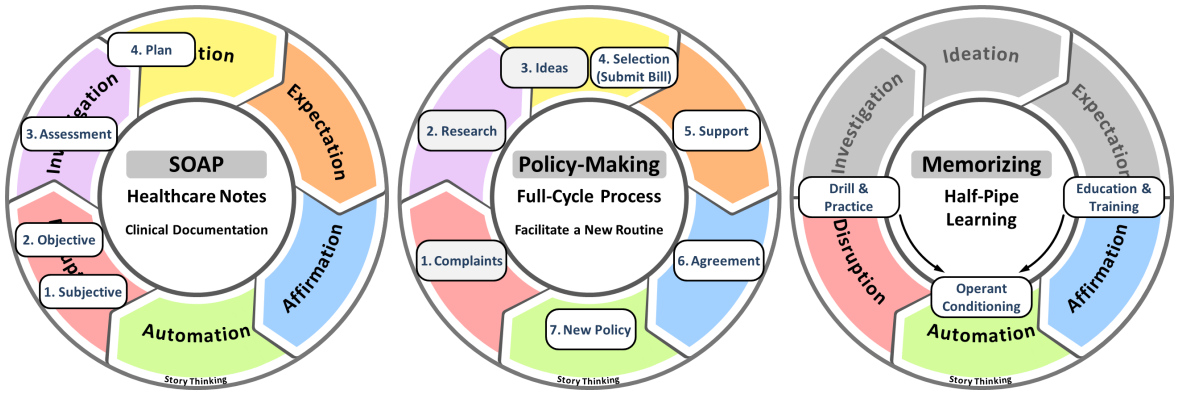


Figure 7. Institutional models misaligned with story.

communication errors between staff, poor training results without a complete advanced organizer, and AI cannot auto-categorize all notes into the limiting four (SOAP) categories (Kwon et al., 2022). SOAP is more than just "notes" since they "shape providers' thinking during the process of documentation" (Lenert, 2016, p. 763).

With Policy-making, a *policy* describes the governing rules for our routines and is not limited to governments, since a parent can declare that bedtime starts at 10:00 pm. We were taught that the first step in creating a new law/policy is to submit a bill, which is an improvement idea starting at Ideation. But this selected improvement idea came after considering several ideas, which came after research into root causes, which came after disruption and complaints about the current policy. Transparency into the policy-making process should mean more than allowing 24 hours to read a bill before voting on it, and should include information from the entire Story Thinking cycle.

With Education, B.F. Skinner is known for his approach to teaching, which he developed by working with rats and pigeons, called *behaviorism* (Skinner, 1938). He redefined learning as a change in behavior, by narrowing the learning process to the end of the story. The focus is on teaching *what works* (for now), rather than preparing students with the skills needed when it *won't work*, and when it *could work* (Story Thinking cycle). Questioning skills are not taught in the classroom because it would compete with the answers being provided. The programmed instruction and memorization replaced understanding, but it provided efficient and effective training during the industrial age.

Aligned with Skinner, the education evaluator, Benjamin Bloom, created an evaluation model (not a learning model) based on behavior learning objectives. In the introduction to his book, he acknowledged the concern that "the taxonomy might lead to fragmentation and atomization of educational purposes such that the parts and pieces finally placed into the classification might be very different from the more complete objective with which one started" (Bloom, 1956). We now know that the learning construct being fragmented is the story. The education system should be driven from a learning model, not an evaluation model, and this is easily accomplished by mapping learning objectives where they occur in Story Thinking (Lewis, 2019) so we will finally have aligned our approaches to learning and evaluating (see Figure 8 for a sample mapping of objectives).

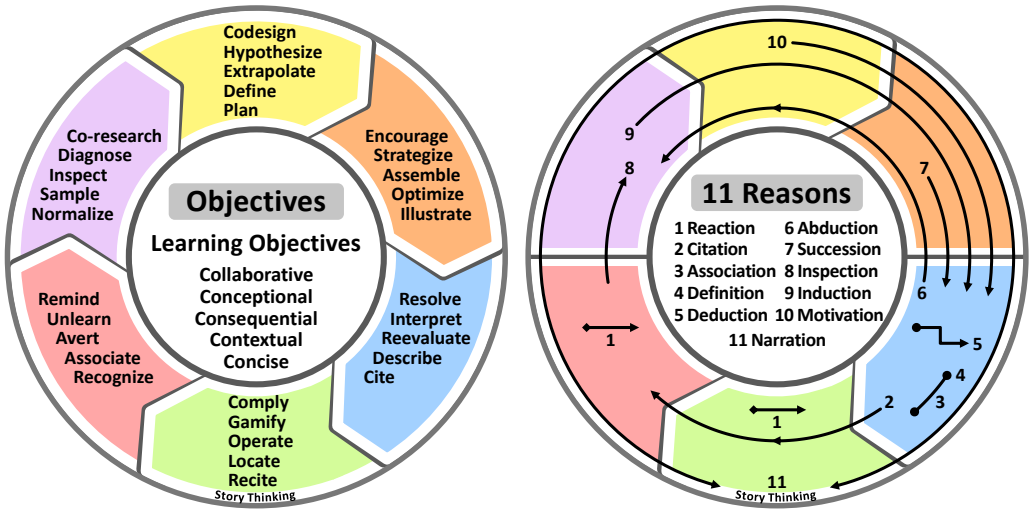


Figure 8. Learning objectives and critical thinking based on story thinking.

In addition to aligning *learning objectives* with the Story Thinking cycle, the reasoning patterns used in *critical thinking* are also aligned with locations within the story, with *narration* providing the larger reasoning pattern and covering the entire story (see Figure 8 for 11 key reasons). Reactive and short-term thinking is based on recognizing previous material and citing authoritative sources instead of the data, concepts, or tradeoffs. When deeper reasoning is observed, it may be just an association or definition, which can include new labels that align with reactionary thought to appear as formed in reason. Deduction can then work from what is known to logically conclude new beliefs which are just fallacies. When an attempt to validate this belief system does occur, it is through abduction, where affirming (not confirming) simply filters evidence to fit. Protecting the current belief system becomes the norm, and constant learning is replaced with constant reaffirming. This is the outcome of creating students that have learned how to know but not how to learn. In moving away from creating memorizers and mental misers, towards creating truth seekers and story thinkers, the larger reasoning patterns are needed, up to and including narration. Below are the 11 key types of reasoning patterns with example related terms:

1. **Reaction** (habit, recognize, emotion, belief, programming, error)
2. **Citation** (authority, expert, rule, origin, data, concept, tradeoff, reference, domain, credibility, context, equivalence, logic, hearsay)
3. **Association** (connection, network, order, taxonomy, inherit, link, predicate, relationships, case, analogy, equation, conflate)
4. **Definition** (label, symbol, identity, description, meaning, inherent, entity, subject, properties, state, metaphor, axiom, mislabel)
5. **Deduction** (premises, arguments, specific conclusion, fallacy)
6. **Abduction** (seeking evidence and hypothesis to defend a belief, retroduction, reaffirmation, maintain, plausibility, justify)
7. **Succession** (prioritization, process, outcome, evaluation)
8. **Inspection** (benchmarks, factors, analysis, chance, causality)

9. **Induction** (instances, pattern, hypothesis, test, confirmation)
10. **Motivation** (inspiration, desire, goal, volition, purpose, constraint)
11. **Narration** (projects, agile, innovation, transformation, story)

While educational reforms have focused on the topics of curriculum, school choice, testing, technology, teacher compensation, teacher qualifications, and student/teacher ratio, there has been little attention on the pedagogy or method of instruction. With behavior learning objectives driving the process, even with the latest revisions for Bloom's taxonomy (Anderson et al., 2001), teachers cannot state *understanding* as an objective because it is not a behavior, and the testers do not know how to test for it. This "tyranny of the testers" (Lewis, 2019) has created an education system where there is zero expectation that anyone will understand anything. Shifting our learning approach from memorizing what is at the end of a story, to learning and experiencing an entire project or story including tradeoff decisions, is where understanding and sense-making is found (Peterson, 2017), and the development of students who can innovate and not just memorize.

4.4 Story Thinking Implications for AI

When recently using a popular commercial large language model (LLM) to summarize a document, I then asked it what story framework it uses for a summary. The answer it gave me was that it uses a framework with a beginning, middle, and ending. It struck me that Aristotle might be pleased to hear that his story framework is still in use. He might also wonder how we have progressed so far in mathematics and computing while still using his basic description of a story as the underlying predictive pattern of language.

As we progressively rely more on AI to provide us with answers, we should understand the implications of the predictive patterns of stories. Right from the beginning of every explanation produced from AI, we should be aware of the power of the backstory or exposition. Where does the story begin? The answer to this simple question will drive the inferences throughout the rest of an explanation. Starting an explanation at the wrong place in a story not only creates a different narrative, it also defines a different "story world" that affects all other reason inferences under this narration. Imagine entering a theater twenty minutes after the movie has started, finding your friend, and asking why this bad character is hitting someone. Then your friend explains, "You don't understand, he is the *good* guy, you missed the first part." Legal systems operate on this principle of first deciding where the story begins. Many examples can be found where the prime suspect in a criminal investigation was freed once the timeline of the crime was moved to an earlier date. The exposition is just the first place to look for completeness in an explanation from AI (see Figure 9).

When looking for signs of completeness in a narrative produced by AI, we should find a beginning which describes the backstory or current beliefs (Exposition) for normalcy of routine or expected working operations. We should then expect to find a problem which is described as *not* expected to work within the current requirements or context (Desperation). Then the narrative should provide the questioning used towards root causes or root factors, leading to those answers (Revelation). This should naturally take us into a list of improvement ideas (Consideration) which could conclude with the need for tighter controls and training within the current operational model, or innovative models and ways for approaching the problem. There should be evidence for a divergence of ideas with several options, leading to a convergence of ideas with rationale for the selected approach. Then a strategy needs to describe how to develop the chosen idea (Determination), through various stages, for example: thought experiment, proof of concept, pilot, etc. The narrative then needs to describe the testing process, use cases, and agreement plan used in determining that the new idea solves the original problem (Resolution). To complete

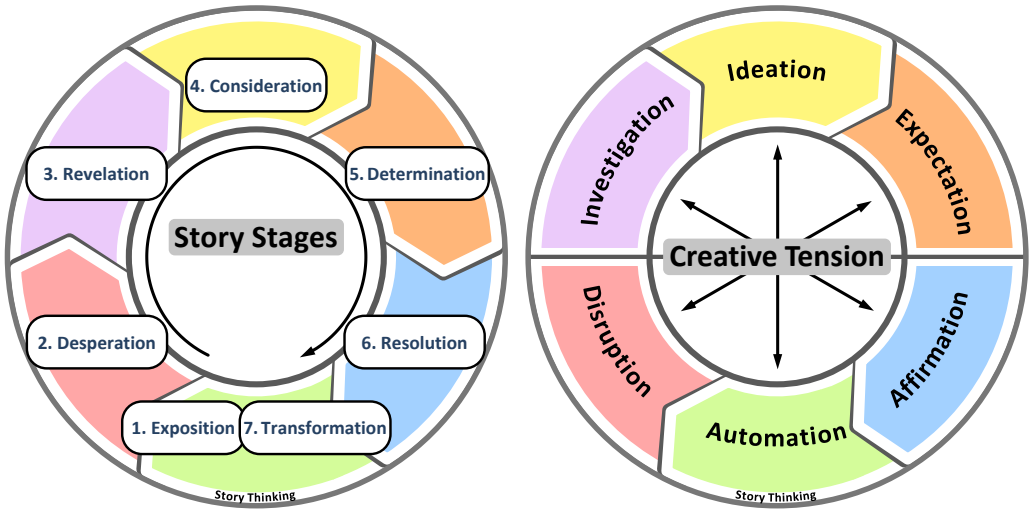


Figure 9. Navigation with story stages and creative tension.

the narrative, a vision of future operations, or actual data from new operations and behaviors (Transformation), should be described (Lewis, 2019).

A realistic explanation that follows a story pattern will not just navigate *around* a story cycle, it will also include *creative tension*, which requires thinking within several phases at the same time. Our thinking within Expectation can be impacted by our thinking within Disruption. For example, a firefighter is in Expectation while searching for people within a house on fire, wanting to reach Affirmation, yet at the same time their oxygen tank is almost empty, representing a growing Disruption. This is called the "hero's dilemma" and the "hard choice." The prisoner of war survivor, James Stockdale, said "You must never confuse faith that you will prevail in the end, with the discipline to confront the most brutal facts of your current reality." Now known as the *Stockdale Paradox*, it is similar to the "innovator's big bet" where the innovator is about ready to ship a new or updated product, and at the same time, going broke. Creative tension always exists between our current reality found in the bottom half of the story, and our future aspirations found in the top half of the story:

- Disruption vs. Expectation: (See the problem vs. seek the promise)
- Automation vs. Ideation: (See what is vs. seek what can be)
- Affirmation vs. Investigation: (See what is true vs. seek a higher truth)

OCR (optical character recognition) works because of the "R." And search technology has improved because we learned how to recognize characters, and also words, phrases, synonyms, specific entities, etc. Now, AI can recognize patterns from probabilistic calculations and provide amazing results. But a million examples of narrow AI does not make general AI, which I believe will require recognizing more than a 3-part story sequence, and instead recognizing the six phases within the Story Thinking cycle, and overseeing the continuous operation of six independent LLMs.

5 Conclusions

Are humans primarily storytellers, or are they primarily rational beings? The *narrative* paradigm is based on a world that is filled with stories and humans understanding complex information through narratives, where rationality is based on the story's internal consistency and external connection to stories that we have experienced. The *rational* paradigm is based on a world that is filled with logical relationships that are communicated through arguments by rational humans through reasoning, where rationality is based on evidence and formal reasoning processes (Fisher 1987). Narratives help humans understand complex information, which helps us operationalize complex ideas. The narrative paradigm "does not deny reason and rationality; it reconstitutes them, making them amenable to all forms of human communication" (Fisher, 1984, p. 2). Story Thinking is based on the narrative paradigm but expands on the idea that humans are primarily storytellers — to include story thinkers.

The philosophy of the narrative paradigm has been validated internally by neuroscience, and externally in this document by showing the alignment between story and 50 change models. The new mental model of work is a story, not a process, which is leftover factory thinking from the industrial age. So, we should consider designing our working environments from the narrative paradigm. And when designing towards education reform, we should understand that lifelong learning involves project skills for when it *won't work* and when it *could work* — not just training for when it *does work*. For the continued development of our working and learning environments, W. Edwards Deming said, "We will never transform the prevailing system of management without transforming our prevailing system of education. They are the same system." And from the evidence provided through neuroscience and cognitive narratology, we might conclude that the new and transformed system he was describing is called *story*.

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Biographies

John Lewis. John Lewis, Ed.D. is a speaker and transformational coach for change, learning, and leadership. He has authored the books, "The Explanation Age" (beyond the information age) and "Story Thinking" (beyond storytelling). John teaches Innovation Management at the Knowledge Management Institute, is on the advisory board with the Lifeboat Foundation, a member of IIKI (International Institute for Knowledge and Innovation) and NDMA (Naturalistic Decision Making Association), and an associate editor for Leadership and Organizational Behavior with the Journal of Innovation Management. John has worked for several leading global organizations and his career highlights include launching GPS satellites and being recognized by Gartner with an industry Best Practice paper for a global Knowledge Management implementation. John holds a Doctoral degree in Educational Psychology from the University of Southern California, with a dissertation focus on mental models and decision making. His unified model of change represents the fundamental structure of stories, and encompasses a majority of earlier models, including Kahneman, Kolb, Kotter, and Kubler-Ross. It solves for the "fragmentation" problem described by Peter Senge, and fulfills on the quote by W. Edwards Deming: "We will never transform the prevailing system of management without transforming our prevailing system of education. They are the same system."
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