1-1-2013

A Model For Designing Instructional Narratives For Adult Learners: Connecting The Dots

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A MODEL FOR DESIGNING INSTRUCTIONAL NARRATIVES FOR ADULT LEARNERS: CONNECTING THE DOTS

by

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DISSERTATION

Submitted to the Graduate School

of Wayne State University,

Detroit, Michigan

in partial fulfillment of the requirements

for the degree of

DOCTOR OF PHILOSOPHY

2013

MAJOR: INSTRUCTIONAL TECHNOLOGY

Approved by:

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Advisor Date

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DEDICATION

This dissertation is dedicated to my husband, Thomas George Smith whose love, patience, and unwavering belief in my ability enabled me to complete this work, and to our daughter, Sarah Marie Smith who always listens to my stories and believes most of them.

ACKNOWLEDGEMENTS

I am extremely grateful to my dissertation committee for their guidance, support, and the time they devoted to assist me. Dr. Ingrid Guerra-López, my dissertation committee chair, provided me with a clear picture of the research expectations and coached me to produce my best work; her thoughtful suggestions have enriched this dissertation. Dr. James Lee Moseley encouraged me to pursue this subject and his editorial advice has strengthened this work. Dr. Timothy W. Spannaus showed me how the principles of message design worked in practice and taught me how episodic memory works. Dr. Ariel S. Levi introduced me to the organizational development and sensemaking literature and was always available when I needed his assistance during this process.

I also wish to express my gratitude to the outstanding Instructional Technology faculty in the College of Education at Wayne State University who introduced me to the field of Instructional Technology and its literature, reviewed my assignments, and provided me with thought provoking feedback. In particular, I am indebted to Dr. Lynn Miller-Wietecha who expressed her confidence in my ability to master the coursework and recognized my potential as a scholar.

I entered this course of study alone, but I am completing it with fellow students, who over the course of seven years of study, became friends and are now colleagues. I am indebted to Hillary, Jess, Trevor, Mike, Ann, and Stacey for their encouragement, for asking the right questions at the right time, for sparking my curiosity about new ideas, for their interest in this research, their good humor and persistence. To these students, and all the others who spent countless hours with me both in and outside of the classroom, thank you.

This work would not have been possible without the many sacrifices and devotion of my parents to my education: my mother Shirley J. Boatman who tirelessly read stories to me from the day I was born, and my father Edward G. Boatman who saw the teacher in me.

For me, the completion of this work at this stage in my life suggests, as George Eliot proclaimed, “it’s never too late to become what you might have been.”

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

Description of the Problem

Understanding how people learn and how best to design instruction that facilitates learning, retention and transfer to practice is a valued goal of the field of Educational Technology. It can be argued that transfer is the objective of education (Ambrose, Bridges, DiPietro, Lovett, & Norman, 2010; Butterfield & Nelson, 1989; Halpern & Hakel, 2003; McKeough, Lupart, & Marini, 1995). Transfer is the application of learned knowledge and skill to different performance contexts or applications. Instruction is designed so learners will be able to successfully retrieve and apply what was learned in one context to another context in the future (Halpern & Hakel, 2003). The "effective transfer of learning to the environment [is] an ever increasing goal of ID [Instructional Design]" (Richey, Klein, & Tracey, 2011, p. 65). Although this transfer of learning is a goal of instructional design, the "means for accomplishing it have been elusive" (R. Thomas, Anderson, Getahun, & Cooke, 1992, p. 1). "Researchers have been more successful in showing how people fail to transfer learning than they have been in producing it" (McKeough, et al., 1995, p. vii). This research study considers how instruction can be designed and deployed to enable transfer.

Transfer begins with learning. What is learning? "First…learning is a persisting change in human performance or performance potential…Second, to be considered learning, a change in performance potential must come about as a result of the learner's interaction with the world" (Driscoll, 2005, p. 9). Learning is a process. It involves a "change in knowledge, beliefs, behaviors or attitudes" (Ambrose, et al., 2010, p. 3). This change in "a person's knowledge or behavior [is] due to experience" (Mayer, 1982 as cited in Richey, et al., 2011, p. 51). We learn through our interpretation and response to our experiences. Learning involves the acquisition and

application of knowledge. One way we come to know is through stories. A story is a narrative account of events. Stories are used to share knowledge, experiences, beliefs and values. Through story, we explain what and how things are, why they are, and we affirm our role and purpose. These accounts of experience put knowledge into meaningful contexts (J. S. Brown & Duguid, 1991; Lave & Wenger, 1991). Stories are "fundamental to the way we communicate, learn and think. They are the most efficient way of storing, retrieving, and conveying information" (Gargiulo, 2005a, p. 27). Goldsworthy and Honebein (2010) contend "learning is the ongoing process of maintaining a coherent story in our minds. The drive to learn is the drive to get the story right" (p. 27).

Narrative is another term for story. Narrative "is present at all times, in all places, in all societies; indeed narrative starts with the very history of mankind; there has not, there has never been anywhere, any people without narrative" (Barthes, 1975, p. 237). The use of narrative in research is based upon the claim that "humans are storytelling organisms who, individually and socially lead storied lives" (Connelly & Clandinin, 1990, p. 2). Historian Hayden White suggests that "narrative is a metacode, a human universal" that can be used to send transcultural messages of "shared reality" (1980, p. 6). Psychologist Theodore R. Sarbin (1986) considered narrative to be a root metaphor for psychology. He proposed the narratory principle: "that human beings think, perceive, imagine, and make moral choices according to narrative structures" (p. 8). Narratives are "strategic, functional and purposeful" (Riessman, 2008, p. 8). Literary theorist Barbara Hardy writes, "we dream in narrative, daydream in narrative, remember, anticipate, hope, despair, believe, doubt, plan, revise, criticize, construct, gossip, learn, hate, and love by narrative" (1968, p. 5). Narrative can best be described as a "fundamental structure of human meaning making" (Bruner, 1986; Irwin, 1996; Polkinghorne, 1988; Sarbin, 1986). For the

purpose of this research study, narrative is defined as a spoken or written account of connected events that represents ordered, interpreted and affected descriptions of experience based on a beginning, middle and end sequence.

Influence of Narrative on Learning

Narratives make human experiences meaningful (Polkinghorne, 1988). They transform experience into knowledge (Lave & Wenger, 1991) through reflection (Schon, 1983) and interpretation (Gudmundsdottir, 1995). When stories are shared, meanings are negotiated (Bruner, 1990) and persuasive arguments are built (Bruner, 1990; S. Taylor, Fisher, & Dufresne, 2002). Stories convince us through "good reasons" (Fisher, 1984) and verisimilitude (Bruner, 1986, 1990). They are both particular and adaptable (J. S. Brown & Duguid, 1991). Stories are culturally situated (Barthes, 1975; Bell, 2002; Boje, 2008; Bruner, 1990; Kaye, 1995; Sugiyama, 2001; White, 1980); they enable us to share who we are (Daloz, 1999; Dominice & Knox, 2000; Langellier, 1989; Linde, 2001; Ochs & Capps, 1996; Vella, 2002) and assist us with understanding the actions and intentions of others (Bruner, 1990; Schon, 1983).

As stories are exchanged, memory structures are built (Schank, 1990, 1999). Consequently, we remember what we tell. Stories allow us to explore and appreciate experience from different perspectives (McEwan & Egan, 1995). They can also function as a substitute for direct experience which novices do not possess (Jonassen & Hernandez-Serrano, 2002).

Narrative is used by humans to communicate their experiences, make meaningful connections between those experiences and advance their development by re-examining past experiences in lieu of new information or experiences. Narrative is interpretative and experiential. "We simply do not know, nor will we ever, whether we learn about narrative from

life or life from narrative; probably both" (Bruner, 1996, p. 94). Through narrative, we communicate; make meaning (think), take action (learn) and advance our development.

Retention and Narrative

Retention is the preservation of learning in long-term memory in such a way that it can be located, identified and retrieved accurately in the future (Sousa, 2006). Retention depends on learner attention and focus, and is affected by the activation of prior knowledge (National Research Council, 2000; Vygotsky, 1979), the connection of new knowledge to prior knowledge (Bransford & Johnson, 1972; Resnick, 1983), the organization of knowledge around "meaningful features and patterns" (Ambrose, et al., 2010, p. 56), and the use of worked examples (Chi, Bassok, Lewis, Reimann, & Glaser, 1989) which enable learners to focus on the principles leading to a solution. "Brain scans have shown that when new learning is readily comprehensible (sense) and can be connected to past experiences (meaning) there is substantially more cerebral activity followed by dramatically improved retention (Maguire, Frith & Morris, 1999 as cited in Sousa, 2006, p. 49).

Narratives naturally enable retention. Developing a story establishes the memory structures that will later be used to recall and tell the story (Livo & Reitz, 1986; K. Young & Saver, 2001). Listening to a story activates prior knowledge both of story structure and previously learned stories enabling the connection of the new story to the previously learned story or experience (Mandler, 1978; Mandler & Goodman, 1982). Stories can be considered knowledge organization structures (Bruner, 1986; Irwin, 1996; Polkinghorne, 1988; Sarbin, 1986). They enable the discernment of meaningful patterns and features by the learner (Jonassen, 1991). Stories themselves are like worked examples; they provide the contextual frame for the consideration of alternatives essential to problem solving (Jonassen & Hernandez-Serrano, 2002;

Lave & Wenger, 1991; Orr, 1996; Schon, 1983). Through story, learners make associations that relate to their cognitive structure. This elaboration or depth of processing (Craik & Lockhart, 1972) "results in better learning" (P. L. Smith & Ragan, 2005, p. 142).

Transfer and Narrative

In an extensive review of the empirical literature related to the study of transfer, Ford and Weissbein (2008) identified three factors that impact instructional outcomes and transfer: instructional design, learner characteristics and environmental factors. The instructional design factors are learning principles and instructional sequence. The learner characteristics include "ability, skill, motivation and personality factors" (p. 23). The environmental factors are climate, social support and work constraints. Based on their review of twenty empirical research studies on training transfer, transfer is enabled when complex learning tasks "mirror the learning tasks found in work settings" (p. 38). They identified a need for the use of design strategies to enable transfer.

Narrative enables transfer by providing instructional sequence (Bruner, 1966) in contextual form (Tennyson & Park, 1980) which prompts episodic memory (Jonassen, 1991). Narrative makes possible the application of story schemas to new contexts (Thorndyke & Hayes-Roth, 1979) through these rich content representations. Designing instruction using narrative to express rich content representations, then using that deployed narrative as a means for learners to explore the multiple ways that content can be applied in different contexts (transfer), suggests a need for a framework, a model that guides the instructor/facilitator through the process of designing, developing and deploying the narrative.

Instructional Design Models

Models are "simplified representations" (Richey, 2005) of complex processes, functions or ideas (Gustafson & Branch, 2002). They are a means for thinking about important principles and their relationship to each other for the purpose of understanding something (P. L. Smith & Ragan, 2005). Models provide structure and order and show conceptual relationships. Instructional design models provide "conceptual and communication tools that can be used to visualize, direct and manage processes for generating episodes of guided learning" (Gustafson & Branch, 1997, p. 73). An instructional model uses principles from learning theory, and instructional theory to design instruction. The effectiveness of various instructional design model elements is supported by research in teacher effectiveness, instructional strategies, communications studies and cognitive learning processes (Bell-Gredler, 1986; Bloom, 1968, 1984; Dunn, 1984; Gagne, 1985; Glaser, 1963; Keller, 1974; Kulhavy, 1977; Mager, 1962; Mayer, 1979; Popham, 1975; Ross, 1984 as cited in Moallem & Earle, 1998, p. 6).

The field of Educational Technology uses models to enable the application and replication of activities known to successfully enable learning, retention and transfer. Educational Technology is defined as "the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological process and resources" (Januszewski & Molenda, 2008). The goal of educational technology as a field is to understand how people learn best and how to design instructional systems to facilitate that learning. Educators and Performance Improvement Technologists have approached the problem of learning retention and transfer to practice through the study of learning, development, communication and instructional design theories. This research study adds narrative, a universal means of contextualizing, assimilating (making meaning), and expressing knowledge to this

theoretical base. Recognizing that humans come to know (make meaning) through narrative, and that knowing is a precursor to learning and retention, suggests that narrative can be used as a catalyst for learning, retention and transfer to practice.

Implications. It is clear from the literature that narrative and its practical application in education and performance environments is a powerful heuristic. This research study will attempt to show how instructional narratives, narratives expressly designed for the purpose of enabling learners to alter their perspective, make decisions, take action, and acquire particular capabilities leading to a change in behavior, can be designed and deployed to enable learning, retention and thereby influence the performance of adult learners in practice. This study uses elements gleaned from the theoretical literature (narrative, development, communication, learning and instructional design) as the foundation for a model to support the research premise.

Theoretical Foundations

Learning theories describe what happens during learning. Development theories explain how we come to know through sense perception, reasoning (thinking) and emotion. Adult learning theory looks at the characteristics of adult learners in an attempt to match what is to be learned with the readiness of the learners for that learning. Communication theories describe how messages are created and interpreted. Instructional design theories use learning, development and communication theories to understand how humans learn and develop (Reigeluth, 1999) and how best to design instructional systems to facilitate that learning. Narrative theory addresses how knowledge and experience are organized into a structure imbued with function and significance. Narrative originates from the synergistic relationship between learning, development, and communication, and is a means of influencing all three. This research study looks at the nature of knowledge and how humans make meaning, make sense of themselves and their environment

through narrative. This narrative approach recognizes that adults lead storied lives; adults make stories as they experience life. Narrative uses this experiential base as a common nucleus to develop context, arrive at interpretations based on prior experiences and make both present and future developmental changes based on meaning making. It is an orientation that all adult learners can understand and use regardless of where they are developmentally.

Purpose of the Study

The purpose of this study was to develop a research-based model for designing and deploying instructional narratives based on principles derived from narrative theory, development theory, communication theory, learning theory and instructional design theory that will enable adult learning and retention and the effective transfer of that retained learning to practice (performance contexts). Findings from these five areas were used to identify elements to inform the development of a model for the design and deployment of instructional narratives. An instructional narrative is a narrative expressly designed for the purpose of enabling learners to alter their perspective, make decisions, take action, and acquire particular capabilities leading to a change in behavior. This research study examined narrative in terms of its use as an instructional modality. A modality addresses the manner in which information is encoded for transmission. This study may serve as the basis for future research on narrative, communication, higher order thinking, learning retention, transfer, and performance improvement.

The general question was: what is the best model that can be developed using narrative as an instructional modality to design instruction for adult learners' that facilitates learning, retention and the effective transfer of that retained learning to practice (performance contexts)?

The following research questions formed the basis of this research study:

1. What major findings from the literature on narrative theory contribute to how experience is made meaningful through narrative meaning making?
2. What major findings from the development theory literature contribute to how adults (come to know) think?
3. What major findings from communication theory contribute to an understanding of how narratives can be used to communicate meaning?
4. What major findings from learning theory contribute to an understanding of how adults learn?
5. What major findings from instructional theory contribute to how to design instruction for adult learners?
6. What model for designing instructional narratives can be constructed based on the findings from these five areas (narrative, development, communication, learning and instructional design theories)?

Significance of the Study

Developing a model to design and deploy instructional narratives to enable learning, retention and transfer is an important research problem for three reasons (a) the literature identifies a need for design strategies to enable transfer (Ford & Weissbein, 2008), (b) neuroimaging evidence that narrative is represented as a coherent whole in the brain (Xu, Kemeny, Park, Frattali, & Braun, 2005), that it activates prior knowledge (Maguire, Frith, & Morris, 1999) as well as areas of the brain associated with both cognitive (language comprehension) (Fletcher et al., 1995) and affective (emotional) processing (Ferstl, Rinck, & Cramon, 2005) support the use of narrative as an instructional modality capable of producing

learning, retention and transfer to practice (performance contexts), and (c) there presently is not a research-based process for building instructional narratives. The current study is important to the field of education generally and in particular for Educational Technology inclusive of performance improvement.

This research study brings together communication, learning, development and instructional design theories by using narrative as a means of leveraging the synergistic relationship between communication, learning and adult development to produce a model for learning and understanding through the activation of meaning making in both the teller (instructor/facilitator) and the learner. Most significantly, this study contributes an original model for enabling learning, retention and transfer to practice (performance context) for adult learners.

The model benefits practitioners by providing a simple means to design, develop and deploy instructional content that is universally recognized by all learners/listeners. Use of the model encourages learner engagement with the content through communities of practice to arrive at shared meanings. The application of the model to adult learning and performance contexts contributes the fields of Educational Technology and Performance Improvement by providing validation for an instructional modality that describes a clear path for learning transfer.

Conceptual Framework

The conceptual framework for this study is an original diagram, Figure 1 that shows a proposed relationship among communication, learning and adult development theories for the purpose of designing and deploying an instructional narrative. It represents a synthesis of theoretical work in a number of different areas and hypothesizes an explanation of how narrative

design and instructional design can be used to design instructional narratives to enable adult learning, retention and the transfer of that retained learning to practice (performance contexts).

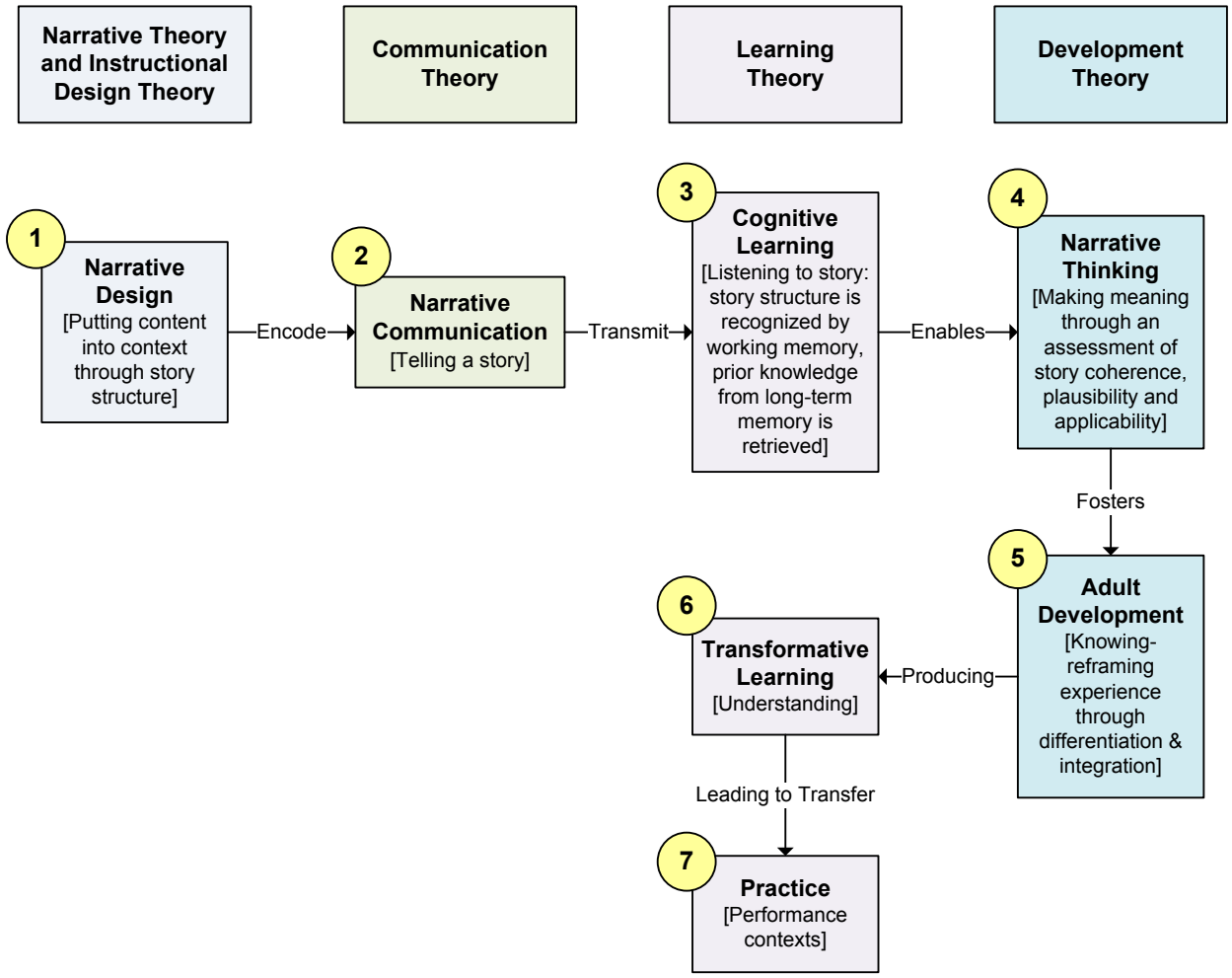


Figure 1. How narrative works to put learning into practice.

This diagram depicts how (1) the use of principles from narrative design and instructional design to plan and encode a content message, contextualized through the application of story structure, (2) the deployment of the encoded message by the teller (instructor/facilitator), (3) the receipt of the transmitted message by the learner which activates cognitive processes; as the learner listens to the story, prior knowledge of both story structure and message content is used

to (4) initiate the meaning making process (thinking) through an assessment of story coherence, plausibility and applicability, which (5) fosters adult development (changes in knowing) through differentiation and integration (6) producing transformation (understanding) which leads to transfer to practice (performance contexts).

Definition of Terms

The following definitions are based on existing literature with some modifications for the purpose of this study.

Adult Development: The process of "qualitative change in attitudes, values and understandings that adults experience as a result of ongoing transactions with the social environment, occurring over time" (K. Taylor, Marienau, & Fiddler, 2000, p. 10).

Audience: Learners gathered for an event. Learners are imbued with unique social and psychological attributes.

Beginning, Middle, End (B/M/E): The basic components of narrative, a structure that imitates a complete action, a whole, through the arrangement of events in an organized sequence (Aristotle, 1999).

Communication: The "relational process of creating and interpreting messages that elicit a response" (Griffin, 2009, p. 6).

Content: Substance of what learners/listeners must know or do. Content inherently contains meaning.

Context: "Multilevel body of factors [and their simultaneous interaction] in which learning and performance is embedded" (Tessmer & Richey, 1997, p. 87). Context enables the assessment and understanding of an event. This study uses the term "environment" to describe the context.

Discussion: Talking with other learners for the purpose of understanding the intended meaning of an experience.

Environment: Refer to "context."

Imagine: The mental formation of ideas, concepts or images based on objects and events not physically present. The process of imagining uses prior knowledge.

Information: Facts and data that give meaning by reducing uncertainty.

Instruction: The "intentional arrangement of experiences, leading to learners acquiring particular capabilities" (P. L. Smith & Ragan, 2005, p. 5).

Instructional Design: The "systematic and reflective process of translating principles of learning and instruction into plans for instructional materials, activities, information resources and evaluation" (P. L. Smith & Ragan, 2005, p. 4).

Instructional Modality: The planned arrangement and encoding of experiences for transmission.

Instructional Narrative: A narrative expressly designed for the purpose of enabling learners to alter their perspective, make decisions, take action, and acquire particular capabilities leading to a change in behavior.

Knowledge: Information acquired through experience and education. Knowledge is a complex product of learning generated through interpretations of information and the study of cause and effect relationships (G. P. Huber, 1991).

Learning: Learning is a persistent change in human performance or performance potential. This change in performance or "performance potential must come about as a result of the learner's interaction with the world" (Driscoll, 2005, p. 9).

Meaning Making: A cognitive activity where relationships are studied, assessed and combined (Polkinghorne, 1988).

Meaningful Learning: A judgment made by the learner in the context of their cognitive architecture (Moon, 2004).

Narrative: A spoken or written account of connected events that represents ordered, interpreted and affected descriptions of experience based on a beginning, middle and end sequence.

Narrative Competence: The knowledge schema (organized past experiences and reactions) an individual brings to narrative making it possible to understand the narrative. Narrative competence is a product of narrative intelligence.

Narrative Design: A planning activity that uses narrative structure to contextualize information.

Narrative Intelligence: The "capacity to both formulate (compose, narrate) and follow (read, understand) story" (Randall, 1999, p. 13).

Narrative Knowledge: Using cognitive, affective and symbolic means to comprehend the meaning and significance of stories (Charon, 2001). Narrative knowing is concerned with meaning, coherence, sequence and understanding (Rossiter, 2005).

Narrative Learning: "Learning through stories" by telling, hearing, and recognizing stories (M. C. Clark, 2010, pp. 5-6).

Narrative Thinking: A cognitive, heuristic process whereby narrative is assessed based on its coherence (probability), plausibility (fidelity) and applicability (Fisher, 1984, 1987). Narrative thinking is the application of story structure to experience. This narrative knowledge is used to produce learning (Robinson & Hawpe, 1986).

Narrativity: What makes a good story [tellability].

Own: The cognitive, affective and kinesthetic possession of an idea, image, object or action.

Practice: The application or use of knowledge, an idea, belief or process. Practice implies action and is grounded in experience (Jewell & Abate, 2001). Practice enables retention and transfer (Driscoll, 2005).

Prior Knowledge: What the learner already knows (Ambrose, et al., 2010).

Reflection: The cognitive and affective processes involved in exploring experience as a means of enhancing understanding (Boud, Keogh, & Walker, 1985). Reflection is an internal dialogue with oneself (Schon, 1983).

Reflective Thinking: "Active, persistent and careful consideration of any belief or supposed knowledge in the light of the grounds that support it" (Dewey, 1933, p. 9). The learner assigns meaning and significance during the process of reflective thinking.

Retention: The preservation of learning in long-term memory in such a way that it can be located, identified and retrieved accurately in the future (Sousa, 2006).

Schema: A schema is an active, organized memory structure that contains the sum of our knowledge. These past reactions and experiences produce a plan or model for behavior (Bartlett, 1995).

Sensemaking: The process of assigning meaning to experience. The activity of pulling together what is going to be interpreted and reinterpreted (Weick, 1995).

Significance: An attribute attached to something the learner deems worthy of attention. The learner assigns significance during reflective thinking (Dewey, 1910).

Story Schema: A story schema is a set of expectations about story content elements and their sequencing (Mandler & DeForest, 1979).

Tell: Using language to communicate (express) information to learners in spoken or written form.

Thinking: An internal cognitive, directed process that involves the manipulation of knowledge and results in behavior (Mayer, 1983). Thinking involves actively explaining, interpreting and assigning meaning (Dewey, 1933).

Transfer: The application of learned knowledge and skill to different performance contexts or applications.

Transformative Learning: The "active process of recognizing again and re-interpreting a previously learned experience in a new context" (Mezirow, 1991, p. 6).

Understanding: The ability to comprehend the intended meaning of words, language, actions or a speaker (Jewell & Abate, 2001).

Summary

This chapter described the problem and introduced the theoretical framework for addressing the problem. A purpose statement was developed to support the research questions. The significance of the study in terms of both research and practice to the fields of Educational Technology and Performance Improvement was offered. Key terms were defined, and an original conceptual framework was introduced.

CHAPTER 2

Literature Review

The purpose of this literature review was to examine findings from the literature on narrative theory, development theory, communication theory, learning theory, and instructional design theory to inform the development of a model for designing instructional narratives that will enable adult learning, retention and the effective transfer of that retained learning to practice (performance contexts). This literature review also examined the research related to narrative application in higher education and organizational settings, two primary performance environments for adult learners.

Narrative

This section establishes the historical origin of narrative, defines narrative in terms of its distinct features, discusses narrative theory and the theorists who have contributed to our understanding of how narratives are constructed, details narrative structure and offers an explanation of how narratives work.

Narrative began with human history. It can be traced to the origin of language some 50,000 or possibly 250,000 years ago depending on either archaeological or anatomical evidence (Sugiyama, 2001). Although the oldest surviving tale, the *Epic of Gilgamesh* dates back only 5,000 years, such written accounts originated from oral traditions. "Narrative starts with the very history of mankind; there is not, there has never been anywhere, any people without narrative" (Barthes, 1975, p. 237). This universality is further evidence that narrative is an ancient phenomenon (Sugiyama, 2001). "Like life itself, it is there, international, transhistorical, transcultural" (Barthes, 1975, p. 237).

Humans acquire the ability to both produce and understand stories between the ages of two and three years (Applebee, 1978; Kemper, 1984; Nelson, 1993; Sugiyama, 2001; Sutton-Smith, 1986). Such understanding is possible because, like language, narrative takes the same basic form. Aristotle described narrative form as a structure with characters in a beginning, middle, end sequence connected by organized events or plot (story) (Aristotle, 1997; McManus, 1999). "In contrast to reading, writing or arithmetic, no special education is required for narrative competence to develop" (Sugiyama, 2001, p. 234). The question of whether narrative competency is innate, similar to Noam Chomsky's theory of generative grammar to explain the acquisition of language, or a learned skill, remains unresolved in the cognitive development literature (Mancuso, 1986; Turner, 1996). Although the explanation for how humans acquire narrative competence is unresolved, it is generally agreed that narrative competence appears at an early age and in most cultures (Polkinghorne, 1988; Stein & Glenn, 1979; Sutton-Smith, 1981, 1986). Bruner (2010) writes "has anybody ever found it necessary to teach a young child what a story *is*, how to understand it?" (p. 45).

Narrative has been the object of inquiry in recent decades in many disciplines. In the 1960s French Structuralists (e.g., Tzvetan Todorov, Roland Barthes, Claude Bremond, Gerard Genette and A. J. Greimas) applied language models to narrative in an attempt to develop a science of narrative (Herman, Jahn, & Ryan, 2005). Roland Barthes (1975) pointed out that the presence of narrative in a variety of formats and genres warranted an interdisciplinary approach to its study. Stories, accounts of experience with specific consequences have come to be viewed as a human strategy for dealing with time, process, and change (Herman, et al., 2005). Such accounts are in contrast with scientific modes of explanation. Narrative is recognized as a "cognitive schema and discourse type," a form of both written and spoken expression that now

> falls within the purview of many social-scientific, humanistic, and other disciplines, ranging from sociolinguistics, discourse analysis, communication studies, literary theory, and philosophy, to cognitive and social psychology, anthropology, sociology, media studies, Artificial Intelligence and the study of organizations, medicine, jurisprudence, and history (Herman, et al., 2005, p. ix).

This has led to the growth of research and teaching activity focusing on narrative.

Narrative Definition

Narrative definitions shed light on the distinct features of narrative. Narrative has been defined in the literature as "an account of events occurring over time" (Bruner, 1991, p. 6), "accounts of action" (Gudmundsdottir, 1995, p. 24), a "form of meaning making" (Polkinghorne, 1988, p. 36), a "communication" (Chatman, 1978, p. 31), a "product of the mind" (Sugiyama, 2001, p. 233), or simply, a story. Although in everyday conversations the terms "narrative" and "story" are taken to mean the same thing, narrative is more than story. The word "narrative" can be traced to the Latin words for both "knowing" (gnarus) and "telling" (narro) (Abbott, 2008). This etymology captures the two sides of narrative; it is a universal means for knowing as well as telling, for assimilating knowledge as well as expressing it. Chatman (1978) writes, "story is the content of the narrative expression, while discourse is the form of that expression" (p. 23). This duality also reveals the introspective or personal and interspective or social nature of narrative. Recognizing this distinction between story and discourse is important. We can never "see a story directly, but instead always pick it up *through* the narrative discourse" (Abbott, 2008, p. 17). The story is shaped by the teller and re-constructed by the listener. Although it may seem that story precedes discourse, story does not actually exist until it is communicated or told. "Story is

always mediated (constructed) by narrative discourse" (Abbott, 2008, p. 19). Figure 2 illustrates the dual nature of narrative.

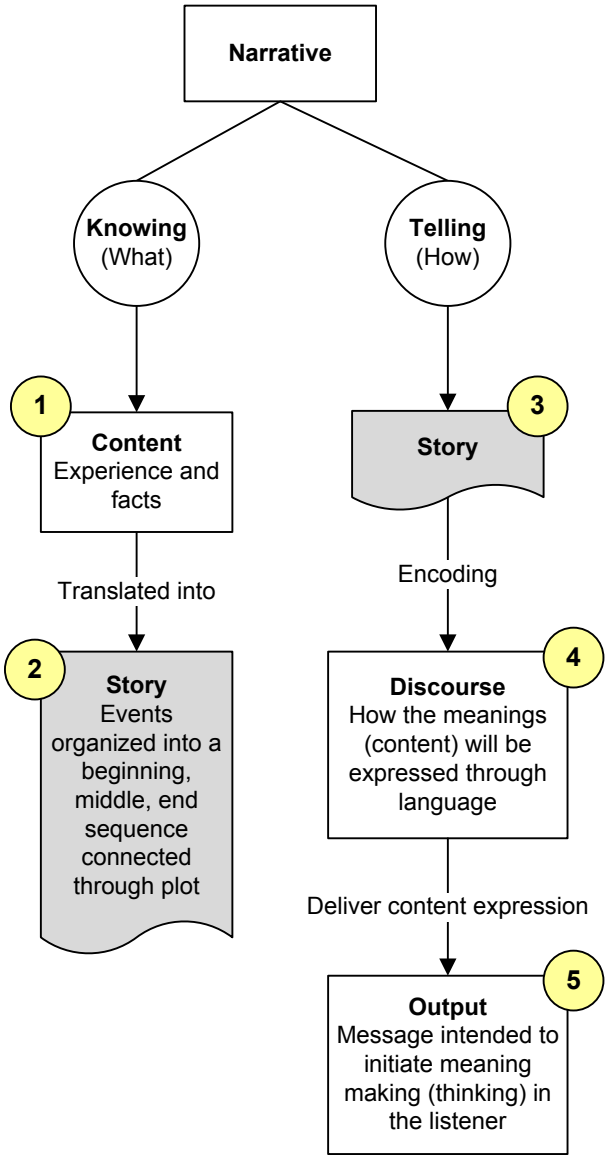


Figure 2. Dual nature of narrative.

Narrative is used to represent reality (White, 1980). Narrative gives meaning to reality by showing how experiences function as parts of a whole (Polkinghorne, 1988). Through narrative, knowledge and experience are organized into a system. This system possesses three distinct

features; it a structure, it is composed of functions, and everything contained in a narrative has significance (Barthes, 1975). The structure stays constant regardless of the medium (W. Martin, 1986) and these three features are cross-cultural (Sugiyama, 2001). Narrative theory addresses the system of narrative and its features of structure, function and significance.

Narrative Theory

Based on literary texts, narrative theory breaks narrative into individual components and studies their function and their relationships. Aristotle is credited with being the first to apply logical reasoning to narratives (Louchart & Aylett, 2004).

Aristotle's Theory of Tragedy in the *Poetics* identifies the basic components of narrative and their arrangement. The Greek word "Poetics" is translated to mean "making;" in this case, the making of a tragedy. To Aristotle, tragedy was an imitation of complete action, a whole. A whole consists of a beginning, middle and end (Aristotle, 1999). The arrangement of events in this beginning, middle, and end sequence establishes a cause and effect chain called 'muthos' or plot. Aristotle named the actions and behaviors of the characters driven by their thoughts, 'mimesis.' Of these two concepts, 'muthos' or plot and 'mimesis' or action, the plot (muthos) was deemed by Aristotle to be the most important because the characters and their behaviors (mimesis) support the plot (Louchart & Aylett, 2004; McManus, 1999). In Aristotle's approach there is an inherent unity of time, place and action, which is established through the plot.

The plot is the first of six principles that describe the important features of tragedy. The second principle, character, is an action agent whose motivations are part of the cause and effect chain established through the plot (McManus, 1999). The third principle, thought, is what is possible and relevant given the circumstances detailed in the plot. The expression of meaning into words is diction, the fourth principle. The fifth principle, song, conveys the emotion of the

story. The sixth principle, spectacle, is the setting or place (Aristotle, 1999). These six principles are used to convey a complete action, a whole.

In Aristotle's basic structure, the beginning describes the setting, introduces the problem and establishes the thinking and actions likely to be taken by the characters. The characters are imbued with characteristics that make their choices seem logical. The middle is where the problem or conflict hinted at in the beginning reaches a climax. The end provides a resolution that follows the cause and effect chain initiated in the beginning. The story events occur in continuous time (Coe, Aiken, & Palmer, 2006; Ricoeur, 1979).

Aristotle believed that narrative served both a social and a psychological function. A play both arouses and purges emotions. Like a "homeopathic medicine: tragedy cures the disease by administering a controlled dose of it and then clearing it away" (J. H. Miller, 1995, p. 67). Many explanations of the nature and function of narrative have been proposed by narrative theorists since Aristotle put forth his ideas in *Poetics*.

Narrative Theorists

For centuries historians used narrative to capture human actions and events. Literary theorists studied narrative in spoken and written fictional stories (J. H. Miller, 1995; Polkinghorne, 1988). The recognition in the early 1960's that narrative theory was an international, interdisciplinary area of study opened the door to the development of French Structuralism. The Structuralist approach to narrative study melded literature, anthropology and sociology together (W. Martin, 1986). Structuralism explores the mental structures used by both the listener and the teller to understand narratives. Structuralists describe these mental structures as having two parts, functional units, and the rules that relate those units. The Structuralist approach used language models to discover the rules humans use to construct their experiences

with narrative. This approach assumes that if the units and the rules are known, they can be used to predict what a narrative will look like (Polkinghorne, 1988).

Structural anthropologist Claude Levi-Strauss studied myths in an attempt to find a common, universal structure that was the same for all people (Polkinghorne, 1988). The operational value of myth lies in its timeless pattern; it explains the present, past and the future (Levi-Strauss, 1963). To explain the universality of myth, he posited that a deep structure containing universal binary opposites such as life and death, or heaven and earth enabled the assumption of different values in the surface structure of the culture's myths (W. Martin, 1986).

Levi-Strauss broke myths down into individual units and examined how the units acquired meaning based on the ways they were combined. The rules that guided the combinations were a kind of grammar, an underlying set of relationships that formed the myth's meaning. He found that the basic structure remained constant as the function of the myth was fulfilled. Levi-Strauss considered these functions to be part of thinking. "Myths are devices to think with; not merely recountings of any particular tale, but ways of classifying and organizing reality" (Polkinghorne, 1988, p. 83). The study of myth is less about the narrative content and more about the mental processes that shape it (Levi-Strauss, 1966). Myths are not descriptions, they are a means to think through and resolve contradictions in thought and social experience (Polkinghorne, 1988). Levi-Strauss's explanation of narrative structure is based on the short myths he analyzed. Longer stories seemed to require a broader theory.

Vladimir Propp offered another approach to narrative analysis. Propp was a formalist scholar who studied the structure of Russian fairy tales. He created a morphology, a description of the parts and their relationship to each other and the whole to analyze one hundred tales (Propp, 1968). His morphology identified eight character types; the villain, donor, helper, the

princess and her father, dispatcher, hero, and false hero and thirty-one types of actions they will perform. Each character functions within a sphere of action that is an inherent part of their character type. For example, the hero can be expected to save the princess, defeat the villain, and slay the dragon (Propp, 1968). Propp described function as an act of character defined in terms of its significance during action. The function determines the meaning and the number of functions is limited (Propp, 1968). Propp considered the relationships between functions to be the basic units of narrative (W. Martin, 1986). His reduction of one hundred fairy tales into a single structure was a key contribution to Structuralism (Herman, et al., 2005). Levi-Strauss's studies of myths and Propp's analyses of fairy tales "rank as the prototypes of all narratives" (Polkinghorne, 1988, p. 83).

Claude Bremond argued that Propp's functions should lead to alternatives. He proposed that the sequence should be the basic unit of narrative, not the function. Sequence is driven by choice. Choice leads to alternative possibilities that exist based on possible story paths. The story then becomes an actualization of the path chosen (Polkinghorne, 1988). Bremond recognized narrative as a 'semiotic [meaning-making] phenomenon.'

Roland Barthes was a French literary theorist who viewed narrative as a system composed of functions, actions and narration. These three descriptive levels or units are bonded together in a "mode of progressive integration;" where functions obtain their meaning from action and action obtains its "meaning from the fact that it is being told, that is, entrusted to a discourse which possesses its own code" (Barthes, 1975, p. 243).

Barthes (1975) believed that everything in a narrative was functional, meaningful and significant. Functions behave like seeds that are planted and rise to maturity at some time during the story. The second level of description, action refers to how characters or agents become

participants in the story through engagement in some struggle, desire or communication. At the third level of description the narrative becomes the "basis of communication" (Barthes, 1975). This level integrates the functions and actions of the previous levels into a communication where the speaker articulates the narrative to a recipient. This system of narrative relies on the processes of articulation and integration. Integration is the combination of functions and actions into meaningful units and articulation is the sharing of those units. Barthes and Claude Bremond are credited with freeing narrative from the confines of literature and fiction and recognizing it as a "semiotic phenomenon that transcends disciplines and media" (Herman, et al., 2005).

Tzvetan Todorov coined the French term 'narratologie' to describe the study and theory of narratives (Herman, et al., 2005). Narratology examines what "all narratives have in common – narratively speaking – and what allows them to be narratively different" (Prince, 1982, pp. 4-5). Such traits distinguish narrative from other "signifying systems" (Prince, 1982).

Todorov assumed there was a universal grammar, a set of rules and operations that showed how reality was structured (Polkinghorne, 1988). His proposed narrative structure requires the "unfolding of an action, a change, a difference" to form a new narrative link (Todorov, 1990, p. 28). These "links" create a logical succession that is supported by transformation. The narrative cycle to establish these links starts with a 1) state of equilibrium that 2) begins to degrade 3) into a state of disequilibrium, which precipitates a 4) search for the return of equilibrium and finally 5) the re-establishment of equilibrium. According to Todorov (1990) "theoretical research has shown – and empirical studies have confirmed – that this cycle belongs to the very definition of narrative; one cannot imagine a narrative that fails to contain at least part of it" (p. 29).

Paul Ricoeur (1983) studied the concept of narrative time. Time is implicit in narrative. It is assumed that narratives occur *in* time. Narrative time is represented as a "linear succession of abstract "now's"" (Ricoeur, 1979, p. 17). Time is essential to plot development; it affects our ability to follow the story. Following a story requires understanding successive actions, thoughts and feelings. The audience is pushed forward with each new development and anticipates the outcome. The conclusion serves as a magnet for the entire development (Ricoeur, 1980). The narrative conclusion can be "neither deduced nor predicted. There is no story if our attention is not moved along by a thousand contingencies" (Ricoeur, 1980, p. 174). A story must be followed to an acceptable, not predictable conclusion. Looking back from the conclusion to events and actions leading up to it, the ending must require those events and actions to be acceptable. This acceptability "characterizes the comprehension of any story told" (Ricoeur, 1980, p. 174).

Ricoeur assesses the meaningfulness of narrative based on how closely it represents lived human experience. He disagreed with Propp's notion that functional units determine story meaning. Ricoeur believed that the whole story must be understood before it can be broken into meaningful units. The meaning of these units is based on their relationship to the whole story (Polkinghorne, 1988). Unlike the Structuralists whose work on narrative form was based on an innate grammar, Ricoeur suggests that narrative form is the retrieval or repetition of past experience through recollection.

Gerard Genette was a French literary theorist associated with the Structuralist movement. His focus was on the "how," the telling or discourse of story (Genette, 1980). He studied how time was represented in the telling of a story. He analyzed time in terms of its order, duration, and frequency and studied the use of voice and mood in the syntax, the arrangement of the words and phrases of narratives. He viewed these concepts as the essential building blocks of narrative

discourse (Genette, 1980). Genette's interpretation of discourse mirrors the elements in the story itself, for example, time changes, character consciousness and the narrator's relationship to both the story and the audience (W. Martin, 1986).

William Labov studied narrative in a sociolinguistic context and created a framework for narrative construction. He defined narrative as a means of reporting past experiences in the same order as the events occurred in the real world (Labov, 1966, 1997, 2006). Unlike the recounting of observation, the experience must have "*entered into the biography of the speaker*" (Labov, 1997, p. 3). Events that have entered into the speaker's biography are "emotionally and socially evaluated, and so transformed from raw experience" (Labov, 1997, p. 3).

Narratives of personal experience consist of five sections beginning with an (1) orientation to person, place and time followed by a (2) complication, the causal events (a crisis or problem), that make action difficult and an (3) evaluation section embedded in the complicating action. The evaluation compares events and establishes their relative importance. The evaluation section communicates the meaning of the narrative by establishing the personal involvement of the teller. The fourth section, resolution reveals the narrative result based on the evaluation and the fifth section, the coda is a means of returning the perspective to the present moment. All narrative construction is preceded by a cognitive process initiated by the teller's decision that an event is "*reportable* or *tellable"* (Labov, 2006, p. 38).

Seymour Chatman synthesized the work of the major narrative theorists, Roland Barthes, Tzvetan Todorov and Gerard Genette into a theory that is based upon the dualist and Structuralist approach first described by Aristotle in *Poetics*. He considers story to be the encoding of 'what' and the discourse level of narrative to be the encoding of the 'how' (Chatman, 1978).

Story, the 'what' of narrative, consists of the content. The content is made up of events and existents. Events are actions and happenings. Existents are the characters and the setting. Discourse, the 'how' of narrative is the expression, the "means by which the content is communicated" (Chatman, 1975, p. 295). Content has both form and substance. The substance of events and existents is the "whole universe," every possible set of "objects, events and abstractions" that can be re-created (Chatman, 1978). The form is the endowment of meaning into those events, characters and settings based on the author's culture. Discourse has both form and substance. The substance of expression is how the narrative is manifested, through words, pictures or gestures. The form is the structure of the narrative transmission (Chatman, 1978). Figure 3 shows a diagram of Chatman's narrative structure.

Chatman's duality theory of narrative can be expanded into a "comprehensive" theory of narrative by including the nature of the verbal transaction and the dynamics of social behavior (Herrnstein-Smith, 1980). The verbal transaction is the way the telling of a narrative is shaped by the experiences, motives and purposes of the teller and the summarizing or re-telling of a narrative by a receiver is shaped by the experiences, motives and purposes of the receiver. Inclusion of the dynamics of social behavior suggests that narratives are not only structures, but are also *acts*, they fulfill a purpose. Every telling is "produced and experienced under certain social conditions" and each party in the exchange is interested in telling and listening (Herrnstein-Smith, 1980, p. 233).

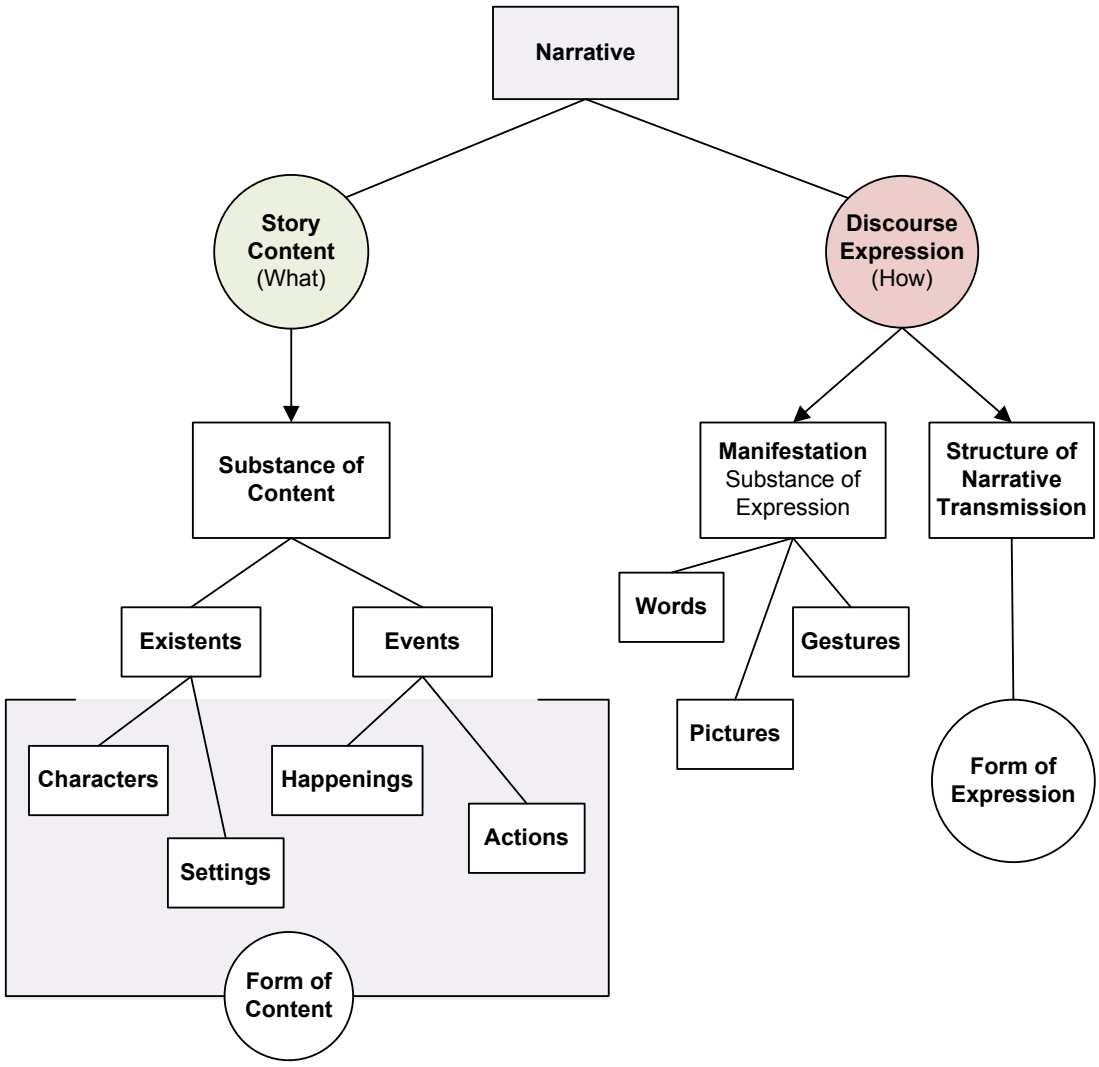


Figure 3. Diagram of the relationship between story, discourse and manifestation. Adapted from "Towards a Theory of Narrative" by S. Chatman, 1975, *New Literary History*, 6(2), p. 300. Copyright 1975 by the Johns Hopkins University Press.

Table 1 is a summary of the aforementioned narrative theorists, the method they used to study narratives and their contribution to the literature.

Table 1

Narrative Theorists: Theoretical Orientation & Contribution to Narrative Study

Narrative Theorist / Orientation	Contribution to narrative study
Aristotle Dualist, Structuralist	• Introduced the concept of the 'whole' characterized by a beginning, middle, end sequence of events arranged in a causal chain • Six principles: plot, character, thought, diction, song, spectacle
Claude Levi-Strauss Structural Anthropologist	• Studied myths, basic structure was constant • Identified a grammar, a set of relationships that formed the myth's meaning • Considered myth's to be a means of thinking to resolve contradictions in thought and social experience
Vladimir Propp Russian Formalist	• Described function as an act of character; characters behave in accepted ways within a sphere of action • Function determines meaning • The relationships between functions are the basic units of narrative
Claude Bremond Structuralist	• Functions should lead to alternatives • Basic unit of narrative is sequence because it is driven by choice and choice leads to alternate possibilities • Recognized narrative as a "semiotic [meaning making] phenomenon"
Roland Barthes Literary Theorist	• Everything in a narrative is functional. Meaningful and significant • Narrative is a system that relies on the integration of functions and actions into meaningful units and the articulation, the sharing of those units
Tzvetan Todorov Structuralist	• Proposed a narrative cycle that establishes a logic of succession initiated by an action that leads to transformation (state of equilibration, degradation, state of disequilibration, search for the return of equilibrium, establishment of equilibrium)
Paul Ricoeur Hermeutic and Phenomenological	• Narrative takes place 'in time' • Narrative form is the retrieval or repetition of past experience • Narrative represents lived human experience
Gerard Genette Literary Theorist, Structuralist	• Addressed the 'how,' the telling or discourse of story • Developed a narrative syntax using the concepts of time, order, frequency, duration, voice. and mood • Described narrators relationship to story and audience
William Labov Sociolinguist	• Narrative in a sociolinguistic context • Narrative framework comprised of orientation, complication, evaluation, resolution, and coda • Narrative construction is preceded by a cognitive process of assessing tellability
Seymour Chatman Dualist and Structuralist	• Narrative is a duality; 'what' and 'how' • Story is the content of narrative expression and discourse is the form of that expression

Narrative Structure

Narrative structure is the framework for the structured relationship and order of events (described by models of narrative grammar) and the way (means/method/technique) that narrative is expressed to an audience. It is present in widely diverse cultures (Mandler, 1984). Narrative structure relates to both the story or events and the discourse that is used to present the story (Herman, et al., 2005). This dual nature of narrative was highlighted by the French Structuralists who called the "what" of narrative the "histoire" and the "how" of narrative the "discours." In French, 'histoire' means both "story" and "history" (W. Martin, 1986). Roland Barthes viewed the 'histoire' or story as the integration of function and action into meaningful units and the 'discours' the sharing or articulation of those units (Barthes, 1975). The Russian formalists led by Vladimir Propp, suggest that the "raw materials," the story or 'fabula' is the text of events. The way in which those events are told is the 'sjuzhet' (Bal, 1997; Herman, et al., 2005; W. Martin, 1986). To Aristotle, the 'what' was the mythos or plot and the 'how' was the logos or speech. Seymour Chatman (1978) views the 'what' to be the substance of the story and the 'how' to be the 'way' or the form, the "structure of the narrative transmission" (p. 24). Knowledge about the structure of narratives is important because such knowledge is used during processing (Mandler & Goodman, 1982). Table 2 summarizes these structural terms.

Table 2

Elements of Narrative: Formalist & Structuralist Terminology for Translating Knowing into Telling

Narrative Element (essence of narrative)	Aristotle (Greek)	Vladimir Propp (Russian)	Roland Barthes (French)	Seymour Chatman (English)
What (knowing) addresses events, location, time, characters, purpose	mythos (plot)	fabula (raw materials)	histoire (story) (integration, combining form and action into meaningful units)	story
How (telling) addresses in what way or manner Focused on activating prior knowledge, invoking curiosity, establishing relevance, and nurturing significance	logos (speech)	sjuzet (procedures used to convey the raw materials)	discours (articulation; sharing full meaning)	discourse

Note. Adapted from: Martin, W., (1986). *Recent theories of narrative.* Ithaca, NY: Cornell University (pp. 107-109).

Narrative grammars. The structural relationship of narrative events within a story is explained through models of narrative grammar (Propp, 1968; Levi-Strauss, 1963; Greimas, 1983; Bremond, 1973; Prince, 1973 as cited in Herman, et al., 2005, p. 366). Similar to Noam Chomsky's linguistic theory, generative-transformational grammar, story grammars are rule systems that tell us what "elements "go together" to form higher elements and how one group of elements is related to another" (Rumelhart, 1980, p. 314). They were developed to describe story texts (Mandler, 1983, August). Story grammars break story elements into a visual hierarchy of elements in the form of a tree diagram that maps element relationships. Story grammars have

been proposed by Mandler & Johnson (1977), Rumelhart (1975), Stein & Glenn (1979), Thorndyke (1977) and Van Dijk (1979). They represent an attempt to formalize the development of narratives, offer a means to interpret texts, to assess what makes a good story (Herman, et al., 2005), and to predict story recall (Mandler & Johnson, 1977). The acquisition of narrative grammar enables children as young as two years old to construct a story (Ames, 1966 as cited in Fuller, 1982). In a study conducted to determine the effect of story structure on memory and comprehension, Thorndyke (1977) found that recognizable narrative structure enabled learners to produce an organized plot hierarchy that was used for encoding. The stories were "rated as easy to comprehend and produced high recall" (p. 104).

Story structure research (Kintsch & Van Dijk, 1978; Mandler & Johnson, 1977; Rumelhart, 1975; Thorndyke, 1977) has shown that stories contain structure, subjects recognize the structure and use it to guide both comprehension and recall (Mandler, 1978; Mandler & Goodman, 1982). Story structure enables the formation of a schema for stories. A story schema is a mental representation containing basic knowledge about the way a story should progress (Mandler, 1983, August). It may originate from a fundamental need to make experiences coherent (Fuller, 1982). It is built by the listener based on their reflection on the attributes of story the listener has learned during their interactions with stories. Story structure develops epigenetically out of a young child's understanding of causality which is observable at nine months (Mancuso, 1986).

Story grammars have been criticized in the literature for their inability to describe how the grammar would be used to understand a story (Black & Wilensky, 1979; Johnson-Laird, 1986). Rumelhart (1980) points out that story grammars are schemes for formalizing the problem-solving structure of stories. Their purpose is to allow the "systematic assignment of a

constituent structure" (p. 315). The structure leads to the development of a schemata that can be used to understand the story (Rumelhart & Ortony, 1976).

Structure attributes and narrative. Piaget showed how various disciplines used structure and how in each instance the attributes of wholeness, transformation and self-regulation were apparent (Chatman, 1978). Narrative meets the attribute of wholeness through the organization of connected events, the story plot. Transformation occurs through discourse, the expression of the story content. Such expression must confine itself to elements relevant to the story. The telling represents the logical whole. Self-regulation is apparent in story through the beginning, middle and end sequence which arranges the circumstances and problem details in the beginning so as to reach a logical resolution at the end. Although such analyses of narrative provide insight into the existing structure of narratives, they fall short of suggesting a model for producing narratives (Cortazzi, 1993).

How Narratives Work

Narratives express reality and are told for a purpose. Narrative may solve the problem of "how to translate knowing into telling [by] fashioning human experience into a form assimilable to structures of meaning that are generally human rather than culture-specific" (White, 1980, p. 5). Such understanding of stories from other cultures renders narrative "translatable without fundamental damage" that is not possible with other forms of communication and suggests that narrative is a "metacode," a universal means of expressing messages of a shared reality (White, 1980).

Building a narrative requires more than logical reasoning; like the reality we are attempting to express, a story creates two landscapes simultaneously. The first landscape contains the elements of action: character, intention or goal, situation. This constitutes the story

structure or grammar. The second landscape contains consciousness: what the characters participating in the action "know, think, or feel, or do not know, think or feel" (Bruner, 1986, p. 14). Both landscapes are essential to the development of a good story and are embedded in Aristotle's beginning, middle, and end sequence through its plot. To be effective, narrative should structure events in the plot so they are connected and move through time logically. Successful narratives establish a goal and arrange the events so goal attainment seems possible. This event linkage contributes to the understanding of each event and explains how it is related to the next event (Gergen & Gergen, 1986).

The beginning of the story establishes a cause and effect chain that reaches a climax in the story middle and a resolution at the story end (McManus, 1999). The plot arranges these causal events into a logic stream that guides the story to its conclusion. These three elements; beginning, middle, and end form the story whole. The unfolding of each element through the plot can be depicted graphically by Freytag's triangle, Figure 4 (Herman, et al., 2005; Holman & Harmon, 1986; McManus, 1999). The beginning (A) introduces the characters, setting and the current situation or problem. The rising action describes the attempts of the characters to move toward their goal in spite of obstacles and complications. The middle (B) or turning point is caused by the incidents that preceded it. These events culminate in a climax the effort of which produces incidents leading to the resolution (C) of the situation or problem (Herman, et al., 2005). Throughout the story, the elements of action and consciousness must seem reasonable to the listener, if so, the conclusion will bring closure.

During the act of telling, the teller turns their experience into the experience of the listeners. There is a psychological connection, a memory that is made by the listener as they interpret the story. The strength of this connection is based on how completely the story can be

integrated into the listener's experience. Greater integration increases the likelihood that the listener will repeat the story to someone else (Benjamin, 1986).

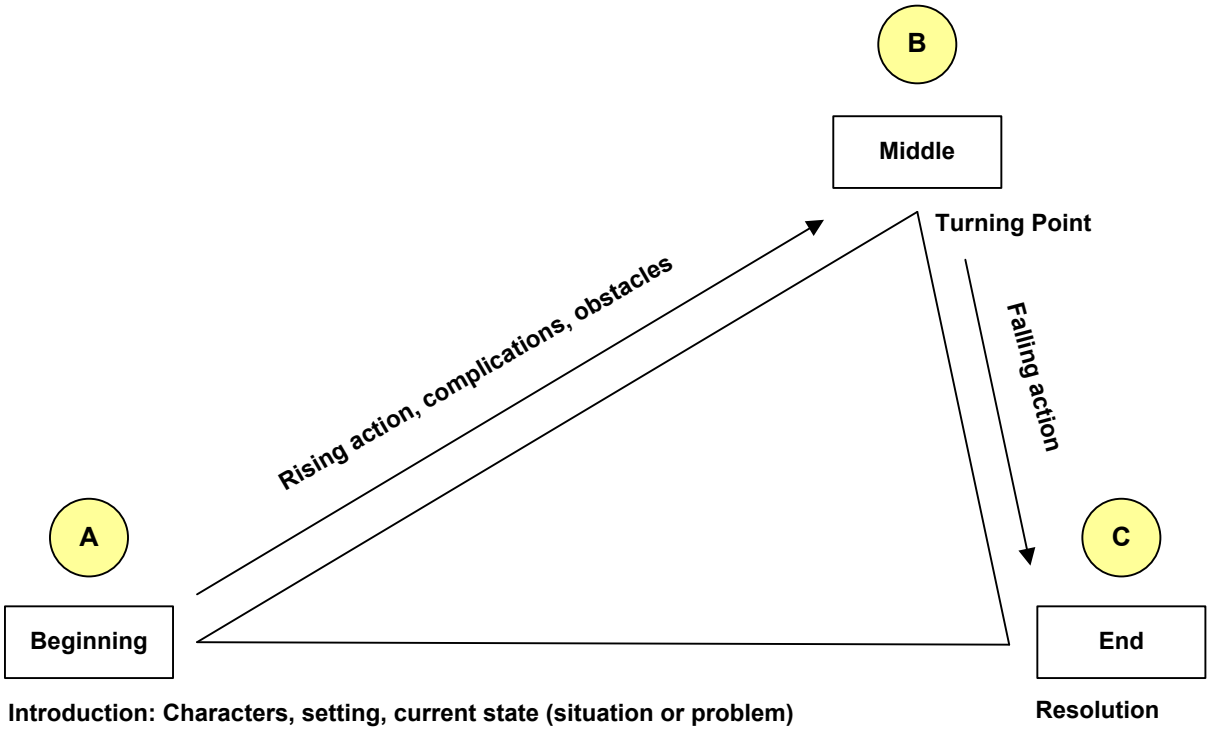


Figure 4. Unfolding of story beginning, middle and end as depicted by Freytag's triangle. Adapted from "Outline of Aristotle's Theory of Tragedy in the *POETICS*" by B. F. McManus, 1999, retrieved from: http://www2.cnr.edu/home/bcmcmanus/poetics.html. Copyright 1999 by Barbara F. McManus.

Summary of narrative theory. Narrative is a meaning making structure used for both assimilating and expressing knowledge. It originates in the mind and can be both spoken and written. Narrative competence is evident at an early age and appears in most cultures. Narrative is comprised of both story and discourse (Chatman). As proposed by Aristotle, the story, the account of experience should be designed in a beginning, middle, end sequence and contain a plot. This narrative cycle is comprised of links as suggested by Todorov that set up a logical succession as events unfold. These successive actions, thoughts and feelings occur in time (Ricoeur) and enable the audience to advance through each unfolding development, culminating

in transformation. Story characters are developed to behave in expected ways based on their character type (Propp) and should be faced with choices (Bremond) that are evaluated as to their meaning by the teller (Labov). A story is a closed structure, dependent upon what happens inside the plot. This structure leads to the formation of story schemas that contribute to story understanding and recall (Mandler). Everything inside the narrative should be functional, meaningful, and significant (Barthes). The discourse or telling of the story should use Genette's elements of time, order, frequency, duration, voice and mood to communicate the story.

An important consideration for building narratives is that narrative construction is preceded by cognition as suggested by Levi-Strauss and Labov. Narrative is both introspective, beginning on the inside initiated by thinking, and intraspective ending with the social act of communicating the story leading to its re-construction by the listener (Chatman). Recognizing that the audience possesses narrative competence, that is, they know what a story is, how it works, and how to understand it, makes narrative a powerful heuristic.

Narrative Practice

This section describes what narrative does, addresses how it is related to both meaning making and language, discusses the concepts of narrative intelligence, tellability and narrativity, and explains how narrative is applied in higher education and organizational settings, two primary performance environments for adult learners.

Narrative Description

Narrative has been described in the literature as a mode of communication (Fahy, 2007; Fisher, 1984, 1987; Gargiulo, 2005a; Guber, 2007; Rodden, 2008; Simmons, 2001, 2007; Stephens, 2009), a form of thinking and reflection (Gold, Holman, & Thorpe, 2002; Kemp, 2001; Kuit, Reay, & Freeman, 2001; Schank & Abelson, 1995; Turner, 1996), a means of adult

development (Banks-Wallace, 1998; Delgado, 1989; Razack, 1993; Rossiter, 1999a, 2002; K. Taylor, et al., 2000), a form of organizational learning and an enabler of sensemaking (Boje, 1991c, 1995, 2008; Boyce, 1995; J. S. Brown & Duguid, 1991; Swap, Leonard, Shields, & Abrams, 2001; Weick, 1995, 2001; Weick, Sutcliffe, & Obstfeld, 2005). Pedagogically, narrative is considered to be a teaching strategy (Ackerman & Maslin-Ostrowski, 1995, April; Butcher, 2006; Cangelosi & Whitt, 2006; C. Cooper, Orban, Henry, & Townsend, 1983; Ferguson, Bareiss, Birnbaum, & Osgood, 1992; Ganske, 2007; Pedersen, 1995), an instructional method (D. H. Andrews, Hull, & Donahue, 2009; Kreps, 1998, November; McDonald, 2009), a problem-solving activity (Black & Bower, 1980; Hernandez-Serrano & Stefanou, 2009; Jonassen & Hernandez-Serrano, 2002) and a pedagogical tool (Abrahamson, 1998; Burk, 2000, November; Coulter, Michael, & Poynor, 2007; Diekelmann, 2001; Gudmundsdottir, 1991, 1995; Ironside, 2003, 2004). Regardless of how narrative is situationally applied, narrative can best be described as a "fundamental structure of human meaning making" (Bruner, 1986; Irwin, 1996; Polkinghorne, 1988; Sarbin, 1986).

Narrative and Meaning Making

Meaning is a cognitive activity where relationships are studied, assessed and connected. Narrative meaning is focused on "aspects of experience that concern human actions or events that affect human beings" (Polkinghorne, 1988, p. 6). Meaning making is an interpretative approach to cognition. It is the "processes and transactions involved in the construction of meanings" (Bruner, 1990, p. 33). Narrative is used to frame experience and initiate meaning making. Meaning making occurs in the space between the event and our reaction to the event (Kegan, 1982). Narrative meaning originates from the connections or relationships among

events. For example, something may be a part of something else or it may be the cause. Narrative meaning is the product of thought (Polkinghorne, 1988).

Meaning making and language. Human meaning making is facilitated by language. The sound of a word is paired with its meaning. This linkage is established in childhood. Individual words are strung together in a particular order. The arrangement of words into sentences is called syntax. Syntax is governed by a generative grammar, a set of rules on how words can be combined to reveal concept relationships. Language enables humans to "convey a concept from mind to mind virtually instantaneously" (Pinker, 1994, p. 84). Narrative uses language to organize experiences. Determining meaning is an active process where elements are organized, assimilated or accommodated (Pulaski, 1980).

Narrative Intelligence

The concept of narrative intelligence is predicated on Gardner's (1993) theory of multiple intelligences. Gardner argues that intellect is not a singular product of the mind, but that the mind contains many autonomous intellectual capacities or intelligences. "An intelligence is the ability to solve problems, or to create products that are valued within one or more cultural settings" (Gardner, 1993, p. x). The theory proposes that by virtue of being human, there are seven different kinds of intelligences: linguistic, musical, logical-mathematical, spatial, bodily kinesthetic, interpersonal and intrapersonal. Each of these intelligences contains a "raw computational core" specific to that intelligence. It is through repeated use, elaboration and interaction among the core elements that knowledge becomes "intelligent" (Gardner, 1993, p. 279).

Randall (1999) suggests that Gardner's theory invites consideration of other intelligences. Support for narrative intelligence can be found in Bruner's (1986, 1996) work on narrative

thinking and Polkinghorne's (1988) discussion on narrative knowing. Narrative "is intricately related to knowing and is our way of taking the flow of experience and making it intelligible" (Baur, 1994, p. xx as cited in Randall, 1999, p. 13). Schank (1990) writes that knowledge is "experience and stories, and intelligence is the apt use of experience and the creation and telling of stories" (p. 16).

Randall (1999) views narrative intelligence as the "capacity to both formulate (compose, narrate) and to follow (read, understand) story" (p. 13). Story composition and followability are built through the use of five "intertwining *sub*-capacities; emplotment, characterization, narration, genre-ate and thematize" (p. 15). Emplotment is the organization of events into a plot. Characterization is the development of external and internal mental pictures of our self and others. By using these pictures, we can "imagine others thoughts and feelings and their possible actions and reactions in particular situations" (Randall, 1999, p. 17). Narration is the telling, the communication of the story. To genre-ate is to organize events into "*predictable patterns.*" To thematize is to see how meaningful patterns in events and situations unfold and are resolved (Randall, 1999). It is through the use of these sub-capacities that narrative intelligence is operationalized.

Randall (1999) suggests that narrative intelligence begins in childhood and is closely associated with Gardner's (1993) interpersonal, intrapersonal and linguistic intelligences. The development of narrative intelligence begins with an understanding of how stories work through their structure. Mancuso (1986) writes "story structure develops epigenetically out of…basic structures [causality, contextuality, continuity] whose early manifestations are observable in the child aged about nine months" (p. 101). "Studies show that children generally master narrative structure in stages" (Gardner, 1982, p. 61). The origin of narrative intelligence in childhood is

also supported by Dautenhahn's (1999, Fall Symposium, 2001) research on the origin of narrative intelligence and its association with social intelligence. Social intelligence is employed during narrative emplotment where the ability to recognize, understand and predict the behavior of others is coupled with the ability to "remember and learn interactions with others to build direct relationships" (p. 6) and to understand those relationships. The growth of narrative intelligence occurs through the use of language to describe the actions and intentions of people. Research indicates that children access narrative memories as they listen to another person's narrative about an experience and use narrative to restate their own experience (Nelson, 1993). Randall (1999) posits that narrative intelligence can be advanced through its repeated use and refinement. Each exposure to and use of narrative intelligence increases both competence and appreciation for narrative strategies.

Work in narrative intelligence is interdisciplinary (Mateas & Sengers, 1999, Fall Symposium). Recognizing narrative intelligence as a means of organizing human experience has stimulated the interest in narrative in many fields. In art, narrative is a form of representation; in psychology it is used for sensemaking. In cultural studies narrative is viewed as a means to increase our knowledge of embedded cultural knowledge. Literary theorists analyze narratives to determine and replicate its properties for both story development and meaning making. In drama, stories are performed in front of an audience and emphasize action and real-time character responses. Narrative intelligence is of particular interest to artificial intelligence researchers who are concerned with replicating the knowledge structures humans use to acquire, process, and retain knowledge. In this regard, narrative intelligence is considered to be humanistic artificial intelligence (Mateas & Sengers, 1999, Fall Symposium).

Tellability

Narrative intelligence is closely related to the concept of tellability introduced by William Labov (2006). Tellability is the application of narrative intelligence by the teller to determine first, whether something of personal significance to the teller is worth telling and second, to recognize, if based on an assessment of the audience needs and abilities, the story will be worth telling to the audience (Baroni, 2011; Norrick, 2005; Schank, 1990). "A sequence of actions, states, and events qualifies as a narrative by virtue of how it situates remarkable or tellable occurrences against a backdrop of stereotypical expectations about the world" (Herman, 2002, p. 85).

Tellable stories must have a point (Ryan, 1991). A narrative point is described by Robert Wilensky (1983) as the structures that "define those things that a story can be about" (p. 583). Narrative points contain something intrinsically interesting, something worthy of attention. They provide context (Baroni, 2011). Narrative points are identified and remembered by the listener. Tellability is assessed based on narrative points and is the reason why some plots are better than others.

Ryan (1986) suggests that tellability depends on plot complexity introduced as part of the plot sequence embedded in the narrative. These 'embedded narratives' initiate two types of mental acts, "retrospective interpretations of the past and projections of the future" (p. 323). Tellability can be predicted based on the complexity of this system of embedded narratives. Depicted graphically, embedded narratives show plot changes driven by character intent marked by many branches as opposed to a linear event structure with few branches. Tellability not only takes an audience in a direction, it leads them down alternative pathways.

Narrativity

Some narratives are simply better than others, they "tell a better story" (Prince, 1982, p. 145). Narrativity is what makes a good story. In the literature, the term "tellability" is often used interchangeably with "narrativity." Narratologists explain narrativity as an assessment of what makes a story a good story inclusive of its tellability. Narrativity is produced through the application of four attributes that make one version of events more narrative than another; event description, wholeness, narrative orientation and narrative point (Prince, 1982).

Event description. There is more than one way to describe an event. Simple, direct statements describing actions are informative and clearly convey meaning. Narratives are concrete, specific and live in certainty: "this happened then that; this happened because of that; this happened and it was related to that" (Prince, 1982, p. 149). The past, "it did happen" is preferable to the future, "it will happen." Meaning making is facilitated when narratives are processed as a series of declarations about events imbued with certainty (Prince, 1982).

Wholeness. A story containing at least three distinct, significant events contains more narrativity than a chronological arrangement of events (Prince, 1982). Each of these events is itself an 'embedded narrative' that should contain a beginning, middle and end to form a whole. Embedded narratives explore character mental states and introduce complexity (Ryan, 1986). When the whole is larger than the individual parts, narrativity is increased (Prince, 1982).

Narrative orientation. Narratives progress from one event or action state to another. As events unfold, they provide possibilities. Listeners' wonder: "what can happen? what will happen? what is happening? what has happened?" (Prince, 1982, p. 155). What occurs next in a narrative depends on what came before and the end depends on the beginning. Getting from beginning to end can lead to surprises due to the possibilities that unfold in the middle of the

story. The end is like a magnet. A well-organized narrative will move the listeners toward the end in anticipation. Narrativity is a function of the feelings the narrative invokes as the listeners advance toward the end.

Narrative point. Narratives should contain a point, a context with a specific purpose. Knowing the point is what gives the story its meaning; it is what is needed for recall (Zull, 2002). Linking events is not enough to make a story worth telling (Polanyi, 1986; Prince, 1982; Wilensky, 1983). Narratives should explain problems or show something unusual that is relevant to the listener. "Without desire on the part of the receiver and without the fulfillment of this desire, there can be no point to a narrative" (Prince, 1982, p. 59). Narrativity is assessed by how well the narrative represents the story events, the conflict and its resolution. It is the listener that assigns value to the narrative.

Summary of tellability and narrativity. Operationalizing narratives requires more than a beginning, middle, and end sequence. Building a good story that listeners find significant and value requires robust event description, knowledge of the mental state of the characters, their inner thoughts, feelings, motives (plot complexity) and a progression from beginning to end filled with possibilities. Listeners will likely view such purposeful narratives as worthy of attention. The attributes of event description, wholeness, narrative orientation and narrative point contribute to the production of a good narrative. Good narratives strengthen story schemas and are retained as listeners relate the narrative to their own story in response (Schank, 1990).

Narrative Application

Literature on narrative application in the areas of narrative inquiry, narrative in organizations and narrative pedagogy was reviewed. Figure 5 shows each of these applications and how they are related to each other.

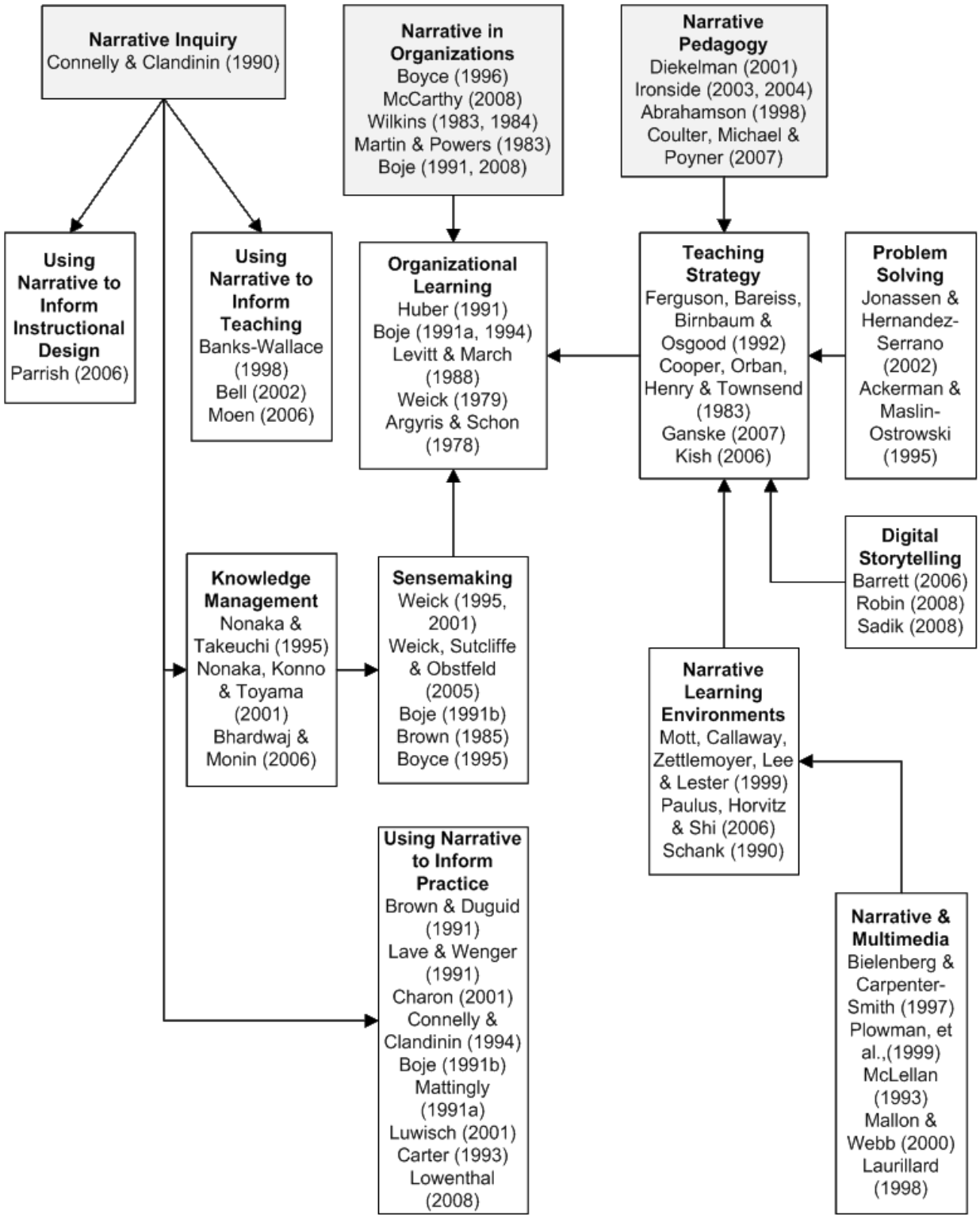


Figure 5. Narrative application.

Narrative Inquiry

Narrative Inquiry is a type of qualitative research design that uses stories to describe human action (Polkinghorne, 1995). The use of narrative in research is based upon the claim that "humans are storytelling organisms who, individually and socially lead storied lives" (Connelly & Clandinin, 1990, p. 2). People tell stories about their lives and narrative researchers listen, describe those lives, and write narratives about what they experienced. These narrative descriptions show how humans engage with the world. Narratives are empirical accounts of what happened. The account is based on data, "it has to be justified by the facts and by the ability of different people to see the same facts-all standard criteria for scientific enquiry" (Hirsch & Rao, 2003 as cited in Bhardwaj & Monin, 2006, p. 76). In narrative inquiry, the term "narrative" is used to describe the event, the structure of the experience being studied, and the method, the "pattern of inquiry" for the analysis and production of stories (Connelly & Clandinin, 1990).

Narrative Inquiry to Inform Teaching

Research on narrative inquiry to inform teaching was devoted to qualitative studies whereby individuals shared stories of their experiences in education (Banks-Wallace, 1998; Bell, 2002; Connelly & Clandinin, 1990; Georgakopoulou, 2006; Moen, 2006). By documenting stories of educational experience from both the teacher and learner perspectives researchers are able to ascertain what it means to both educate and be educated (Connelly & Clandinin, 1990). Narrative inquiry rests on the epistemological assumption that humans make sense of experience by the "imposition of story structures" (Bell, 2002, p. 207).

Experience is personal, social and culturally situated (Bell, 2002; Dewey, 1910, 1933, 1938). When people tell experiential stories, the choices they make about their role, event

sequence, causal relationships and the story ending are shaped by the stories they grew up with. In this way, the stories we tell are rooted in our culture (Bell, 2002).

Human experiences are connected. One criterion of experience is continuity; that is, experiences grow out of other experiences and lead to further experiences (Dewey, 1938). We position ourselves in a "continuum-the imagined now, some imagined past, or some imagined future-each point has an experiential base and leads to an experiential future" (Clandinin, 2000, p. 2). We reflect on present experiences and connect them to past experiences. In education, experiential continuity is reinforced when instruction relates to a question that is "vital in the student's own experience" (Dewey, 1910, p. 199). Instruction, then becomes the "enlargement of experience" (Dewey, 1933, p. 202).

Narrative to Inform Instructional Design

Narrative is used to inform instructional design through the composition of a story of learner experience. The story is used to connect those learner experiences with what is to be learned. This process enables the development of an instructional design that is more learner-centric (Lloyd, 2000; Parrish, 2006). Through story, the designer can explore learner "motivations, desires, ambitions and frustrations" (Parrish, 2006, p. 78). Design stories capture the entire learning experience. They provide a richly descriptive means to communicate the design to clients and stakeholders. Design stories are used as part of the formative evaluation of an instructional design project.

Narrative can also be used to inform instructional design through the incorporation of storytelling elements into instructional designs. By applying the storytelling elements of conflict: the cognitive dissonance created when characters behave in unexpected ways, authenticity:

character development based on realistic emotions and reactions, entertainment: stimulating audience interest and attention, designers can improve learner experiences (McDonald, 2009).

Narrative in Organizations

The use of narrative in organizations is well established in the literature. Research on narrative in organizations addresses how narrative shapes culture and enables change (Boje, 1991c; Boje, Luhman, & Baack, 1999; Boyce, 1995, 1996; Denning, 2001; Gabriel, 1991, 2000; Hazen, 1993; Kreps, 1990; J. Martin & Powers, 1983a, 1983b; McCarthy, 2008; Pondy, 1983; Rhodes & Brown, 2005; S. Taylor, et al., 2002; Tyler, 2007; Wilkins, 1983, 1984) how narrative advances organizational learning, informs practice and teaches management and leadership skills (Argyris & Schon, 1978; Boje, 1991a, 1994; Boland Jr, Tenkasi, & Te'eni, 1994; J. S. Brown & Duguid, 1991; Crossan, Lane, & White, 1999; Cullen, 2008; Czarniawska, 1998; Gargiulo, 2005b; G. P. Huber, 1991; Kaye, 1995; Lave & Wenger, 1991; Levitt & March, 1988; Rhodes, 1996, 1997; Swap, et al., 2001; Tenkasi & Boland Jr, 1993; Vance, 1991; Watson, 2001; Weick, 1979; Zemke, 1990). Knowledge management (Bhardwaj & Monin, 2006; Leonard, 2007; Nonaka, Konno, & Toyama, 2001; Nonaka & Takeuchi, 1995; Reamy, 2002; Ruggles, 2002) and sensemaking (Boje, 1991c; Boyce, 1995; M. H. Brown, 1985, 1986; Leedom, 2001, October; Maitlis & Lawrence, 2007; Weick, 1995, 2001; Weick, et al., 2005) enable organizational learning.

The literature suggests that narrative is a powerful, inherent force in organizations (Boje, et al., 1999; Boyce, 1995; Denning, 2001; Gabriel, 2000). Boje (1991c, 1995, 2008) proposed that an organization be considered a collective storytelling system where members tell stories as part of sensemaking, comparing their individual memory with the organizations' memory. By nature, storytelling is both retrospective and present as it connects what was while describing the

'here and now.' This view supports Hazen's (1993) contention that organizations be understood as "socially constructed verbal systems: as stories, discourses, or texts" (p. 15) manifested in the voices of each member. Stories serve as "repositories of organizational intelligence" used to support organizational development (Kreps, 1990, p. 191) and advance organizational goals (Tyler, 2007). Organizational narratives reveal contextual knowledge, facilitate the adoption of ideas and influence action.

Narrative and culture. Stories and storytelling both express and shape organizational culture by offering an organizing perspective, managing meaning making, enabling member socialization, and by providing information to interpret and respond to situations (Boyce, 1996). Through the stories told in organizations, researchers and organizational development practitioners identify organizational values and discover how the culture works (Boyce, 1996; Wilkins, 1984).

The two main purposes of story in organizations are to provide *grounding* by clarifying values and *instruction* by demonstrating the "way to do things around here" (Neuhauser, 1993, p. 28). Cultural stories function like behavioral scripts that guide action and "socialize new members into [the] culture" (Kreps, 1990, p. 192). Cultural stories contain four attributes, 1) they are concrete, 2) express common knowledge, 3) are believable, and they 4) describe how things are done or not done in the organization (Wilkins, 1984, pp. 47-48). Cultural stories contain detail and organizational significance, they allow listeners to "experience [an] event vicariously" (Wilkins, 1984, p. 48) and are more persuasive than other forms of communication. As listeners interpret and assess stories, values and actions are linked together (Fisher, 1984, 1987).

Narrative and organizational commitment. The interpretative nature of narrative makes it able to perform a variety of functions in an organization. McCarthy (2008) found that

stories were "strongly associated with organizational commitment [and they] play an important role in conveying values and complex messages" (p. 163). Martin and Powers (1983b) cite research evidence that

> organizational stories legitimate the power relations within the organization, they rationalize existing practices, traditions, and rituals; and they arbitrate through exemplars the philosophy of management and the policies which make the organization distinctive. In short, this research suggests the proposition that there is an association between stories and organizational commitment (p. 97).

To validate the claim that stories and organizational commitment are associated, Martin and Powers (1983a) conducted two research experiments. In the first experiment, subjects were asked to assess the effectiveness of a winery advertisement. In the second experiment subjects compared the impact of a corporate policy claim. In both experiments, the subjects, MBA graduate students, were presented with 1) story, 2) statistics, 3) statistics plus story. Subjects in the story condition found the advertisement or policy claim to be both believable and truthful. Story had a stronger impact on subjects than the statistics condition and the statistics plus story condition. These experiments confirmed the research hypothesis that stories caused commitment and "caused more commitment than other means of communicating information, such as statistics" (p. 167). It is noteworthy that story influenced both subject cognition, through the assessment of truthfulness, and attitude, by subject commitment to the values expressed. In terms of practice, this research suggests that story, more than other forms of communication, can be used to affect performance (J. Martin & Powers, 1983b).

Narrative as a change agent. Stories are also "powerful media" for bringing about change both in people and the culture (Kaye, 1995). Stories are "part of a process for recognizing

as well as collectively accomplishing and enacting change" (Boje, 1991a, p. 8). Denning (2002) identifies the following reasons why stories are effective change agents:

(a) Storytelling is natural and easy

(b) Stories show the connections between things

(c) Stories help cope with complexity

(d) Stories bypass defense mechanisms

(e) Stories are energizing

(f) Stories can enhance or change perceptions

(g) Stories are easy to remember

(h) Stories are universally non-adversarial

(i) Stories are inherently non-hierarchical

(j) Stories engage our feelings (pp. 4-6)

However, not all stories are effective (Boje, 1991a; Gabriel, 2000; J. Martin & Powers, 1983a). Organizational stories are most effective when listeners can relate the story to something in their own life (Boyce, 1995; Denning, 2002; S. Taylor, et al., 2002). When a story resonates with the lived experience of the listener, it becomes relevant and personally meaningful. Taylor, Fisher and Dufresne (2002) propose an aesthetics perspective on story effectiveness. This perspective suggests that stories are most effective when they invoke meaning through listener interpretation, connect with the listener through shared experience and are enjoyable.

Narratives, organizations and research. In their review of narrative, organizations and research, Rhodes and Brown (2005) found that narrative provides a "different, and valuable, form of knowledge that enables researchers to engage with the lived realities of organizational life" (p. 182). Story, unlike any other method reveals hidden patterns and exposes meanings. By

nature, story is more of an art than a science and as such is the subject of criticism (Gabriel, 2000). This on-going "tension between stories and science" in the literature exists because there is little attempt to organize the research and assess its impact on the field (Rhodes & Brown, 2005).

Organizational Learning

The literature on organizational learning addresses how narratives are used to transform information into knowledge and knowledge into understanding and action both individually and collectively to influence behavior.

There is a well-established link in the literature between stories and learning (Vance, 1991). Huber (1991) writes "*an organization learns if any of its units acquires knowledge that it recognizes as potentially useful to the organization*" (p. 89). Knowledge can be defined as information (facts and data that give meaning by reducing uncertainty) acquired through experience and education. Knowledge is a complex product of learning generated through interpretations of information and the study of cause and effect relationships (G. P. Huber, 1991). Organizational learning occurs when individuals make interpretations based on their experience and the experience of others and test their understanding in the context of an organization (Argyris & Schon, 1978). Understanding is the ability to comprehend the intended meaning of words, language, actions or a speaker (Jewell & Abate, 2001). Understanding guides action and action informs understanding (J. S. Brown & Duguid, 1991; Weick, 1979). Learning is action based on interpretation (Argyris & Schon, 1978). Organizations learn from direct experience and from the experience of others (Levitt & March, 1988). "Organizational learning links cognition and action" (Crossan, et al., 1999, p. 524). It has been described as "distributed cognition"

(Boland Jr, et al., 1994). This cognitive description recognizes organizations as both "bodies of thought" and "sets of thinking processes" (Weick, 1979, p. 41).

Organizational learning happens through story (Czarniawska, 1998). An organizational story is a "*detailed narrative of past management actions, employee interactions, or other intra- or extra-organizational events that are communicated informally within the organization*" (Swap, et al., 2001, p. 95). This definition recognizes organizational story as a means of communicating the organization's values, norms and culture. Another definition of organizational story is offered by Boje (1991a) who suggests that an organization story is an "exchange between two or more persons during which a past or anticipated experience was being referenced, recounted, interpreted or challenged" (p. 8). This simplified definition takes into consideration that a fully developed narrative, inclusive of beginning, middle, end, structured plot and detailed telling is not always necessary in organizations. Boje (1991a) found that informal conversations "rarely verbalized the whole story" (p. 8) because it was unnecessary. The whole story was recognized and acknowledged. Although this simplified definition does not meet the criteria for story as detailed by Swap, et al., (2001) it describes what happens in organization's when stories have become part of organizational memory (G. P. Huber, 1991).

Organization's learn by "encoding inferences from history into routines that guide behavior" (Levitt & March, 1988, p. 319). Routines can be defined as the operating procedures and processes guided by knowledge and influenced by the organization's culture. These historic routines are embedded in the organization in the form of experiential stories. Experiential stories focus on conversational dialogue, "a process of face-to-face, assumption testing, disclosure and trust-building" (Boje, 1994, p. 434). These conversations connect experiences and reinforce or dispel assumptions (Gargiulo, 2005b). Stories make information believable and easier to

remember (Neuhauser, 1993). They capture the "interpretative spirit of organizational learning" where "problems and successes are embedded in people's interpretations, beliefs, confidence, commitment and interpersonal relationships" (Rhodes, 1997, p. 10). Learning becomes internalized and personalized through the storytelling process (Livo & Reitz, 1986). In organizations, "learning is said to have occurred when organization's perform in improved ways" (Rhodes, 1997, p. 10).

Crossan, et al., (1999) proposed a framework for organizational learning where experiential stories play a significant role in each of four framework processes: *intuiting*, recognition of experiential patterns, *interpreting*, explaining an idea to others through dialogue, *integrating*, creating a shared understanding and taking action and *institutionalizing*, the process of making sure the routines are implemented. In each process step, story enables learning by providing context, stimulating attention, facilitating meaning making and provoking memory.

Organizational learning occurs in communities of practice where stories, "packages of situated knowledge" (Lave & Wenger, 1991) are used to connect work practice with learning (J. S. Brown & Duguid, 1991). In communities of practice, learning is considered to be a situated activity where learners, through participation in the culture, acquire knowledge and skill. This perspective puts knowledge into meaningful contexts and considers stories to be a form of situated learning.

Brown and Duguid (1991) proposed that working, learning and innovating are interrelated and compatible and should be linked both in theory and practice. In practice, learning acts like a "bridge between working and innovating" (p. 41). Narrative is a means of uncovering organizational practices and putting them into context. Telling a story is an "invitation to cooperative problem solving" (Robinson, 1981, p. 69). Problems can be diagnosed by

constructing a coherent account through story to holistically consider the problem. Orr (1990b as cited in J. S. Brown & Duguid, 1991) found that diagnostic stories were used to describe the problem, were modified as experiences were shared, re-examined as information was added or subtracted, and used for reflection. Diagnostic stories "provoked memories and new insights" (p. 44). By encouraging collaboration and contributing to the collective knowledge of the community, stories act as "repositories of accumulated wisdom" (p. 45). Because stories mirror the workplace, they are useful for showing what takes place between work, worker and workplace. Stories are adaptable and particular (p. 44), and they capture the "complexity of practice better than static or abstract models" (Rhodes & Brown, 2005, p. 174).

Narrative is used in organizations to teach management and leadership skills. Stories are used to develop managers because stories make information easy to remember and believable (S. Morgan & Dennehy, 1997). Books on using story as a management tool tout leading successful organization change based on telling the right story right, explain how to match a story to a situation, identify story characteristics necessary to stimulate action, and offer advice on how to develop and communicate stories to motivate, build trust, transmit values, quell gossip, and encourage collaboration (Armstrong, 2007; J. S. Brown, Denning, Groh, & Prusak, 2005; Denning, 2001, 2005; Kahan, 2010; Neuhauser, 1993; Simmons, 2001, 2007). Missing from these mainly anecdotal accounts is research related to the effectiveness of stories in practice. With the exception of several studies conducted by Martin and Powers (1983a) and Wilkins (1983, 1984) research on using narrative in practice to educate is limited to children (Zemke, 1990).

Knowledge Management

Knowledge management is an instructional performance support system that connects organizational learning to performance (VanTiem, Moseley, & Dessinger, 2004; Wang, 2006). Knowledge management can also be considered a strategy implemented to create, gather, share, store and retrieve information and knowledge in a timely manner. Knowledge management is about "increasing the effectiveness of the creation, diffusion, and adoption of ideas" (Ruggles, 2002, p. 1). It depends upon an "enabling context" (Ichijo, 2007) such contexts are provided through the use of narrative. The goal of knowledge management is the "dynamic management of the process of creating knowledge out of knowledge" (Nonaka, et al., 2001, p. 13). Knowledge is "inextricably bound up with human cognition" and its management occurs in a social context (J. C. Thomas, Kellogg, & Erickson, 2001, p. 863).

In organizations, knowledge is created by the flow of information and resides in the beliefs and commitment of the individual (Nonaka, et al., 2001). Knowledge is about meaning and action. It is context-specific and relational (Nonaka & Takeuchi, 1995). Knowledge can be defined as the "dynamic human process of justifying personal beliefs toward the 'truth' (Nonaka, et al., 2001). Human beings acquire knowledge by organizing their experiences. The knowledge expressed with words represents only part of our knowledge. "We can know more than we can tell" (Polanyi, 1966 as cited in Nonaka & Takeuchi, 1995, p. 60). Ruggles (2002) explains that "knowledge is a sticky (i.e., not easily pulled apart) collection of information, data, experiences, and even emotions which resides most richly within people" (p. 2).

There are two kinds of knowledge, explicit and tacit. Explicit knowledge can be described as "know-what." It is easily shared with others. Tacit knowledge is deeply rooted in personal experience. It is hard to put into words so it is difficult to share with others. Tacit

knowledge can be described as "know-how," the "ability to put "know-what" into practice" (J. S. Brown & Duguid, 1998, p. 91). "Know-how" is revealed in communities of practice. Explicit knowledge is easy to obtain and difficult to protect in organizations because it is so easily communicated. Tacit knowledge is embedded in work practice so it is more difficult to obtain but much easier to protect. Explicit and tacit knowledge work together to convert knowledge (Nonaka, et al., 2001) and build core competencies (J. S. Brown & Duguid, 1998).

Based on this interactivity between explicit and tacit knowledge, Nonaka and Takeuchi (1995) proposed that knowledge is created through four modes of knowledge conversion:

1) Socialization: from tacit to tacit knowledge
2) Externalization: from tacit to explicit knowledge
3) Combination: from explicit to explicit knowledge
4) Internalization: from explicit to tacit knowledge (p. 62)

This knowledge conversion process is enabled by story. Stories are 'particularly suited' to knowledge management because they convey meaning and knowledge through context. Stories create "clusters or chunks of information" (Reamy, 2002, p. 9) that are easy to relate to and remember. Stories can be connected to personal experience, are memorable and are "more likely to guide behavior" (Leonard, 2007, p. 64) than other forms of communication.

During the socialization mode, creating tacit knowledge through interaction with others, stories assist in the development of shared mental models (Swap, et al., 2001). In the externalization mode, stories are particularly effective in uncovering tacit knowledge and making it explicit (Hannabuss, 2000 Nov/Dec; Linde, 2001; Nonaka, et al., 2001). Stories are used in the combination mode where explicit knowledge from many sources is exchanged. In the internalization or "learning by doing" mode, stories are used to share explicit knowledge and

turn it into tacit knowledge. “When experiences through socialization, externalization and combination are internalized into individuals’ tacit knowledge bases in the form of shared mental models or technical know-how, they become valuable assets” (Nonaka & Takeuchi, 1995, p. 69).

In practice, Bhardwaj and Monin (2006) used storytelling to discover how tacit knowledge interacted with organizational subsystems; psychological, intellectual knowledge, functional, social and cultural. Stories are a “transfer mechanism” a means of both uncovering and communicating tacit knowledge. Their purpose is to influence action. Although stories are “more likely to be believed and acted upon than mere statements of policies and norms” (Swap, et al., 2001, p. 110) skills requiring deep content knowledge are difficult to transfer through story.

Knowledge management can both improve and be improved by storytelling. Knowledge management provides a “framework for legitimacy” for storytelling (Reamy, 2002). Corporate contexts provide an opportunity for the practical application of story elements. Stories, although difficult to classify in typical knowledge management reference libraries, enrich these storehouses by providing knowledge in context.

Sensemaking

Sensemaking is the process of assigning meaning to experience. Sensemaking is the activity of pulling together what is going to be interpreted and reinterpreted (Weick, 1995). The sensemaker converts a “world of experience into an intelligible world” (Weick, 2001, p. 9). The goal of sensemaking is to create situational understanding leading to decision-making and action (Weick, et al., 2005). Sensemaking is both an individual and a social activity. The sensemaking process (Weick, 1995) consists of seven properties:

1. Grounded in identity construction

   Making sense begins with a sensemaker. Weick (1995) writes "how can I know what I think until I see what I say" (p. 18). This question serves not only as a sensemaking "recipe," but it also emphasizes the person who is doing the sensemaking. Making sense of the environment is influenced by the sensemakers definition of self. "Once I know who I am, then I know what is out there" (p. 20).

2. Retrospective

   Lived experience is the reality that is known after it has happened. "People can know what they are doing only after they have done it" (p. 25). These experiences are remembered as distinct events.

3. Enactive of sensible environments

   Based on the actions of the sensemaker an environment is created. By selecting and focusing attention, an event is "called to life" (p. 36).

4. Social

   Sensemaking is influenced by the presence of others. Through interaction with others, meanings are imbued with relevance and support.

5. Ongoing

   Experience never starts or stops. "People are always in the middle of things" (p. 43), they are always immersed in the flow of events. When this event flow is interrupted, an emotional response is produced; this emotion influences sensemaking.

6. Focused on and by extracted cues

   "Extracted cues are simple, familiar structures that are seeds from which people develop a larger sense of what may be occurring" (p. 50). Since extracted cues

originate from context, what they become is rooted in that context. Like seeds, the growth of extracted cues is influenced by how people elaborate or abandon them as people and situations change.

7. Driven by plausibility rather than accuracy

   "Sensemaking is about coherence, how events hang together" (Weick, 2001, p. 462). Plausibility is determined based on the application of the prior six sensemaking properties. People see and find reasonable things they can act upon. This affects what is accepted and what is rejected. Accuracy is a secondary consideration that may not be possible to determine at the time of perception.

Sensemaking is analogous to creating a map. Maps orient people. When people take action (enactment) they produce outcomes (cues) in context (social) and this "helps them discover (retrospect) what is occurring (ongoing) what needs to be explained (plausibility) and what should be done next (identity enhancement)" (Weick, 1995, p. 55). Figure 6 is a graphic representation of the sensemaking process. In this diagram steps 1 and 2 represent the "sensing" part of sensemaking and steps 3 through 7 represent the "making" portion of sensemaking. Interpretation begins after all the elements are assembled and plausibility is determined (Hannabuss, 2000 Nov/Dec). Sensemaking happens quickly. We see the product of sensemaking, not the process itself (Weick, 1995). The product of sensemaking is learning.

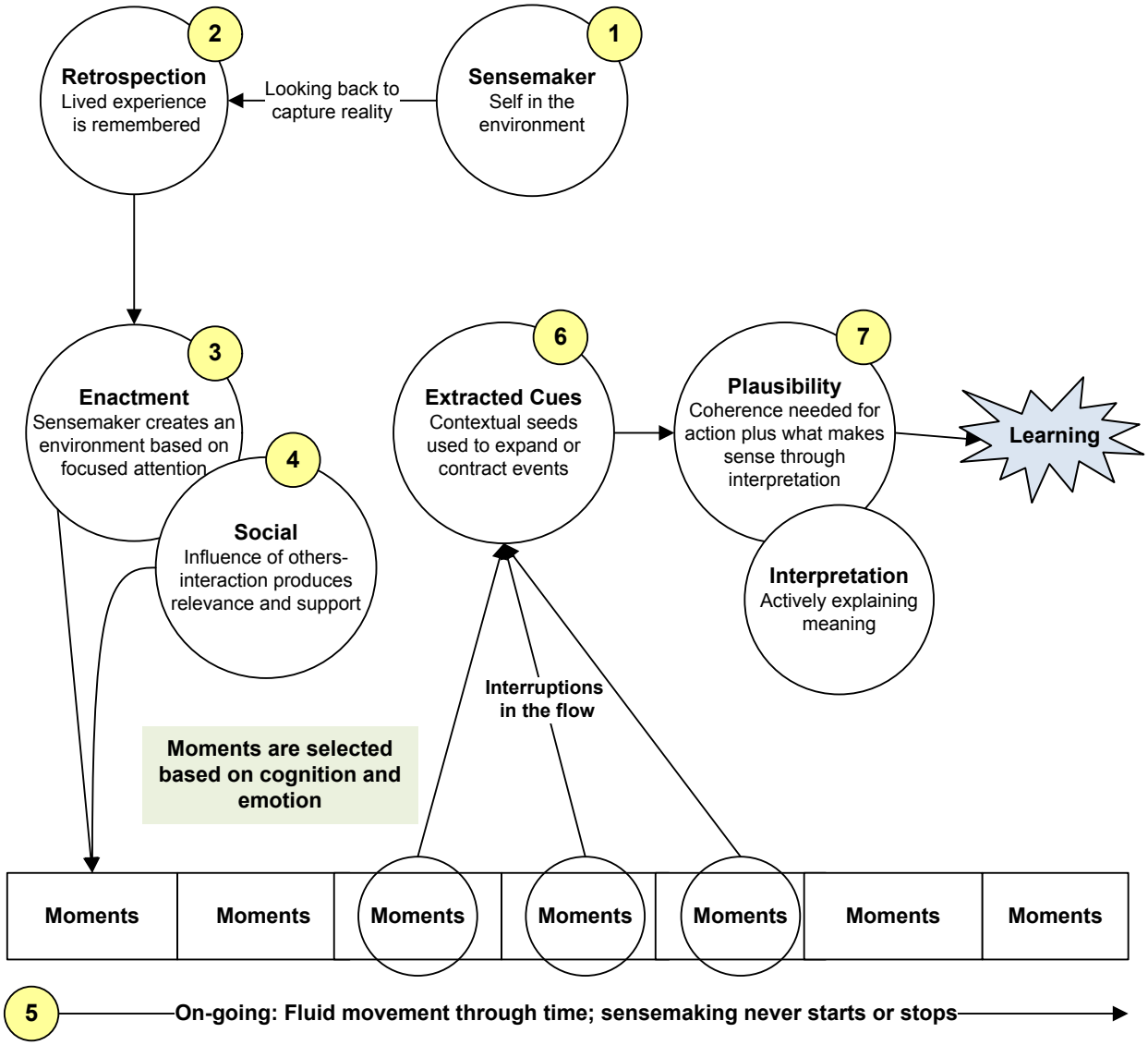


Figure 6. Graphic representation of the seven properties of the sensemaking process as proposed by Karl E. Weick in *Sensemaking in Organizations*, 1995, p. 17.

Given the ability of sensemaking to produce learning what is necessary to initiate the action that begins the sensemaking process? According to Weick (1995)

> something that preserves plausibility and coherence, something that is reasonable and memorable, something that embodies past experience and expectations, something that resonates with other people, something that can be constructed retrospectively but can

> also be used prospectively, something that captures both feeling and thought, something that allows for embellishment to fit current oddities, something that is fun to construct. In short, what is necessary is a good story.
>
> A good story holds disparate elements together long enough to energize and guide action, plausibly enough to allow people to make retrospective sense of whatever happens, and engagingly enough that others will contribute their own inputs in the interest of sensemaking (pp. 60-61).

Telling a story activates sensemaking. The requirements for producing effective narratives, a beginning, middle, end sequence, structured plot, and predictable outcome provide a "plausible frame for sensemaking" (Weick, 1995, p. 128). Stories enable understanding by integrating what is known with conjecture. They suggest a causal order of events that may have been perceived as unrelated to facilitate diagnosis. Stories provide a means for listeners to make connections by discussing shared values and meanings. Stories enable people to reconstruct previous events. They guide action and foster the building of a "database of experiences from which they can infer how things work" (p. 129).

Boje (1991c) reported in his study of performance at an office supply firm that in organizations, performance stories were integral to members' sensemaking. Stories provided a means for members to "supplement individual memories with institutional memory" (p. 106). This finding supports Brown's (1985) claim that "storytelling acts as a form of sensemaking" in a study that demonstrated how stories are used to socialize members in an organization. Members learned behaviors, values and norms related to their position through story. Stories provided a means for members to "express their knowledge, understanding and commitment to the organization" (p. 38). The U.S. Department of Defense (DOD) has identified sensemaking as

an "essential cognitive element of the military decision making process (MDMP)" (Leedom, 2001, October, p. 3). Sensemaking is defined by the military as the "process of creating situation awareness in situations of uncertainty" (p. 8). Situation awareness is the knowledge needed for effective action. In this context, stories are used to "guide action under conditions of crisis, complexity, and time pressure" (p. 11).

Collective sensemaking is the process used by groups to "interactively create a social reality, which becomes the organizational reality" (Boyce, 1995, p. 109). Collective sensemaking is grounded in the organizational symbolism literature which suggests that organizations are "human systems manifesting complex patterns of cultural activity" (G. Morgan, Frost, & Pondy, 1983, p. 4). In her study of a non-profit organization, Boyce (1995) demonstrated that story and storytelling were the symbolic forms used by groups to both construct and collectively center on shared meaning. The study findings included:

- Shared storytelling was a useful vehicle for collective centering and for confirming the collective sense in an organizational setting
- Story themes were indicators of the collective sense of the organization
- There was a collective effort (conscious or unconscious) to protect the shared meanings in the organization from change by filtering out anything that contradicted the collective sense (p. 133)

In a longitudinal study of sensemaking in organizations, Maitlis and Lawrence (2007) found that gaps in organizational sensemaking processes trigger sensemaking and that sensemaking was enabled by the ability of the stakeholders to both develop and tell stories.

Narrative to Inform Practice

In practice, narrative is used to understand people and situations through stories told about life experiences. Practice applications provide evidential support for the use of narrative to provoke changes in behavior.

The literature on the use of narratives to inform practice was largely devoted to the fields of business, medicine and education. As addressed previously, narrative in organizations is used to shape culture, educate, inform practice, manage knowledge and activate sensemaking (Boje, 1991b, 1991c; J. S. Brown & Duguid, 1991; Cullen, 2008; Lave & Wenger, 1991; Nonaka & Takeuchi, 1995; Tyler, 2007; Weick, 1995, 2001).

In medicine, Charon (2001) contends that the effective practice of medicine requires narrative competence, the "ability to acknowledge, absorb, interpret and act on the stories and plights of others" (p. 1897). By applying narrative competence, physicians practice medicine with "empathy, reflection, professionalism and trustworthiness" (p. 1897). Narrative medicine provides a means for patients and physicians to make a personal connection and enables understanding (Greenhalgh, 1999).

Narrative is used by occupational therapists to solve clinical puzzles and to shape the therapeutic experience for patients by emplotting therapeutic encounters with patients. Mattingly (1991a) considers narrative reasoning to be the "central mode of clinical reasoning in occupational therapy" (p. 998). Narratives are used in nursing practice for diagnosis and healing (Sandelowski, 1994). During diagnosis, nurses use diagnostic reasoning to interpret the emplotments and metaphors in patient stories. In healing, narrative nursing interventions are aimed at moving patients toward an "integrated sense of self with future possibilities" (p. 29). In anesthesia education Sandberg (1998) advocates the use of storytelling to create professional

identity, socialize new members and to provide an experiential knowledge base to inform present care practices.

In education, narrative is used for educator development. By telling teaching stories, educators learn about diversity (Luwisch, 2001), foster collegiality (Shank, 2006), inform their work (K. Carter, 1993) and teacher quality is improved (Lowenthal, 2008). The telling and retelling of teaching stories from both teacher and student perspectives is a reflective process that leads to the discovery of new insights, understanding, transformation and changes in practice (Connelly & Clandinin, 1994).

Narrative Pedagogy

Narrative pedagogy is a research-based pedagogy that considers narrative to be an interpretative pedagogical tool used in practice to create meaning and advance knowledge through understanding (Abrahamson, 1998; C. A. Andrews et al., 2001; Burk, 2000, November; Coulter, et al., 2007; Diekelmann, 2001; Gudmundsdottir, 1991, 1995; Ironside, 2003, 2004; McAllister et al., 2009). Narrative pedagogy can be defined as the sharing, study, deconstruction and assessment of experiences in a search for meaning. This "narrative way of knowing" is how understanding is explained to others (Gudmundsdottir, 1991). Narrative pedagogy uses multiple theories of knowledge (epistemologies) and explores ways of knowing, thinking and interpretation to understand the nature of experiences (Diekelmann, 2001). Experiences are understood in context and on the basis of how past events contribute to and render understandable the comprehension of new events. This additive process is how humans learn (Abrahamson, 1998).

Narrative pedagogy enables teaching and learning by providing a framework for accessing experiences and sharing them with others. It is an interpretative, phenomenological

approach (C. A. Andrews, et al., 2001). During storytelling the teller and the listener connect cognitively and emotionally. This connection enables the listener to relate to the teller based on the listeners' prior experiences and to comprehend the teller's conception of the content. This interpersonal experience sets thinking in motion and advances development as it moves both teller and listener toward a "more ordered sense of the world" (Abrahamson, 1998, p. 441).

Narrative pedagogy is distinguished from traditional pedagogy through its emphasis on context and interpretation. In traditional pedagogy, knowledge sparks thinking and leads to action. The action is a product of thinking. Teachers specify learning outcomes in advance and structure learning activities for students to hone their thinking. The students' ability to achieve the outcome provides evidence of student thinking. In narrative pedagogy, the context (situation) where thinking occurs and its interpretation are the action drivers. This "situational reading" is more important than the ability of the students to perform a task to meet a particular outcome. Good practice requires more than good decisions. For example, in nursing "interventions arise from the nurse's skillful read of the situation and how that reading shapes the options for responding to the person's particular situation" (C. A. Andrews, et al., 2001, p. 256).

The hallmarks of narrative pedagogy are skill and knowledge acquisition through student and teacher interaction where the teacher is in a participating rather than a leading role, and the practice of thinking through reading, writing and dialogue. Narrative pedagogy is more than sharing stories, it is "interpreting and thinking and exploring meaning and significances" (C. A. Andrews, et al., 2001, p. 257). It fosters inclusion and collaboration, and encourages different ways of thinking.

Narrative pedagogy is used in nursing education to interpret the experiences of students, teachers and clinicians (C. A. Andrews, et al., 2001; Diekelmann, 2001; Ironside, 2003, 2004;

McAllister, et al., 2009) and in teacher education programs to understand how teachers come to know the content they teach (Coulter, et al., 2007; Gudmundsdottir, 1991).

Teaching strategy. Narratives are used as a teaching strategy to guide student learning (Butcher, 2006; Cangelosi & Whitt, 2006; C. Cooper, et al., 1983; Ferguson, et al., 1992). In his research investigating "Teaching with stories," Ganske (2007) found increased teacher commitment to storytelling as a teaching method, improved perception of the power and influence of stories and recognition of the affective impact of story and its potency as a teaching method. In her study on the use of vignettes, incomplete short stories to encourage discussion, Kish (2006) found that stories provoked higher order thinking. This study mirrors Butcher's (2006) findings that when stories are used as a teaching strategy, they enable student-teacher bonding, validate student experience and stimulate critical thinking.

Problem solving. The use of narrative to support problem solving is well documented in the literature (Ackerman & Maslin-Ostrowski, 1995, April; Hernandez-Serrano & Stefanou, 2009; Jonassen & Hernandez-Serrano, 2002; Lave & Wenger, 1991; Orr, 1996; Schon, 1983). Many researchers contend that workplace learning occurs through narrative (Rhodes & Brown, 2005). Narratives are considered to be a "natural and powerful" means of retrieving, sharing and retaining experiential knowledge (Jonassen & Hernandez-Serrano, 2002).

During problem solving, past experiences are retrieved from memory, organized into stories and the lessons embedded in those stories are applied to new problems. As a natural form of meaning making (Bruner, 1986; Polkinghorne, 1988), narrative is "perhaps the most generic and applicable form of learning support for problem solving" (Jonassen & Hernandez-Serrano, 2002, p. 65). Stories provide the context necessary to both render past experiences understandable and enable understanding of new situations (Abrahamson, 1998; Shank, 2006).

Practitioner stories make human experiences meaningful (Polkinghorne, 1988). They transform experience into knowledge (Lave & Wenger, 1991) through reflection (Schon, 1983) and interpretation (Gudmundsdottir, 1995). When stories are shared, meanings are negotiated (Bruner, 1990) and persuasive arguments are built (Bruner, 1990; S. Taylor, et al., 2002). Stories convince us through "good reasons" (Fisher, 1984) and verisimilitude (Bruner, 1986, 1990). They are both particular and adaptable (J. S. Brown & Duguid, 1991). Stories are culturally situated (Barthes, 1975; Bell, 2002; Boje, 2008; Bruner, 1990; Kaye, 1995; Sugiyama, 2001; White, 1980); they enable us to share who we are (Daloz, 1999; Dominice & Knox, 2000; Langellier, 1989; Linde, 2001; Ochs & Capps, 1996; Vella, 2002) and assist us with understanding the actions and intentions of others (Bruner, 1990; Schon, 1983).

As stories are exchanged, memory structures are built (Schank, 1990, 1999). Consequently, we remember what we tell. Stories allow us to explore and appreciate experience from different perspectives (McEwan & Egan, 1995). They can also function as a substitute for direct experience which novices do not possess (Jonassen & Hernandez-Serrano, 2002).

The aforementioned attributes of narrative make it well suited to address the complexities of workplace problems. Such problems are ill-structured, open-ended, contain sub problems and may not have a distinct beginning or ending (Jonassen, 1997; Kolodner, Hmelo & Narayanan, 1996; Sinnott, 1989 as cited in Jonassen & Hernandez-Serrano, 2002). During problem solving, stories about the problem are shared, explored and interpreted. This discussion brings forward old experiential memories and produces new insights (J. S. Brown & Duguid, 1991). Eventually the interplay amongst these elements leads to problem diagnosis and resolution. In a study comparing case study and case story methods, Ackerman and Maslin-Ostrowski (1995, April)

found that case stories evoked emotion, produced richer discussion, provided opportunities for reflection and produced a depth of understanding that case studies did not.

Digital storytelling. Digital storytelling is a teaching strategy used in K-12 and higher education classrooms (Robin, 2008). Digital storytelling is the "modern expression of an ancient art" (Frazel, 2010, p. 9). This deep learning tool brings together four student-centered learning strategies: student engagement, reflection, project-based learning and technology integration (Barrett, 2006). Learners become digital storytellers by researching a topic, developing a story and writing a script. The story is brought to life through the use of multi-media; audio, video clips, computer-generated graphics and music. The final product is burned to a DVD, played on a computer or uploaded to a web site (Robin, 2008).

Barrett (2006) hypothesizes that digital storytelling enhances student learning, motivation and engagement, is more effective than paper-based reflection, builds technology skills and benefits all learners. Student produced digital stories encourages deep learning, reflection about self and others and provides an opportunity to acquire media literacy (Sadik, 2008). In the Pacific Voices project, students created and shared video letters with a network of students and teachers. Watching these letters fostered interaction and learning about other islands, cultures and traditions (Skouge & Rao, 2009). At the university level, digital storytelling is used to "give voice" to students with disabilities. Developing digital stories teaches lessons and values while "empowering people to be agents of positive change" (p. 56). Digital stories enable perspective transformation. Tendero (2006) found that seeing and hearing performance through digital storytelling enabled teacher reflection on the multiple and simultaneous classroom events and led to changes in teaching performance.

Narrative learning environments. Narrative learning environments are collaborative environments where stories are used to make sense of experience. Such environments support constructivist learning (Mott, Callaway, Zettlemoyer, Lee, & Lester, 1999). A constructivist learning perspective assumes knowledge is constructed by individuals and then "socially co-constructed by learners based on their interpretations of experiences in the world" (Jonassen, 1999, p. 217). The literature on narrative learning environments explains how these environments can be used to support particular disciplines (Mott, et al., 1999), diverse audiences (Imel, 1995), on-line learning (Paulus, Horvitz, & Shi, 2006), and artificial intelligence (Louchart & Aylett, 2004; Schank, 1990).

In narrative learning environments, stories are told, heard, discussed, deconstructed and reflected upon. Learners participate in the construction of narratives, discuss how story character intentions affect their actions, explore intended teller meanings and reflect on their narrative construction and discussion experiences. Reflection is a cognitive and affective activity where learners explore experience to reach understanding (Boud, et al., 1985; Kuit, et al., 2001). Narrative learning environments recognize the contextual nature of knowledge inclusive of the learner/knowledge relationship. Successful narrative learning environments promote learner engagement (Paulus, et al., 2006) through social presence, the ability of learners to "project themselves socially and emotionally in a community of inquiry" (Rourke, Anderson, Garrison, & Archer, 1999, p. 50). Narrative learning environments can be considered a means of developing narrative competence. Narrative competence is the knowledge schema (organized past experiences and reactions) an individual brings to narrative making it possible to understand the narrative. It is a product of narrative intelligence.

Narrative & multi-media. Literature on the use of narrative in multimedia suggests that narrative facilitates communication (Forrester, 1996), increases engagement (McLellan, 1993), enables meaning making (Plowman, Luckin, Laurillard, Stratfold, & Taylor, 1999), and contributes to the learning experience by increasing learner motivation and content memory (Bielenberg & Carpenter-Smith, 1997; Mallon & Webb, 2000). Instructional designers use narratives in multimedia environments because narratives provide structure, coherence and are associated with cognition and comprehension (Laurillard, 1998; Plowman, et al., 1999). Narratives reduce the cognitive load (mental effort) produced by navigation through the use of a storyteller as a guide (McLellan, 1993), and they build memory structures; narratives are natural "units of storage and retrieval in human memory" (Bielenberg & Carpenter-Smith, 1997, p. 152).

Multi-media stories provide context and motivation by creating required learner action sequences accompanied by consequences and offer challenge while minimizing threat. Story establishes learner empathy for the protagonist and sparks learner curiosity to discover what happens next (Bielenberg & Carpenter-Smith, 1997).

Summary of narrative applications in practice. The literature on narrative applications provides evidential support for the use of narrative to provoke changes in behavior. Narrative shapes culture, enables change, clarifies values and describes how things are done.

In practice, narrative construction begins with a teller who operationalizes an experience (prior knowledge) that is meaningful and important (significant) by organizing the experience into connected events in a beginning, middle and end sequence. The product of this conversion is an authentic story that is cognitively and affectively owned by the teller. These elements, prior knowledge, significance, and the beginning, middle, end sequences of events are integral to the

teller's learning experience. From the teller's perspective, learning occurs during story organization as knowledge gaps are identified and addressed (Cortese, 2005).

Recognizing that effective stories resonate with listeners lived experience, descriptive information about the audience; the learners/listeners social and psychological attributes; content, the substance of what the learners/listeners must know or do, and the environment; the operational surroundings that make up the context contribute to listener comprehension. These elements, audience, content and environment are the inputs that the teller will use during narrative construction.

Narrative influences both cognition and attitude (J. Martin & Powers, 1983b) and is integral to the knowledge conversion process where explicit knowledge, "know-what" and tacit knowledge, "know-how" are socialized, externalized, combined and internalized (Nonaka & Takeuchi, 1995) to build core competencies in organizations (J. S. Brown & Duguid, 1998). This conversion illustrates how narrative influences action.

Sensemaking begins with a good story (Weick, 1995). Stories are coherent, plausible and engaging (Fisher, 1984, 1987). As a precursor to learning, sensemaking provides context and fuels interpretation. Narratives are also a means of reflection. As a pedagogical tool, narrative creates meaning and advances knowledge through understanding. We learn when experiences are understood in context on the basis of how past events contribute to, and render understandable, the comprehension of new events (Abrahamson, 1998).

The ability of narrative to convert knowledge, enable sensemaking, advance understanding through reflection and influence action suggests that narrative affects performance.

Development Theory

This section addresses how we think through a review of Jean Piaget's theory of cognitive development, Lev S. Vygotsky's theory of social development, John Dewey's work on thinking, and Jerome S. Bruner's theories of development, knowledge and instruction.

Development theories address cognitive development; how we come to know through sense perception, reasoning and emotion. Development theories can be distinguished from learning theories based on their orientation. Developmental theorists attribute all cognitive changes to development. Cognitive theorists attribute cognitive changes to the effects of learning (P. L. Smith & Ragan, 2005). Cognition can be defined as the "mental action or process of acquiring knowledge and understanding through thought, experience and the senses" (Jewell & Abate, 2001, p. 332). This research study uses factors from both developmental and cognitive learning theories to inform the model for the design of instructional narratives.

Piaget's Development Theory

Jean Piaget (1896-1980) called his views on how a child comes to know the world genetic epistemology; the origin of knowledge (Driscoll, 2005). Piaget's theory of intellectual development is a stage theory. Learners progress in a linear fashion from one stage to the next only when they exhibit developmental readiness. Each stage is characterized by a qualitative change in cognition, and requires a reorganization of the individual's cognitive structure. The four stages of development are sensorimotor, pre-operational, concrete operational, and formal operational (Piaget & Inhelder, 1969). As the child moves from one stage to the next, their capacity for abstract thought increases. Table 3 shows Piaget's stages of cognitive development.

The formal operational stage begins at approximately age 11 but continues into adulthood. The ability to think abstractly in the absence of direct experience and to use inductive

and deductive reasoning in the form of a proposition are significant benchmarks for advancing thinking. Although the ability to reach this stage is believed to be within everyone's potential (Phillips, 1969 as cited in P. L. Smith & Ragan, 2005), research in intellectual development has demonstrated that "a large proportion of adults, including college students, has not achieved formal operations across all content areas" (P. L. Smith & Ragan, 2005, p. 67).

Table 3

Piaget's Stages of Cognitive Development

Stages of Development	Typical Characteristics
Sensorimotor (birth to approximately age 2)	Innate reflexes are adapted to situations Behavior is goal-directed, with goals moving from concrete to abstract Able to mentally represent objects and events
Preoperational (2 to 7 years)	Acquires semiotic function; engages in symbolic play and language games Has difficulty seeing different points of view; thought and communication are egocentric Problem reasoning is one-dimensional
Concrete Operational (7 to 11 years)	Performs mental operations (conservation, reversibility) Can demonstrate logical thought to solve problems Has difficulty with hypothetical thinking, unable to consider all aspects of a problem
Formal Operational (11 years onward)	Can solve abstract problems logically and systematically Reasons hypothetically and can imagine different possibilities Social consciousness is developed

Note. Adapted from *Psychology of Learning for Instruction* by Marcy P. Driscoll, 2005, p. 195. Copyright 2005 by Pearson Education, Inc.

According to Piaget there are four factors influencing cognitive development: maturity, physical experience from an individual's actions and their experience with the world, social transmission of knowledge, and equilibration, a self-regulatory process (Ginsburg & Opper,

1969). Equilibration integrates the effects of the other three factors. Its purpose is to achieve balance and harmony. Equilibration is an active process that works with assimilation and accommodation to correct any thinking shortcomings through adaptation (Driscoll, 2005). Piaget considered adaptation to be the "essence of intellectual functioning" (Pulaski, 1980, p. 9). Adaptation is paired with organization. Organization is necessary for the integration of both physical and psychological structures (Pulaski, 1980). Adaptation is composed of the processes of assimilation and accommodation. During assimilation a child incorporates new objects or experiences into what is already known, into an existing scheme or pattern of behavior. Accommodation occurs when an existing scheme requires modification to account for the new object or experience (Driscoll, 2005; Pulaski, 1980). Both assimilation and accommodation influence each other and along with equilibration form the mechanism that a child uses to progress from one development stage to the next (Driscoll, 2005). This interaction between existing cognitive structures and new experiences leads to the development of understanding. Piaget contended that learning and interest are enabled if the experience is relevant to what is already known "but at the same time is sufficiently novel to present incongruities and conflicts" (Ginsburg & Opper, 1969, p. 223). Development is stimulated through this conflict resolution process. The concept of equilibration is similar in nature to cognitive dissonance. When new incoming information does not fit with our existing knowledge about our self, inclusive of our behavior and our environment, cognitive dissonance occurs (Festinger, 1957). Cognitive dissonance is an uncomfortable state, which an individual will work actively to reduce or eliminate.

Intellectual development is progressive. New knowledge is added to existing knowledge only when that new knowledge can be connected by experience (Ginsburg & Opper, 1969).

Experience is used to form premises and then to test those premises both inductively; by looking forward to build up an idea, and deductively; by looking backward to develop, apply and test an idea. This active process, or thinking (Dewey, 1910, 1933) connects these experiences by producing new premises or re-affirming existing premises. "Knowledge is invented and reinvented as the child develops and interacts with the world" (Driscoll, 2005, p. 191). Piaget believed that development preceded learning; that is, individuals must be "cognitively ready" to attempt a task (Pulaski, 1980; P. L. Smith & Ragan, 2005).

Vygotsky's Theory of Social Development

Piaget's view is often contrasted with Vygotsky's Theory of Social Development which proposes that learning precedes development (P. L. Smith & Ragan, 2005). Lev S. Vygotsky (1896-1934) was interested in the process of intellectual development. He studied the origin of intellectual skills and how those skills changed as learning and development occur. He believed that individual development could only be understood in the "social and cultural context within which such development is embedded" (Driscoll, 2005, p. 247).

Vygotsky's experiments provided opportunities for subjects to encounter obstacles while problem solving and to use external aids or tools. Subjects were also given problems that exceeded their ability to solve them. By exposing subjects to these conditions, he observed that the "individual actively modifies the stimulus situation as part of the process of responding to it" (Vygotsky, 1979, p. 14). He called this process mediation.

During mediation social relations are converted to psychological functions through the use of tools or signs (Driscoll, 2005). Tools are externally oriented and are used to master an activity. Signs are internally oriented and are used as a "means of psychological influence" (Vygotsky, 1979, p. 127). A sign is anything that represents something else. For example, hand

gestures, body movements, language, icons, images or pictures. To achieve higher psychological function, tools and signs are combined in psychological activity (Vygotsky, 1979). Bringing external social experiences and reconstructing those experiences internally by using signs involves a series of transformations called internalization. Vygotsky introduced the concepts of internalization and the zone of proximal development to explain what happens when mediation becomes more internal and symbolic and higher mental processes are engaged (Driscoll, 2005).

Internalization is the internal reconstruction of an external social experience (Vygotsky, 1979). For example, the gesture of pointing only becomes a sign when another person reacts to the motion. When an adult observes a child making a grasping motion with its fingers aimed toward an object, the adult provides the meaning of the motion by their reaction (Vygotsky, 1979). The adult response turns the situation into a social exchange (Driscoll, 2005). The child's grasping motion has been simplified through this social exchange into an act of pointing. When the child reconstructs this meaning internally and later uses the pointing gesture, the interpersonal activity becomes an intrapersonal activity. To transform an interpersonal process into an intrapersonal process every function appears twice, "first *between* people (*intrapsychological*), and then *inside* the child *(intrapsychological*). This applies equally to voluntary attention, to logical memory and the formation of concepts. All the higher learning functions originate as actual relations between human individuals" (Vygotsky, 1979, p. 57).

Vygotsky's research on the relationship between learning and development in school age children lead him to examine "functions that have not yet matured but are in the process of maturation, functions that will mature tomorrow but are currently in an embryonic state" (Vygotsky, 1979, p. 86). He labeled the difference between what a child can do alone and what the child cannot do, the zone of proximal development. The gap between these two states

represents an opportunity for the child to progress with assistance to the next set of capabilities (Vygotsky, 1979). Introducing learning at this point can "set developmental processes in motion" (Driscoll, 2005, p. 255). Figure 7 shows how the introduction of instruction may cause a shift in the zone of proximal development toward the next step in the maturation process. To Vygotsky, "learning awakens a variety of internal developmental processes that are able to operate only when the child is interacting with people in his environment and in cooperation with his peers" (Vygotsky, 1979, p. 90).

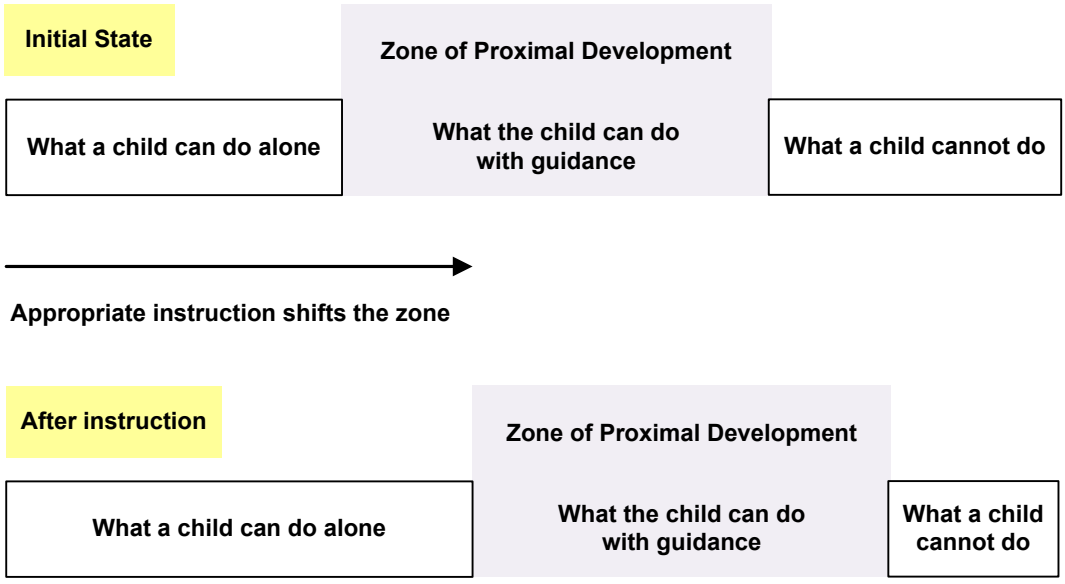


Figure 7. A representation of Vygotsky's Zone of Proximal Development (ZPD). Adapted from "Psychology of Learning for Instruction" by M. P. Driscoll, 2005, p. 254. Copyright 2005 by Pearson Education, Inc.

Vygotsky and Language Development

To Vygotsky, the development of language was a significant step toward intellectual development. Language is the "means by which reflection and elaboration of experience takes place" (Vygotsky, 1986, p. 126). The convergence of practical ability with speech "gives birth to the purely human forms of practical and abstract intelligence" (Vygotsky, 1979, p. 24). He

distinguished between inner speech for oneself and communicative or outer speech for others. Thought involves the use of inner speech; self-talk regulates thinking. Inner speech is markedly different from external speech. Inner speech is thinking in "pure meanings" (Vygotsky, 1986). Thoughts create connections, perform a function or solve a problem. Thought is not accompanied by speech. Putting thoughts into words is challenging; if thought and speech were identical this disconnect would be impossible. "Thought has its own structure, and the transition to speech is no easy matter" (Vygotsky, 1986, p. 250).

Speech can be broken into individual units or words, thought does not contain separate units (Vygotsky, 1986). Thought is more holistic, similar to a snapshot where one thought contains an entire scene. For example, to communicate the sight of a barefoot girl in a pink shirt running on the beach, individual words do not appear, one thought surfaces. To share that thought, words are strung together. It takes time for a speaker to translate whole thought into words. This movement from thought to words happens through meaning (Vygotsky, 1986).

Understanding another individual's thought is only possible "when we understand its affective-volitional basis" (Vygotsky, 1986, p. 252). Understanding another's speech is possible not only by understanding the speakers thought, but the listener must know the speakers motivation (Vygotsky, 1986).

John Dewey and Thinking

There are four levels of thinking (Dewey, 1910). The first is "everything that goes through our heads." Such thinking is restricted to what we directly perceive through our senses. The second level of thinking is not restricted to direct perception. This level is characterized by imaginative incidents that have an internal coherence and follow a continuous thread to a conclusion. Although these connections stimulate reflective thought, they do not "*aim at*

knowledge, at beliefs about facts or in truths" (Dewey, 1910, p. 3). The third level of thinking is the consideration of belief on some basis. There is acceptance or rejection of something as "reasonably probable or improbable" (Dewey, 1910, p. 4). The fourth level of thinking is reflective thought. Reflective thought is based on things not directly perceived. It is the "active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it" (Dewey, 1933, p. 9). The aim of reflective thinking is a conclusion, a belief based on evidence (Dewey, 1933).

Thinking begins with inferences. We are in a continual state of making inferences (Dewey, 1910). When the facts are important to our interests, we add them to our knowledge base. Any subject can be considered intellectual in terms of its function, its power to start direct significant inquiry and reflection. The very act of thinking is belief testing. Every inference should be tested against a store of accumulated experiences. Over time, learners develop the skill to discriminate beliefs from assertions. This process of making inferences and drawing conclusions can go right or it can go wrong (Dewey, 1910). We may use inaccurate prior knowledge; established rules, misunderstandings, passionate beliefs and information from authority figures without question. Such false ideas can become great truths that continue to exert power over our thinking even when contrary facts are presented. Since thinking is consecutive and it builds on what precedes it, such mutually supported errors can weave a large "fabric of misconception" (Dewey, 1910, p. 21). It is through education that these accumulated barriers to rational thinking can be broken apart (Dewey, 1910). Teaching "transform[s] natural tendencies into trained habits of thought" (Dewey, 1910, p. 26). It provides a means of fighting "unsupported facts" and unseating erroneous conclusions. Such teaching provides direction, but it is incumbent upon the learner to take the initiative. Teacher insight into the developmental

readiness of the learner is the first step toward cultivating "critical examination and inquiry" (Dewey, 1910, p. 29).

Thinking requires a store of experiences from which suggestions can emerge. Thinking begins with curiosity. A curious mind is "constantly alert and exploring, seeking material for thought" (Dewey, 1910, p. 31) stimulated by a strong desire to know. Social situations evoke curiosity. As a person interacts with their environment and the people in it, the search for facts and the story behind those facts sets in motion an "intellectual" curiosity (Dewey, 1910). Intellectual curiosity occurs when observations and experiences are transformed into possible problems sparked by those observations and experiences. The task of the teacher is to keep that spark of curiosity alive (Dewey, 1910).

How thinking works. Thinking happens inside our head, it is internal. Our thoughts flow in a steady stream like a river. This continual flow is broken by suggestions that easily slip into what is already known. Conclusions may be reached with few or many suggestions but deep thinking involves taking the time to "digest impressions and translate them into substantial ideas" (Dewey, 1910, p. 37). It is noteworthy that the source of these suggestions is past experience and prior knowledge (Dewey, 1910).

The act of thinking is the way in which "things acquire significance" (Dewey, 1910, pp. 38-39). Thinking is personalized and specific, "different things suggest their own appropriate meanings" (Dewey, 1910, p. 39). Thinking begins with a state of uncertainty or doubt, a dilemma that needs a solution. This suggestion of uncertainty leads to a search for facts to either collaborate or negate the suggested belief. The facts must be organized in terms of proving or disproving the belief. This is followed by the formulation of possible solutions through reasoning. Additional observations and experimentation leads to a conclusion or solution where

the belief is either accepted or rejected (Dewey, 1910). The need for a solution to restore balance is a "steadying and guiding factor in reflection" (Dewey, 1910, p. 11). This regulation of thinking is similar to what Piaget called equilibration and Vygotsky identified as internalization (Ginsburg & Opper, 1969; Vygotsky, 1979).

Thinking and meaning making. The purpose of thinking is to grasp meaning (Dewey, 1910). Reflective thinking uses facts as raw material. Facts that are not coherent create a state of perplexity that starts the reflective process. The search for facts to resolve this perplexity leads to the suggestion of some meaning that will restore balance. Meaning is an idea assigned to the facts that connects them in some way (Dewey, 1910). The search for meaning involves both inductive and deductive reasoning. The building up of an idea to form a binding principle is inductive discovery. The activity of developing and testing an idea is the establishment of deductive proof (Dewey, 1910). The movement between induction and deduction occurs in a carefully regulated manner. The object of induction or discovery is to find out what facts mean. The object of deduction or testing is to find out what facts will substantiate a given meaning. Thinking uses this back and forth movement to bridge a "gap in experience" by binding together facts or actions that previously were not connected (Dewey, 1910). These premises, when bound together, form the foundation, the support for the conclusion. The conclusion "contains" the premises. The conclusion is a representation of how the "elements of reasoning are bound tightly together" (Dewey, 1910, p. 81).

Knowledge that has been acquired through the process of thinking can readily be put into logical use because it has been tested through reasoning and used to solve a problem. Such knowledge meets Driscoll's (2005) criteria for learning. Knowledge acquired by thinking changes performance or performance potential because of the "learners experience and

interaction with the world." This drawing upon past experience to form inferences and testing those inferences to arrive at a logical, coherent solution are the hallmarks of reflective thinking (Dewey, 1910, 1933).

Summary of Dewey's theory of thinking. Dewey's theory of how we think is supported by the developmental theories of both Piaget and Vygotsky. Piaget's formal operational stage uses inductive and deductive reasoning to formulate a proposition in the absence of direct experience. This coincides with Dewey's fourth level of thinking, reflective thought, which is based on things not directly perceived. Reflective thought is also essential in Vygotsky's intrapsychological transformation process that is part of the internalization process.

The natural resources of thinking; curiosity, organization and significance (Dewey, 1910, 1933) are present in narratives. Narrative can be used as a means of invoking curiosity, organizing premises, establishing significance and initiating reflection to reinforce existing meanings, create new meanings, or weaken meanings that did not have enough evidential support. Stimulating learner curiosity is the first step toward acquiring material for thinking (Dewey, 1910). The role of an educator is to develop activities suitable to the learners' developmental state, which fosters observation and inference. Educators are also responsible for breaking through barriers to rational thinking by unseating erroneous conclusions produced by inaccurate, incomplete or inappropriately applied prior knowledge.

Jerome S. Bruner and Cognitive Development

The theories of Vygotsky and Jerome S. Bruner (1915-) consider how the cultural context affects learning and development. Like Vygotsky, Bruner (1966) suggests that mental growth is from the "outside in." Mental activity cannot be understood unless the culture is considered. "Learning, remembering, talking, imagining: all of them are made possible by

participating in culture" (Bruner, 1996, p. xi). This cultural "situatedness" lead him to suggest that a theory of development must be connected to both a theory of knowledge and a theory of instruction (Bruner, 1966). Bruner also contends that mental growth occurs from the "inside out" through integration, a process where actions are organized into higher order structures making possible the use of large amounts of information for problem solving (Bruner, 1964).

Bruner's theory of cognitive growth is based on his study of human evolution. He noted that size changes in the human brain over time have been the result of "external implementation systems," not changes in morphology (Bruner, 1964, p. 1). He identified three kinds of external implement systems: *amplifiers of motor capabilities*, *amplifiers of sensory capabilities* and *human ratiocinative* (judgment) *capabilities*. All of these implement systems are "conventionalized and transmitted by the culture" (Bruner, 1964, p. 1). Our contact with the environment must be represented in some way to enable its retrieval for use. Retrieval is dependent upon how past experience is coded and processed. The end product of this coding and processing is a representation. Representation is how children build models of their environment.

Bruner identified three modes of representation: enactive, iconic and symbolic. The modes appear in a child's life sequentially, each depends on a previous mode for its development. All three modes remain intact throughout one's life (Bruner, 1964, 1966).

Enactive representation refers to a "mode of representing past events through motor response" (Bruner, 1964, p. 2). Some kinds of understanding are represented in our muscles. For example, a young child may not be able to articulate directions to a friend's house, but the child can take you there by following a previously travelled route. As adults, we navigate through complex walkways bounded by cubicles to reach our workspace without being able to describe

or picture the office layout. Our understanding of driving a car, swimming and riding a bicycle are all part of our muscle memory.

Iconic representation "summarizes events by the selective organization of percepts and of images, by the spatial, temporal, and qualitative structures of the perceptual field and their transformed images" (Bruner, 1964, p. 2). Iconic representation uses images to represent events. A child who can draw a picture depicting a circus she/he attended represents her/his experience and understanding of that event in the iconic mode.

In symbolic representation "a symbol system represents things by design features that include remoteness and arbitrariness" (Bruner, 1964, p. 2). For example, language is a symbol system used to encode our representation of an experience. Words stand in place of objects, events and ideas and they can be combined to produce more than "what can be done with images or acts" (Bruner, 1964, p. 2).

To Bruner, the product of cognitive development is thinking. Developing this ability to think occurs as the child progresses from enactive representation where motor skill practice is a precursor to the development of an iconic representation of the sequence of actions involved. It is the transition from iconic representation to symbolic representation that is Bruner's main focus. It is through the development of a child's ability to use symbols via language that "provides a means not only for representing experience, but also for transforming it" (Bruner, 1964, p. 4). This ability significantly increases one's problem solving adeptness.

The acquisition of enactive, iconic and symbolic modes of representation "supplies the "inside out" part of the developmental story" (Driscoll, 2005). The "outside in" part of the developmental story is through how the environment affects mode acquisition. Bruner (1964) called this process internalization. Internalization is dependent upon our interaction with others.

Through interaction we develop categories and transformations leading to action. The growth of a child's mind depends upon the "unlocking of capacity by techniques that come from exposure to the specialized environment of a culture" (Bruner, 1964, p. 14).

Summary of Bruner's theory of cognitive development. Bruner's modes of representation redefine readiness for learning. Where Piaget suggests that learner readiness is dependent upon the ability of the child to comprehend the subject matter, Bruner suggests that the subject matter be structured to match the learner's cognitive structure. The sequential acquisition of enactive, iconic and symbolic modes of representation and the internalization process suggests that adult learners possess the ability to interpret evidence and make conjectures in the absence of direct sensory perception or observation at a more advanced level than children due to their increased opportunities to interact with their environment.

Recognition that cognitive growth occurs through both internal, "inside out" and external "outside in" processes suggests that the act of thinking "constantly goes beyond the information given" (Bruner, 1973, p. 218) as evidence is interpreted. Instruction should include both internal; audience readiness assessment, and external; cultural context assessment to advance cognitive growth. The goal of instruction should be the "retrieval of what is relevant in some usable form" (Bruner, 1964, p. 2). Educators are challenged to provide instructional problems that fit the learner's thinking and move them into more powerful modes of thinking (Bruner, 1973). Instruction becomes an "effort to assist or shape growth" (Bruner, 1966, p. 1).

Bruner's Theory of Knowledge

Bruner (1986) proposed that there are "two modes of cognitive functioning, two modes of thought, each providing distinctive ways of ordering experience, of constructing reality" (p. 11). These modes are complementary and cannot be simplified; both are necessary to "capture the

rich diversity of thought." The paradigmatic or logico-scientific mode is a "formal, mathematical system of description and explanation" (Bruner, 1986, p. 12) it is fueled by observations, premises and conclusions. The narrative mode looks for connections between events. It works with human intentions, actions, circumstances and consequences.

Our knowledge about the paradigmatic mode originates from the fields of logic, mathematics and the sciences. Its "imaginative application" begins with a hypothesis and ends with logical proof, solid argument, and good theory. In the narrative mode "imaginative application" begins with human experience grounded in intention, change of circumstance, action and consequence. It ends with "good stories, gripping drama, believable (though not necessarily "true") historical accounts" (Bruner, 1986, p. 13). In contrast to the paradigmatic mode where our knowledge of how science and logical reasoning work is abundant, we know "precious little" about how narrative processes work. One of the reasons for this may be because a story creates two landscapes simultaneously, one of action and one of consciousness.

The action landscape is composed of the characters and their intentions and the situation, the context. The consciousness landscape describes what the characters involved in the action know, think, and feel (Bruner, 1986). These elements form the story grammar. To understand how these elements come together to make a good story, Bruner studied the work of Vladimir Propp, Tzvetan Todorov and Paul Ricoeur. He suggests that "stories create a reality of their own" (Bruner, 1986, p. 43). Narratives are composed in one's mind using language and symbols to reflect contextual, cultural relationships. This suggests that narrative works as an "instrument of the mind in the construction of reality" (Bruner, 1991, p. 6).

Bruner (1991) identified ten features of narrative for the purpose of providing a framework for their construction. Among these features are:

- Narratives describe events in sequence, "in-time" rather than "clock time" as noted by Ricoeur (1979, 1980, 1983) (p. 6).
- Narratives describe people in settings acting in ways consistent with their "beliefs, desires, theories and values" (p. 6). However, these intentional states do not necessarily lead to predictable outcomes. People in narratives may end up "*doing* practically anything" (p. 7).
- Narrative accounts address something out of the ordinary, something worth telling. Narrative "tellability" is an assessment made by the teller (p. 12).
- Narratives contain a plot through which meaning is expressed. The telling of the story and its comprehension by the listener is dependent on the listener's ability to process knowledge interpretatively (p. 8).

Narrative is a meaning structure that organizes events and actions into a recognizable whole. Significance is attributed to the actions and events based on their effect on the whole (Polkinghorne, 1988). Meanings are composed and decomposed through narrative interpretation. Bruner (1990) hypothesizes that humans possess a "readiness or a predisposition" to organize experiences narratively.

Bruner's Theory of Instruction

Bruner's work addresses how we come to know, (theory of development); what it means to know, (theory of knowledge); and how we can advance or grow what we know, (theory of instruction). Our mental growth begins with taking the "outside in" through our cultural environment using language to represent those experiences (development). Such experiences are then re-constructed narratively and meanings are ascertained (knowledge) and communicated ("inside-out"). A theory of instruction advances the processes of both development and meaning

making by providing assistance for translating experiences into "more powerful systems of notation and ordering" (Bruner, 1966, p. 21). This progression (development-knowledge-instruction) suggests a synergistic relationship between development, knowledge (knowing through meaning making) and instruction.

A theory of instruction should specify: (1) the conditions necessary to predispose an individual toward learning (2) how knowledge is structured so that it can be "readily grasped" by the learner (3) effective knowledge presentation sequences (4) nature and timing of rewards and punishments (Bruner, 1966).

Sparking a (1) predisposition to learning and problem solving in a learner depends upon consideration of alternatives by the learner. The exploration of alternatives requires *activation*, something to initiate the search; *maintenance*, something to keep the process moving, and *direction*, something to keep the process organized (Bruner, 1966, p. 43). Activation is accomplished by the introduction of uncertainty. The output of uncertainty is curiosity, which advances the search for alternatives and provokes the assessment of the alternatives. During exploration, the instructor can provide directional cues to minimize the exploration of wrong alternatives and promote the exploration of possible correct alternatives. Exploration direction is determined by the task goal. Methods for (2) structuring knowledge use one of the three modes of representation; enactive, iconic, symbolic, are economical, that is, the amount of knowledge that must be held in one's working memory is small enough to be processed for comprehension, and powerful in its ability to foster connections between other knowledge. (3) Presentation sequence leads the learner through the body of knowledge so that the learner's ability to pick up, transform and retain that learning is increased. An effective presentation sequence enables learner mastery. The sequence will vary depending upon the learner, their developmental stage,

and the material to be learned. There is no optimal sequence for all learners (Bruner, 1966). (4) Reinforcement occurs through the sharing of knowledge results during instruction. The timing and placement of this corrective knowledge affects how the learners will use the knowledge as part of their alternative evaluation, trial and error or hypothesis testing. Knowledge of results should occur when the learner is comparing their assessment results to the goal. Such knowledge is timely, useful and readily received by the learner. Presentation prior to this point in the problem solving process can be confusing and not readily understood by the learner (Bruner, 1966). To summarize, a robust theory of instruction must consider the nature of knowledge, the nature of the knower and the nature of the knowledge getting process (Bruner, 1966).

Summary of development theory. The development process and its attributes as proposed by Piaget, Vygotsky, Dewey and Bruner are summarized in Table 4.

Table 4

Theories of Cognitive Development

Theorist	Focus	Unit of Analysis	Process of Development and Learning	Characterized by
Piaget	Performance	Individual	Development precedes learning (inside – out)	Adaptation [a] and organization
Vygotsky	Process	Social Activity (experiences)	Learning precedes development (outside – in)	Internalization, zone of proximal development
Dewey	Process	Individual and social experiences	Thinking (outside – in)	Induction and deduction
Bruner	Instruction	Individual and culture	Progression through three modes of representation: enactive, iconic and symbolic (inside – out) Environment affects information acquisition (outside-in)	Modes of representation (thinking) Internalization (incorporating the culture)

[a] Adaptation is comprised of assimilation (adding new information into existing mental structures or schema) and accommodation (forming new mental structures (schema) when new information does not fit into existing structures). These processes work together to achieve equilibration (balance).

Adult Development

This section offers a definition of the adult development process and reviews the literature on adult development. Merriam, Caffarella and Baumgartner's (2007) developmental perspectives, Taylor, Marienau and Fiddler's (2000) aspects of adult development and Rossiter's (1999b) theory of adult development as narrative are considered. The adult development literature landscape is summarized in Figure 8.

Adult development can be considered a "process of qualitative change in attitudes, values and understandings that adults experience as a result of ongoing transactions with the social environment, occurring over time, but not strictly as a result of time" (Nemiroff & Colarusso,

1990; Tennant & Pogson, 1995; Weathersby & Tarule, 1980 as cited in K. Taylor, et al., 2000, p. 10). This change is systematic and it occurs through the "dynamic interaction of heredity and environmental influences" (Merriam, et al., 2007, p. 298). These changes over time enable an individual to advance their level of functioning. Adult development spans the disciplines of psychology, sociology, biology and philosophy (Levinson, 1986; Merriam, et al., 2007; K. Taylor, et al., 2000). Pinpointing the process where the inherent nature of an adult and their relationship with the environment and culture converge to advance adult development is complicated. Developmental theories provide a context in which to consider how advanced functioning or growth occurs (Daloz, 1999).

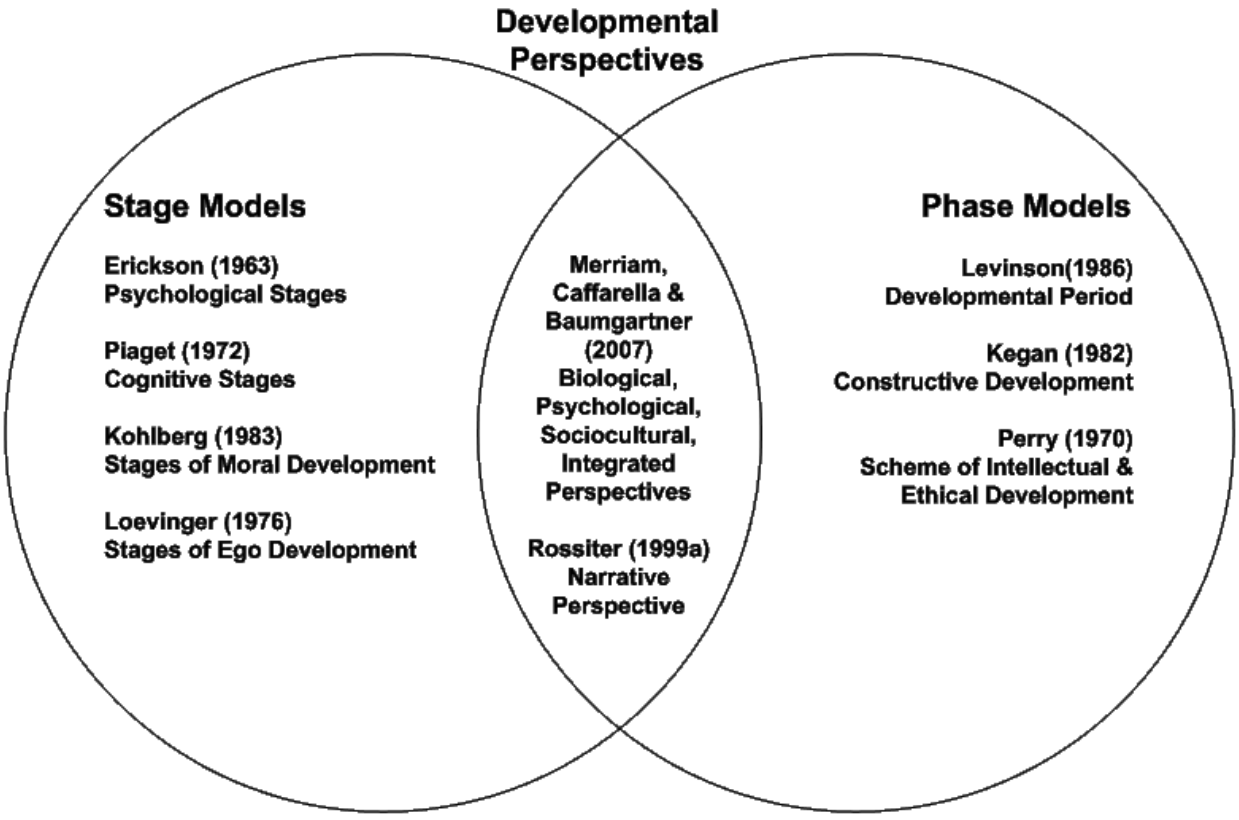


Figure 8. Adult development literature landscape showing the relationship between stage models, developmental perspectives and phase models of development.

The literature on adult development emphasizes stage and phase models of development (Daloz, 1999; Daloz & Cross, 1986; Merriam, et al., 2007; Tennant & Pogson, 1995). Most frequently noted are Erickson's (1963) psychological stages, Piaget's (1972) cognitive stages, Kohlberg's (1983) stages of moral development and Loevinger's (1976) stages of ego development (Rossiter, 1999a). Other frequently cited models include David Levinson's (1986) developmental periods model, Robert Kegan's (1982) constructive development theory and William Perry's (1970) scheme of intellectual and ethical development. These stage and phase models have been favored by educators because they provide a "roadmap" to follow (Daloz, 1999). Educators sometimes "latch on to an easily assimilated theory, one which clearly differentiates and orders the 'phases' or 'stages' of life and which advances an unambiguous account of the process and the end point of development" (Tennant, 1988, pp. 64-65). Stage and phase models highlight some features, ignore others and may contain methodological and conceptual issues (Courtenay, 1994; Tennant, 1988). "No one theory explains everything" (M. C. Clark & Caffarella, 1999, p. 4); each theory advances a particular way to consider adult development. Daloz and Cross (1986) suggest the application of multiple theories to obtain a deeper understanding of how adults change and develop.

Developmental Perspectives

One approach to understanding the adult development theoretical landscape is to group the theories according to their purpose so that researchers can see what each "cluster is seeking to accomplish" (M. C. Clark & Caffarella, 1999, p. 4). Merriam, Caffarella, and Baumgartner (2007) suggest a typology consisting of four perspectives; biological, psychological, sociological and integrated.

The biological perspective addresses the physical and biological changes brought about by the maturation process (Merriam, et al., 2007). Such changes affect sensory perception and may negatively impact learning. Awareness of these changes by educators and learners is important to ensure that environmental supports are in place in the learning environment.

The psychological perspective refers to how an individual develops internally and how the environment may affect the development of self. The internal experiences of an individual involve the ego, cognitive, intellectual, moral, faith and spiritual development in addition to life events and transitions and relational development (M. C. Clark & Caffarella, 1999). Most work in adult development is focused on psychological development (Merriam, et al., 2007).

The sociocultural perspective addresses how the social environment influences development (Dannefer, 1996; Gardner & Kosmitzki, 2005; Shaffer, 2005 as cited in Merriam, et al., 2007). This perspective considers how age, race, gender, socioeconomic status and sexual orientation "affect how society defines us" (Merriam, et al., 2007, p. 312). The sociocultural perspective provides our life context. These factors "shape the trajectory of the life course" (Bee, 1996 as cited in M. C. Clark & Caffarella, 1999, p. 6).

The integrative perspective combines two or more of the aforementioned perspectives in an attempt to holistically characterize adult development. This perspective recognizes the complexity of adult development. Looking at how the biological, psychological and sociocultural frameworks intersect and interact with each other significantly increases our understanding of adult development (M. C. Clark & Caffarella, 1999).

Summary of developmental perspectives. Adult development, how we come to know, is complex. There is not a single, best or "most efficient route to development" (Tennant & Pogson, 1995, p. 197). Viewing adult development from the integrated perspective suggested by

Merriam, Caffarella and Baumgartner (2007) increases our understanding of how adults develop. Recognizing the biological, psychological and sociocultural changes that adults go through and how these changes trigger and interact with learning leads to the structuring of learning experiences that will both "respond to and stimulate development" (p. 324).

Aspects of Adult Development

Taylor, Marienau and Fiddler (2000) identified the following four aspects of adult development that seem to traverse the models and theories and establish the groundwork for understanding adults:

- People develop through interactions with their environment
- Development follows a cycle of differentiation and integration
- Within individuals, development is a variable, not uniform, process
- The ability to reframe experience serves as a marker for development (p. 11).

Experience is a transaction between an individual and the environment. Experience is created when external conditions and individuals "personal needs, desires, purposes, and capacities" (Dewey, 1938, p. 42) interact. Development occurs through the interaction. How adults adapt material in the interaction is shaped by their "cultural practices, authorities, class and racial identity" (K. Taylor, et al., 2000, p. 11).

The processes of differentiation and integration enable adults to expand and contract their existing experiences to accommodate or modify new experiences. Accommodation is a dialectical process that leads to a synthesis that resolves any contradictions (K. Taylor, et al., 2000). This is similar to Piaget's establishment of a condition of equilibration (Ginsburg & Opper, 1969). Considering development as a recurring cycle of differentiation and integration is

in contrast to other theories of development that contain a "culturally idealized, normative endpoint" (K. Taylor, et al., 2000, p. 11).

Recognizing that adult development is a variable process addresses differences in adult maturity due to the nature and extent of their experiences. The "nature, timing, and processes of development will vary according to the experience and opportunities of individuals and the circumstances of their lives" (Tennant & Pogson, 1995, p. 197).

Reframing experience refers to the belief system that adults use to guide their choices and understand themselves. Taylor, Marienau and Fiddler (2000) call these beliefs *life themes*. Life themes bring organization to "perceptions, thoughts, actions, and feelings that constitute an individual's interactions with her environment" (p. 12). Development occurs when an adult not only recognizes these beliefs or life themes, but also can move to a more complex construction of self because of experiences and their reaction to those experiences. Reframing experiences moves an individual from a position of 'this is the way I am' to a growth position of 'this is who I am in the process of becoming.'

These four aspects of development: environmental interactions, differentiation and integration, variable process and reframing experience are also common elements associated with learning. From a learning perspective, "development is a qualitative change or transformation in a way of knowing" (K. Taylor, et al., 2000, p. 13).

Adult Development as Narrative

Rossiter (1999b) posited that adult development can be viewed as narrative. This perspective suggests that "story is a metaphor for human life" (p. 77). Based on the notion that narrative is the primary means whereby adults organize and make meaning out of their experiences (Bruner, 1990; Polkinghorne, 1988) and the "narratory principle" suggested by

Sarbin (1986) that "human beings think, perceive, imagine, and make moral choices according to narrative structures" (p. 8), Rossiter (1999b) explains that meaning is "constructed, understood and expressed in story form" (p. 78). Our everyday conversations at work, at home, at school are all acts of storytelling. A narrative orientation to adult development assumes that adults make sense of their experiences over the course of their lives by building a personal narrative that is expanded and contracted to "accommodate new insights, unanticipated events and transformed perspectives" (Rossiter, 1999b, p. 78). This holistic approach recognizes the "cognitive, affective and motivational dimensions of meaning making" (p. 78) and encompasses both biological and environmental influences. A narrative orientation to adult development assumes that (1) narrative is the basic structure of meaning making, (2) adult development is both experienced and expressed through self-storying, (3) a human science approach, and (4) adult development proceeds predictably (Rossiter, 1999b).

To understand a narrative orientation to adult development, Rossiter (1999b) suggests that four narrative qualities, the contextual, interpretative, retrospective and temporal are necessary. The contextual quality concerns story coherence through its plot. This is the internal context that shows how story events are related to each other. The succession of these events leads to the assessment and selection of a logical, attainable outcome. The story is situated in both time and place. This is analogous to an adult's situation in a culture that forms their sociocultural meaning system.

The interpretative quality involves the search for meaning as the story listener/reader considers the story in terms of what is already known. By elucidating events and behaviors, the story is more than an account of what happened or a prediction of what might happen, it can support multiple explanations. This interpretative quality is grounded in the developmental

landscape of the individual who is making the interpretation. As individuals come to understand, they expand and contract the context as they place it within their existing bank of experiences. This interpretative act is a form of growth (Rossiter, 1999b).

The retrospective quality of narrative is history, going back in time to tell what was. As a story is told and re-told, the teller is re-writing their life story based on new understanding. The significance of many decisions is not realized until after the decision is made and experienced. Freeman (1991) suggests development occurs through the process of re-writing the self; it is intrinsic to development. "It is only after one has arrived at what is arguably or demonstrably a better psychological place than where one has been before that development can be said to have occurred" (p. 99).

The temporal quality of narrative is its movement through time as events take place. There is an interrelationship between time and place that occurs as an understanding of the past and the future is unfolding and changing in the present (Rossiter, 1999b). "We are always within time" (Rossiter, 1999b, p. 82). Life narratives are open-ended and constant, plot details shift and are re-shaped based on the present need. Past, present and future meanings are understood in relationship to each other. As the present changes, it influences our interpretation of the past and our vision of the future (Rossiter, 1999b).

A narrative orientation to adult development is a human science orientation as opposed to a natural science orientation. This orientation explains the life course as interpreted through meaning making and as lived through experience. "It is through the ongoing construction of the self-narrative that developmental change is experienced and understood" (Rossiter, 1999b, p. 84).

Summary of a narrative perspective for adult learners. Adult development as narrative complements other developmental theories and perspectives. This perspective addresses the meaning of "changes and events over the life course; it therefore suggests implications for our understanding of learning that have to do with meaning making and transformation" (Rossiter, 1999b, p. 82). Rossiter (1999b) identified four implications that adult development as narrative has for adult learners:

(1) *Learners are experts on their own development.* Because the narrative perspective describes development "from the inside out as it is lived," adults are a significant source for information on how their development and their learning are progressing (Rossiter, 1999b). This suggests that educators' knowledge of adult development is incomplete, in addition to what educators know from adult developmental theories; the learner possesses the rest of their developmental story. Knowing where the learner is developmentally enables the educator and the learner to determine learning progress or growth (Rossiter, 1999b). (2) *Narratives mediate change.* Change introduces new circumstances and evidence that triggers the story process. As we seek to understand something, we look for meaning in our current knowledge base and revise meanings to accommodate new ideas or beliefs. The act of learning "stimulates the narrative impulse" (Rossiter, 1999b, p. 83). Learners create stories to incorporate these new ideas or beliefs into their personal meaning systems. (3) *The telling of the life narrative leads development.* The act of telling or writing about one's development enables an individual to reflect on their story, choose how to interpret it and how to change it. This ownership makes narrative both empowering and transformative (Rossiter, 1999b). (4) *Adults re-story their lives in the process of transformative learning.* Re-storying as suggested by Randall (1996) is a three-stage process of transformative learning. The first stage involves moving from a narrow to a

broader, more inclusive perspective. The limitations of one's meaning system are acknowledged in the second stage. During the third stage, the individual reflects on the situation and studies options. Action is taken in the fourth stage predicated on the individual's new world landscape.

A narrative orientation for adult development uses re-storying as the primary means of making meaning and creating/re-creating one's life narrative. Although re-storying seems to mirror Mezirow's (1991) perspective transformation process, re-storying is subjective and interpretative whereas transformative learning is characterized by rational discourse and objectivity (Rossiter, 1999b). Transformative learning is defined as the "active process of recognizing again and re-interpreting a previously learned experience in a new context" (Mezirow, 1991, p. 6). Perspective transformation as development leads an individual into a more "inclusive, differentiated, permeable and integrated perspective" (Mezirow, 1991, p. 155). Adults naturally move toward this orientation. A "strong case can be made for calling perspective transformation the central process of adult development" (Mezirow, 1991, p. 155).

Summary of adult development. Given the complexity of adult development and the preponderance of models and theories explaining the nature of adult development, the adult education practitioner is challenged to assess the value of these models and theories in terms of their practical application. Courtenay (1994) questions the feasibility of configuring many "different learning approaches based on the learners level of development" (p. 152). Applying Rossiter's (1999b) narrative approach seems to eliminate the need for customizing learner experiences by focusing on broad perspectives within the framework of narrative experience. This approach works in conjunction with the biological, psychological and sociocultural perspectives suggested by Merriam, et al., 2007 and the four aspects of development; environmental interaction, differentiation and integration, variable process, and reframing

experience proposed by Taylor, et al. 2000. The narrative approach recognizes that adults lead storied lives; adults make stories as they experience life. Narrative uses this experiential base as a common nucleus to develop context, arrive at interpretations based on prior experiences and make both present and future developmental changes based on meaning making. It is an orientation that all adult learners can understand and use regardless of where they are developmentally.

Communication Theory

This section offers a working definition of communication, explains the purpose of communication and examines communication theory through a discussion of Robert Craig's (1999) seven communication traditions. This section also details Rita Richey's (1986; Richey, et al., 2011) model for the transmission of messages, Robert Georges (1969) description of narrative as a communicative event is explained and Walter Fisher's (1984, 1987) narrative paradigm is compared to the rational paradigm.

Communication is a universal human experience (Littlejohn & Foss, 2011). The term 'communication' is used to describe "almost every kind of human interaction" (Griffin, 2009, p. 6). It has been "systematically studied since antiquity" (Littlejohn & Foss, 2011, p. 5). Frank Dance (1970) examined the "multitudinous" definitions of 'communication' in the literature and found 15 conceptual components in those definitions. His intent was to synthesize the components into a single definition. He discovered that definitions of communication reflect fields at almost every conceivable level ranging from "*all* behavior to *meaningful, purposive behavior of human beings in conscious interaction*" (Dance, 1970, p. 208). He concluded his study by suggesting that "we are trying to make the concept of 'communication' do too much

work for us" (p. 210) and proposed the creation of a family of concepts for the purpose of organizing research.

Littlejohn and Foss (2011) suggest scholars choose a communication definition based on how the definition helps answer the question under investigation. Acting in accordance with this recommendation, this research study will use the following working definition of communication proposed by Griffin (2009), "communication is the relational process of creating and interpreting messages that elicit a response" (p. 6). This operational definition captures both the transmission of a message and its understanding through interpretation, it is based on communication practices that involve "talking and listening, writing and reading, performing and witnessing…doing anything that involves "messages" in any medium or situation" (Craig, 2006, p. 39). A communicator or sender constructs these messages. The message recipient or receiver interprets the message. The message meaning for both the sender and the receiver is not derived from the words themselves but is based on the meanings that the sender and receiver assign to the message. Communication scholars emphasize that "words don't mean things, people mean things" (Griffin, 2009, p. 7). This process of making meaning is relational, the message is considered in terms of its connection and significance to other prior knowledge. The response is the effect; the cognitive, emotional or behavioral reaction the message has on the receiver (Griffin, 2009).

The purpose of communication is to make meaning and exchange understanding. The act of communication means that information is passed from "one place to another" (G. A. Miller, 1951, p. 6). Early communication theory literature suggests that Lasswell's (1948) maxim, "who says what to whom with what effect" (p. 37) encapsulated the field of communication theory (Littlejohn & Foss, 2011). However, the simplicity of Lasswell's statement belies the complexity

of the communication process. Communication touches many disciplines; linguistics, journalism, speech, psychology, sociology, anthropology, management, political science, education and involves the use of biological, cognitive and psychological systems (Richey, 1986). There are many conceptual models, theories and approaches that explain particular aspects of the communication process. To bring these models, theories and approaches together, Craig (1999) suggests that the field of communication be viewed holistically through discussions focused on seven different traditions, each of which contains a specific view of communication. Such study recognizes communication as a practical, applied discipline and provides scholars with a means of talking about communication. The seven traditions (p. 133) are:

1. Rhetorical: Communication as a practical art of discourse
2. Semiotic: Communication as sharing meaning through signs
3. Phenomenological: Communication as the experience of sharing self with others through dialogue
4. Cybernetic: Communication as information processing
5. Sociopsychological: Communication as interpersonal interaction
6. Sociocultural: Communication as the production and reproduction of social reality
7. Critical: Communication as discursive reflection

The traditions are a way of mapping how communication looks from the perspective of those working within the tradition. The traditions vary in terms of their objectivity and interpretative qualities. The traditions also work together and overlap; there are not distinct boundaries. Each tradition offers solutions to communication problems from the position of communicative practice (Craig, 1999).

Rhetorical Tradition

Communication in the rhetorical tradition is theorized as "*a practical art of discourse*" (Craig, 1999, p. 135). Rhetoric uses language (symbols) to share meanings. Although rhetoric is closely associated with making arguments and speeches, it has grown to include how humans use symbols to both describe and affect the world (Littlejohn & Foss, 2011).

Five principles of the rhetorical tradition used by the teller for both the preparation and delivery of a message are: invention, arrangement, style, delivery, and memory (Littlejohn & Foss, 2011, p. 62). The *invention* process is used to assign meanings to symbols through interpretation. The message is organized by looking at the logical relationships between people, objects and context and *arranging* them to enable audience sensemaking. How the symbols will be presented is addressed through *style*. The words and visuals that are chosen and the meanings assigned to those words/visuals as well as the physical appearance of both the presenter and the presentation environment are part of the style process step. *Delivery* is how the symbols will be expressed in physical form, for example, verbally or visually. *Memory* addresses more than memorizing the message, it includes the cultural underpinnings that influence how the deliverer remembers and understands information.

Semiotic Tradition

Communication in the semiotic tradition is theorized as "*intersubjective mediation by signs*" (Craig, 1999). Signs represent "objects, ideas, states, situations, feelings, and conditions outside of themselves" (Littlejohn & Foss, 2011). Words are a special kind of sign, they are symbols that represent or stand in for what they describe. Symbols are "instruments of thought" (Langer, 1942 as cited in Littlejohn & Foss, 2011, p. 45), they enable us to think about something without the object itself being present. Semiotic thinking is initiated through the

relationship among the object (referent), the person (interpreter) and the sign. The person (interpreter) assigns meaning to the sign. The meaning is dependent on the "image or thought of the person in relation to the sign and the object it represents" (Littlejohn & Foss, 2011, p. 45). This relationship is called the "*triad of meaning*." For example, the word "car" is associated with a particular make of car (Ford, Dodge, and Chevrolet) by the listener. Although the word is not the car itself, through the listeners "thoughts, associations and interpretation" (p. 45) the word "car" is linked with the physical object. The semiotic tradition addresses how signs relate to what they stand for, the relationships between signs and how signs make a difference in the lives of people.

This tradition recognizes that meaning can also be conveyed indirectly through behavior and some ideas may be easier to express visually. However, miscommunication is always possible because these signs and symbols (words) can "mean different things to different people" (Craig, 1999, p. 137). Communication in this perspective requires an understanding not only words and grammar, but also society and culture (Littlejohn & Foss, 2011). Through the inclusion of society and culture to enable meaning, the semiotic tradition is related to the sociocultural tradition.

Phenomenological Tradition

Communication in the phenomenological tradition is theorized as "*dialogue* or *experience of otherness*" (Craig, 1999, p. 138). This tradition is concerned with the way human beings understand the world through direct experience. Phenomenology makes "actual lived experience the basic data of reality" (Littlejohn & Foss, 2011, p. 47). This tradition is governed by three operating principles. (1) Knowledge is obtained through direct, conscious experience; (2) meaning is determined by the relationship between the individual and the object, and (3)

language is used to make meaning (Deetz, 1973). "We experience the world through the language we use to define and express that world" (Littlejohn & Foss, 2011, p. 48).

The active mental process of assigning meaning to an experience is interpretation. Interpretation clarifies our experiences as we mentally move back and forth between the experience itself and other related experiences to assign meaning to the experience based on similar, previous experiences. An interpretation of the experience is built and the specifics are reviewed to test the interpretation. Interpretation is a continual process of refining meaning (Littlejohn & Foss, 2011).

Cybernetic Tradition

Communication in the cybernetic tradition is theorized as "*information processing*" (Craig, 1999, p. 141). The word "cybernetics" originates from the Greek word for "steersman" or "governor." Norbert Wiener used the word "cybernetics" to describe the "science of control and communication in animal and machine" (Littlejohn & Foss, 2009, p. 285).

Cybernetics at its core is based on system theory. According to system theory, "a system is a set of interrelated and interacting parts that work together toward some common goal" (P. L. Smith & Ragan, 2005, p. 24). Systems are organized, use feedback to self-stabilize, and are part of the environment. As a system interacts with its environment it receives input, processes that input and produces an output that is sent back to the environment. By monitoring, adjusting and controlling outputs, systems maintain balance and produce results (Littlejohn & Foss, 2011).

In the cybernetic tradition, communication links these interrelated system components. Feedback is the mechanism that initiates information processing both in our heads and on our computer (Griffin, 2009). Cybernetics considers the difference between mind and matter to be functional, analogous to software and hardware. This suggests that thinking is "nothing more

than information processing" (Craig, 1999, p. 141). When thought is characterized as information processing it becomes intrapersonal, "groups, and organizations also think, whole societies think, robots and artificial organisms will eventually think" (Craig, 1999, p. 141).

Claude Shannon at Bell Telephone Laboratories established communication as information processing in the literature in 1949 through the introduction of the *Mathematical Theory of Communication* developed to address the problem of how to transmit communication signals from sender to receiver (Shannon & Weaver, 1967). The model as shown in Figure 9 graphically depicts a communication system composed of five parts:

1) An *information source* that develops the message(s) to be communicated.
2) A *transmitter* that changes the message into an acceptable signal for transmission.
3) The *channel* is the medium used to transmit the signal to the receiver; it is shown in the model as the noise source. It acts on the transmitted signal to produce the received signal.
4) The *receiver* rebuilds the message from the signal.
5) The *destination* is the intended message recipient.

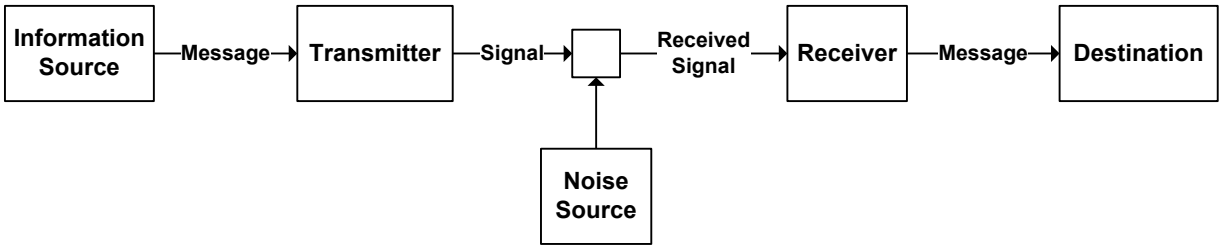


Figure 9. Shannon and Weaver's Model of Communication Theory. Adapted from "A Mathematical Theory of Communication" by Claude E. Shannon and Warren Weaver, 1967, p. 7. Copyright 1967 by the University of Illinois Press.

This model explains how information arrives at a destination. It depicts the "engineering aspects" of communication, the "semantic aspects" are irrelevant (Shannon & Weaver, 1967, p. 8). For example, two messages, one loaded with meaning and one that is nonsense is treated exactly the same in this model. According to Travers (1970) information theory "does not necessarily have anything to do with the communication of either meaning or knowledge" (p. 68). Communication problems are viewed as breaks in information flow due to noise, too much information or mismatches between structure and function (Craig, 1999). Although the Shannon and Weaver transmission model is useful for describing the movement of information from 'here to there' from an engineering perspective, its usefulness in describing face-to-face communication is questionable (Griffin, 2009).

Cybernetics is closely connected with the rhetorical tradition in terms of technique. In its use of symbols to assign meaning, it is similar to semiotics and in the way meanings are shared and through interactions among system elements, it is related to phenomenology (Craig, 1999). Cybernetics offers a practical approach to communication.

Sociopsychological Tradition

The Sociopsychological tradition theorizes communication as a "*process of expression, interaction and influence*" (Craig, 1999, p. 143). Communication occurs when people interact with each other. The product of this interaction is behavior. The psychological aspect of this perspective views people as individuals with distinct characteristics, attitudes, emotions and personality, which affects how they behave. Messages are encoded and shared using these characteristics and mental models. Mental models explain how something works and serve as performance guides (Driscoll, 2005). Messages are decoded and processed mentally based on these characteristics and mental models. The social aspect of this perspective recognizes the

influence that messages created in the mind of one person can have over another person (Littlejohn & Foss, 2011).

Sociopsychological theories look at how people behave, how people "acquire, store and process information in a way that leads to behavioral outputs" (Littlejohn & Foss, 2011, p. 54) and how biology, the function and structure of the brain, explains behavior. The Sociopsychological tradition is cognitively oriented and works closely with the cybernetic tradition to explain how people share messages with each other.

Sociocultural Tradition

Communication in the sociocultural tradition is theorized as "*a symbolic process that produces and reproduces shared sociocultural patterns*" (Craig, 1999, p. 144). Through the language people use to describe themselves and their environment "reality is produced, maintained, repaired and transformed" (Griffin, 2009, p. 48).

This tradition addresses how people come together to "create the realities of their social groups, organizations, and cultures" (Littlejohn & Foss, 2011). The way reality is perceived is expressed through the words used to describe self and surroundings. It is how the culture and social structure are produced and reproduced (Griffin, 2009). As culture is shaped through these exchanges, it becomes the "context for action and interpretation" (Littlejohn & Foss, 2011, p. 55). Meaning is ascertained through context; the symbols used will take on different meanings and will vary based on the situation.

Critical Tradition

Communication in the critical tradition is theorized as "*discursive reflection*" (Craig, 1999, p. 146). The premise underlying the critical tradition is that acts of communication are "inherently faulty, distorted and incomplete" (Craig, 1999, p. 147). Every act of communication

contains an instability that arises from an inherent human tendency to question the validity of incoming information (Habermas, 1984 as cited in Craig, 1999). The process of discursive reflection, deep thinking through discussion with others, clarifies these ideological distortions and invokes conscious-raising (Craig, 1999).

This tradition attempts to understand the nature of power, the values of freedom and equality; the basic beliefs that dominate society (Littlejohn & Foss, 2011). Critical theorists continually question their assumptions about the world, its norms and their own inner experiences (Craig, 1999). The tradition is a reminder that communication is more than something people do, it is something to "talk about in ways that are practically entwined with our doing it" (Craig, 1999, p. 149).

Model for the Transmission of Messages – Rita Richey

To describe communication in a broader context, inclusive of information theory, to support instructional design Richey (1986) developed a model for the transmission of messages as shown in Figure 10. This model addresses not only the transmission of information as characterized by information theory but also the meaning making process.

The model considers the message source to be a human being replete with their "combination of culture, experiences, and resulting attitudes and aptitudes" (Richey, 1986, p. 45). Message encoding is the process used by the message source to prepare the message for the receiver through the use of symbols, typically words that convey meaning through the use of grammar. Messages can also be prepared without words; gestures, vocal tone and facial expressions are all effective non-verbal mechanisms for both message encoding and transmission.

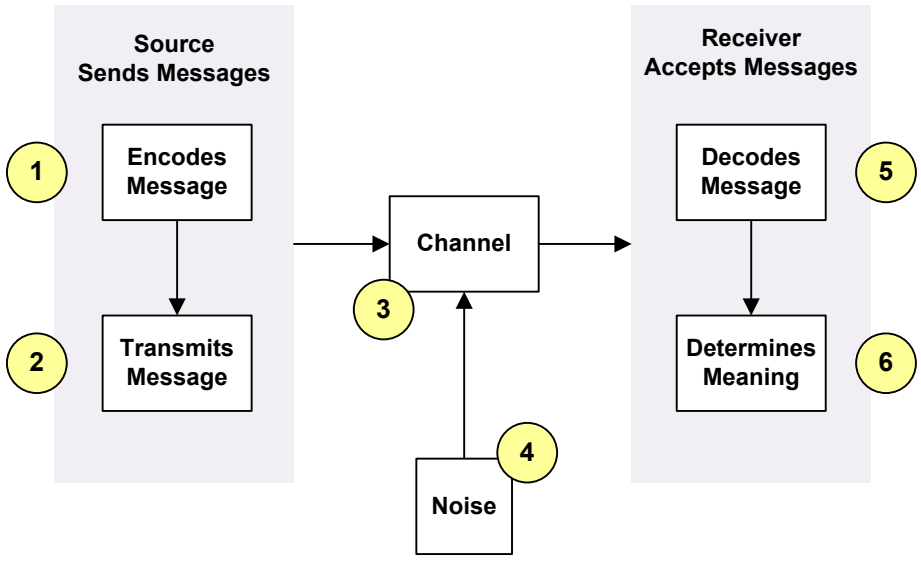


Figure 10. Richey model of the transmission of messages. Adapted from "The Theoretical and Conceptual Bases of Instructional Design" by Rita C. Richey, 1986, p. 44. Copyright 1986 Rita C. Richey.

The channel refers to the medium used for message transmission. An auditory channel transmits sound waves and a visual channel transmits light waves. The number of channels and the amount of information an individual can handle in single or dual channels is an important consideration in instructional design (Richey, 1986). Noise is "anything that interferes with the message" (Richey, et al., 2011, p. 38). Noise can be in the form of multiple voices, unfamiliar words, or visual or cultural disturbances which can lead to errors in communication (Richey, 1986; Richey, et al., 2011).

The receiver accepts and decodes the message. The process of decoding requires not only converting the message but analyzing and interpreting the message to determine its meaning. "The ability of the receiver to determine meaning relates to one's ability to think and to use language" (Richey, 1986, p. 46).

Linear transmission models are superficially simple. Shannon and Weaver (1967) identified three significant problems inherent in transmission models that should be addressed:

1) The technical problem of accurate symbol transmission
2) The semantic problem of how precisely the symbols (words) convey the intended meaning as interpreted by both sender and receiver
3) The effectiveness problem related to whether the received meaning affected the behavior of the receiver as intended by the sender (p. 2)

These problems can be minimized to some extent through message form and structure.

Message form and structure. Message meaning is shaped by the message structure, its organization, information load and attention-getting properties (Richey, 1986). Although both verbal and non-verbal means can be used to exchange information, most messages use verbal language. The way language works to convey a message is best described by Pinker (1994) "each person's brain contains a lexicon of words and the concepts they stand for (a mental dictionary) and a set of rules that combine the words to convey relationships among concepts (a mental grammar)" (p. 85). Words are the building blocks of message structure; they are arranged based on grammar into sentences that make up the body of the message.

Message decoding is facilitated by the way the information is organized. "Information is easier to remember when it is in an orderly state, rich in pattern and structure, highly interconnected, containing a good deal of redundancy" (Campbell, 1982 as cited in Richey, 1986, p. 48). Information load refers to the amount of information the human cognitive system can process. It is a function of both the number of pieces or chunks of information and the receiver's previous experience with the information, and the delivery rate (Marsh, 1983; G. A. Miller, 1951).

The attention-getting properties of a message include the auditory and visual cues that direct the receiver's attention to what the sender deems important. A raised or lowered voice, an arrow, or the use of color to highlight part of a visual, are all attention-getting mechanisms. The receiver's attention is also influenced by the noise inherent in the communication channel. What stimuli the receiver notices and decodes given this noise is important to communication theorists and instructional designers because what gets noticed is what gets decoded (Richey, 1986). Structurally, messages are typically spoken (auditory) written or visual and received through single or multiple channels. Dual channel messages contain both auditory and visual information. The effectiveness of a transmission depends on both the information load and the channel capacity. The system has limitations; only so much information can be processed at one time (G. A. Miller, 1956; Richey, 1986). These message elements, structure, organization, load and attention-getting properties, affect how the receiver will interpret the message.

Narrative as a Communicative Event

Narrative or storytelling can be considered a holistic, communicative event. To support this notion, Georges (1969) developed a set of postulates to describe aspects of "storytelling events" and the interrelationships among them (p. 317):

1) "Every storytelling event is a communicative event" (p. 317) consisting of an encoder and a decoder. Communication occurs through a message transmitted through audio and visual channels. The sending and receiving of the storytelling event generates "perceptual responses" interpreted by both parties as feedback.
2) "Every storytelling event is a social experience" (p. 317) in which one participant assumes the social identity of the storyteller and the remaining participants assume the identity of the listener. The teller plans, encodes and delivers the message. The

listeners receive, decode and respond to the message. Both teller and listeners perform these duties according to "socially prescribed rules" (p. 318).

3) "Every storytelling event is unique" (p. 319) in that it happens only once in a specific place and time within a particular social setting and it produces social and psychological interactions that affect how the story characters relate to each other in the social setting.

4) "Storytelling events exhibit degrees and kinds of similarities" (p. 319). The similarities originate from the culture and are recognizable by the social group they describe.

According to the aforementioned postulates, the message of any storytelling event is "generated and shaped by and exists because of a specific storyteller and specific story listeners whose interaction constitute a network of social interrelationships that is unique to that particular storytelling event" (Georges, 1969, p. 324).

These postulates consider storytelling events to be "dynamic phenomena" (Georges, 1969, p. 319) shaped by both teller and listeners, embedded in culture and fueled by interrelationships. Storytelling events reflect the culture and social situations they describe. They reveal "social cohesion and equilibrium" as well as "discord" and "social inconsistencies" (Georges, 1969, p. 325). Storytelling events provide a means of testing hypotheses, sharing meaning and determining significance.

Narrative Paradigm – Walter R. Fisher

Based on the assumption that human beings are inherently storytellers, or "homo narrans" by nature, Fisher (1987) proposed that all forms of communication be viewed from a narrative perspective. Believing existing theories of communication and logic to be inadequate, he

developed the narrative paradigm to answer the question of how "people come to believe, and act on the basis of communicative experiences" (p. xi).

Historically, the rational paradigm has dominated the study of rhetorical communication since the time of Aristotle (Littlejohn & Foss, 2011). The rational paradigm, suggests that knowledge comes from the mind through reasoning to determine truth. This paradigm proposes that human beings use argument grounded by "legislative, scientific, legal and forensic" context as the "paradigmatic mode of human interaction" (Littlejohn & Foss, 2011, p. 144). The rational paradigm (Fisher, 1984) is based on five assumptions:

1) Humans are essentially rational
2) Decision-making and communication occur through argument
3) Argument is built to suit the speaking situation
4) Rationality is determined by how much we know and our ability to present a good argument
5) The world is a set of logical puzzles that can be solved through rational analysis

This paradigm is a scientific approach that assumes people use logic to make decisions based on evidence and good argument (Griffin, 2009). Fisher (1984) recognized that reasoning did not need to be tied to argument; reasoning was present in any symbolic action. He found that rationality was too limited, it did not always explain communication experiences, and he asserted that humans used the rational paradigm because they had been taught to use it. He developed the narrative paradigm as a "better solution" that provided room not only for argument, but also for all human communication.

The narrative paradigm assumes that narrative understanding is innate in human beings, the "narrative impulse is part of our very being because we acquire narrativity in the natural

process of socialization" (Goody & Watt, 1962-1963; Krashen, 1982 as cited in Fisher, 1984, p. 8). Fisher was also influenced by MacIntyre's (1981) observation that "man is in his actions and practice, as well as in his fictions, essentially a storytelling animal" (p. 201). According to Fisher (1987), humans are narrative beings who "experience and comprehend life as a series of ongoing narratives, as conflicts, characters, beginnings, middles, and ends" (p. 24).

The narrative paradigm (Fisher, 1984) is based on five assumptions:

1) Humans are essentially storytellers
2) Decision making and communication occur through "good reasons"
3) Good reasons are based on our history, biography, culture and character
4) Narrative rationality is determined by narrative probability and fidelity
5) The world is a set of stories that we choose and thereby recreate our life

This paradigm is a theoretical approach that "views narrative as the basis of all human communication" (Griffin, 2009, p. 302). Narrative rationality is predicated on both narrative probability and narrative fidelity. The audience (listener/reader) uses these two tests or standards to determine the acceptability of the narrative.

Narrative probability is an assessment of story coherence. It is closely associated with the story plot. Are the characters behaving in expected ways? Is the plot organized and does it unfold predictably? Does the story reach a logical conclusion? Does the story make sense as a way to understand and explain how the world works? Such questions test how well the narrative "hangs together" (Griffin, 2009).

Narrative fidelity addresses whether the "story rings true with stories already accepted as true" (Littlejohn & Foss, 2011, p. 144). The story will seem similar to those the listeners may have already experienced. There is a "congruence between values embedded in [the] message

and what the listeners regard as truthful and humane, the story strikes a chord" (Griffin, 2009, p. 204). Fidelity provides a "logic of good reasons" to guide future actions (Fisher, 1984).

The creation of meaning in the narrative paradigm is through the interaction between the teller and the listener in building a shared story that makes sense to them by discussing the "good reasons" for their interpretation (Littlejohn & Foss, 2011). The goal is mutual understanding. The narrative paradigm assumes that people "judge the stories that are told for and about them and that they have a rational capacity to make such judgments" (Fisher, 1987, p. 67). Narratives that will be remembered are those that resonate with listener experiences and values. Such narratives "transcend temporal and cultural differences" (Littlejohn & Foss, 2011, p. 144).

Criticism of the narrative paradigm. The narrative paradigm has been the subject of some criticism by other theorists who find the traditional rational paradigm to be more rigorous in its application than the narrative paradigm. Warnick (1987) objected to Fisher's claim that narrative is more "comprehensible and accessible to the public and is therefore to be valued over rationality" (p. 176). Of particular interest is the perceived lack of rigor in the "good reasons" test of rationality. Fisher (1987) argues that people naturally tend to prefer what they perceive as true and just. Warnick (1987) counters that "good reasons" are audience and context specific and questions this positive view of human nature, she suggests that "good reasons" can lead to the acceptance of false or misleading information. She points out that the acquisition of narrative probability and fidelity whether through biology or culture does not necessarily prepare listeners to be competent judges of the stories heard. Citing the example of the Nazi propaganda used to convince the German people that their Jewish neighbors were part of an organized conspiracy to undermine the Aryan race, Warnick (1987) contends that narrative rationality can lead to the acceptance of false or misleading information. The counterargument offered by Fisher (1987) is

that effective discourse is not the same as good discourse. He recognizes that although evil can overwhelm innate tendencies, the example illustrates the need for the narrative paradigm to be used to promote human values (Griffin, 2009).

Learning Theory

This section defines learning, describes how learning theories work, and explains how we learn through a review of three cognitive orientations to learning: information processing theory, schema theory and situated cognition. The literature on prior knowledge, working memory and cognitive load theory is reviewed.

How adults learn is considered through an examination of the literature related to assumptions about adult learners, learning and experience, learning and development, and reflection. The role of narrative in human cognition is explained. Jack Mezirow's (1991, 2000) transformation theory and transformative learning in practice is discussed. This section concludes with a review of brain-based learning theory inclusive of recent findings from cognitive neuroscience.

Learning theories describe what happens during learning. What is learning? "First…learning is a persisting change in human performance or performance potential…Second, to be considered learning, a change in performance potential must come about as a result of the learner's interaction with the world" (Driscoll, 2005, p. 9). Learning is a process. It involves a "change in knowledge, beliefs, behaviors or attitudes" (Ambrose, et al., 2010, p. 3). This change in "a person's knowledge or behavior [is] due to experience" (Mayer, 1982 as cited in Richey, et al., 2011, p. 51). We learn through our interpretation and response to our experiences. What experiences are necessary and how these experiences bring about learning are what learning theories attempt to explain.

Learning theories are comprised of three components, the results, means and inputs. The results are behavioral, a change in performance. The means are the processes used to produce the results. The inputs are the process triggers, the experiences and sensory stimuli (Driscoll, 2005). This research study uses a cognitive orientation to describe learning. Cognitive learning theories are focused on the learner's mental processes (means) (Merriam, et al., 2007; Richey, et al., 2011). Cognitive orientations to learning assume that the human memory system actively organizes and processes information and that prior knowledge plays a role in learning (Gredler, 1997 as cited in Merriam, et al., 2007, p. 285). This interpretative approach to cognition is concerned with meaning making, how learners make sense of themselves and their environment (Bruner, 1990). Grounded in cognitive psychology, cognitive learning theories explain the "development of cognitive structures, processes, and representations that mediate between instruction and learning" (P. L. Smith & Ragan, 2005, p. 26). Cognitive theories hypothesize how cognitive processes operate within the learner to make meaning, remember and retrieve information. One frequently used explanation for how information is transformed or processed within the human brain is information processing theory.

Information Processing Theory

Information processing theory describes the transformations, the processing that occurs as information moves through structures within the brain (P. L. Smith & Ragan, 2005). The theory suggests the way the brain functions is analogous to the way a computer works. Information is received, analyzed, stored and retrieved. These processing actions use three kinds of memory to produce learning; sensory, short-term store or working, and long-term memory (Shiffrin & Atkinson, 1969). Memory is the "mental faculty of retaining and recalling past experiences" (Seel, 2008, p. 40). As a biological phenomenon, memory is continually changing

during recall and consolidation (Zull, 2011). Figure 11 shows how information moves through this multistage, multistore model of memory as it is processed.

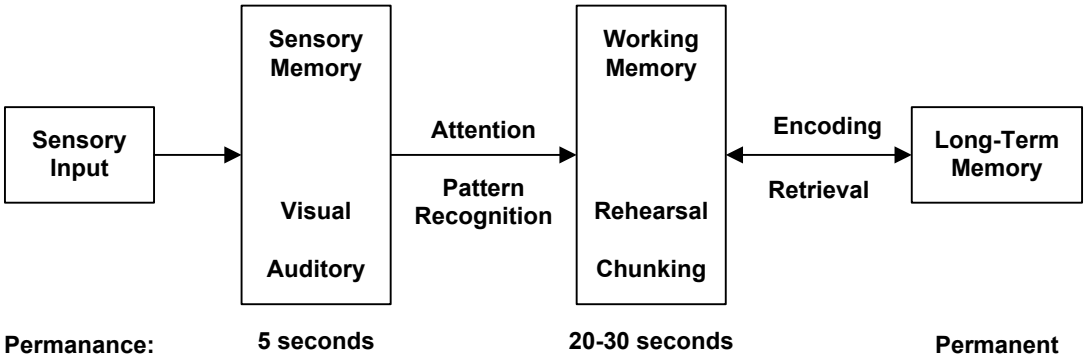


Figure 11. Flow of information as generally conceptualized in Information Processing Theory. Adapted from "Psychology of Learning for Instruction" by M. P. Driscoll, 2005, p. 75. Copyright 2005 by Pearson Education, Inc.

The process is initiated by an input received from the senses (sight, sound, etc.) that holds the attention of the receiver. This information is retained just long enough (about 5 seconds) to be recognized as something deemed relevant. Gestalt theory suggests that the receiver perceives the stimulus as a whole and actively imposes organization on this sensory data (Driscoll, 2005; Winn, 2004). This stimulus copy advances to the next store as an organized perception. The short-term store or working memory continues processing (working with) the information to make it ready for long-term storage. This processing in working memory is where learning occurs (Sweller, 2007).

Working memory holds information not only for a limited amount of time, about 20-30 seconds, but it also holds a limited amount of information (Driscoll, 2005). The number of individual items that can be held in working memory is equal to 7 ± 2 "chunks" of information at one time (G. A. Miller, 1956). These information "chunks" can be letters, numbers, pieces or

single syllable words. Chunks are determined by the receiver/learner based on what can be put together without the loss of meaning. When this capacity is exceeded, "our thinking and learning processes bog down" (R. C. Clark, Nguyen, & Sweller, 2006, p. 7).

Due to these two working memory constraints, duration and capacity, information (sensory input) must be assembled or "chunked" in a meaningful way based on what is already stored in long-term memory (Ericsson & Kintsch, 1995), and actively "worked with" through mental repetition or rehearsal or the information will disappear in seconds (R. C. Clark, et al., 2006). This meaningful semantic processing produces "superior performance on a subsequent recall or recognition task" (Bradshaw & Anderson, 1982, p. 165). Although rehearsal extends the duration and assists with encoding for long-term storage, it does not affect the capacity, the number of pieces or chunks of information to be stored (Gagne, 1985).

After rehearsal and chunking, the encoded information from working memory enters long-term memory. This permanent store contains the capacity to hold an unlimited amount of information (Driscoll, 2005). Successful entry into long-term memory requires that the information be both organized and meaningful so it can be "integrated with related prior knowledge" (P. L. Smith & Ragan, 2005). The greater the effort expended by the receiver/learner to assign meaning and connect the information to prior knowledge, the greater the likelihood that the information will be remembered (Craik & Lockhart, 1972; Craik & Tulving, 1975). Learning happens during this encoding process. Meaningful knowledge is connected to prior knowledge, associations are made and knowledge is sent to long-term memory for storage and recall (G. Cooper, 1998). Long-term memory consists of representations based on these associations (Driscoll, 2005).

In terms of learning, the transformation that occurs as information leaves the working memory and enters long-term memory is most important. During the working memory encoding process, information is assigned conceptual meaning by the learner (Gagne, 1985). Meanings are retrieved from long-term memory (prior knowledge) and applied to incoming information (Driscoll, 2005). Although Figure 11 depicts the processing or transformation of information in a linear fashion, information actually moves continuously from working memory to long-term memory and from long-term memory back to working memory. Working memory is more than a temporary store for incoming information; it actively searches long-term memory to retrieve previously stored information. "Working memory makes possible the combining of material to be learned with the contents of memory established by previous learning" (Gagne, 1985, p. 74). Working memory is considered to be the interface between memory (retaining and recalling) and cognition, the "mental action of acquiring knowledge and understanding through thought and experience and the senses" (Jewell & Abate, 2001).

Dual coding theory. Research on memory stores (Paivio, 1986, 2007) suggests that instead of one sensory, one working and one long-term memory as described by information processing theory, there are separate memory systems for verbal information related to language (auditory, speech) and visual information related to pictures and nonverbal (imagined) thoughts. Dual coding theory assumes that thinking uses the "cooperative activity of two functionally independent but interconnected systems" (Paivio, 2007, p. 33). The verbal system provides meaning to a word and the visual system provides an image of the word or a representation through the imaginal system. As this information is synchronously processed, it produces to memories that are available for recall (Paivio, 1991).

Episodic buffer theory. Recent research on the ability of working memory to both store and process information simultaneously has led to the conclusion that working memory is not a unitary structure (Baddeley, 1992a, 1992b, 2000, 2002). Working memory is composed of a central executive system that directs attention. This system monitors the information from a visual sketchpad that stores visual images and a phonological loop that rehearses and stores auditory information (Baddeley, 1992a, 1992b). A fourth component, the episodic buffer was added by Baddeley (2000, 2002) to address how information from the visual sketchpad and phonological loop is integrated with information in long-term memory for active processing. It is controlled by the central executive, which serves to bind the information into a coherent episode. This arrangement, as shown in Figure 12 suggests that working memory provides a system for processing information that enables the complex cognitive activities of understanding and learning (Baddeley, 1992b). Information from the episodic buffer enters long-term memory for further processing.

Episodic memory. There are two kinds of long-term memory stores, episodic memory and semantic memory. Episodic memory is a neuroscience (brain/mind) system that enables learners to remember past experiences (Tulving, 2002). Episodic memory originates from a single experience subjectively situated in space and time. Episodic memory is a "hypothetical memory" system that enables mental time travel from the past to the present by allowing the learner to re-experience "through autonoetic awareness" their own previous experience (Tulving, 2002, p. 5). Encoding into episodic memory depends upon the conscious elaboration of meaning (Gardiner, 2001) and the use of semantic memory or knowing to function (Tulving, 1993, 2002).

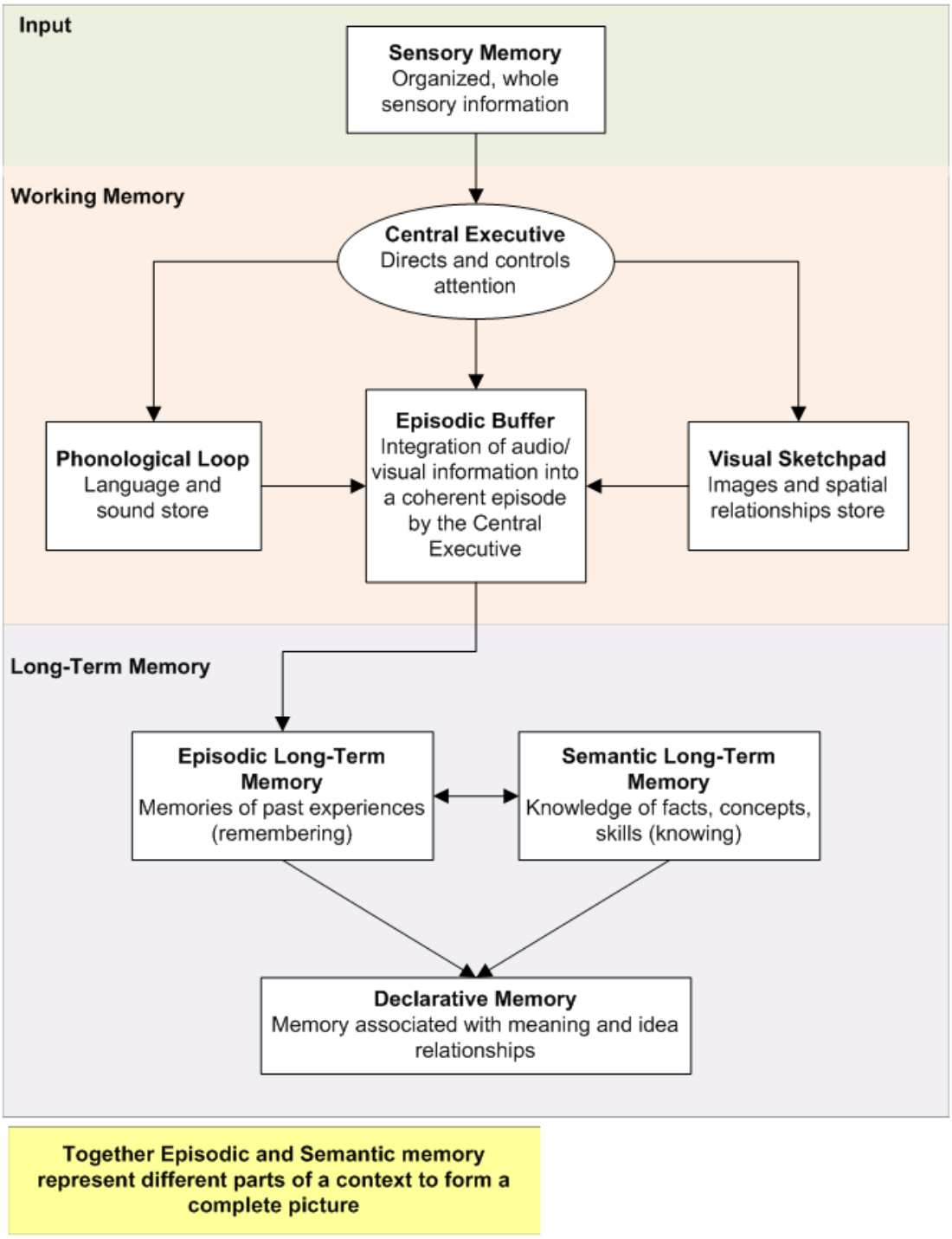


Figure 12. Model of working memory and its relationship to long-term memory for information storage and retrieval. Adapted from "The episodic buffer: A new component of working memory?" by Alan Baddeley, 2000, *Trends in Cognitive Sciences*, 4(11), p. 418. Copyright 2000 by Elsevier Science Ltd, and "What is Episodic Memory" by Endel Tulving, 1993, *Current Directions in Psychological Science*, 2(3), p. 67. Copyright 1993 by American Psychological Society.

Semantic memory is "long-term factual knowledge about language and the world it relates to, knowledge that we must have acquired through learning, but we cannot recall the time or the place it was acquired (Paivio, 2007, p. 28). It is an organized record of facts, concepts and skills. Episodic memory or experiential remembering is paired with semantic memory or knowing, memory associated with meaning and idea relationships, to produce a declarative or explicit memory.

Learning is the product of declarative memory. "Without learning there is nothing to remember, and without memory, there is no evidence of learning" (Baddeley, 1989; Long, 1983; Schaie & Geiwitz, 1982 as cited in K. L. Huber, 1993, p. 35). It is noteworthy that although memory, learning and retention seem to converge in long-term memory as shown in Figure 12, it is the processing, the encoding, where meaning is determined and connected to prior knowledge that occurs in working memory that influences whether or not the encoded information will successfully be retained and retrieved from long-term memory. The memory stages suggested by information processing theory are summarized in Table 5.

Implications of information processing theory for instruction. To design instruction based on the information processing theory of how learning occurs, Driscoll (2005) recommends:

- Providing organized instruction
- Arranging extensive and variable practice
- Enhancing learners' encoding and memory (p. 104)

Organized instruction imposes a meaningful structure on information. Drawing the learner's attention to specific content features and important information establishes pattern

recognition. Encoding and retrieval can be further enhanced by using images or "representing information in multiple ways" (Driscoll, 2005, p. 105).

Table 5

Memory Stages and their Properties

Property (Attribute)	Stage		
	Sensory Input	Working Store	Long-Term Store
Capacity	Large	Small	Large
Duration	5 seconds	20-30 seconds	Permanent
Source (point of origin)	Environment	Environment (sensory) and prior knowledge	Encodings from working store
Encoding	Stimulus copy	Dual code: verbal and visual	Episodic and semantic

Note. Adapted from *Psychology of Learning for Instruction* by Marcy P. Driscoll, 2005, p.76. Copyright 2005 by Pearson Education, Inc.

Practice, the application or use of knowledge in varied contexts helps learners assign multiple cues to what is being learned. Practice makes knowledge easier to recall in response to various performance contexts. Practice is an external condition that makes possible the internal processes of retention and transfer (Driscoll, 2005). In a meta-analysis of the mental practice literature, Driskell, Copper and Moran (1994) found evidence that "mental practice has a positive and significant effect on performance" (p. 481).

Learners' encoding and memory can also be enhanced by chunking, breaking down content into smaller pieces, elaborating content with examples, and connecting content with something meaningful to the learner. This elaboration during encoding is how retrieval cues are established and associations are strengthened. The successful application of each of these instructional strategies, organization, practice and learner encoding are dependent on the

learners' prior knowledge for activation (Driscoll, 2005). These instructional strategies serve to strengthen the likelihood of retention and transfer.

Schema Theory

Schema theory addresses how knowledge is represented in long-term memory (P. L. Smith & Ragan, 2005). A schema is an active, organized memory structure that contains the sum of our knowledge. These past reactions and experiences produce a plan or model for behavior (Bartlett, 1995). Schemas are the "*building blocks of cognition*" (Rumelhart, 1980, p. 33). Information processing depends upon these structures. They provide context for interpreting knowledge and are considered to be dynamic data processing structures that change in response to stimuli (Bobrow & Norman, 1975). These data structures represent generic concepts stored in memory (Rumelhart & Ortony, 1976). Schemas are abstract representations containing only the features necessary for rapid recognition and recall in storage. This simple, broad encoding places minimal demand on memory.

Bartlett's (1932) studies on the nature of remembering over time describe schema as the "organized mass results of past changes of position and posture [that are] actively *doing* something all the time" (1995, p. 201). These cognitive structures are built over time and are modified during our interactions. They influence how information is both encoded and recalled (Winn, 2004). Schemas are used to understand, store and retrieve knowledge (Mayer, 2003; Richey, et al., 2011; Rumelhart & Ortony, 1976). Incoming knowledge is organized; meaning is assigned through the working memory encoding process and then matched to long-term memory schemas to continue the meaning making process. Recall performance is enhanced when there is a relationship, a causal connection between schema elements (Bradshaw & Anderson, 1982). Schemas not only hold experiential representations, they provide a context for the interpretation

of new experiences (Cortazzi, 1993; Winn, 2004). Piaget suggested that as these 'schemes' are acquired (assimilation) and modified (accommodation) as development occurs (Ginsburg & Opper, 1969; Pulaski, 1980).

Schemata are acquired and modified through three different processes or modes of learning; accretion, tuning and restructuring (Rumelhart & Norman, 1976). Learning through accretion is the gradual acquisition of information through everyday interactions. It can be described as fact learning. Each day, knowledge is incrementally increased as facts are added to memory stores. Learning through tuning involves the modification of schemata to better align them with more advanced interpretations based on experience. Learning through restructuring occurs when "some critical mass of information has been accumulated" (p. 7). Restructuring requires the imposition of a new structure to interpret incoming information and to re-organize what is already in storage.

Schema accessibility is dependent upon the strength of the stored knowledge, the amount of overlap between the new knowledge and prior knowledge, and how frequently the schema was activated. "Each time a schema is activated for use, it becomes accessible for successive activations" (Thorndyke & Hayes-Roth, 1979, p. 87).

Story schemas. A story schema is a set of expectations about story content elements and their sequencing (Mandler & DeForest, 1979). Learners formulate these expectations by listening to many stories and recognizing the beginning, middle and end sequence. These expectations are also formed through life experience and includes knowledge about causal relationships and possible action sequences (Mandler & Johnson, 1977). As stated previously, there is a significant amount of empirical evidence to support the development of narrative competence at an early age (Applebee, 1978; Kemper, 1984; Nelson, 1993; Sugiyama, 2001; Sutton-Smith,

1986). There is also strong evidence in the literature to show that this competence is based upon the building of story schemas in memory that enable encoding and retrieval (Kemper, Rash, Kynette, & Norman, 1990; Kintsch, 1998; Kintsch & Van Dijk, 1978; Mandler, 1978, 1987; Mandler & DeForest, 1979; Rumelhart, 1975; Thorndyke, 1977).

Story schemas help learners organize story elements and develop propositions about the relationship of those elements (Kintsch & Greene, 1978). Story schema is a framework within which comprehension processes operate (Cortazzi, 1993). This framework enables the learner to decide what details are important, determine where more information is needed and to select what should be remembered. Story schema is a "theory about what should occur in a story" (Woolfolk, 1995, p. 253). It enables the learner to fill in details so the story makes sense based on the learners' previous experience. Recall through a schema is automatic (Brown, 1975 as cited in Mandler & DeForest, 1979). More structured stories are easier to recall than less structured stories (Mandler, 1984; Rumelhart, 1975). The story schemata present in young children (Mandler & Johnson, 1977; Poulsen, Kintsch, Kintsch, & Premack, 1979; Stein & Glenn, 1979) serve as the foundation for the production of more structurally complex narratives as we age (Kemper, et al., 1990). Thorndyke and Hayes-Roth (1979) found that with only one prior learning trial using a story schema produced a positive transfer of the schema to the new context.

Mental models. A mental model is a schema that represents not only content knowledge, but also contains an interpretation of how something works that guides performance and problem-solving (Driscoll, 2005; Johnson-Laird, 1986). Broader than a schema, mental models are what learners bring to tasks based on their experience. These models are "imprecise, partial and idiosyncratic understandings that evolve with experience" (Driscoll, 2005, p. 130).

Although they are incomplete and unstable, details are forgotten unless they are accessed regularly, and they are unscientific; they contain behavior patterns that seem to work for the user, even if they do not make logical sense, mental models guide behavior (Norman, 1983).

Learners use mental models to understand stories (Bower & Morrow, 1990; Bransford, Barclay & Franks, 1972; Rumelhart, 1977a; Schank & Abelson, 1977; van den Broek, 1990 as cited in Golden & Rumelhart, 1993, pp. 203-204). Understanding a story involves the development of a representation of the story that is consistent with the listener and the teller's knowledge of the world (Golden & Rumelhart, 1993). Characters and their actions and intentions are interpreted based on referents in the real world. These representations include a map of the physical settings where character actions occur and provide an enabling context for character actions. The principles that learners use to explain and understand narrative character actions are the same principles learners use in the real world to understand people's actions. Once the mental model is built, the representation is encoded. Upon recall, the model is re-built (Golden & Rumelhart, 1993). In a review of research conducted to determine if comprehension is affected by the development of mental models by story readers, Bower and Morrow (1990) found that the activation of mental models facilitates comprehension.

Situated Cognition

Based on the premise that knowledge and learning must be understood as integrated with the context in which they occur, the theory of situated cognition "claims that every human thought is adapted to the environment, that is, *situated*, because what people *perceive*, and how they *conceive of their activity*, and what they *physically do* develop together" (Clancey, 1997, pp. 1-2). Rooted in Vygotsky's contention that individual development can only be understood in the "social and cultural context within which such development is embedded" (Driscoll, 2005, p.

247), and the constructivist notion that "people understand contextually" (K. Taylor, et al., 2000, p. 19), situated cognition is focused on the "sociocultural setting and the activities of people within that setting" (Driscoll, 2005, p. 158). In this way, "cognitive activity is socially defined, interpreted and supported" (Rogoff, 1984, p. 4). In situated learning "experience becomes activity…adults no longer learn from experience, they learn in it, as they act in situations and are acted upon in situations" (Wilson, 1993).

Unlike information processing and schema theories that consider learning to be an individual, internal process where knowledge resides in the learner, situated cognition considers knowledge to be similar to language, its "constituent parts index the world and so are inextricably a product of the activity and situations in which they are produced" (p. 33). Concepts evolve each time they are used because each use introduces new situations and activities that provide more depth. In this way, concepts, like words, are always under construction; part of their meaning is determined by their contextual use. Conceptual knowledge is developed through activity. J. S. Brown, Collins and Duguid (1989) consider conceptual knowledge to be analogous to a set of tools. Like tools, concepts are understood through use and their use changes the learners' view of the world and their cultural beliefs. The active use of this set of tools (conceptual knowledge) integrates declarative knowledge "knowing what" with procedural knowledge "knowing how" (Driscoll, 2005). Learning occurs through the interaction of concept and activity in the culture. During these interactions, learners form indexical representations. These representations are developed as learners perform tasks, and engage in conversations and narratives to exchange ideas. Task efficiency is increased as learners develop their conceptual understanding through these social collaborations (J. S. Brown, et al., 1989).

Situated cognition addresses the disconnect that occurs when learning from formal educational settings is unable to be transferred to new contexts (Carraher, Carraher, & Schliemann, 1985; Lave, 1979; Perkins, 1985 as cited in Choi & Hannafin, 1995). This disconnect between "knowing what" (learning) and "knowing how" (practice) is likely a product of an education system that assumes conceptual knowledge can be detached from both where it is learned and where it will be used (J. S. Brown, et al., 1989). Assuming that learner capacity and processes for meaning making can be "attributed to their internal functioning without concern for the context of their activity is unrealistic" (Rogoff, 1984, p. 2). This position is supported by Wilson (1993) who argues that knowledge and learning should be understood as "inextricably integrated with the setting in which they occur" (p. 73).

Situated cognition recognizes that it is impossible to separate thinking from the context in which it occurs. Knowledge is a product of the relationship between the learner and the environment and learning is a product of the learner's engagement in these contexts (Choi & Hannafin, 1995). Evidential support for this position is provided by numerous studies that show learning separated from its contextual use is less effective than learning in context. For example, G. A. Miller and Gildea's (1987) work on vocabulary teaching noted that by learning vocabulary in context through listening, talking and reading, the average 17 year old has learned 5,000 new vocabulary words (13 per day). This approach was contrasted with learning words from definitions and abstract sentences out of context that produced a vocabulary acquisition rate of 100 to 200 words per year (limited by what can be taught in the classroom). Additionally, what is learned is nearly useless in practice.

Lave and Wenger (1998) summarize the basic premises of situated cognition as:

1. We are social beings. Far from being trivially true, this fact is a central aspect of learning.

2. Knowledge is a matter of competence with respect to valued enterprises, such as singing in tune, discovering scientific facts, fixing machine, writing poetry, being convivial, growing up as a boy or a girl, and so forth.

3. Knowing is matter of participating in the pursuit of such enterprises, that is, of active engagement in the world.

4. Meaning-our ability to experience the world and our engagement with it as meaningful-is ultimately what learning is to produce (p. 4).

Situated cognition is considered by its proponents to be a work in progress (Kirshner & Whitson, 1997).

Prior Knowledge

According to Ausubel (1968) "the most important single factor in influencing learning is what the learner already knows" (p. vi). During learning, incoming information inclusive of sensory perceptions is interpreted based on the learners existing knowledge, beliefs and assumptions (Dewey, 1910, 1933; National Research Council, 2000; Vygotsky, 1979). This prior knowledge enables learners to make "cognitive connections between what they already know and what they are being asked to learn" (Driscoll, 2005, p. 77). Prior knowledge is defined as

> the whole of a person's actual knowledge that: (a) is available before a certain learning task, (b) is structured in schemata, (c) is declarative and procedural, (d) is partly explicit and partly tacit, (e) and is dynamic in nature and stored in the knowledge base (Dochy, Segers, & Buehl, 1999, p. 146).

The positive effects of prior knowledge on memory and comprehension have been shown in numerous studies (Bransford & Johnson, 1972; Britton & Graesser, 1996; Dooling & Lachman, 1971; Frase, 1975; Kintsch et al., 1993; McNamara, Kintsch, Songer, & Kintsch, 1996; Voss, Vesonder, & Spilich, 1980 as cited in Schwartz & Bransford, 1998). Some researchers contend that prior knowledge is a prerequisite to learning (Bransford & Johnson, 1972; Resnick, 1983). In an extensive review of the research on prior knowledge and its role in student performance, Dochy, Segers and Buehl (1999) found a strong relationship between prior knowledge and performance. Activating prior knowledge in situations where large amounts of knowledge need to be learned enables the integration of new knowledge (Kole & Healy, 2007). When prior knowledge is well-known, learner verification of new facts is faster (J. R. Anderson, 1981).

Tobias (1994) suggests there is a linear relationship between prior knowledge and interest. Interest originates from the learners interaction with the environment. Working with interesting information engages deep cognitive processing, arouses personal, emotional associations, and stimulates more mental imagery increasing the likelihood of recall. Interest assigns value to knowledge and facilitates learning (Krapp, Hidi, & Renninger, 1992). When new, potentially meaningful information is mapped to prior knowledge in an organized and significant way, meaningful learning occurs (Driscoll, 2005). Meaningful learning is a judgment made by the learner based on experience in the context of the learners cognitive architecture (Moon, 2004). It occurs through reflection.

Prior knowledge is accumulated over time. The greater the learners experience, the more likely it is that existing knowledge organization structures (schemas) are sufficiently developed to enable rapid meaning determination and assimilation. The amount of prior knowledge and

experience a learner possesses is the difference between an expert (extensive knowledge and experience) and a novice (little knowledge and experience) (Merriam, et al., 2007). Experts are better at solving problems because they have developed more elaborate schemas based on many experiences (Ambrose, et al., 2010). Novices do not yet possess such schemas (Sweller, 1988).

Prior knowledge enables higher-order thinking. During problem solving, Jonassen (1997) posits that learners decompose problems and map them onto existing (prior) knowledge. This representation activates a schema for solving a particular problem. As the problem is considered, an analogous relationship is created between the previous and the current problem. In a study on analogical problem solving, Gick and Holyoak (1980) studied whether students who read a story about a military problem and its solution could produce analogous solutions to a medical problem. Students had to transfer the military solution to the medical problem. Transfer occurred when students were prompted to use the story to solve the problem. However, when the story prompt was withheld, the frequency of analogous solutions decreased. This study demonstrated that problem solutions can be "developed by using an analogous problem from a very different domain" (p. 346). It also confirmed that learners can produce analogous solutions even when mapping between the story and the problem is incomplete. The need for the story prompt suggests that instructors should take an active role in activating learner prior knowledge (Bransford & Johnson, 1972; Dooling & Lachman, 1971).

Nature of prior knowledge. The nature of prior knowledge and experience is important during learning. Prior knowledge can be declarative, knowledge of facts and concepts, "knowing what" or procedural, "knowing how" to apply processes or theories. These two kinds of knowledge are different and will lead to different learning outcomes. An assessment of the

nature of learner prior knowledge in terms of "knowing what" or "knowing how" should be made so instruction can be appropriately designed (Ambrose, et al., 2010).

Prior knowledge can impede leaning if it is inappropriate for the learning context. For example, learners may use everyday meanings to interpret technical information. Although the prior knowledge is correct, its application in the new context may lead to distorted understanding. Learning will also be impeded if learners make analogies from one situation to another without recognizing the limits of a single analogy when using it to describe a complex concept. Similarly, prior knowledge may be applied incorrectly across disciplines, cultures or contexts that can lead to inaccurate assumptions. When learners are "explicitly taught the conditions and contexts" to apply knowledge it reduces the inappropriate application of prior knowledge (Ambrose, et al., 2010, p. 22). Prior knowledge may also be wrong. Inaccurate prior knowledge (flawed ideas, beliefs, assumptions, models or theories) "can distort new knowledge by predisposing students to ignore, discount, or resist evidence that conflicts with what they believe to be true" (Dunbar, Fugelsang & Stein, 2007; Chinn & Malhotra, 2002; Brewer & Lambert, 2000; Fisk & Taylor, 1991; Alvermann, Smith, & Readance, 1995 as cited in Ambrose, et al., 2010, pp. 23-24). These misconceptions occur as learners attempt to reconcile inconsistencies to make incoming knowledge fit into inaccurate or incomplete prior knowledge schemas. Over time, the errors are compounded as more support is accrued through experience (Dewey, 1910). For example, college students develop beliefs about "physical and biological phenomena that fit their experiences but do not fit scientific accounts of these phenomena" (National Research Council, 2000, p. 10). These misconceptions can be addressed through instruction where they can be "explicitly confronted with contradictory explanations and

evidence" (Broughton, Sinatra & Reynolds, 2007; Guzetti, Snyder, Glass & Gamas, 1993; Chi, 2008 as cited in Ambrose, et al., 2010, p. 24).

Given the significance of prior knowledge on learning and recognizing that learners may use prior knowledge from everyday contexts, incomplete analogies or other disciplines, cultures or contexts that can affect their interpretations of new knowledge and impose new learning, it is important for instruction to

> (a) clearly explain the conditions and contexts of applicability, (b) teach abstract principles but also provide multiple examples and contexts, (c) point out differences, as well as similarities, when employing analogies, and deliberately activate relevant prior knowledge to strengthen associations (Ambrose, et al., 2010, p. 23).

Working Memory and Cognitive Load Theory

During learning, working memory may become overloaded if there is not an "appropriate or automated schema" (Driscoll, 2005) from which to retrieve relevant prior knowledge. Cognitive load refers to the strain occurs when the working memory capacity of 7 ± 2 items at one time as suggested by Miller (1956) is exceeded. Surpassing this guideline slows down thinking and leaning because without appropriate retrieval cues each incoming stimulus element is attended to individually. Research conducted over the past twenty-five years by instructional scientists has "expanded and refined the rule of 7 ± 2 into a comprehensive set of instructional principles called *cognitive load theory*" (R. C. Clark, et al., 2006, p. 7).

Cognitive load theory addresses the learning of complex tasks where information elements and their interactions need to be processed at the same time to produce meaning. The theory considers both the structure of the information and the cognitive architecture that enables learners to process that information. Cognitive architecture is defined as the "manner in which

the structures and functions required for human cognitive processes are organized" (Sweller, 2007, p. 370). These structures are used to direct action. Learning occurs when this information structure is in alignment with the learners' cognitive architecture (Paas, Renkl, & Sweller, 2003).

Cognitive load theory uses the cognitive architecture suggested by both Information Processing and Schema theories to focus on how information is encoded into long-term memory. If working memory is unable to attend to incoming information to be learned, then learning will be ineffective. Cognitive load refers to the "total amount of mental activity imposed on the working memory in an instance in time" (G. Cooper, 1998, p. 11). Recent research on Miller's (1956) 7 ± 2 working memory capacity suggests that the actual capacity is more likely three or four pieces or "chunks" (Clark, 2010; Cowan, 1998; Luck & Vogel, 1998 as cited in Farrington, 2011, p. 114). Material can be difficult to learn when this capacity is exceeded and when there is a high level of element interactivity. Problem solving, a primary factor in learning, imposes a heavy cognitive load on working memory due to the amount and complexity of information to be processed. Such a load exhausts cognitive resources.

Research on this mental effort, the cognitive load required to integrate new knowledge and skills into long-term memory, has identified three kinds of cognitive load; intrinsic, extraneous and germane (R. C. Clark, et al., 2006). Intrinsic load is the "mental work imposed by the complexity of the content" (p. 9). Extraneous load "imposes mental work that is irrelevant to the learning goal" (p. 12). Germane load is the "relevant load imposed by instructional methods that lead to a better learning outcome" (p. 11). The productive working memory mental effort produced by germane load enables the development of "schema construction and automation in long-term memory" (Paas, Renkl, & Sweller, 2004, p. 2). Schema construction and automation are major learning mechanisms, they use the information stored in long-term memory to reduce

the burden on working memory (Sweller & Chandler, 1994; Sweller, Van Merrienboer, & Paas, 1998).

Cognitive load research addresses how best to eliminate extraneous load and optimize the element interactivity associated with the intrinsic load imposed by the subject matter to produce germane load. Germane cognitive load is characterized as having a high degree of element interactivity. Element interactivity enables both schema construction and automation. When learners develop schemas containing high element interactivity they "feel they have understood the material. When the schemas become automated, it is understood very well" (Sweller, 1994, p. 311). Learning through schema acquisition reduces cognitive load because the number of interacting elements in working memory is reduced (Sweller & Chandler, 1994).

How learning works. Learning occurs through the psychological processes of attention, activation of prior knowledge, elaboration-rehearsal, and encoding and retrieval (R. C. Clark, et al., 2006). These working memory processes enable the entry of new information to be integrated into pre-existing long-term memory schemas.

The goal of instruction, the "intentional arrangement of experiences, leading to learners acquiring particular capabilities" (P. L. Smith & Ragan, 2005, p. 5), is to "free working memory from irrelevant mental effort and harness it for the work required to integrate new knowledge and skills into the schemas in long-term memory" (R. C. Clark, et al., 2006, p. 34). The productive mental effort used to build effective schemas is germane cognitive load. To support this productive mental effort, cognitive load theorists developed the following four research based guidelines for promoting germane cognitive load:

- Use diverse worked examples to foster transfer of learning
- Help learners exploit examples through self-explanations

- Help learners automate new knowledge and skills
- Promote mental rehearsal of complex content after mental models are formed (R. C. Clark, et al., 2006, p. 217).

The first two guidelines enable learners to build schemas; the second two guidelines enable the automation of those schemas (R. C. Clark, et al., 2006). Once schemas are in place, they can be accessed and brought into working memory as a single entity. This reduces the load on working memory and enables the use of mental rehearsal or practice to learn new content. Mental rehearsal has been defined as the "introspective or covert rehearsal that takes place within an individual who thinks through the performance of an activity" (G. Cooper, Tindall-Ford, Chandler, & Sweller, 2001, p. 218). During mental rehearsal, the learner imagines the procedure or concept. By imagining content and its relationships, schemas are automated and transfer from working memory to long-term memory is more likely to occur (Leahy & Sweller, 2008).

Imagination effect. A number of studies have shown that engaging learners in mental rehearsal of a worked example is more effective than asking learners to study a worked example (G. Cooper, et al., 2001; Ginns, Chandler, & Sweller, 2003; Leahy & Sweller, 2004, 2008; Tindall-Ford & Sweller, 2006). This learning by imagining produces more learning than studying when the learner has a basic schema in place. According to cognitive load theory, learners produce this "imagination effect" when they imagine information and process it using working memory schemas. This processing facilitates schema automation and leads to the development of expertise (Leahy & Sweller, 2005). As demonstrated in the aforementioned studies, the inclusion of an imagination strategy can enable learning if the learners possess prior knowledge in the content area and the content contains high element interactivity (Leahy & Sweller, 2005). By

imagining procedures or relationships, learners advance their performance (develop expertise), automate schemas, and free up working memory (G. Cooper, et al., 2001).

In experiments conducted to test the effect of imagining behavioral scripts and the subsequent effect on personal intentions, Anderson (1983) found that: (a) imagining oneself performing or not performing a behavior, produces corresponding changes in intention toward the behavior, (b) the more frequently one imagines oneself in a behavioral script, the more intention change is produced (p. 293). This effect was replicated by a second experiment and the intention effects lasted over a three-day period. This process of mental imagining is contingent upon learner prior knowledge. Inexperienced learners do not yet possess the schemas needed to produce mental representations. This finding suggests that instruction should be tailored to the level of experience possessed by the learners (Kalyuga, Ayres, Chandler, & Sweller, 2003).

Self-explanation effect. The strategy of imagining an activity or procedure may be related to the self-explanation effect (Bielaczyc, Pirolli, & Brown, 1995; Chi, et al., 1989; Renkl, 2002; Renkl, Stark, Gruber, & Mandl, 1998; VanLehn, Jones, & Chi, 1992). This effect occurs when learners explain examples to themselves. During self-explanation, learners make inferences, assess their understanding, use analogies, and update their mental models (Atkinson, Renkl, & Merrill, 2003; VanLehn, et al., 1992). During this explanatory process learners must keep in mind (imagine) an activity or procedure to develop an account of the relationships and processes involved (Leahy & Sweller, 2004). Self-explanations contribute to learning and problem-solving performance (Bielaczyc, et al., 1995; Chi, De Leeuw, Chiu, & LaVancher, 1994). "Students who explain examples to themselves learn better, make more accurate self-assessments of their understanding, and use more analogies more economically while solving problems" (VanLehn, et al., 1992, p. 1).

How Adults Learn

Recognizing the nature of learning is relevant to an understanding of how best to arrange conditions to optimize adult learning. Learning is a complex process that involves both the mind and the emotions. Smith (1982) noted the following accepted observations about learning:

1. Learning goes on throughout life
2. Learning is a personal and natural process
3. Learning involves change
4. Learning is bound up with human development
5. Learning pertains to experience and experiencing
6. Learning has an intuitive side (pp. 35-36)

Learning is used to acquire mastery, extend and clarify experiential meaning and to test ideas related to solving a problem (Kidd, 1973). Adult learning can be described as a "dialectical process in that it involves interactive, constructive and transformative dimensions" (Basseches, 1984; Kegan, 1982; Riegel, 1973 as cited in MacKeracher, 2004, p. 8). Brookfield (1986) characterizes adult learning as collaborative, experiential, reflective, transactional and practice oriented. Although there is an abundance of literature addressing the question of how adults learn, "we have no single answer, no one theory explains all that we know about adult learners, the various contexts where learning takes place, and the process of learning itself" (Merriam, 2001). There are, however, several frameworks or models that contribute to our understanding of how adults learn. This section describes three explanations for how adults learn; Malcolm Knowles' (2005) Andragogy, Knud Illeris' (2004a) dimensions of learning and Peter Jarvis' (2006) model of the learning process.

Andragogy. Andragogy is one of the best-known explanations for adult learning. Malcolm Knowles used the term "andragogy" to describe the "art and science of helping adults learn" in sharp contrast to pedagogy, the "art and science of helping children learn" (Merriam, et al., 2007, p. 84). In the years since its introduction, andragogy has sparked both research and controversy. "It has been alternately described as a set of guidelines (Merriam, 1993), a philosophy (Pratt, 1993), a set of assumptions (Brookfield, 1986) and a theory (Knowles, 1989)" (Knowles, et al., 2005, p. 1). Andragogy is based on the following assumptions about the adult learner:

1. The learner is self-directing.
2. The learner enters an educational situation with a great deal of experience.
3. Adults are ready to learn when they perceive a need to know or do something in order to perform more effectively in some aspect of their lives.
4. Adults are motivated to learn after they experience a need in their life situation.
5. Adults are motivated to learn because of internal factors such as self-esteem, recognition, better quality of life, greater self-confidence, the opportunity to self-actualize (Knowles, et al., 2005, pp. 294-295).

These assumptions inform a set of adult learning principles that are used to design adult learning programs. The principles of andragogy are "(1) the learner's need to know, (2) self-concept of the learner, (3) prior experience of the learner, (4) readiness to learn, (5) orientation to learning, and (6) motivation to learn" (Knowles, et al., 2005, p. 3). In the nearly 40 years since its introduction, Knowles came to agree that andragogy is less of a theory of learning than a "model of assumptions about learning" (Knowles, 1989 as cited in Merriam, 2001, p. 5). One of the major criticisms of andragogy is that its assumptions can be applied to all learners, not just

adult learners. One of the strengths of andragogy is that it is learner centric (Houle, 1996). It provides a "helpful rubric for better understanding adult learners" (Merriam, et al., 2007, p. 92).

Three dimensions of learning model. The three dimensions of learning model proposed by Knud Illeris (2004a) assumes that all learning includes two processes: (1) an external interaction process between the learner and their "social, cultural and material environment" and (2) an internal psychological process of "elaboration and acquisition in which new impulses are connected with the results of prior learning" (Illeris, 2004b, p. 83). Based on these process assumptions, Illeris proposes that there are three dimensions involved in learning, cognitive, emotional and social as shown in Figure 13. These dimensions are graphically plotted on an inverted triangle. Cognition and emotion are at the top of the triangle and the environment is at the apex. All three dimensions all occur in society, which is represented by a circle. Learning requires the interaction of all three dimensions.

The cognitive dimension is concerned with knowledge and skill learning. This learning is managed by the central nervous system. The emotional dimension consists of feelings, emotions, attitudes and motivation. This learning involves psychological energy (Illeris, 2004a). Both the cognitive and emotional dimensions are internal processes that interact with each other during knowledge and skill acquisition. The third dimension, society is engaged as the learner interacts with their environment. This dimension is external. It works on two levels. The first level is the learner's interactions with others. The second level recognizes the contribution of others to the learner's learning (Merriam, et al., 2007). This buildup of sociality takes place through the cognitive and emotional dimensions. Transformative learning occurs through the simultaneous restructuring of the cognitive, emotional and social dimensions during a learning event (Illeris, 2004b).

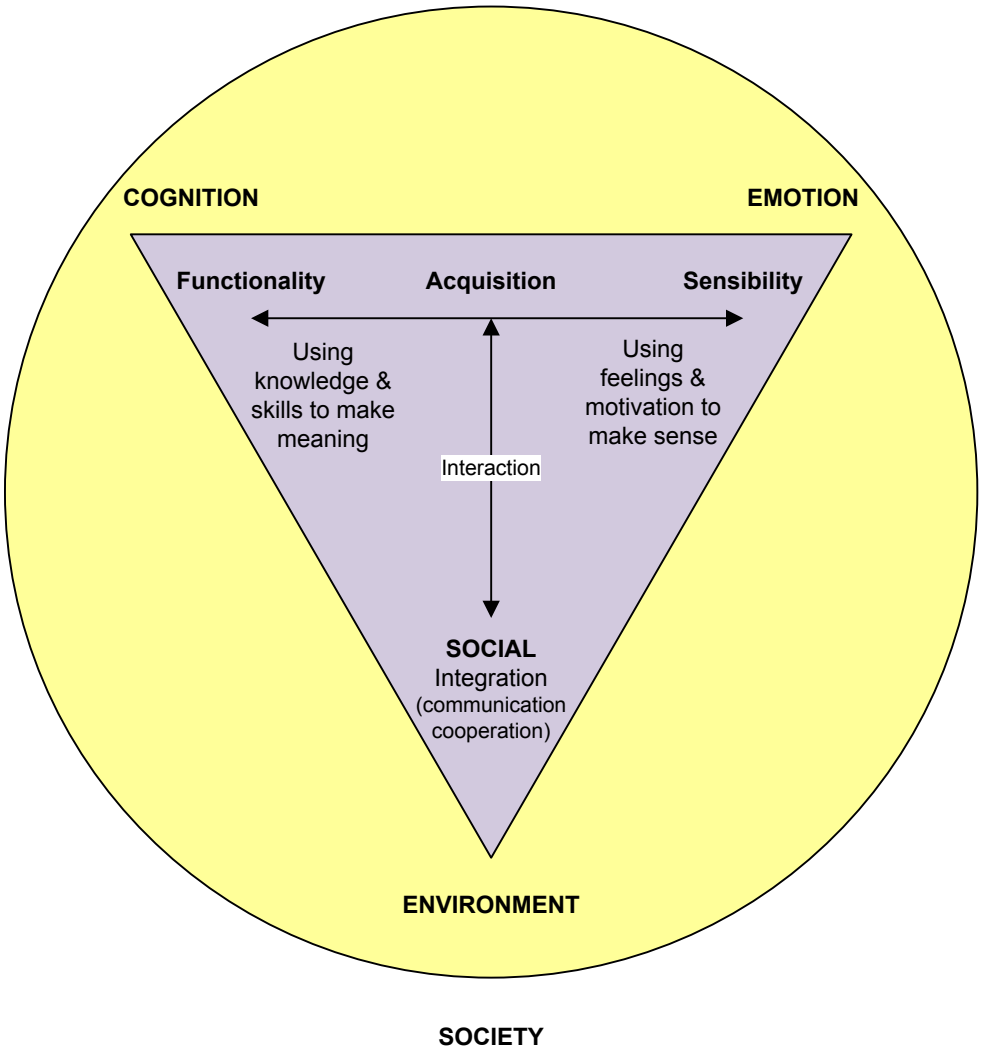


Figure 13. Learning processes and dimensions as suggested by Knud Illeris. Adapted from "Transformative Learning in the Perspective of a Comprehensive Learning Theory" by Knud Illeris, 2004, Journal of Transformative Education, 2(2), p. 82. Copyright 2004 by Sage Publications, Inc.

In this model, learning begins with the introduction of one of five stimuli or "raw material" that marks the start of the interaction. An interaction is described as consisting of perception, transmission, experience, imitation and activity/participation. These five categories are combined in a pattern specific to the situation to form a learning event (Illeris, 2004a). This

model is both simple and comprehensive (Merriam, et al., 2007). The inclusion of the emotional and social elements distinguishes this model from other learning frameworks that emphasize the cognitive aspect of learning. The model provides a balanced approach to understanding how learning works.

Jarvis' learning process. The model of the learning process put forth by Peter Jarvis (2006, 2010) is based on the idea that learning begins with experience. The learning process is initiated by sensory input. Jarvis considers biology to be significant during learning because of the way that human senses work to transform sensory input into "knowledge, skills, attitudes, values, emotions and so on" (2006, p. 14). In this model of learning, the world is the learner's world, which changes in response to the larger world and the learner's involvement in it. Jarvis (2006) considers the learner holistically. The mind and the body enter a learning situation with a history (prior knowledge) that interacts with the present experience to produce knowledge.

As depicted in the model, Figure 14, the learning process begins with an experience in a social context that the learner is unable to automatically accommodate or assimilate. This creates a condition of discomfort, a cognitive dissonance (Festinger, 1957) that may or may not stimulate learning. If the learner chooses to ignore their discomfort, learning does not occur. The two-way arrow between boxes 1 and 2 represents this discomfort. If the learner chooses to address their discomfort, then any of the three ways of learning, thought, reflection, emotion and action are used in different combinations (indicated by the arrows between the boxes) to produce different types of learning; "critical thinking, problem-solving learning, reflective learning, action learning and so on" (Merriam, et al., 2007, p. 102). Jarvis (2006) speculates that the interplay between thought and emotion leads to action. Emotions affect our thinking, our motivation and our beliefs, attitudes and values. The result of learning (box 6) is a change in the

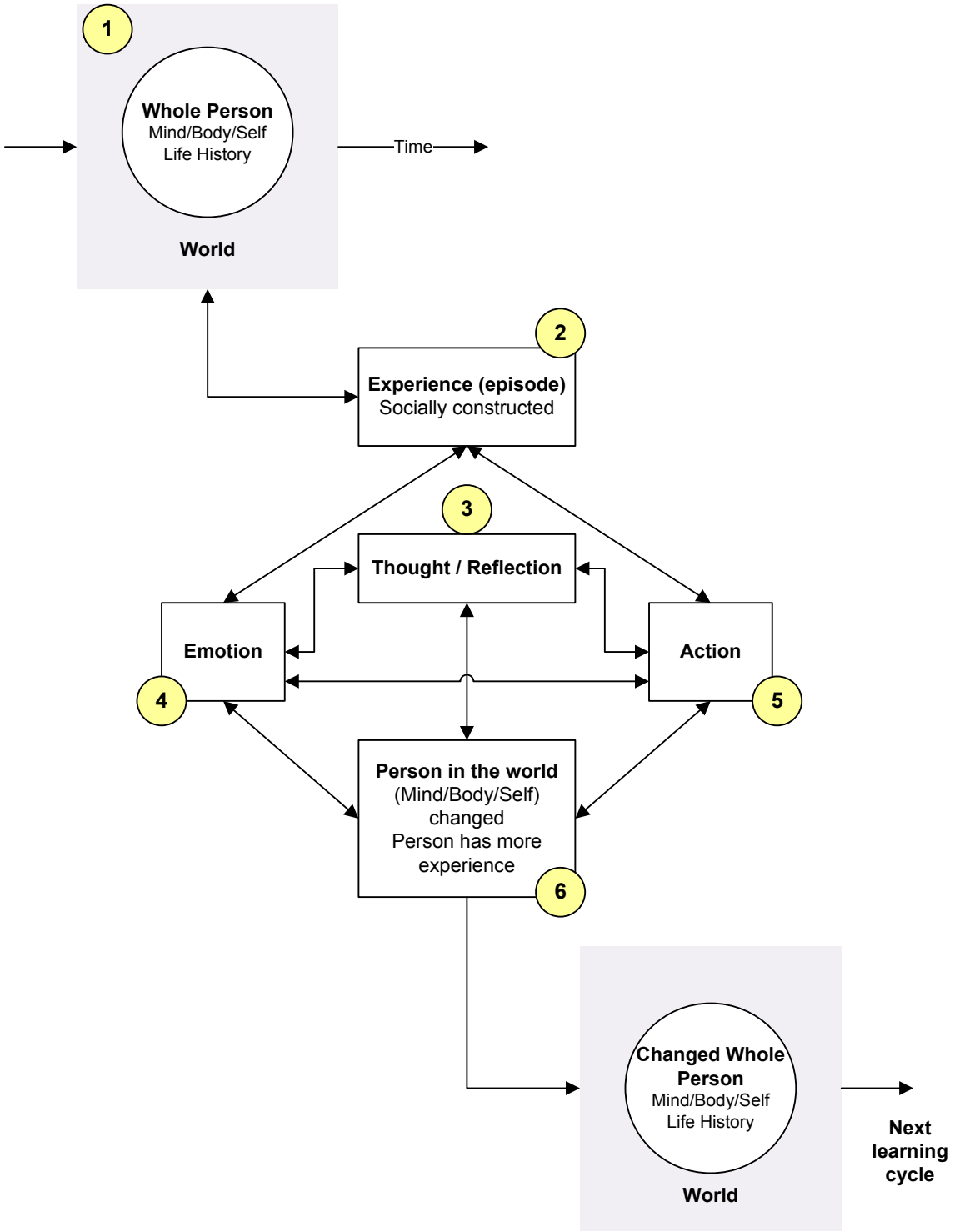


Figure 14. Transformation of a person through experience according to Peter Jarvis. Adapted from "Towards a Comprehensive Theory of Human Learning" by Peter Jarvis, 2006, p. 23. Copyright 2006 by Routledge.

learner. The newly changed learner enters the next learning cycle with a revised life history. The model shows continuous learning with the duplication of the first box on the lower right immediately following box 6. This model can be summarized by Jarvis's (2006) definition of human learning:

> I now regard human learning as the combination or processes whereby the whole person – body (genetic, physical and biological) and mind (knowledge, skills, attitudes, values, emotions, beliefs and senses) – experiences a social situation the perceived content of which is then transformed cognitively, emotionally or practically (or through any combination) and integrated into the person's individual biography resulting in a changed (or more experienced) person (p. 13).

Learning and Experience

"People learn from experience" (Merriam, et al., 2007, p. 163). This view is well supported in the literature (Baker, Jensen, & Kolb, 2002; Boud, et al., 1985; Bruner, 1966; Caffarella & Barnett, 1994; Chickering, 1977; Dewey, 1938; Illeris, 2004a; P. Jarvis, 2006, 2010; P. Jarvis, Holford, & Griffin, 2003; Knowles, et al., 2005; Kolb, 1984; Mezirow, 1991, 1997, 2000; Moon, 2004; Schon, 1983; Vygotsky, 1979). Jean Piaget's theory of learning and cognitive development is based on experience (Ginsburg & Opper, 1969). Learning occurs and development is advanced during the processes of assimilation and accommodation. New experiences are either assimilated into what is already known; into an existing concept, schema or pattern of behavior; or those concepts, schemas or behavior patterns are accommodated (modified) to account for the new experience. Piaget suggested that intelligence is shaped by experience. Intelligence is not an innate characteristic, but rather the product of interaction between the learner and their environment (Kolb, 1984).

In *Experience and Education* (1938), John Dewey discussed the connection between life experiences and learning. He noted "the belief that all genuine education comes about through experience does not mean that all experiences are genuinely or equally educative" (p. 13). Some experiences are "miseducative." Miseducative experiences inhibit learner growth during future experiences. For instance, experiences may "produce a lack of sensitivity and responsiveness…[put learners] in a groove or rut…[or] promote a careless attitude" (pp. 13-14). Regardless of whether learning occurs formally through education and instruction or informally by making sense of life experiences, learning occurs when experience is attended to by the learner in some way (Merriam & Clark, 2006).

Determining whether experiences actually produce learning is difficult because "every experience is a moving force. It's value can be judged only on the ground of what it moves toward and into" (Dewey, 1938, p. 31). Dewey suggested that the "greater maturity" possessed by adults enables the evaluation of experience. He contended that experiences that produce learning meet the criterion of continuity and interaction. Continuity means that each new experience takes something from a prior experience and changes it in some way that will affect future experiences. Interaction suggests that experiences are what they are because of the transaction that occurs between the learner and the environment. The environment can be described as "whatever conditions interact with personal needs, desires, purposes, and capacities to create the experience" (p. 42). The principles of continuity and interaction work together, what the learner learns in one situation provides the understanding needed to address future situations.

Experiential learning. Drawing from the work of Jean Piaget, John Dewey, and Kurt Lewin, David Kolb (1984) suggests that learning is a continuous, holistic process "whereby knowledge is created through the transformation of experience" (p. 38). This transformation

occurs through the interaction between content and experience. Kolb describes the experiential learning process as a cycle containing four steps, as shown in Figure 15. The cycle is initiated (first step) when a concrete experience arouses the attention of the learner. The experience is observed and reflected upon in the second step. Next, abstract concepts are developed and generalizations are formulated (third step). Concepts are tested in the fourth step through experimentation. Transformation occurs in the second step as the experience is reflected upon and in the fourth step during experimentation where ideas are tested. "Knowledge results from the combination of grasping experience [steps 1 and 3] and transforming it [steps 2 and 4]" (p. 41).

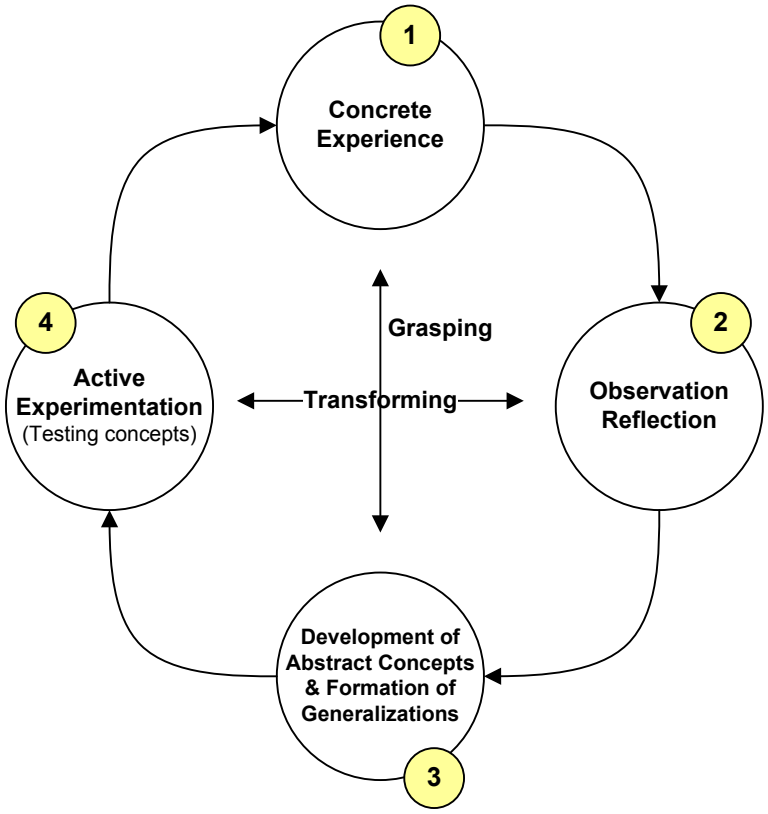


Figure 15. David Kolb's Experiential Learning Model. Adapted from "Experiential Learning" by David Kolb, 1984, p. 42. Copyright 1984 by Prentice-Hall.

In addition to Kolb's model of experiential learning, the literature is replete with many definitions of and views of how experiential learning works. Boud, Cohen and Walker (2000) (as cited in Moon, 2004) developed the following five statements about experiential learning that have helped to delineate its features and boundaries:

- Experience is the foundation of, and the stimulus for all learning.
- Learners actively construct their own experience.
- Learning is a holistic process.
- Learning is socially and culturally constructed.
- Learning is influenced by the socio economic context in which it occurs (p. 111).

These statements support the idea that learning involves the whole person, both cognitively and affectively, recognizes the active use of past and present life and learning experiences and the use of continued reflection on those experiences to transform them to deepen understanding (Kolb, 1984).

Experience and adult learners. The literature on adult learning emphasizes experience as both the initial catalyst and a critical factor for producing significant learning (Brookfield, 1986; P. Jarvis, 1992; Knowles, et al., 2005; Merriam, et al., 2007; Tennant & Pogson, 1995). Life experiences are a key differentiator between adult and child learners. "To children, experience is something that happens to them; to adults, experience is who they are" (Knowles, et al., 2005, p. 66). Adults define themselves (self-identity) based on their experiences (Dominice & Knox, 2000) and they learn both through and by experience (R. M. Smith, 1982). The "reservoir of experiences" possessed by adults affects how they perceive the world (Brookfield, 1986). "Adults have more experiences. Adults have different kinds of experiences. Adult experiences are organized differently" (Kidd, 1973, p. 46). Adults use experience as a learning

resource (Brookfield, 1986). Life experiences become learning experiences as learners assign meaning to and make sense of their life experiences (Chickering, 1977; Dewey, 1910, 1933, 1938; P. Jarvis, 1992; Lindeman, 1926; Merriam & Clark, 2006). Kegan (1982) observes that an experience does not become an experience until the learner has made sense of it. An adults search for meaning provides a motive for learning (Daloz & Cross, 1986). Although the nature of experience is individual, all experiences are mediated by their social context (Moon, 2004).

In a qualitative study examining the significance of life-experience learning, Merriam and Clark (1993) found that for learning to be significant: "(1) it must personally affect the learner, either by resulting in an expansion of skills, sense of self, or life perspective, or by precipitating a transformation; and (2) it must be subjectively valued by the learner" (p. 129).

Learning and Development

The four aspects of adult development suggested by Taylor, Marienau and Fiddler (2000), environmental interactions, differentiation and integration, variable process and reframing experience are also commonly associated with learning. As learners interact with their environment, they use differentiation and integration to interpret (make meaning) of the experience and connect it to their prior knowledge through reflection. This interpretation may require the reframing of the experience in lieu of the learners belief system. The developmental advancement and/or developmental shift (change in view) that follows will vary from learner to learner. Experience includes both informal life experiences and formal structured learning experiences (Merriam & Clark, 1991 as cited in Merriam & Clark, 2006). Learning and development converge through meaning making.

Learning can be understood as the "process of a using prior interpretation to construe a new or revised interpretation of the meaning of experience in order to guide future action"

(Mezirow, 2000, p. 5). Development viewed from a learning perspective is a "qualitative change or transformation, in a way of knowing" (K. Taylor, et al., 2000, p. 13). Development occurs during learning as meanings are clarified through "expanded awareness, critical reflection and validating discourse" (Mezirow, 2000, p. 25). This fusion between learning and development occurs during meaning making as experiences undergo interpretation and perspective is transformed (Mezirow, 1991).

Meaning making. Meaning making is a cognitive activity where relationships are studied, assessed and combined (Polkinghorne, 1988). Mezirow (1991) contends "meaning making is central to what learning is all about" (p. 11). Beginning with John Dewey, many theorists have connected meaning making, life experience and learning (Merriam & Heuer, 1996). We learn through our interpretation and response to our experiences. Meaning making is based on constructivism. This philosophical orientation suggests that knowledge is individually constructed and that learning occurs when learners produce meaning from experience in context (Richey, et al., 2011).

Rooted in the work of Jean Piaget, constructivism is based on the assumption that "knowledge is not transmitted, it is constructed" (P. L. Smith & Ragan, 2005, p. 19). Individual constructivism emphasizes individual meaning making. Social constructivism emphasizes the role of social interaction in knowledge development. Both orientations are characterized by the following assumptions:

- Knowledge is constructed from experience
- Learning results from a personal interpretation of knowledge
- Learning is an active process in which meaning is developed on the basis of experience (P. L. Smith & Ragan, 2005, p. 19).

Experience and social situations do not inherently contain meaning. Meaning is assigned by the learner based on their prior knowledge and experience. Since each learner will make their interpretation through their personal belief system, learners' meaning of the same situation will vary. These meanings are "socially constructed and context dependent" (Merriam & Heuer, 1996, p. 247).

Meaning making is an internal mental process (cognitive) that involves clarifying the experience by putting together associations based on the learner's frame of reference (belief system). This action prepares existing schema for modification or initiates new schema development. Next, prior interpretations are recalled and possible interpretations are suggested. A new interpretation is formulated and validated by assessing its fidelity. The process output is the action taken by the learner through their engagement with the environment, other learners and oneself (Mezirow, 1991). This logical discussion of ideas during meaning making involves an internal dialogue with oneself that explores alternate views for the purpose of arriving at an integrated perspective. This kind of learning is significant in that it affects the behavior and attitude of the learner (Rogers, 1983 as cited in Merriam & Heuer, 1996) and transformative because it gives new meaning and perspective to experience (Mezirow, 1991). Adult development is melded to both meaning making and learning through this perspective transformation. "Meaning-making, learning and adult development are interdependent concepts whose locus is within cognitive development" (Merriam & Heuer, 1996, p. 250). Taylor, Marienau and Fiddler (2000) suggest that experience, reflection, and meaning making create a bridge between learning and development.

Reflection

Reflection is how we respond to our learning experiences. It is fundamental to learning (Merriam & Clark, 2006). The purpose of reflection is to make decisions based on ideas and feelings. All reflection presupposes a lack of understanding. We reflect to determine the meaning and significance of experience (Dewey, 1933). Reflection transforms experience into meaningful knowledge (Rodgers, 2002) by analyzing underlying assumptions and making meanings explicit. During reflection, experience is re-lived, thought about and evaluated in terms of other related experiences. The shift in education from content memorization to the study of how learners think has led to extensive research on reflection (Cranton, 1994).

Dewey (1933) considered reflection to be a form of thinking, he defined reflective thinking as the "active, persistent and careful consideration of any belief or supposed knowledge in light of the beliefs that support it" (p. 9). Reflective thinking is a form of cognition that emerges in adulthood. It depends on the capacity of the learner for advanced abstract thinking (Fischer & Pruyne, 2002). Reflection is the subject of much of John Dewey's work. In a review of Dewey's writings, Rodgers (2002) identified four criteria that characterize Dewey's conception of reflection and its purpose:

1. Reflection is a meaning making process that moves a learner from one experience into the next with deeper understanding of its relationships and with connections to other experiences and ideas. It is the thread that makes continuity of learning possible.
2. Reflection is a systematic, rigorous, disciplined way of thinking, with its roots in scientific inquiry.
3. Reflection needs to happen in community, in interaction with others.

4. Reflection requires attitudes that value the personal and intellectual growth of oneself and others (p. 845).

These criteria emphasize the iterative, systematic nature of reflection (Rodgers, 2002).

Rogers (2001) identified and examined seven major theoretical approaches to reflection, Dewey (1933); Schon (1983); Boud, Keogh and Walker (1985); Langer (1989); Loughran (1986); Mezirow (1991); and Seibert and Daudelin (1999), that contributed to an "integrated understanding of the concept" (p. 38) of reflection. His analysis revealed both similarities and differences in terms of terminology, definitions, antecedents, contexts, processes, outcomes and techniques to promote reflection. Although the researchers used many different terms to describe the process of reflection including reflection-in-action (Schon, 1983), reflective learning (Boyd & Fales, 1983), critical reflection (Mezirow, 2000), and reflective thinking (Dewey, 1933), their theoretical approaches shared several common definitional attributes:

> These included reflection as a cognitive and affective process or activity that (1) requires active engagement on the part of the individual; (2) is triggered by an unusual or perplexing situation or experience; (3) involves examining one's responses, beliefs, and premises in light of the situation at hand; and (4) results in integration of the new understanding into one's experience (Rogers, 2001, p. 41) .

Active engagement assumes that a learner is prepared and willing to participate in reflection. Reflection is initiated through a "disorienting dilemma" (Mezirow, 2000), an "inner discomfort" (Boyd & Fales, 1983), or a "state of doubt, perplexity or mental difficulty" (Dewey, 1933). A learner faced with this cognitive dissonance (Festinger, 1957) will interpret the experience, identify the problem or question originating from the experience, generate possible solutions or explanations, develop and test hypotheses (Rodgers, 2002) to restore Piaget's

equilibration or balance (Ginsburg & Opper, 1969). "The outcome of reflection is always some kind of learning and development" (Merriam & Clark, 2006, p. 40). Reflection enables the learner to make better choices, take action and improve their effectiveness based upon their newly integrated understanding. The process of reflection, shown in Figure 16 is a continuous process where each new experience leads to reflection and produces new understanding (Rogers, 2001).

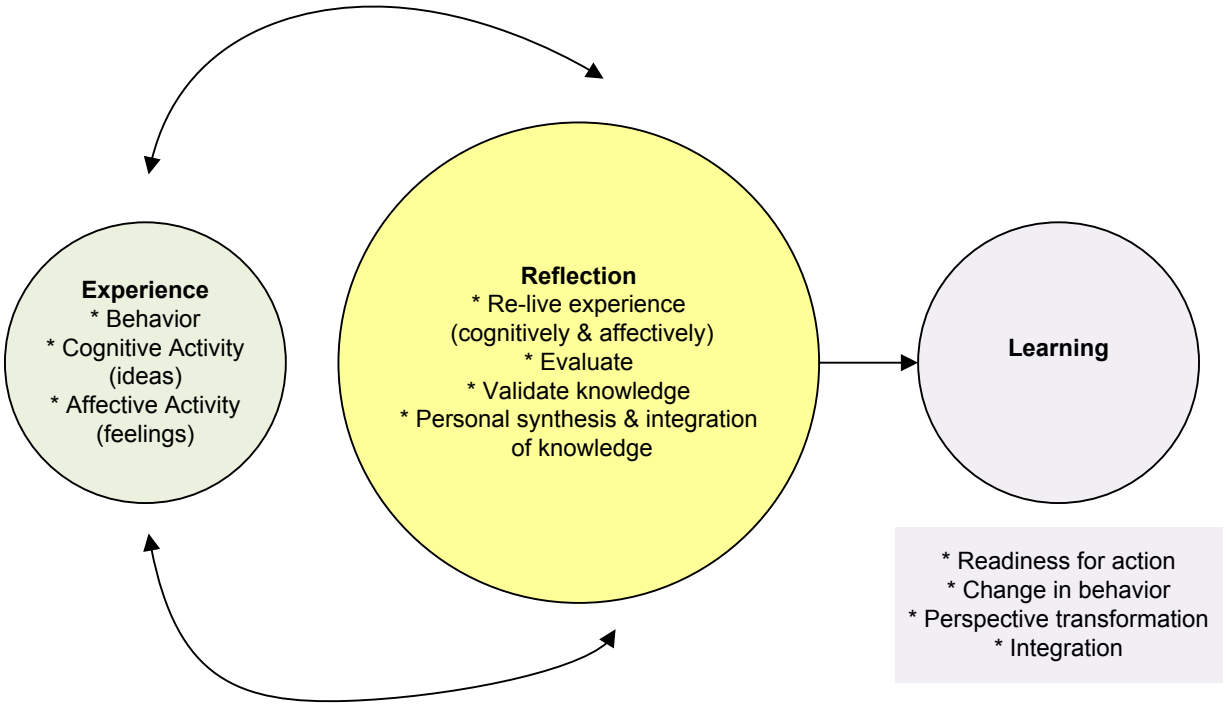


Figure 16. How reflection works to produce learning. Adapted from "Reflection: Turing Experience into Learning" by David Boud, Rosemary Keogh and David Walker, 1985, p. 20. Copyright 1985 by Kogan Page, Ltd.

Conceptually, reflection is related to critical thinking. The phases of critical thinking; trigger event, appraisal, exploration, developing alternative perspectives and integration (Brookfield, 1987) are closely related to reflective learning. Boyd and Fales (1983) define reflective learning as the "*process* of internally examining and exploring an issue of concern,

triggered by experience, which creates and clarifies meaning in terms of self, which results in a changed conceptual perspective" (p. 100). In the context of learning, Boud, Keogh and Walker (1985) view reflection as the "intellectual and affective activities in which individuals engage to explore their experience in order to lead to new understandings and appreciations" (p. 19). The outcome of these learning activities is a "change in assumptions about oneself and the world" requiring a "corresponding change in one's behavior and relationships" (Schlossberg, 1981, p. 5).

Reflection and narrative. Reflection can be defined as the cognitive and affective process involved in exploring experience as a means of enhancing understanding (Boud, et al., 1985), it is an internal dialogue with oneself (Schon, 1983). Experiences do not have any "systematic cognitive connection" until they are responded to through reflection. During reflection, experience takes story form and acquires meaning. A story is a "natural way to recount experience" (Gudmundsdottir, 1995, p. 33).

Story is considered a catalyst for reflective practice (Kuit, et al., 2001). Practitioners have used story in all phases of the reflective process, as the triggering event to prompt event interpretation and meaning making, and to explore possible outcomes. In a qualitative reflective teaching project at the University of Sunderland, Kuit, Reay and Freeman (2001) aimed at using methods to "become better reflective practitioners" (p. 140) found that the often difficult process of reflection was enabled by storytelling and collaboration with others. In practice, storytelling and story analysis enable reflection on the tacit knowledge that guides practice. Practitioner reflection on the stories they already tell creates a "natural bridge" to a serious inquiry about deeply held beliefs and assumptions that "under grid the decisions they make" (Mattingly, 1991b).

Stories encourage reflection, particularly when paired with discussion (McDrury & Alterio, 2003). Learning is enhanced when there is a strong relationship between the learning experience and the reflective activity that follows it (Boud, et al., 1985).

Role of Narrative in Human Cognition

The role of narrative in human cognition is twofold: (1) fostering learning through stories and (2) conceptualizing the learning process itself (M. C. Clark, 2010; M. C. Clark & Rossiter, 2008).

Learning through stories. We learn by hearing stories, by telling stories and by "recognizing the narratives in which we are positioned" (M. C. Clark, 2010, p. 6). We construct stories by reflecting on experience; these accounts are our attempt to explain and understand our experiences (Robinson & Hawpe, 1986). Narrative provides an organizing structure for our new experiences and knowledge (Mandler, 1984). Good narrative structure ensures that the narrative can be generalized to many situations (Gudmundsdottir, 1995). It is through this structure that narrative contextualizes learning. Constructing stories or "storying" is not only a "fundamental means of meaning making…it is an activity that pervades all aspects of learning" (Wells, 1986, p. 194).

Telling stories is how we discover what an experience means. By providing context and enabling the interpretation of experience through reflection, stories make learning happen. Telling is also how we remember an experience (Bruner, 1990; Mandler, 1984; Schank, 1999). What makes an experience memorable is its significance to us personally (Anderson & Conway, 1993 as cited in Schank, 1999). Intelligence can be described as the "telling of the right story at the right time in the right way" (Schank, 1990, pp. 241-242).

Hearing stories brings us into the experience and reminds us of our own stories.

> We do not easily remember what other people have to say if they do not tell it in the form of a story. We can learn from the stories of others, but only if what we hear relates strongly to something we already knew. We can learn from these stories to the extent that they have caused us to rethink our own stories. But mostly, we learn from a reexamination of our own stories (Schank, 1990, p. 83).

Our thinking is shaped by the sociocultural context we are immersed in. This "narrative situatedness enables us to identify and critique how that shaping takes place" (M. C. Clark, 2010, p. 6). We are narratively positioned and constituted. "Individuals both live their stories in an ongoing experiential text and tell their stories in words as they reflect upon life and explain themselves to others" (Clandinin & Connelly, 1991, p. 265). Our sense of self is developed through narrative. Rosenwald and Ochberg (1992) argue that "personal stories are not merely a way of telling someone (or oneself) about one's life, they are the means by which identities are fashioned" (as cited in M. C. Clark & Rossiter, 2008, p. 62). Fenwick (2000) considers the narrativizing of experience to be a "knowable resource to be exploited" in a search for knowledge (p. 244). By telling, hearing and recognizing stories, we learn narratively.

Conceptualizing learning as narrative. Narrative organizes knowledge and experience into a system containing a structure, functions and significance (Barthes, 1975). Its purpose is to make experience meaningful (M. C. Clark & Rossiter, 2008). Given the inherent nature of humans as "homo narrans" (Fisher, 1987) and the contention by many theorists that meaning making is a narrative process (Bruner, 1990; Irwin, 1996; Polkinghorne, 1988; Sarbin, 1986) applied to experience and that "meaning making is the constructivist definition of learning," Clark and Rossiter (2008) argue that learning can be conceptualized as a narrative process (p.

66). Framing learning as a narrative process suggests that learning is experiential and the learner, to make experience meaningful, uses narrative.

Experience is "prelinguistic, it exists prior to and apart from language" (M. C. Clark, 2010, p. 5). Experience is accessed, reflected upon and the recognition of language (symbols) is used to make sense of the experience. Narrative, constructing a logical, meaningful story about the experience and articulating it (discourse) by sharing it with others is how we learn what the experience means. When we construct a coherent narrative, we learn (M. C. Clark & Rossiter, 2008; Dewey, 1938). This learning process engages the learner both cognitively and affectively. The process of "narrating our evolving understanding of something is how we make our learning visible to ourselves and others" (M. C. Clark, 2010, p. 6).

Transformation Theory

Transformation theory is a constructivist approach to adult learning, grounded in the nature of human communication, that offers an explanation of how experience, meaning and learning are related (E. W. Taylor, 2007). The theory describes how learners "construe, validate, and reformulate the meaning of their experiences" (Cranton, 1994, p. 22). Since its introduction by Jack Mezirow in 1978, transformative learning has "received more attention than any other adult learning theory" (E. W. Taylor, 2000, p. 285). The focus of transformative theory is on how adult learners take ownership and act on their values, feelings and meanings to make clear decisions. The theory contains both individual and social dimensions (Mezirow, 2000) and uses experience, critical reflection and reflective discourse to produce action.

Mezirow (2000) defines learning as the "process of using a prior interpretation to construe a new or revised interpretation of the meaning of one's experience as a guide to future action" (p. 5). Transformational learning

> produces more far-reaching changes in learners than does learning in general and…these changes have a significant impact on the learner's subsequent experiences. In short, transformational learning shapes people; they are different afterward, in ways both they and others recognize (M. C. Clark, 1993, p. 47).

Grounded in Jurgen Habermas' (1985) theory of communicative action, transformative learning (Mezirow, 1991, 1997, 2000) differentiates between two domains of learning. Instrumental learning, "learning to control and manipulate the environment or other people, as in task-oriented problem solving to improve performance" and communicative learning, "learning what others mean when they communicate with you" (Mezirow, 2000, p. 8). Instrumental learning involves the assessment of truth and validity through empirical testing. During instrumental learning, points of view are transformed through critical reflection on the content and the process of solving the problem. This is similar to Bruner's (1986) paradigmatic or logico-scientific mode of thinking. Communicative learning is about understanding "*purposes, values, beliefs* and *feelings*" (Mezirow, 1997, p. 6). It involves assessing the meaning of words; the "coherence, truth and appropriateness of what is being communicated" (Mezirow, 2000, p. 9) as well as assessing the credibility of the speaker in terms of qualification, truthfulness and emotional authenticity. Communicative learning shares some similarities with Bruner's (1986) narrative mode of thinking in that it works with human intentions and actions.

Based on the assumption that "adults have acquired a coherent body of experience – assumptions, concepts, values, feelings, conditioned responses – frames of reference that define their world" (Mezirow, 1997, p. 5). Mezirow suggests these frames of reference are the meaning perspectives that filter our sensory impressions and provide context for meaning making. Frames of reference are the product of interpreting experience (Mezirow, 2000). Transformative learning

is the process of changing our frames of reference to make them "more inclusive, discriminating, open, emotionally capable of change, and reflective so that they may generate beliefs and opinions that will prove more true or justified to guide action" (Mezirow, 2000, pp. 7-8). Transformative learning is a "rational, analytical, cognitive process" with an "inherent logic" (Grabove, 1997, pp. 90-91).

A frame of reference contains both cognitive and affective components. It is composed of two dimensions, habits of mind and points of view. A habit of mind is a set of assumptions – "board, generalized, orientating pre-dispositions that act as a filter for interpreting the meaning of experience" (Mezirow, 2000, p. 17). Habits of mind are social norms, customs, psychological views, values, attitudes as well as aesthetic judgments. A habit of mind is expressed as a point of view – "the constellation of belief, value judgment, attitude and feeling that shapes a particular interpretation" (Mezirow, 1997, p. 6). Learning occurs through the elaboration of existing frames of reference (meaning schemes), learning new frames of reference, and by transforming points of view or habits of mind. Transformation is the reformulation of these meaning schemes (frames of reference) through the process of building new dominant narratives (Mezirow, 2000). These meaning schemes (frames of reference) are changed during critical reflection on the experience and engagement in reflective discourse with others. The product of these activities is perspective transformation. Although not every experience leads to transformation, every experience is added to the body of knowledge possessed by the learner and is available for use.

The process of perspective transformation is initiated through critical reflection on the assumptions, beliefs and context underpinning the experience that affect how we make sense of the experience (Merriam, et al., 2007). Mezirow (2000) contends that transformation involves movement through the following phases to clarify meaning:

1. A disorientating dilemma
2. Self-examination with feelings of fear, anger, guilt, or shame
3. A critical assessment of assumptions
4. Recognition that one's discontent and the process of transformation are shared
5. Exploration of options for new roles, relationships, and actions
6. Planning a course of action
7. Acquiring knowledge and skills for implementing one's plans
8. Provisional trying of new roles
9. Building competence and self-confidence in new roles and relationships
10. A reintegration into one's life on the basis of conditions dictated by one's perspective (p. 22).

Beginning with a disorienting dilemma, meanings are deconstructed through critical reflection on both the assumptions of others and the learner's own assumptions. Disorienting dilemmas produce cognitive, affective, and behavioral reactions. Assumptions are more than constructs, emotional attachments are embedded in the assumption context and are aroused when assumptions are challenged (Courtenay, Merriam, & Reeves, 1998). Numerous studies have documented the importance of the affective element in transformative learning (Barless, 2000; Clark, 1993; Egan, 1985; Hunter, 1980; Scott, 1991; Taylor, 1994 as cited in Yorks & Kasl, 2002).

Reflection is the "intentional reassessment of prior leaning to reestablish its validity" (Mezirow, 1991, p. 15). Reflection considers the content, process and premises that make up the experience. Content reflection considers the experience itself. During process reflection the learner considers how to handle the experience. Premise reflection examines "long-held, socially

constructed assumptions, beliefs and values about the experience or problem" (Merriam, 2004, p. 62). Critical reflection focuses on the premises; it is the only form of reflection that can produce perspective transformation (Mezirow, 1991, 1997, 2000). Brookfield (2000) defines critical reflection as "some sort of power analysis" involving deeply held assumptions (p. 126). Taylor (2008) suggests that critical reflection is a "developmental process rooted in experience" (p. 11). Critical reflection involves reframing meaning structures by considering the assumptions of others (objective reframing) on the learner's own assumptions (subjective reframing) (Brookfield, 2000). Each time a frame of reference undergoes critical reflection, assumptions, values, and beliefs are tested and justified.

During instrumental learning, points of view are transformed through the critical assessment of "assumptions supporting the *content* and/or *process* of problem solving" (Mezirow, 2000, p. 20). Habits of mind are transformed through critical reflection on the "*premises* defining the problem" (p. 20). Critical reflection on the assumptions underpinning content, process or premises is used during both instrumental and communicative learning. The new meaning developed through critical reflection is further tested to determine its truth and validity through reflective discourse. Discourse is "dialogue devoted to searching for a common understanding and assessment of the justification of an interpretation or belief" (pp. 10-11). During dialogue with other learners, evidence is weighed and assumptions are critically assessed to deepen understanding. Mezirow (2000) specified the following seven participant conditions for rational discourse based on communication in the critical tradition (Craig, 1999):

- More accurate and complete information
- Freedom from coercion and distorting self-deception

- Openness to alternative points of view: empathy and concern about how others think and feel
- The ability to weigh evidence and assess arguments objectively
- Greater awareness of the context of ideas and, more critically, reflectiveness of assumptions, including their own
- An equal opportunity to participate in the various roles of discourse
- Willingness to seek understanding and agreement and to accept a resulting best judgment as a test of validity until new perspectives, evidence, or arguments are encountered and validated through discourse as yielding a better judgment (pp. 13-14)

It is noteworthy that these conditions for reflective discourse are also conditions for learning (Mezirow, 1991). They enable learners to move toward meaning perspectives that are "more developmentally advanced, that is, more inclusive, permeable, and integrative of experience" (p. 198).

Successful transformative learning experiences end with learner action. The learner will make an "informed reflective decision to act on his or her reflective insight" (Mezirow, 2000, pp. 23-24). This action can be immediate, delayed or a confirmation of an existing action. Taking action based on a new perspective involves "overcoming situational, emotional, and informational constraints" (p. 24). In summary, transformative learning occurs when learners change their frames of reference by critically reflecting on their assumptions and beliefs, validating those assumptions and beliefs through reflective discourse with other learners and taking action based on their new perspective.

Empirical research on transformative learning began with Mezirow and Marsick's (1978) study which focused on perspective changes experienced by 83 women returning to school after

a long absence (E. W. Taylor, 2000). On the basis of this study, assumptions about how adults make meaning were formulated. The study found frame of reference, a disorienting dilemma (first phase of meaning clarification), critical reflection and dialogue with others to be essential elements for meaning making. Although Mezirow's learner-centric, psychological approach to transformational learning has dominated most of the research, other conceptualizations of transformational learning depict transformational learning as a complex, multifaceted theory (E. W. Taylor, 2000). Other theorists who have emphasized the role of the individual learner in transformative learning include Laurent Daloz who suggests a psycho developmental approach emphasizing the importance of story during transformation, Robert Boyd who proposes a psychoanalytic approach that addresses the importance of symbols and the unconscious during transformative learning and Paulo Freire who suggests a sociocultural approach focused on social change (Merriam, et al., 2007).

Mezirow's (1991, 1997) psychoanalytical perspective has been criticized for its emphasis on rationality as evidenced by the significant role afforded to critical reflection in perspective transformation (E. W. Taylor, 1998). Additional criticism of the theory addressed the exclusion of the affective and social aspects of learning (Clark & Wilson, 1991; Lucas, 1994; McDonald, Cervero and Courtenay, 1999; Taylor, 1994 as cited in Baumgartner, 2001, p. 17). However, Mezirow's (2000) iteration of the theory acknowledges the importance of these aspects during meaning making. In a significant review of empirical research about transformative learning (1999-2005) conducted by Edward W. Taylor (2007), 40 studies published in peer-reviewed journals were analyzed to identify new insights on transformative learning theory. Most of these studies used Jack Mezirow's (1991, 2000) conception of transformative learning as their framework. The studies were situated in formal higher education settings and used qualitative

research designs. The study findings were grouped based on how best they informed a particular aspect of transformative learning. The review findings affirmed Mezirow's conception of transformative learning.

The concept of critical reflection was demonstrated by the research to be essential to transformative learning. The studies showed that successful transformative experiences depend upon the formation of relationships with others. Such relationships enable the conversations necessary to reach consensual understanding. This body of research offered insight into the complex nature of transformative relationships. "The findings in this review, as well as previous reviews, have found the role of relationships in transformative learning most significant" (E. W. Taylor, 2007, p. 187). Although the research affirmed the essential role of emotions, affective ways of knowing in transformation, "little is known about how to effectively engage emotions in practice" (p. 188). Most significantly, many varied disciplines found "this pedagogical approach to teaching adults helpful in guiding practice and explaining change in perspective among students" (p. 186). Another significant finding was participant recognition that their knowledge has changed through the process of transformation was not enough to produce the action necessary to complete the transformation. Educators should provide specific steps (instrumental learning) to ensure that students are prepared to act on their new understanding.

Transformative learning and narrative. During the First National Conference on Transformative Learning to address how adults learn held at Teachers College, Columbia University in April 1988, narrative and its usefulness in transformative learning was referenced as a means to articulate learner autobiographies and shape assumptions (Robert Kegan), to affect learning (Edward Taylor) and as a catalyst for making learning happen (Stephen Brookfield). Lyle Yorks suggested that narrative approaches to inquiry during the study of transformative

learning were more effective than linear or quantitative approaches. Mary Field Belenky used stories as a mirror to help learners recognize their accomplishments. She emphasized the value of listening to stories and noted the "empowering potential of stories." Victoria Marsick stated her belief that "people make meaning best through stories" (Wiessner, Mezirow, & Smith, 2000, p. 338).

Transformative Learning in Practice

Transformation cannot be taught, however, educators can provide opportunities for learner's to question assumptions (Cranton, 2002). Three elements, based on the literature, seem to be part of most transformative educational experiences: individual experience, critical reflection and dialogue (E. W. Taylor, 2009). The transformative process begins with a disorienting dilemma and ends with restored equilibrium (Cranton, 2002).

Individual experience. Individual experience, what each learner brings into the learning environment as well as what happens in the environment, is the primary medium for transformative learning (E. W. Taylor, 2009). Educators stimulate experience through activities. The amount of experience possessed by learners is significant when fostering transformative learning. In a study exploring transformational professional values in nursing graduate students, Cragg, Plotnikoff, Hugo and Casey (2001) found that "nurses with more experience are more likely to internalize the new points of view to which their education exposes them" (as cited in E. W. Taylor, 2009, p. 6).

Learners become aware of their assumptions through a disorienting dilemma. An activating event may be a lecture, a context passage or a story where learners are introduced to different viewpoints. Such events serve as a catalyst for critical reflection. C. A. Jarvis (2003) found that "narrative organization and point of view may lead readers to identify with characters

whose values and actions are in opposition to their own. Reflection on this identification may challenge existing meaning perspectives at the personal or sociocultural level" (p. 265). In addition to course content, the introduction of intense experiential activities can provoke meaning making. For example, a visit to a military history, civil rights or holocaust museum may serve as a catalyst for transformation as learners confront difficult social issues through reflection and discussion in an environment that supports questioning assumptions and beliefs. This interdependent relationship between experience and critical reflection leads to new perspective development (E. W. Taylor, 2009).

Critical reflection. Critical reflection is the questioning of deeply held assumptions and beliefs based on the learners prior experiences. It is initiated in response to a state of uncertainty, a dilemma that needs a solution and involves the examination of "presuppositions underlying [the learners] knowledge of the world" (E. W. Taylor, 2009, p. 8). Expressing assumptions is difficult because they are "deeply embedded in our childhood community and culture" (Cranton, 2002, p. 67). Merriam (2004) suggests that "mature cognitive development" is necessary for learner critical reflection (p. 65). Educators can move learners toward the development of critical reflection skills through the use of journaling, critical questioning and discussion (K. Taylor & Lamoreaux, 2008). Reflection is a developmental process that takes time and practice. Kreber (2004) argues it is not enough for educators to encourage reflection, learners should be assessed on their progress toward achieving higher levels of reflection.

Dialogue. Dialogue is used in transformative learning to develop and promote transformation (E. W. Taylor, 2009). "*Dia*" means "between," "*logos*" means "word." Hence, *dia* + *logue* = "the word between us" (Vella, 2002, p. 3). Dialogue occurs when a learner communicates with another learner to understand the meaning of an experience. The goal of

dialogue is to reach understanding (Mezirow, 1991). Dialogue is "relational, trustful communication" (E. W. Taylor, 2009, p. 9). Through dialogue, critical reflection is put into action. "Experience is reflected on, assumptions and beliefs are questioned and habits of mind are ultimately transformed" (p. 9). The process of exposing experience to discussion enables learners to try out other points of view, identify contradictions, validate assumptions and reframe arguments. The new knowledge, based on the reflective consideration of these multiple perspectives through dialogue with others, is considered to be an interpretation without bias. Although research on dialogue and transformational learning is limited, "social interaction and dialogue have been found to lead to consensual validation (valid by the process of discussing it) among learners" (p. 9). The validity testing of new meanings is enabled by Mezirow's (2000) seven conditions for rational discourse. Courtenay, Merriam and Reeves (1998) found that validation helped learners who, for example were diagnosed as HIV positive, realize they were not alone during the transformational learning that occurs when addressing a life-threatening event. Taylor (2009) suggests that educators create these positive conditions for "productive dialogue" and be attentive to what learners discuss. Awareness of learner attitudes, feelings, personality and preferences enables educators to recognize signs of change and take action to help learners through any discomfort "while on the edge of knowing" (p. 10).

Brain Based Learning Theory

Brain based learning theory uses knowledge from developmental psychology, cognitive psychology and cognitive neuroscience about brain function and structure to suggest how learning occurs (National Research Council, 2000). In recent years, this knowledge has been enhanced by the use of non-invasive imaging, Positron Emission Tomography (PET) and functional Magnetic Resonance Imaging (fMRI). These scanning techniques have enabled

researchers to observe human learning as it occurs by using color to show differences in brain metabolism (blood flow) in particular areas of the brain in response to different kinds of brain activity (National Research Council, 2000; Sousa, 2006). These responses occur in the cerebral cortex. The cerebral cortex is the grey layer of tissue covering the cerebrum, the largest part of the brain. Thinking and learning occurs in the cerebral cortex (Zull, 2002).

The functions of the cerebral cortex are sensing, integrating and motor (moving). The outside world enters the sensing area of the cerebral cortex through the five senses: sight, smell, hearing, taste or touch. The act of sensing sends an electrical impulse to the specific region of the brain responsible for recognizing that particular sensory information. These sensory impulses are added together (integrated) and associations are made to produce meaningful images or words. These "meanings are then integrated in new ways that become ideas, thoughts and plans" (Zull, 2002, p. 15). Integrated meanings are assembled to produce a plan for what and where action is needed. These plans are executed through the motor function. Motor signals are sent to the muscles to elicit movement inclusive of speaking and writing (Zull, 2002). Knowledge of the structure of the brain and its functions enables researchers to theorize about how the structure produces learning.

Learning and the cerebral cortex. The sensory cortex gathers and monitors information from the environment. Our physical movements (motor cortex) are in response to this sensory information. The integrative cortex contains front and back segments. The back integrative cortex is associated with the past; "memory of stories, memory of place, understanding language, flashbacks, emotions related to experiences, long-term memory (facts, people, faces, experiences)" (Zull, 2002, p. 36). The front integrative cortex is associated with the future;

"choice decisions to act, inhibition, emotions associated with action, responsibility, mental energy, consequences, predicting, creating" (p. 36).

The brain physically changes as we learn (Zull, 2006). A signal received by neurons in the cortex prompts the growth of more neurons, increases the cell density and leads to the formation of branches with other neurons to produce synapses, a junction between neurons (R. Carter, Aldridge, Page, & Parker, 2009). These changes occur from "repeated firing of the specific neurons engaged in learning experiences" (Zull, 2006, p. 5). They enable the experience to be constructed or recalled later (R. Carter, et al., 2009). Learning depends on the strength and the number of the connections made between each of the four areas of the cerebral cortex: sensory, back integrative, front integrative, and motor. Zull (2006) suggests learning experiences be designed to use these four areas. He identified "four fundamental pillars of learning: gathering, reflecting, creating, and testing" (p. 5) and mapped them to David Kolb's (1984) Experiential Learning Cycle to illustrate how the brain learns, Figure 17.

The learning cycle begins with an external, concrete experience that enters the brains sensory cortex. Learner observation and reflection activate the back integrative cortex. Abstract concepts are developed and formed in the front integrative cortex and the process of active experimentation engages the motor cortex. The transformation of experience, changing information into knowing, occurs as the brain sends impulses from the back integrative cortex to the front integrative cortex (indicated by the transformation line in Figure 17). This "conversation" changes the learner from a receiver to a producer of knowledge. Zull (2002) suggests that balancing the learner's use of the back cortex (receiving) and the front cortex (producing) leads to better learning.

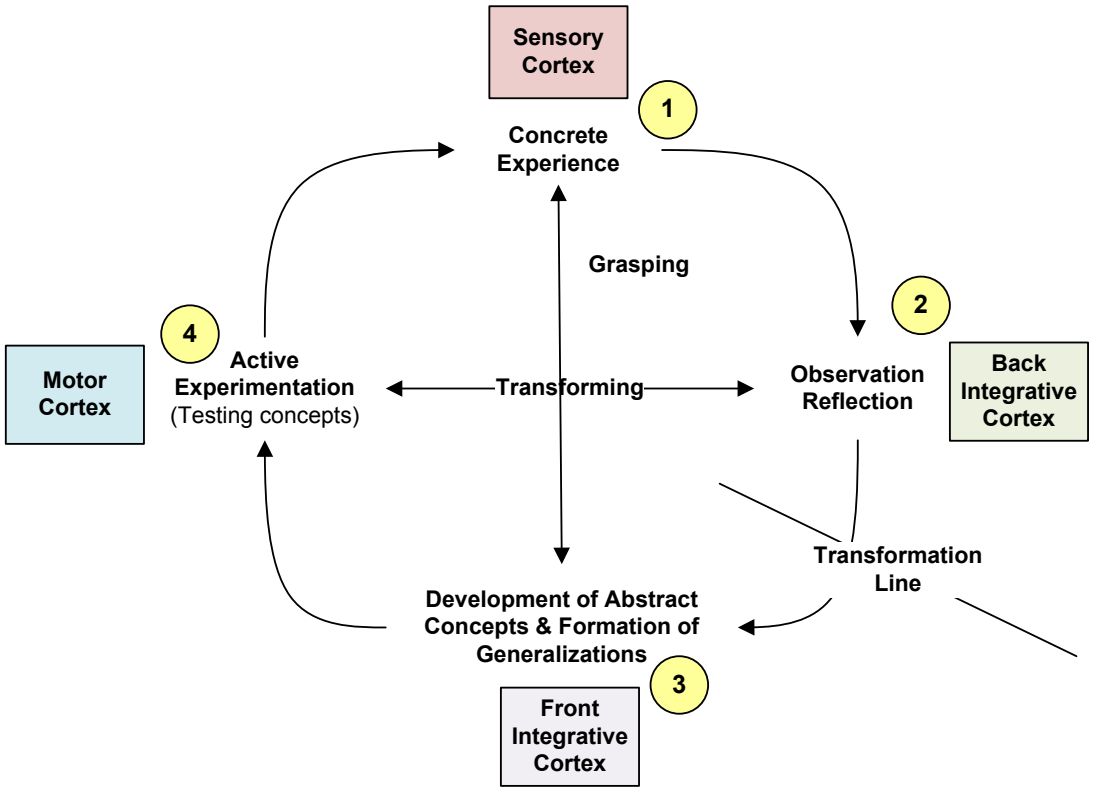


Figure 17. Regions of the brain mapped to David Kolb's Experiential Learning Cycle based James E. Zull's (2006) four pillars of learning. Adapted from "Key Aspects of How the Brain Learns" by James E. Zull, The Neuroscience of Adult Learning, pp. 4-7. Copyright 2006 by Wiley Interscience.

Learning and Memory

Memory is the "mental faculty of retaining and recalling past experiences" (Seel, 2008, p. 40). As a biological phenomenon, memory is continually changing during recall and consolidation (Zull, 2011). Learning depends on the formation of memory. "Without learning there is nothing to remember, and without memory, there is no evidence of learning (Baddeley, 1989; Long, 1983; Schaie & Geiwitz, 1982 as cited in K. L. Huber, 1993, p. 35).

Memories are composed of networks of neurons (Zull, 2011). Neurons are nerve cells that collect and transmit signals through branches called dendrites to neighboring cells by

sending an electrical signal through a long fiber (axon) across a synapse; a small gap. This activity prompts the release of chemicals (neurotransmitters), which either "excite or inhibit the neighboring neuron" (Sousa, 2006, p. 22). As the neurons transmit signals, more branches are grown and cellular density increases which improves the neurons ability to connect with other neurons to form more synapses (Zull, 2006). "Learning occurs by changing the synapses so that the influence of one neuron on another also changes" (Sousa, 2006, p. 22). During learning the brain physically changes as neurons are repeatedly fired, neurotransmitter chemicals are released, and synapses are added (National Research Council, 2000). These neuronal networks grow "more and more complex through learning and remembering" (Zull, 2002, p. 98). Notably, we do not have to engage in an experience in order for it to affect our learning; by observing or listening to the experience of others, a learner can re-create the experience. Mirror neurons enable learners to decode intentions and predict the behavior of others. "They allow us to recreate the experience of others within ourselves, and to understand others' emotions and empathize" (Sousa, 2006, p. 23).

How Meanings are Made

How the brain lays down a memory, makes experience meaningful, and produces learning can be explained by mapping the functions of the cerebral cortex to the information processing model of memory (Sousa, 2006; Zull, 2002, 2011), depicted in Figure 18.

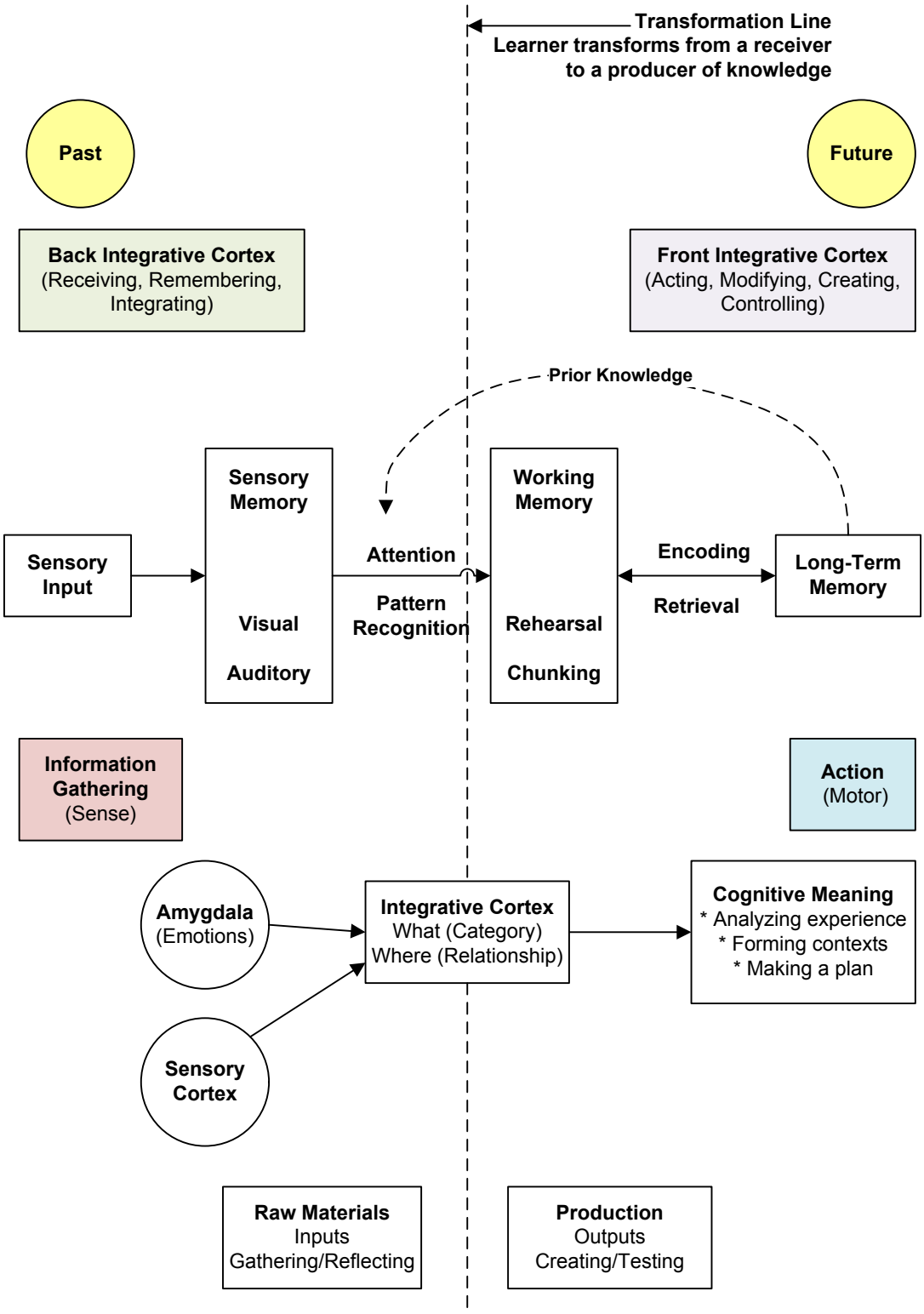


Figure 18. The functions of the cerebral cortex mapped to the information processing model of memory.

The meaning making process begins with sensory input (sensory cortex) and ends with action (motor cortex). In between the initial input and final output, the back and front integrative cortex areas "communicate" with each other to analyze the experience, determine meaning and produce context. Context shapes content. It enables the learner to relate new information to what is already known (prior knowledge) (Schank, 1990). The sensory cortex collects sensory information and uses pattern recognition to make associations with prior knowledge stored in long-term memory. The incoming sensory information is categorized (what) and relationship (where) to other stored information is established. While the sensory cortex is working to lay down a sensory memory, the area of the back cortex responsible for emotion, the amygdala subconsciously monitors the situation and puts the experience into emotional context. This occurs before the learner begins the conscious process of trying to understand it cognitively (Zull, 2002). As information moves into the working memory, located in the front integrative cortex, there is "communication" with the memories and information residing in the back integrative cortex. This "exchange is essential in problem solving and idea generation" (Zull, 2011, p. 96).

Encoding is the critical act of learning (Gagne, 1985). The back integrative cortex (receiving, remembering, and integrating) provides the raw materials (inputs) used by the front integrative cortex (thinking, analyzing, and planning), to produce cognitive meaning (output). In the front integrative cortex experience is analyzed, contexts are formed and plans are made (Zull, 2011). This area of the brain "involves intent, recall, feelings, decisions and judgments" (Zull, 2006, p. 6). It is noteworthy that the traditional teaching approach of delivering information engages the back cortex functions and the "discovery approach (proposing and testing ideas) [focuses] on the front cortex functions" (Zull, 2002, p. 40).

Although depicted in a linear fashion, evidence on memory supports parallel processing; that is, multiple inputs are processed very quickly at the same time. These processes of learning and remembering are biological process that produce chemical changes in the brain as a result of experience (Sousa, 2006). The greater the learner's experience, the more likely it is that knowledge organization structures are sufficiently developed to enable rapid meaning determination (Ambrose, et al., 2010). Winn (2004) notes that there is a circular relationship among learning, meaning and memory. "What is learned is affected by how meaningful it is, that meaning is determined by what we remember, and that memory is affected by what we learn" (p. 84).

Learning and Retention

Retention is the preservation of learning in long-term memory in such a way that it can be located, identified and retrieved accurately in the future (Sousa, 2006). Retention depends on learner attention and focus, and is affected by the activation of prior knowledge (National Research Council, 2000; Vygotsky, 1979), the connection of new knowledge to prior knowledge (Bransford & Johnson, 1972; Resnick, 1983), the organization of knowledge around "meaningful features and patterns" (Ambrose, et al., 2010, p. 56), and the use of worked examples (Chi, et al., 1989) which enable learners to focus on the principles leading to a solution. "Brain scans have shown that when new learning is readily comprehensible (sense) and can be connected to past experiences (meaning) there is substantially more cerebral activity followed by dramatically improved retention (Maguire, Frith & Morris, 1999 as cited in Sousa, 2006, p. 49).

Reflection enables the "reframing," the reinterpretation of "past experiences in the light of newer ones-because it can alter neural connections and therefore the meaning we make on the basis of those connections" (K. Taylor & Lamoreaux, 2008). Retention is also affected by the

nature of processing (Sousa, 2006). Processing involves rehearsal, which can be rote or elaborative, and time. If there is insufficient time for the learner to rehearse information in working memory, it will be lost. Time enables the learner to review the information, "make sense of it…elaborate on the details…assign value and relevance, thus increasing the chance of long term storage" (Sousa, 2006, p. 87). Brain scans show that the front integrative cortex is involved during rehearsal and long-term memory formation, and this activity determines whether information is stored or forgotten (Buckner, Kelley & Peterson, 1999; Wagner et al., 1998 as cited in Sousa, 2006, p. 87).

Narrative and Retention

Narratives naturally enable retention. Developing a story establishes the memory structures that will later be used to recall and tell the story (Livo & Reitz, 1986; K. Young & Saver, 2001). Listening to a story activates prior knowledge both of story structure and previously learned stories enabling the connection of the new story to the previously learned story or experience (Mandler, 1978; Mandler & Goodman, 1982). Stories can be considered knowledge organization structures (Bruner, 1986; Irwin, 1996; Polkinghorne, 1988; Sarbin, 1986). They enable the discernment of meaningful patterns and features by the learner (Jonassen, 1991). Stories themselves are like worked examples, they provide the contextual frame for the consideration of alternatives essential to problem solving (Jonassen & Hernandez-Serrano, 2002; Lave & Wenger, 1991; Orr, 1996; Schon, 1983). Through story, learners make associations that relate to their cognitive structure. This elaboration or depth of processing (Craik & Lockhart, 1972) "results in better learning" (P. L. Smith & Ragan, 2005, p. 142).

Narrative Processing in the Brain

Context is the "multilevel body of factors [and their simultaneous interaction] in which learning and performance is embedded" (Tessmer & Richey, 1997, p. 87). Context affects cognitive performance and is important for language processing. In a study using fMRI to examine the impact of context by comparing subject responses to words, sentences and narratives, Xu, Kemeny, Park, Frattali and Braun (2005) found increased activity as context complexity increased with the most activity associated with subject exposure to narrative. Brain activity associated with narrative appeared in the left hemisphere at the beginning of the story and in the right hemisphere during story resolution. These findings support the representation of narrative as a coherent whole in the brain.

Neuroimaging studies have also confirmed that communicating a story is associated with the same regions of the brain used to understand stories. The activation of these particular areas of the brain during narrative processing are unique and separate from areas used for word or sentence processing (Fletcher, et al., 1995; Mar, 2004). Ferstl, Rinck, and Cramon (2005) found that the affective component of narrative "induced processes beyond language comprehension" (p. 734). There is also increased cerebral activity as narratives are built and linked to prior knowledge in areas of the brain associated with comprehension (Maguire, et al., 1999).

The neuroimaging evidence that narrative is represented as a coherent whole, that it activates prior knowledge as well as areas of the brain associated with both cognitive (language comprehension) and affective (emotional) processing support the use of narrative as an instructional modality capable of producing learning, retention and transfer to practice (performance contexts).

Instructional Design Theory

This section begins with a definition of instructional design and its relationship to learning and educational practice. Instructional design models, model development and model validation literature is reviewed. Literature related to instructional design theory and how it works to advance learning and development is reviewed. Robert M. Gagne's theory of instruction and the role of context in learning and instructional design are discussed. This section concludes with a review of the empirical findings related to instructional strategies to enable learning transfer to practice (performance contexts).

Instructional Design

Instructional design has been defined in a variety of ways in the literature. In a broad sense, instructional design provides a framework based on theory and practice for making instructional decisions. Instructional design is considered both a science and an art (Richey, et al., 2011). Instructional design can be defined as the "systematic and reflective process of translating principles of learning and instruction into plans for instructional materials, activities, information resources, and evaluation" (P. L. Smith & Ragan, 2005, p. 4). This definition highlights process. Process orientations are grounded in the Instructional Systems Design (ISD) steps of Analysis, Design, Development, Implementation and Evaluation (ADDIE) (Richey, et al., 2011). Other definitions highlight function. Reigeluth (1983) suggests that instructional design is the "process of deciding what methods of instruction are best for bringing about desired changes in student knowledge and skills" (p. 7). The product of this design activity is a 'blueprint,' a prescription for the instruction.

The nature of instructional design can be understood by considering the meaning of the terms 'instruction' and 'design' independently. Smith and Ragan (2005) consider instruction to

be the "intentional arrangement of experiences leading to learners acquiring particular capabilities" (p. 5). The purpose of instruction is to "help people learn" (Gagne, Wager, Golas, & Keller, 2005, p. 1) and "arrive at shared meanings" (Reigeluth, 1992, p. 81).

Design is a planning activity. Design connects learning and learners through the selection of strategies that enable learning. The strategies chosen are based on an understanding of how people learn and perform and how what the learner brings with them (prior knowledge) affects their learning and performance. Design processes are also dependent upon the content, learning environment and the instructional delivery options (Richey, et al., 2011). Smith and Ragan (2005) distinguish design from other kinds of instructional planning by the "level of precision, care, and expertise that is employed in the planning, development and evaluation process" (p. 6).

Instructional design scope. Instructional design is both an established profession and a field of study. The instructional design knowledge base contains the following six content domains:

- Learners and Learning Processes;
- Learners and Performance Contexts;
- Content Structure and Sequence;
- Instructional and Non-instructional Strategies;
- Media and Delivery Systems;
- Designers and Design Processes (Richey, et al., 2011, p. 3).

Each of these domains plays a role in instructional design activities and provides the structure for the knowledge base. This multidisciplinary knowledge base draws its principles and procedures from general systems, communication, learning, development, and instructional theories (P. L. Smith & Ragan, 2005). Instructional design can be considered both a practice and

a linking science. Its knowledge base is shaped by practitioner experience, theory and research (Richey, et al., 2011). In this way, instructional design connects learning theory with educational practice (Reigeluth, 1999, 1983).

Nature and function of theory. A theory is "a set of related propositions that attempts to explain and sometimes to predict, a set of events" (Hoover & Donovan, 1995, p. 69). Theory "*depicts some aspect of human experience*" (Littlejohn & Foss, 2011, p. 19). Theory enables us to "explain, predict or control events" (P. L. Smith & Ragan, 2005, p. 19). It is "a way of looking at the facts, of organizing and representing them" (Kaplan, 1964, p. 309). Theory describes the relationship between concepts. Developing a workable theory calls for the "exercise of creative imagination" (p. 308).

In social scientific thinking, theory is used to "provide *patterns* for the interpretation of data" to "*link* one study with another," to "supply frameworks within which concepts and variables acquire *specific significance*" and to enable interpretation of the "*larger meaning*" of findings (Hoover & Donovan, 1995, p. 40). Theory provides the structure for the interpretation and verification of complex activities (Richey, et al., 2011).

Instructional design assumptions. Recognizing that there is not one best model for instructional design, Gagne, Wager, Golas, and Keller (2005) have identified the following common instructional design assumptions that guide practice:

- Instructional design is focused on the process of intentional learning, not teaching.
- Learning is a complex process affected by many variables. For example, John Carroll's (1963) Model of School Learning identified five variables; three residing in the learner (internal) and two environmental conditions (external) that affect learning. Factors in the learner are (1) aptitude-the amount of time needed to learn the task

under optimal conditions, (2) ability to understand instruction, and (3) perseverance-the amount of time the learner is willing to actively engage in learning. External factors are (4) opportunity-time allowed for learning, and (5) the quality of instruction (p. 720). These variables work together to affect learning.

- Instructional design models can be applied at many levels.
- Instructional design is a process containing sub processes.
- Different kinds of learning outcomes require different kinds of instruction (pp. 2-3).

These assumptions underpin instructional designs and recognize "there is no one best way to teach everything" (Gagne, et al., 2005, p. 3).

Instructional design models. Models are "simplified representations" (Richey, 2005) of complex processes, functions or ideas (Gustafson & Branch, 2002). They are a means for thinking about important principles and their relationship to each other for the purpose of understanding something (P. L. Smith & Ragan, 2005). Models provide structure and order and show conceptual relationships. They are used in theory development and to translate theory into practice (Richey, 2005). Models guide practice; their successful application depends upon how closely the theory underpinning the model is in alignment with the application context (Gustafson & Branch, 1997).

Models can be characterized as conceptual or procedural. Conceptual models describe relationships between factors or components. They originate from theory or the application of theory, are analytic in nature and context-free. Conceptual models are supported by "experience, deductive logic, or inferences from observations" (Richey, et al., 2011, p. 187). Conceptual models can be narrative descriptions, taxonomies, or visual representations (Richey, 1986).

Examples of conceptual models include Dale's (1946) Cone of Experience, Bloom's (1956) taxonomy of cognitive objectives, and Gagne's (1972) domains of learning (Richey, 2005).

Procedural models describe verbally or visually how to perform a task. They are "derived from experience or theory and often used as problem solving guides" (Richey, et al., 2011, p. 193). Procedural models are used in instructional design to prescribe the steps to follow to design effective instruction. Examples of procedural models include Dick, Carey and Carey (2001), Morrison, Ross, and Kemp (2005), Gagne's Events of Instruction model (Gagne, Briggs & Wager, 1992) and Keller's (1987) ARCS model (Richey, 2005).

Models used in instructional design provide "conceptual and communication tools that can be used to visualize, direct and manage processes for generating episodes of guided learning" (Gustafson & Branch, 1997, p. 73). An instructional model uses principles from learning theory, and instructional theory to design instruction. Reigeluth (1983) considers an instructional model to be "a set of strategy components" (p. 21) that describe a method and its associated components in detail. Walter Dick (1981) argues that instructional design models "represent the theory of instructional design. The theory includes a description of a series of steps which, when executed in sequence, result in predictable outcomes" (p. 29).

Although there are many different types of instructional design models due to their varied application environments (Gustafson & Branch, 2002), all instructional design models contain three features: 1) linear planning process, 2) an objectives first approach to planning, and 3) a generic model for planning instruction (Moallem & Earle, 1998, pp. 5-6). Instructional design models serve four purposes:

1. Improving learning and instruction by means of problem solving and feedback characteristics of the systematic approach

2. Improving management of instructional design and development by means of the monitoring and control functions of the systematic approach
3. Improving evaluation processes by means of the designated components and sequence of events, including the feedback and revision of events, inherent in models of systematic instructional design
4. Testing or building learning or instructional theory by means of the theory-based design within a model of systematic instructional design (D. H. Andrews & Goodson, 1980, pp. 3-4).

The effectiveness of various instructional design model elements is supported by research in teacher effectiveness, instructional strategies, communications studies and cognitive learning processes (Bell-Gredler, 1986; Bloom, 1968, 1984; Dunn, 1984; Gagne, 1985; Glaser, 1963; Keller, 1974; Kulhavy, 1977; Mager, 1962; Mayer, 1979; Popham, 1975; Ross, 1984 as cited in Moallem & Earle, 1998, p. 6).

Model development. Although the field of Educational Technology prominently uses instructional design models, the research literature contains very little information about how instructional models should be developed and validated (Bagdonis & Salisbury, 1994; Richey & Klein, 2007). This lack of information can be attributed to the "different types of models and different ways in which individuals think about models, there exists no one technique or process to determine how a model should be developed" (Bagdonis & Salisbury, 1994, p. 28). For example, the Dick and Carey instructional model was constructed by "applying a diverse body of research and thinking of the times to the task of creating instructional products. It was a logical process of synthesis" (Richey & Klein, 2007, p. 66). Tessmer, McCann and Ludvigsen (1999) developed a model for identifying training excesses and deficiencies by conducting a literature

review and synthesizing the findings. Most instructional design models are constructed in this way.

While models are not the same as theory, Andrews and Goodson (1980) argue that the requirements for model development should be the same as theory development: "to prescribe the sequence of events and functions for the tasks that lead to effective instruction" (p. 3). Morris (1967) suggests that model development is an intuitive process for an experienced designer. It is based on the designer's philosophical and theoretical perspective, which suggests contexts for application. In their review of instructional design models, Gustafson and Branch (1997) content "the greater the compatibility between an ID model and its contextual, theoretical, philosophical, and phenomenological origins, the greater the potential for success in constructing effective learning environments" (p. 16).

Model development steps have been proposed by Morris (1970), Lebow (1990), Randers (1980), and Carson (1987) (Bagdonis & Salisbury, 1994). These problem-centric, systematic and linear approaches simplify the problem, are focused on the instructional objectives, identify relationships between elements and are process-oriented (procedural). Even though these frameworks for model development identify what to do, for example, Morris (1970) suggests seeking analogies between the problem and other systems, and Lebow (1990) recommends defining a model for reference to map component relationships, they offer little guidance on how to identify relevant model elements and the steps necessary to support those elements (Bagdonis & Salisbury, 1994). Using a problem-solving orientation, Rubinstein (1975) offers a simple, practical approach to model development. He contends that abstract models containing less detail are more productive and useful. To achieve this level of abstraction, he proposes that model development follow these fundamental steps:

1. Establish the purpose of the model.
2. List the possible elements (observations, measurements, ideas, and concepts) which may relate to the purpose, however remote.
3. Select those items of Step 2, which are relevant to the purpose in step 1.
4. Aggregate elements, which can be chunked together by virtue of the strong structural, functional, or interactive connections between them. This is a process of classification, in a sense.
5. Repeat Step 4 several times, if necessary, until a model consisting of seven, plus or minus two, chunks emerges (p. 197).

This approach relies on the developer to inductively select elements and aggregate the concepts necessary to support the model purpose. It is grounded in the developer's theoretical and philosophical orientation. An example of how this process can be used to develop a model, is offered by Alexander (1970), who used the steps to design a tea kettle:

1. Purpose: Invent a tea kettle to fit the context of its use.
2. Possible elements relating to purpose: size, weight, handling: not hard to pick up when hot, not easy to let go by mistake, storage in the kitchen; ease of water flow in and out, pour cleanly; maintain water temperature, i.e., water not to cool too fast; cost of material; material should withstand temperature of boiling water; not hard to clean; shape not too difficult to machine; shape compatible with material of reasonable cost; cost of assembly; not corrode in steamy kitchen; inside not difficult to keep free of scale; economical to heat small amounts of water; can be used with gas or electricity; cost of use, namely, gas or electricity, not high; should have a reasonable life; should satisfy a large class of customers; safe for children, not burn out dry without warning,

stable on stove when boiling; color of exterior, pleasant appearance in shape, compatible in shape and choice of colors with other common kitchenware.

3. Relevant elements: Let us consider all but the last three elements as relevant. Namely, and here comes aggregation, the aesthetic features of color and appearance are not considered relevant.
4. Aggregation: Use, safety, production, initial cost, cost of maintenance.
5. Further abstraction leads to aggregation of the chunks in step 4 into two larger chunks of *Function* and *Economics* (as cited in Rubinstein, 1975, pp. 198-199).

The larger chunks, function and economics are more abstract than the concepts (production, safety, use) and (capital, maintenance) supporting them. Modeling simplifies a real-world problem by "aggregating elements that are strongly connected through structure and function, or both, and selecting chunks so the connection between them in terms of structure and function is weaker than that inside" (Rubinstein, 1975, p. 200). To reduce a theory or a group of theories into a model, concepts relevant to the problem are linked to similar concepts and assembled into chunks. Each chunk contains a set of concepts that is determined by the model developer to be essential to the process of enabling the model to achieve its purpose. When the chunks are linked together, they form a step in the model that is used to support the model purpose. These model building process steps enable the generation of relevant theoretical concepts and their assembly into meaningful chunks (model steps and elements).

It is noteworthy that the literature describing instructional design model development is "directed toward the effects or outcomes of the model and say little about the processes involved in their construction" (Bagdonis & Salisbury, 1994, p. 30). Providing the method used to develop the model will enable developers to replicate the process to build future models.

Model validation. Instructional design model validation is a "carefully planned process of collecting and analyzing empirical data to demonstrate the effectiveness of a model's use in the workplace or to provide support for the various components of the model" (Richey, 2005, p. 174). Model validation can be internal or external. Internal validation addresses model integrity and use. These studies occur during model construction or its early use. Internal validation produces descriptive data to support the model components, the relationships between the components and the processes used (Richey, 2005). For example, a literature review may be conducted to confirm model components or sequence. Such a review serves as a formative evaluation of the model. Methods of internal validation are expert review, usability documentation, and component investigation (Richey & Klein, 2007). External validation focuses on the "effects of using the model-the instructional products themselves, and [the] impact of these products on learners, clients, and organizations" (Richey, 2005, p. 175). Methods of external validation are field evaluation and controlled testing (Richey & Klein, 2007).

Model validation has received little attention in the literature (Gustafson & Branch, 2002). Several extensive literature reviews on the validation of instructional design models (King, 1989; Bagdonis, 1992; Andrews and Goodson, 1980) show that many models have never been validated or were "validated over time by their repeated use" (Bagdonis & Salisbury, 1994, p. 31). Instructional designers consider models to be valid if they meet the needs of the workplace, are easy to use and produce products acceptable to their clients. This experiential assessment provides the supporting data. Theorists and model developers assume model validity if the model is a "logical, coherent entity with literature support" (Richey, 2005, p. 174). Seel (1997) contends that a model does not require empirical conformation like theory because a

"model only represents theory for a particular situation and to a particular degree of accuracy" (p. 357).

Instructional Design Theory

Instructional design theory is a "theory that offers explicit guidance on how to better help people learn and develop" (Reigeluth, 1999, p. 5). Instructional design theories:

- are *design-oriented*, they address how to achieve learning and development goals.
- describe *methods* of instruction (ways to support and facilitate learning) and the *situations* in which those methods should be used. Methods of instruction can be broken into *more detailed component methods*, which provide more guidance to educators.
- are *probabilistic*, they increase the likelihood of accomplishing the instructional goals (pp. 6-7).

The goal of instructional design theory is to offer methods of instruction for different situations that increase the probability that the desired learning outcomes will occur (Driscoll, 2005). To accomplish this goal, four components should be considered:

1. The learner
2. The learning task (including desired learning outcomes)
3. The learning environment (learning conditions and instructional methods)
4. The frame of reference (or the context in which learning is to occur) (Schott & Driscoll, 1997 as cited in Driscoll, 2005, p. 353).

Given an understanding of the learners and the learning goal (outcome) an instructional method is selected based on instructional theory (for example, information processing, situated

cognition) and an instructional model, step-by-step procedures that produce learning outcomes is used to guide the instructors actions (Driscoll, 2005).

How instructional design theory works. Most theories are descriptive, they describe what happens when a series of events occur. For example, information processing theory is a descriptive theory that explains how sensory information is converted into knowledge for storage into long-term memory. Descriptive theories are predictive; given an event, they predict the effect or next step in the process. Design theories are prescriptive, they offer practitioner guidance for selecting a method to achieve an instructional goal (Reigeluth, 1999). For example, if the instructional goal is the retention of new information, the instructor should relate the new information to the learners' prior knowledge. This is the instructional method (Reigeluth & Carr-Chellman, 2009).

Reigeluth and Carr-Chellman (2009) used the Delphi process to more clearly define the nature of instructional theory and build a common knowledge base. Based on this research, the most important constructs of an instructional theory are instructional method "anything that is done purposely to facilitate human learning and development" and instructional situation, "all aspects of an instructional context that are useful for deciding when and when not to use a particular instructional method" (p. 31). The word 'situation' refers to elements of the context that influence the selection of a method. The instructional situation contains values about instruction and conditions of instruction. Values about instruction are instructional elements that are considered important by an instructional theory. Values are based on opinion; they represent a philosophy of instruction. The four kinds of values are learning goals, priorities, methods and power (Reigeluth & Carr-Chellman, 2009). The conditions of instruction are the factors that influence the selection of the methods. The conditions of instruction are:

- *Content:* Nature of what is to be learned
- *Learner:* Nature of the learner
- *Learning environment:* Nature of the learning environment inclusive of human resources, material resources, and organizational arrangement
- *Instructional development constraints:* Resources available for designing, developing and implementing the instruction, including time, cost and labor (p. 24).

The instructional situation (values about instruction and conditions of instruction) provides the inputs necessary to support the selection of instructional methods, Figure 19.

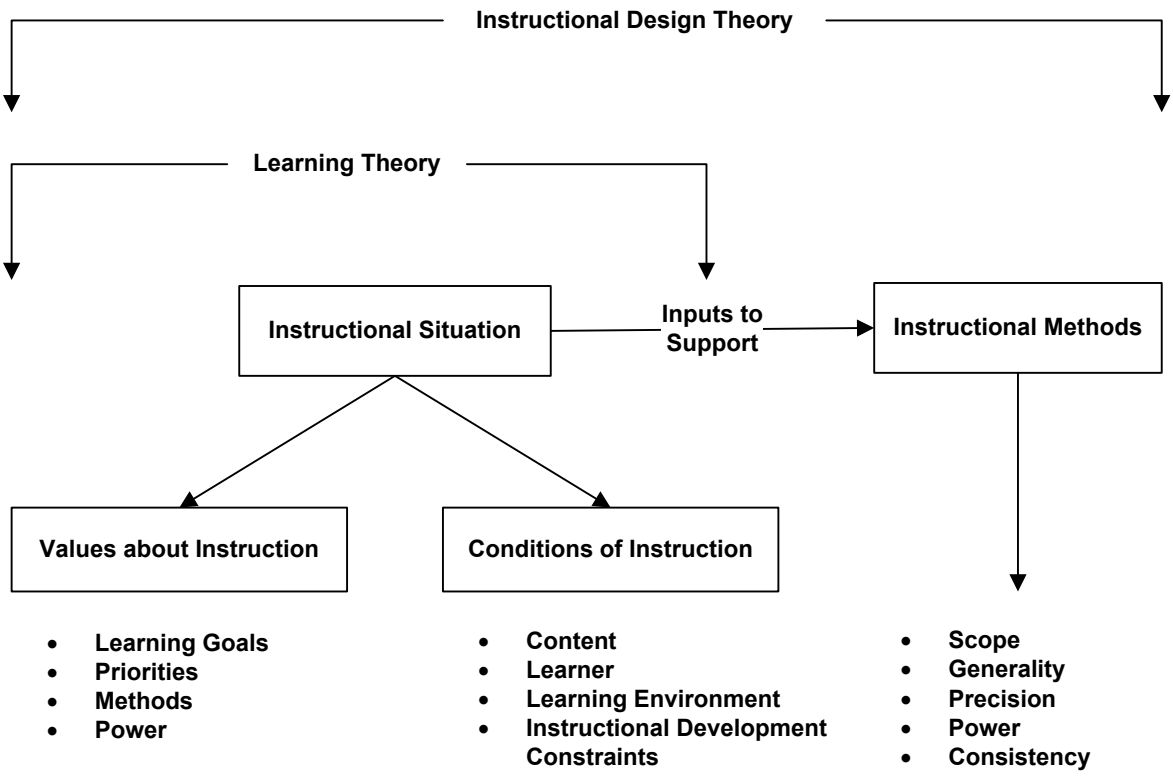


Figure 19. The relationship between learning theory and instructional design theory based on Charles Reigeluth and Allison Carr-Chellman's explanation of instructional design theory. Adapted from "Psychology of Learning for Instruction" by M. P. Driscoll, 2005, p. 353. Copyright 2005 by Pearson Education, Inc.

Instructional methods are assessed in terms of their situational applicability based upon the criteria of scope, generality, precision, power and consistency (Reigeluth & Carr-Chellman, 2009).

Robert M. Gagne's Theory of Instruction

Originating from instructional psychology research, Robert M. Gagne's theory of instruction is a conditions-based theory, a cognitive approach to the selection and design of instruction (Richey, et al., 2011). It is comprised of three major components: conditions of learning, events of instruction and learning outcomes (Gagne, et al., 2005).

Gagne (1985) considers learning to be a change in the learner's disposition or capability that is reflected in behavior. There must be a noticeable difference between what the learner does before the learner enters a learning situation and what the learner does after participation in the learning situation in order to confirm that learning has occurred. This change in performance must also be retained over time. Learning situations contain factors both internal and external to the learner. The internal factors the learner brings to the learning situation are their stored memories (prior knowledge) and their intentions (motivation to learn). The external factors are the learning environment itself, the resources in the environment and the management of learning activities in the environment. These external conditions interact with the internal conditions of the learner. These factors (conditions of learning) have a direct effect on learning and should be considered when designing instruction (Gagne, et al., 2005).

Based upon the information processing theory of how learning works, the learning environment (external conditions) should be arranged to enable the internal processing of information by the learner from sensory input into short term memory, integration with prior knowledge (internal conditions), and its subsequent encoding into long term memory for storage.

Instruction enables learning when it supports the internal events of information processing. The external events, the instruction itself, must align with the internal events. Instruction can be considered a "deliberately arranged set of external events designed to support internal learning processes" (Gagne, et al., 2005, p. 10). Gagne (1985) hypothesized that arranging the events of instruction to leverage information processing theory of learning would increase the likelihood that the resulting instruction would produce learning, retention and transfer to practice.

The external events of instruction Gagne (1985) suggests will bring about the internal processing that leads to learning are:

1. Gaining attention
2. Informing learner of the objective; activating motivation
3. Stimulating recall of prior knowledge
4. Presenting the stimulus material
5. Providing learning guidance
6. Eliciting performance
7. Providing feedback
8. Assessing performance
9. Enhancing transfer and retention (p. 304)

Gagne, et al., (2005) associated these events with the information processing theory of learning and memory to show how the events work with this learning process to produce efficient learning:

1. Stimulation to gain attention to ensure the reception of stimuli
2. Informing learners of the learning goals to establish appropriate expectancies
3. Reminding learners of previously learned content for retrieval from LTM

4. Clear and distinctive presentation of material to ensure selective perception
5. Guidance of learning by suitable semantic encoding
6. Eliciting performance, involving response generation
7. Providing feedback about performance
8. Assessing the performances involving additional response feedback occasions
9. Arranging variety of practice to aid future retrieval and transfer (p. 10)

This sequence of these events corresponds to the way information is transformed according to the memory stores (sensory, working memory, long-term memory) and their function as described by information processing theory. When information retrieved from long-term memory enters working memory, this prior knowledge is considered the "essential part of the internal conditions of learning for new material" (Gagne, et al., 2005, p. 10). The result of this interaction (learning) produces five kinds of learning outcomes or learned capabilities:

1. *Intellectual skills:* Which permit the learner to carry out symbolically controlled procedures using discriminations, concepts, rules, and problem-solving skills
2. *Cognitive strategies:* The means by which learners exercise control over their own learning processes
3. *Verbal information:* The facts and organized 'knowledge of the world" stored in the learner's memory
4. *Attitudes:* The internal states that influence the personal action choices a learner makes
5. *Motor skills:* The movements of skeletal muscles organized to accomplish purposeful actions (Gagne, et al., 2005, pp. 10-11).

The intention of instruction is to bring about more than one or two of these outcomes or capabilities. This is what gets learned and stored in memory (Gagne, 1985). For example, learning to tell a story, a verbal act, is possible through the activation of intellectual skills (recognizing language symbols and the rules for assembling a sentence), the use of cognitive strategies (remembering, thinking), attitude engagement (influenced by intellectual skill and motor skill) and the use of motor skills (employed during the act of telling). This organized outcome is possible through the associations the learner makes during the learning process. Instruction should recognize and address multiple outcomes.

Intellectual skills include learning concepts, principles and how to solve problems. These higher-order learning skills must be practiced and applied (Gagne, et al., 2005). Intellectual skills are enabled by prerequisite knowledge about concepts, principles, and processes. The activation and use of intellectual skills leads to the building of elaborate, cumulative intellectual structures. "Intellectual skills are richer in transfer potential which allows the building of increasingly complex structures of intellectual competence" (p. 12). Intellectual skills are operational; they influence what the learner does (performance).

Gagne's (1985) theory of instruction suggests instruction is planned for the purpose of supporting the processes of learning. Designing effective instruction begins with recognizing the conditions of learning (learner internal and external factors) and using those factors to develop instruction to activate the learner's internal learning process (information processing theory) which produces learning outcomes (capabilities).

In a review of empirical studies on conditions-based instructional design theory, inclusive of Gagne's Theory of Instruction, Smith and Ragan (2004) reported the following results:

- Strong empirical support for the validity of learning hierarchies and the extent to which they accurately describe relationships among sub skills and prerequisite skills;
- Strong support for the notion that different events of instruction lead to different kinds of learning, especially for declarative and procedural outcomes;
- Weak support for the hypothesized relationship between internal process of learning and the acquisition of different learning outcomes (as cited in Richey, et al., 2011, p. 124).

Context in Learning and Instructional Design

Context is part of every learning experience (Tessmer & Richey, 1997; M. F. Young, 1993). Context can be defined as "a multilevel body of factors in which learning and performance are embedded" (Tessmer & Richey, 1997, p. 87). Contextual factors include the learner's work environment and associated work practices as well as learner characteristics (attitude, background) (Richey, et al., 2011). These physical, social and instructional factors surround both the learner and the instruction (Tessmer & Wedman, 1995) and they work together to influence learning (Richey, et al., 2011). An analysis of instructional context can identify factors that inhibit or enable learning and transfer.

Tessmer and Richey (1997) reviewed the literature related to general systems, communication and psychological theories and found support for considering context in instructional designs. "Contextualizing instruction makes abstract concepts more complete, promotes understanding and retention, as well as facilitates reinforcement and transfer of training" (p. 64). Their examination of the role of context in learning led them to propose a three-part view of context and its influence on learning and performance. The three parts are the

orienting (before), instructional (during), and transfer (after) contexts. Each context contains three embedded sub-contexts, the learner, immediate environment, and the organization.

The orienting context precedes the learning event. It includes factors that influence the learner's motivation and cognitive preparation to learn. Orienting context factors are what the learner brings to the learning event. The instructional context contains the factors that are directly involved in the delivery of the instruction. These external factors are confined to the learning event itself. The transfer context is the environment where learning is applied. The sub-contexts in each of these contextual parts provide information about the learner's experiential background, the immediate work environment inclusive of work and social practices, and the organization's culture, specific to the contextual level. For example, in the instructional context, the learner context contains the physical and psychological factors that affect learner motivation and processing as well as instructor behavior (Tessmer & Richey, 1997). The three-part contextual model assumes that instructional design based on the investigation and consideration of these contexts results in the development of successful instruction.

In a review of the instructional design literature related to the teaching of concepts, Tennyson and Park (1980) found that the "instructional sequence should be organized in contextual form" (p. 65) to enable learning. In a study on the sequencing of instructional content, Mager (1961) found that an effective content sequence is one that is "meaningful to the *learner*" (p. 405). Structuring knowledge in contextual form enables learners to assemble information in ways that are meaningful to them. Jonassen (1991) argues that context provides meaning for learners and "activates relevant schemata" (p. 36). Context provides a real world, relevant, experiential platform for knowledge acquisition. Contextualized instruction prompts episodic

memory and uses a narrative structure that "has been shown to enhance meaningfulness and memory of acquired knowledge" (Jonassen, 1991, p. 37).

Learning Transfer

One of the challenges of designing instruction that leads to learning is how to preserve that learning in long-term memory so it can be retrieved and transferred to new performance contexts. Meaningful context provides the learner with a rich network of relationships (schema) to draw cues from for retrieval. Meaningful context "appears to offer the best assurance of recall" (Gagne, et al., 2005, p. 201). It is this retained learning that is accessed by the learner during transfer. Transfer, the final event in Robert Gagne's (1985) nine events of instruction, is the application of learned knowledge and skills to different performance contexts or applications. Although transfer is considered to be a valued goal of education, the "means for accomplishing it have been elusive" (R. Thomas, et al., 1992, p. 1).

Transfer is not easy (Ambrose, et al., 2010). The literature describes two kinds of transfer. Near or low road transfer refers to transfer that is similar to the original context. For example, low road transfer is a practiced skill like driving. Far or high road transfer refers to transfer to a context that is different than the original learned context (Ambrose, et al., 2010), it is the "conscious application of abstract knowledge to a new situation" (Woolfolk, 1995, p. 315). During far transfer, the learner actively selects and assesses strategies and correctly applies them based on previously learned understanding without instructor prompting (National Research Council, 2000). Far transfer is difficult to achieve because the learner must possess understanding of how the relevant concepts work. There is considerable evidence in the literature that what is learned during instruction is only applied by learners to contexts that are similar to the context used during instruction (near transfer) (Bransford, Nitsch, & Franks, 1977; Cronbach

& Snow, 1977; Mayer & Greeno, 1972; Royer, 1979 as cited in R. E. Clark & Voogel, 1985, p. 113). Ambrose, Bridges, DiPietro, Lovett and Norman (2010) report that "(a) transfer occurs neither often nor automatically, and (b) the more dissimilar the learning and transfer contexts, the less likely successful transfer will occur" (p. 108). Failure to transfer occurs when knowledge is closely associated with the original context where it was first learned (Ambrose, et al., 2010; Ford & Weissbein, 2008; National Research Council, 2000). Unless varied contexts are explored during learning, the learner will confine its use to its original learned context. Failure to transfer can occur if learners do not understand key principles or deep structure, "they understand what to do, but not why" (Ambrose, et al., 2010, p. 109). Failure to transfer can also occur because strategies are not built into instructional designs to enable transfer (Holton, 1996 as cited in Yamnill & McLean, 2001, p. 200).

In an extensive review of the empirical literature related to the study of transfer, Ford and Weissbein (2008) identified three factors that impact instructional outcomes and transfer: instructional design, learner characteristics and environmental factors. The instructional design factors are learning principles and instructional sequence. The learner characteristics include "ability, skill, motivation and personality factors" (p. 23). The environmental factors are climate, social support and work constraints. This model of inputs and transfer conditions provided the framework for their review of twenty empirical research studies on training transfer. Based on this review, transfer is enabled when complex learning tasks "mirror the learning tasks found in work settings" (p. 38). They identified a need for the use of design strategies to enable transfer and for the development of better ways to measure transfer.

Transfer is enabled when learners "combine concrete experience within particular contexts and abstract knowledge that crosscuts contexts" (Schwartz, et al., 1999 as cited in

Ambrose, et al., 2010, p. 110). Transfer is also enabled through analogical reasoning (Gentner, Holyoak & Kokinov, 2001; Catrambone & Holyoak, 1989; Holyoak & Koh, 1987; Klahr & Carver, 1988 as cited in Ambrose, et al., 2010). Alexander and Murphy (1999) suggest instructors model analogical thinking and expect such thinking from learners to establish a means of transfer.

Teaching for transfer is the application of research based instructional strategies that enable educators to assist learners with making the connections between prior knowledge, new knowledge and the new contexts in which such knowledge can be successfully applied (Ambrose, et al., 2010; Halpern & Hakel, 2003; R. Thomas, et al., 1992).

Instructional strategies to facilitate transfer. There are a number of empirically validated strategies used to facilitate transfer in the literature. Garavaglia (1993) suggests using different examples to make learners aware of the possible contexts where the knowledge may be applied. This enables learners to focus on the relevant aspects of content to develop a more "flexible representation of knowledge" (Gick & Holyoak, 1983 as cited in National Research Council, 2000, p. 62). Halpern and Hakel (2003) recommend "practice at retrieval." Learners generate responses to different knowledge application contexts so retrieval becomes more fluent; the more something is retrieved from long-term memory, the stronger its connection. Ambrose, Bridges, DiPietro, Lovett and Norman (2010) advocate discussing conditions of applicability with learners. By explaining the specific contexts where knowledge (principles) or skills are, and are not applicable, learners are better able to recognize the conditions for transfer. Comparisons enable learners to determine meaningful structural features (underlying principles) of a case, problem or scenario and compare these attributes to another case, problem or scenario. Structured comparisons help learners see under the surface features to get into the "deep features

of novel problems and thus facilitate successful transfer" (Ambrose, et al., 2010, p. 119). Learner encouragement to discuss and apply their learning in new contexts leads to successful transfer (Noe, 1986 as cited in Yamnill & McLean, 2001, p. 202). These strategies not only enable learner transfer, they also teach learners how to learn for transfer (Perkins & Salomon, 1988).

Summary

This chapter examined findings from the literature on narrative theory, development theory, communication theory, learning theory, and instructional design theory to inform the development of a model for designing instructional narratives for the purpose of enabling adult learning, retention and the effective transfer of that retained learning to practice (performance contexts). This chapter also examined the research related to narrative application in higher education and organizational settings, two primary performance environments for adult learners.

CHAPTER 3

Methodology

The purpose of this study was to develop a research-based model for designing and deploying instructional narratives based on principles derived from narrative theory, development theory, communication theory, learning theory and instructional design theory to enable adult learning and retention and the effective transfer of that retained learning to practice (performance contexts). Findings from these five areas will identify elements that will be used to inform the development of a model for the design and deployment of instructional narratives. An instructional narrative is a narrative expressly designed for the purpose of enabling learners to alter their perspective, make decisions, take action, and acquire particular capabilities leading to a change in behavior. This research study examines narrative in terms of its use as an instructional modality. A modality addresses the manner in which information is encoded for transmission.

This study used a design and development research approach. Design and development research produces knowledge gleaned from practice. Richey and Klein (2007) define design and development research as "the systematic study of design, development and evaluation processes with the aim of establishing an empirical basis for the creation of instructional and non-instructional products and tools and new or enhanced models that govern their development" (p. 1). Design and development research is a pragmatic kind of research that tests theory and validates practice. It enables the establishment of new procedures, techniques and tools based on methodical analysis. This applied research is related to the practice of instructional design. The design and development of instructional products is "considered by many to be the heart of the instructional design and technology (IDT) field" (Richey & Klein, 2007, p. 1).

This chapter describes the research design and the data collection and analysis processes.

Research Design

Model development research, a form of design and development research, was used to develop and validate a model using narrative as an instructional modality to design instruction for adult learners' that facilitates learning, retention and the effective transfer of that retained learning to practice (performance contexts). Model development research addresses the construction of models and processes. The objective of model development research is the "production of new knowledge in the form of a new (or an enhanced) design or development model" (Richey, et al., 2011, p. 11). This research method was selected because it is a means of constructing a model. The research technique for this study was literature review and analysis (Richey & Klein, 2007).

Model research studies are exploratory in nature. In an exploratory study, the researcher builds understanding based on what is read (Creswell, 2009). This type of research is less structured than descriptive research and is typically qualitative in nature (Richey & Klein, 2007). Qualitative data, the use of words rather than numbers, is heavily used in the social sciences. These kinds of data provide rich descriptions and explanations. The findings enable researchers to "get beyond initial conceptions and to generate or revise conceptual frameworks" (Miles & Huberman, 1994, p. 1). It is noteworthy that the researcher's theoretical and philosophical perspective influences all model design and development. This bias significantly contributes to the decision making and reasoning processes during the design and development research process (Hoover & Donovan, 1995).

Data Collection and Analysis

Design. This research study was comprised of three distinct, yet interrelated literature reviews. The first review focused on obtaining an understanding of how the use of narrative as an instructional modality works to enable learning and retention and the effective transfer of learning to practice (performance contexts). The review purpose was to build the conceptual framework to solve the research problem, learning transfer to practice. The second literature review was focused on determining how best to design, develop and deploy an instructional narrative. This review established the model steps and elements deemed necessary to operationalize the conceptual framework. The review purpose was to build the model. The third review was focused on confirming theoretical support from the theory bases identified in the conceptual framework, narrative, development, communication, learning and instructional design, for each of the model elements. This review served as a formative review of the model and its processes. The review purpose was to internally validate the model.

Analysis process. The researcher applied an inductive reasoning process to assemble the conceptual framework and develop the model for designing instructional narratives from the research literature. Inductive reasoning is the buildup of ideas from data (information) into broad themes, categories or patterns to produce a generalized model or theory (Creswell, 2009). The researcher gathered information (data) from the literature about the use of narrative as an instructional modality. These data were grouped into themes and the themes were cultivated into patterns. Pattern building is a by-product of the researcher's past experience and the literature review. Patterns are explanations that develop as a natural consequence of sense making during data analysis. "Pattern theories are systems of ideas that inform. The concepts and relations within them form a mutually reinforcing, closed system. They specify a sequence of phases or

link parts to a whole" (Neuman, 2000 as cited in Creswell, 2009, p. 64). The researcher employed pattern building to make inferences about how narrative could be applied to solve the problem. Pattern theory was used to develop the conceptual framework and the model for designing instructional narratives.

First literature review. The literature review in this design and development phase was focused on the use of narrative as an instructional modality for adult learners. A modality addresses the manner in which information is encoded for transmission. Initial literature searches were conducted using the key words: narrative, story, adult learners and learning. Literature from each of the five theory bases was reviewed. The information obtained from this review was grouped into themes and patterns were developed. The researcher's understanding of how narrative, development, communication, learning, and instructional design theories could work together to solve the research problem, led to the depiction of these hypothesized relationships in the conceptual framework, Figure 1. This framework operationalizes the researcher's literature based qualitative assumptions about how narrative works to put learning into practice. It shows the theoretical relationships and boundaries and provides direction for the study.

Second literature review. The literature review in this design and development phase was focused on model development. Recognizing the complexity associated with operationalizing narrative to facilitate learning, retention and transfer, the researcher made the decision to simplify the complex processes involved by developing a model to enable the communication and practical application of narrative in performance environments. Model development provides the means to translate theory into practical use in instructional settings (Davis & McCallon, 1974 as cited in D. H. Andrews & Goodson, 1980, p. 4).

The general question was: what is the best model that can be developed using narrative as an instructional modality to design instruction for adult learners' that facilitates learning, retention and the effective transfer of that retained learning to practice (performance contexts)?

The following are the research questions that formed the basis of this research study:

1. What major findings from the literature on narrative theory contribute to how experience is made meaningful through narrative meaning making?
2. What major findings from the development theory literature contribute to how adults (come to know) think?
3. What major findings from communication theory contribute to an understanding of how narratives can be used to communicate meaning?
4. What major findings from learning theory contribute to an understanding of how adults learn?
5. What major findings from instructional theory contribute to how to design instruction for adult learners?
6. What model for designing instructional narratives can be constructed based on the findings from these five areas (narrative, development, communication, learning and instructional design theories)?

These questions led to literature searches that broadly addressed how each theory worked and identified its contribution to the researcher's understanding of how findings from each of the theory bases would contribute to solving the problem. The model was developed using Rubinstein's (1975) five step model development process. This approach relies on the developer to inductively select elements from the literature and aggregate the concepts necessary to support the model purpose. It is grounded in the developer's theoretical and philosophical orientation.

Given the model purpose, the researcher identified possible relevant elements from the literature review. These elements were chunked together based on the "strong structural, functional or interactive connections between them" (Rubinstein, 1975, p. 197). This was an iterative process of identifying conceptual themes, defining and re-defining boundaries and confirming or dismissing potential conceptual relationships. This effort produced a model containing four steps and 12 elements, three elements for each of the model steps.

The model is procedural in nature. Procedural models "reflect current and proposed practice. They identify steps, not relationships among variables; their primary function is to facilitate application, rather than to describe or explain events" (Richey, 1986, p. 94). The model foundation is a set of concepts identified as relevant to narrative, development, communication, learning and instructional design. These concepts provide the theoretical underpinnings for the model and were used to determine and assemble the model procedures. These operational procedures are based on the structural, functional and interactive relationships derived from the conceptual literature. The model contains four steps, Describe, Operationalize, Tailor and See. Each step contains three elements that work together to complete the step action. These actions are the processes that lead to the completion of the step. Each step output becomes the input for the next model step.

Third literature review. The literature review in this design and development phase was focused on gathering theoretical support from each of the five theory bases: narrative, development, communication, learning, and instructional design for the 12 model elements. The purpose of this literature review was to internally validate the model and its processes. Theorists and model developers assume model validity if it is a "logical, coherent entity with literature support" (Richey, 2005, p. 174). Literature support for the model was focused on the work of

other theorists and researchers that addressed the use of each model element in practice. As suggested by Richey and Klein (2007), the review addressed the following internal model validation concerns:

- Are all steps included in the model necessary?
- Are the steps manageable in the prescribed sequence?
- To what extent does the model address all relevant environmental factors?
- To what extent is the model usable for a wide range of design projects and settings?
- Can the steps be completed efficiently under most working conditions?
- Is the use of this model cost effective? (p. 23)

Data was collected from the five theory bases and assembled into tables. The conceptual support from the five theory bases provided empirical support for the model (Reigeluth & Stein, 1983), strengthened the case for inclusion of the elements, and confirmed the element's contribution to the model step it supported. This review served as a formative evaluation of the model elements and processes.

Limitations of the Study

Researcher bias is a research study limitation inherent in all model design and development research projects given the interconnected nature of the experiential background of the researcher with the literature. This affects not only the selection of the literature to be reviewed for inclusion, but, most importantly, the inductive processes used by the researcher to aggregate conceptual elements and assemble the model. Another limitation of this research study is the lack of external validation of the model. External model validation studies assess the deployed model's impact (Richey & Klein, 2007).

Summary

This chapter presented the research methodology. The research design and data collection and analysis processes were described. The research design consisted of three distinct, interrelated literature reviews. Data obtained from these literature reviews were analyzed using inductive reasoning and applying pattern theory.

CHAPTER 4

Findings

The purpose of this study was to develop a research-based model for designing and deploying instructional narratives based on principles derived from narrative theory, development theory, communication theory, learning theory and instructional design theory to enable adult learning and retention and the effective transfer of that retained learning to practice (performance contexts). Findings from these five areas were used to identify elements to inform the development of a model for the design and deployment of instructional narratives. An instructional narrative is a narrative expressly designed for the purpose of enabling learners to alter their perspective, make decisions, take action, and acquire particular capabilities leading to a change in behavior. This research study examined narrative in terms of its use as an instructional modality. A modality addresses the manner in which information is encoded for transmission.

This chapter introducing the findings from the six research questions contains two sections. The first section addresses research questions one through five. It summarizes the analysis and synthesis of the literature from the narrative, development, communication, learning, and instructional design theory bases. The results are compiled in tables that show the relationship between the theoretical literature and each model step and its associated elements. The second section addresses the sixth research question, "what model for designing instructional narratives can be constructed based on the findings from these five areas (narrative, development, communication, learning and instructional design theories)? The answer to this research question--and the result of this research study is--*A Model for Designing Instructional Narratives for Adult Learners: Connecting the DOTS*. This model contains elements derived

from the literature that support the use of narrative as an instructional modality to promote learning, retention and learning transfer to practice (performance contexts). This section introduces the model and defines each model step and its associated elements. The purpose of each step in relationship to the other model steps is described. How the model is applied to design, develop and deploy instructional narratives is explained. The criteria for the selection of a model for an instructional situation as suggested by Edmonds, Branch and Mukherjee (1994) are applied to provide guidance on when the DOTS model should be selected for an instructional situation. This section concludes with a discussion of model validity.

Analysis and Synthesis of the Literature

This section addresses research questions one through five. Relevant literature from each of the five theory bases, narrative, development, communication, learning, and instructional design was analyzed and synthesized to produce the *Model for Designing Instructional Narratives*. The findings are mapped to the model steps and its associated elements. Although each of the five theory bases contributes in some way to each of the model elements, the predominant areas of theory base influence are shown in Figure 20.

Findings from Narrative Theory

This section addresses research question one: "What major findings from the literature on narrative theory contribute to how experience is made meaningful through narrative meaning making?" The relationship of the research finding to a specific model element is noted by the placement of the element in brackets next to each finding.

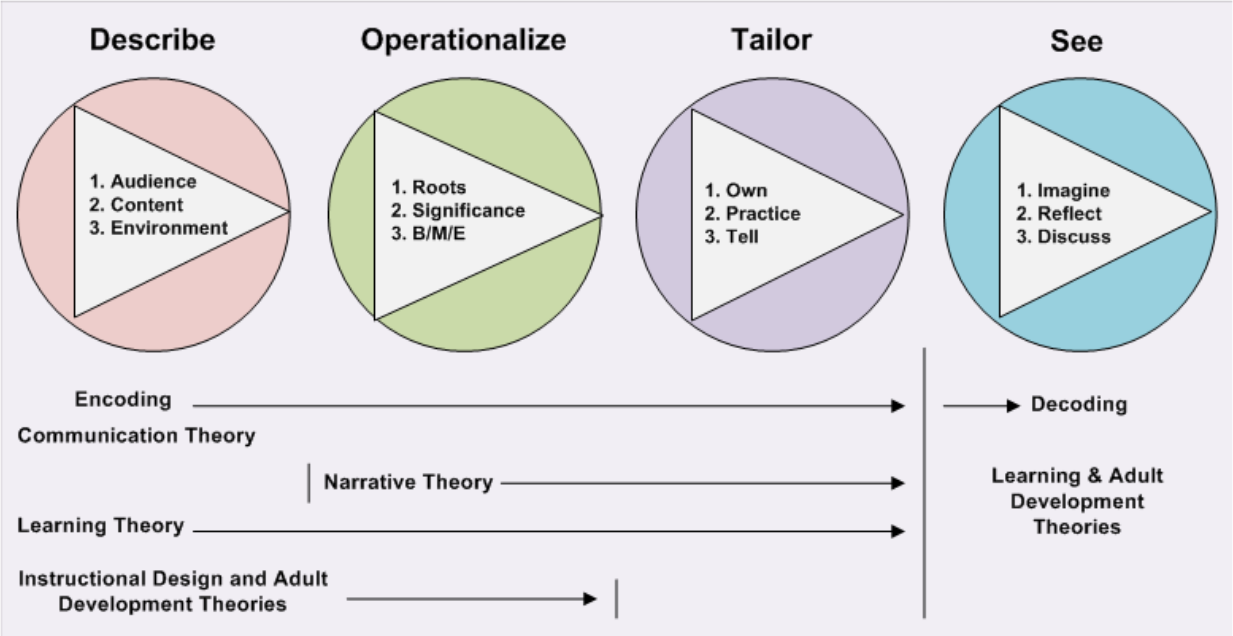


Figure 20. The five theory bases: narrative, development, communication, learning, and instructional design mapped to the *Model for Designing Instructional Narratives for Adult Learners: Connecting the DOTS*

Narrative is a meaning making structure used for both assimilating and expressing knowledge (Bruner, 1986; Irwin, 1996; Polkinghorne, 1988; Sarbin, 1986). It originates in the mind and can be both spoken and written. Narrative competence is evident at an early age and appears in most cultures (Polkinghorne, 1988; Stein & Glenn, 1979; Sutton-Smith, 1981, 1986). The model uses the narrative components of both story and discourse (Chatman, 1978). The story, the account of experience, is designed in a beginning, middle, end sequence and contains a plot [B/M/E] as proposed by Aristotle (Louchart & Aylett, 2004; McManus, 1999). This narrative cycle is comprised of links as suggested by Todorov (1990) that set up a logical succession as events unfold. These successive actions, thoughts and feelings occur in time (Ricoeur, 1979, 1980) and enable the learners/listeners to advance through each unfolding development, culminating in transformation. Story characters are developed to behave in

expected ways based on their character type (Propp, 1968) and should be faced with choices (Polkinghorne, 1988). It is through these choices that meaning is made. The teller evaluates story events and establishes their importance [Own] (Labov, 1966, 1997, 2006). Everything inside the narrative should be functional, meaningful, and significant [Significance] (Barthes, 1975). The discourse or telling of the story uses Genette's (1980) elements of time, order, frequency, duration, voice, and mood to communicate [Tell] the story. The story is a closed structure, dependent upon what happens inside the plot. This structure leads to the formation of teller/listener story schemas that contribute to story understanding and recall (Mandler & Johnson, 1977).

Operationalizing narratives requires more than a beginning, middle, and end sequence. Building a good story that learners/listeners find significant and value requires robust event description, knowledge of the mental state of the characters, their inner thoughts, feelings, motives (plot complexity) and a progression from beginning to end filled with possibilities. Learners/listeners will likely view such purposeful narratives as worthy of attention. The attributes of event description, wholeness, narrative orientation and narrative point contribute to the production of a good narrative. Good narratives strengthen story schemas and are retained as learners/listeners relate the narrative to their own story in response (Schank, 1990). The model includes a tellability assessment by the teller to be certain the planned story is worth telling.

Narrative intelligence, the ability to both create and follow narratives, is likely strong by the time an individual reaches adulthood (Randall, 1999). The model leverages this capacity by providing a framework that enables the teller to build a story according to the familiar beginning, middle and end structure learned in childhood and by arranging learner/listener opportunities for

social interaction [Discuss] to reach story understanding (E. W. Taylor, 2009). Discussion also provides an opportunity for learners/listeners to share their assessment of the story.

Narrative application in practice. The literature on narrative application in practice provides evidential support for the use of narrative to provoke changes in behavior. Narrative shapes culture, enables change, clarifies values and describes how things are done.

In practice, narrative construction begins with a teller who operationalizes an experience (prior knowledge) [Roots] that is meaningful and important [Significant] by organizing the experience into connected events in a beginning, middle and end sequence [B/M/E]. The product of this conversion is an authentic story that is cognitively and affectively owned by the teller [Own]. These elements, prior knowledge, significance, and the beginning, middle, end sequences of events are integral to the teller's learning experience. From the teller's perspective, learning occurs during story organization as knowledge gaps are identified and addressed (Cortese, 2005).

Recognizing that effective stories resonate with learner's/listener's lived experience, the model includes descriptive information about the audience; the learners/listeners social and psychological attributes [Audience]; content, the substance of what the learner's/listener's must know or do [Content], and the environment; the operational surroundings that make up the context contribute to learner/listener comprehension [Environment]. These elements, audience, content, and environment are the inputs the teller will use during narrative construction.

Narrative influences both cognition and attitude (J. Martin & Powers, 1983b) and is integral to the knowledge conversion process where explicit knowledge, "know-what" and tacit knowledge, "know-how" are socialized, externalized, combined and internalized (Nonaka & Takeuchi, 1995) to build core competencies in organizations (J. S. Brown & Duguid, 1998). This conversion illustrates how narrative influences action.

Sensemaking begins with a good story (Weick, 1995). Stories are coherent, plausible and engaging (Fisher, 1984, 1987). As a precursor to learning, sensemaking provides context and fuels interpretation. Narratives are also a means of reflection. As a pedagogical tool, narrative creates meaning and advances knowledge through understanding. We learn when experiences are understood in context on the basis of how past events contribute to, and render understandable, the comprehension of new events (Abrahamson, 1998).

The ability of narrative to convert knowledge, enable sensemaking, advance understanding through reflection, and influence action suggests that narrative affects performance.

Tables 6, 7, 8, 9 show how findings from the narrative theory literature were applied to support the *Describe*, *Operationalize*, *Tailor*, and *See* model elements.

Table 6

Model Step 'Describe' and its Elements Linked to Narrative Theory

Audience	Content	Environment
Man is "essentially a storytelling animal" (MacIntyre, 1981). Humans are narrative beings (Fisher, 1987). Humans are able to both produce and understand stories between the ages of two and three years (Applebee, 1978; Kemper, 1984; Nelson, 1993; Sugiyama, 2001; Sutton-Smith, 1986). Narrative is "international, transhistorical, transcultural" (Barthes, 1975, p. 237). "Humans are storytelling organisms who individually and socially lead storied lives" (Connelly & Clandinin, 1990, p. 2).	Narrative is a means of expressing a shared reality (White, 1980). Through narrative knowledge is assembled into a system composed of structure, function & significance (Barthes, 1975). Narrative meaningfulness is based on how closely it represents lived, human experience (Labov, 1997; Ricoeur, 1979). Narrative structures are used to think, perceive, and imagine (Sarbin, 1986). Narrative contextualizes learning through its structure (Gudmundsdottir, 1995).	Stories are culturally situated (Boje, 2008; Bell, 2002; Bruner, 1990; Kaye, 1995; Sugiyama, 2001; White, 1980). Narrative makes experience meaningful (M.C. Clark & Rossiter, 2008). Narrative occurs "in time" (Ricoeur, 1979, 1980, 1983). Narratives provoke sensemaking in organizations (Boje, 1991b; Boyce, 1995; M. Brown, 1985; Weick, 1995, 2001).

Table 7

Model Step 'Operationalize' and its Elements Linked to Narrative Theory

Roots (Prior Knowledge)	Significance	Beginning Middle End
Narrative is introspective; it begins on the inside of the teller (Chatman, 1978). Narrative intelligence is the ability to both create and follow a story (Randall, 1999). A story is a "natural way to recount experience" (Gudmundsdottir, 1995, p.3). Connecting past with present experiences; experiential continuity (Dewey, 1910, 1938; Clandinin, 2000; Parrish, 2006).	Narrative is a meaning structure that organizes events & actions into a recognizable whole. Significance is attributed to the action and events based on the effect on the whole (Barthes, 1975; Polkinghorne, 1988; Bruner, 1991). Natural resources of thinking; curiosity, organization & significance are present in narratives (Dewey, 1910, 1933). Narrative construction is preceded by an assessment of tellability (Labov, 2006; Norrick, 2005; Schank, 1990; Wilensky, 1983). Narrative is a means of testing hypotheses, sharing meaning and determining significance (Georges, 1969).	Narrative is a structure with characters in a beginning, middle, and end sequence organized by events or plot (Aristotle, 1997, Louchart & Aylett, 2004; McManus, 1999). Narrative provides an organizing structure for our new experiences and knowledge (Mandler, 1984). Narrativity (tellability) attributes: event description, wholeness, narrative orientation & narrative point (Prince, 1982). Relationships between characters (Propp, 1968). Narrative cycle (Todorov, 1990). Story is the encoding of 'what' (Chatman, 1978). Embedded narratives (Ryan, 1986).

Table 8

Model Step 'Tailor' and its Elements Linked to Narrative Theory

Own (Think)	Practice	Tell
Narrative is a "fundamental structure of human meaning making" (Bruner, 1986; Polkinghorne, 1988). Function of narrative is thinking (Levi-Strauss, 1963). Narratives are composed in one's mind using language & symbols to reflect contextual, cultural relationships (Bruner, 1991).	Story discourse (telling) uses time, order, frequency, duration, voice and mood to convey story (Genette, 1980).	Telling is the expressive component (discourse) of narrative (Chatman, 1978). Narrative depends upon speaker articulation to a recipient (Barthes, 1975). Narrative is interspective or social (Chatman, 1978). Telling is produced & experienced socially; it is purposeful (Herrnstein-Smith, 1980).

Table 9

Model Step 'See' and its Elements Linked to Narrative Theory

Imagine	Reflect	Discuss
Imagining oneself performing or not performing a behavior, produces corresponding changes in intention toward the behavior (C. Anderson, 1983).	Narrative transforms experience into knowledge (Lave & Wenger, 1991) through reflection (Schon, 1983) and interpretation (Gudmundsdottir, 1995). Narrative meaning originates from the connections or relationships among events (Polkinghorne, 1988). Humans make sense of experience through the "imposition of story structures" (Bell, 2002, p.207). Stories encourage reflection when paired with discussion (McDrury & Alterio, 2003).	When stories are shared, meanings are negotiated (Bruner, 1990) and persuasive arguments are built (Bruner, 1990; S. Taylor, et al., 2002). Narrative enables the exploration & appreciation for experiences from different perspectives (McEwan & Egan, 1995). Narratives enable us to share who we are (Daloz, 1999; Dominice, 2000; Langellier, 1989; Ochs & Capps, 1996; Vella, 2002). Narrative supports problem-solving (Jonassen & Hernandez-Serrano, 2002; Orr, 1996; Schon, 1983; Lave & Wenger, 1991).

Findings from Development Theory

This section addresses research question two: "What major findings from the development theory literature contribute to how adults think (come to know)? The relationship of the research finding to a specific model element is noted by the placement of the element in brackets next to the finding.

Piaget's stage theory of intellectual development can be considered an antecedent for how adults come to know the world (Piaget & Inhelder, 1969). Developmental readiness for learning is a consideration for narrative construction [Audience]. Instructional narratives should be designed to connect with the learner's present developmental state, access what the learners already know experientially; their prior knowledge [Roots], and should show how the new knowledge is relevant and yet novel enough to spark curiosity and initiate Piaget's (Ginsburg & Opper, 1969) equilibration process [Significance].

Instructional narratives embody the social and cultural context that Vygotsky deemed critical to both learning and development. The process of internalization is how external social experiences are re-constructed internally using signs and tools to produce meanings. Internalization is used during narrative assembly to re-construct teller experiences [Own]. Vygotsky's (1979) zone of proximal development can be used as part of learner [Audience] and content [Content] assessment to determine the need for assistance or "scaffolding" to be built into the instructional narrative to advance learner [Audience] capability. Vygotsky's experiments on the nature of thought reveal the complexity of translating one's experience, which is embedded in thought, into words that convey the meaning associated with the teller's thinking to the listener. More than words are needed to convey meaning; the teller must personalize the story with the emotional content necessary to convey motivation [Own].

Bruner's (1986) theory of knowledge, what it means to know through experience and reason, influences the way narratives are assembled. Narratives are experiential; they use prior knowledge as part of the meaning making process. Narratives enable the assignment of significance to actions and events. Recognition of the contextual nature of knowledge suggests that narratives are a practical means of advancing development through thinking.

The natural resources of thinking: curiosity, organization and significance (Dewey, 1910, 1933) are present in narratives. The model uses narrative as a means of invoking curiosity, organizing premises, establishing importance and relevance [Significance] and initiating reflection [Reflection] to reinforce existing meanings, create new meanings, or weaken meanings that did not have enough evidential support. Instruction should include both internal; audience readiness assessment [Audience], and external; cultural context assessment [Environment] to advance cognitive growth. The model is grounded in instructional theory. As suggested by Bruner (1966), the model addresses the activation of learner predisposition to learning [Audience], knowledge structure, presentation sequence [B/M/E] and reinforcement [Practice] [Discuss] all of which enable learner knowledge retention and transfer.

Adult development. Adult development, how we come to know, is complex. Understanding how adults change in response to their environment contributes to the structuring of instructional narratives. To advance development, the narrative stimulus should shape the interaction to encourage the learner's/listener's differentiation and integration cycle. This cycle starts the meaning making (thinking) process and may lead learners/listeners to reframe experience based on the teller's experience shared through the narrative discourse [Tell]. As the learners/listeners decode the narrative, the variability in adult development suggests that growth (perspective transformation) will likely occur differently for each learner/listener. Recognizing these differences exist serves as a starting point for post-narrative teller facilitated discussion [Discuss].

Narrative perspective. The model uses Rossiter's (1999b) narrative perspective for adult learners. This approach eliminates the need for customizing learner experiences by focusing on broad perspectives within the framework of narrative experience. It works in conjunction with

the biological, psychological and sociocultural perspectives suggested by Merriam, Caffarella, and Baumgartner (2007). This approach also uses the four aspects of development; environmental interaction, differentiation and integration, variable process, and reframing experience proposed by Taylor, Marienau, and Fiddler (2000). The narrative perspective recognizes that adults lead storied lives; adults make stories as they experience life. The model uses this experiential base as a common nucleus to develop context [B/M/E], arrive at interpretations based on prior experiences [Roots] and make both present and future developmental changes based on meaning making. It is an orientation that all adult learners can understand and use regardless of where they are developmentally.

Tables 10, 11, 12, 13 show how findings from the development theory literature were applied to the support *Describe*, *Operationalize*, *Tailor*, and *See* model elements.

Table 10

Model Step 'Describe' and its Elements Linked to Development Theory

Audience	Content	Environment
Teacher insight into developmental readiness cultivates "critical examination & inquiry" (Dewey, 1910, p.29). Developmental readiness to think abstractly in the absence of direct experience & to use inductive & deductive reasoning (Pulaski, 1980). Individuals must be "cognitively ready" (Pulaski, 1980, P. L. Smith & Ragan, 2005). Zone of Proximal Development (ZPD) (Vygotsky, 1979). Audience readiness assessment (Bruner, 1973). Awareness of the biological, psychological and sociocultural changes that adults go through (Merriam, et al., 2007).	Language is used for reflection & elaboration of experience (Vygotsky, 1986, p.126). New knowledge is added to existing knowledge when it is connected by experience (Ginsburg & Opper, 1969). Adult development is both experienced and expressed through self-story (Rossiter, 1999b). Facts considered important to the learner's interests are added to their knowledge base (Dewey, 1910).	Development is embedded in social & cultural context (Vygotsky, 1979). Cognitive growth occurs "outside in" as learners assesses the cultural context (Bruner, 1964). People develop through interactions with their environment (K. Taylor, et al., 2000).

Table 11

Model Step 'Operationalize' and its Elements Linked to Development Theory

Roots (Prior Knowledge)	Significance	Beginning Middle End
Experience must be relevant to what is already known & must present incongruities & conflicts (Ginsberg & Opper, 1969). Adaptation, comprised of assimilation (adding new information into existing mental structures or schema) and accommodation (forming new mental structures (schema) when new information does not fit into existing knowledge structures) enables equilibration (balance) (Pulaski, 1980). Re-constructing experiences occurs through internalization (Vygotsky, 1979). Past experiences & prior knowledge are necessary for thinking (Dewey, 1910). Reframing experience "serves as a marker for development" (K. Taylor, et al., 2000, p. 11).	New knowledge must be novel enough to spark curiosity & initiate the equilibration process (Pulaski, 1980).	Narratives contain a plot through which meaning is expressed (Bruner, 1991). Bruner (1990) hypothesizes that we possess a "readiness, a predisposition to organize experiences narratively" (p. 45). Organization is necessary for integration (Pulaski, 1980). Narrative orientation to adult development includes four qualities: contextual, interpretative, retrospective and temporal (Rossiter, 1999b).

Table 12

Model Step 'Tailor' and its Elements Linked to Development Theory

Own (Think)	Practice	Tell
Narrative mode of thought looks for connections between events (Bruner, 1986). The teller must personalize the story with the emotional content necessary to convey motivation (Vygotsky, 1986).	Mental practice is an "effective means of enhancing performance" (Driskell, Copper, & Moran, 1994, p. 490).	Language is the means by which reflection & elaboration of experience occur (Vygotsky, 1986).

Table 13

Model Step 'See' and its Elements Linked to Development Theory

Imagine	Reflect	Discuss
"Imaginative application" begins with human experience, grounded in intention, change of circumstance, action & consequence (Bruner, 1986). Internalization, reconstructing experiences internally (Vygotsky, 1979). Experience, reflection and meaning making create a bridge between learning and development (K. Taylor, et al., 2000).	Reflection is both inductive and deductive; it suggests meaning (Dewey, 1910). The need for a solution to restore balance guides reflection; it regulates thinking (Dewey, 1910). Piaget's equilibration, the self-regulating process used to achieve balance and harmony (Ginsberg & Opper, 1969). Drawing on past experiences to form inferences, testing them & arriving at a coherent solution are the hallmarks of reflective thinking (Dewey, 1910, 1933). Differentiation & integration enables adults to expand and contract existing experiences to accommodate or modify new experiences (K. Taylor, et al., 2000). Learning and development converge through meaning making (Mezirow, 2000).	Higher learning functions originate as "actual relations between human individuals" (Vygotsky, 1979, p. 57). Development occurs through interaction (K. Taylor, et al., 2000).

Findings from Communication Theory

This section addresses research question three: "What major findings from communication theory contribute to an understanding of how narratives can be used to communicate meaning?" The relationship of the research finding to a specific model element is noted by the placement of the element in brackets next to the finding.

Each of Craig's (1999) seven communication traditions are used in the model to communicate meaning. The model foundation is the Cybernetic tradition. This systematic approach to the movement of information from 'here to there' considers communication to be information processing. The exclusion of the biological, psychological, sociocultural factors in this tradition that are necessary for meaning making suggest a need for support from each of the other six traditions in the message encoding and decoding process to both enrich and provide feedback for system stability.

The Semiotic tradition is used during narrative construction. Recognizing that meanings exist in the minds of the teller and the learner/listener, narratives must adopt a common language grounded in the culture of the audience [Audience]. Messages should be planned to consider how the message could be interpreted differently than the teller intended given the meanings assigned by the learners/listeners. The interpretative quality indicates a need for reflection [Reflect] and discussion [Discuss] to enable the teller and the learners/listeners to reach mutual understanding of the message.

Narrative is a means of communicating direct experiences with others. Recognizing that present experiences are interpreted in lieu of previous experiences suggests that narratives should draw upon prior knowledge, knowledge that is 'rooted' in the learner/listener [Roots] to both contextualize the message and indicate its significance to the learners/listeners [Significance].

This translation of lived experience into narrative occurs through the Phenomenological tradition.

The story is told in the Rhetorical tradition. Instructional narratives should be carefully planned to ensure that the symbols chosen by the teller convey the intended meaning(s). To more closely align the teller's message with the learner/listener interpretation of the message, the five rhetorical principles described by Littlejohn and Foss (2011), (invention, arrangement, style, delivery and memory) for both the preparation and delivery of a message should be applied by the teller [Own]. The *invention* process is used to assign meanings to symbols through interpretation. The message is organized by looking at the logical relationships between people, objects and context and *arranging* them to enable learner/listener sensemaking. How the symbols will be presented is addressed through *style*. The words and visuals that are chosen and the meanings assigned to those words/visuals as well as the physical appearance of both the teller and the presentation environment are part of the style process step. *Delivery* is how the symbols will be expressed in physical form, for example, verbally or visually. *Memory* addresses more than memorizing the message, it includes the cultural underpinnings that influence how the teller remembers and understands information.

The Sociopsychological tradition is used during message encoding and decoding. The teller's experiential selection and message construction plan influences how the learners/listeners will decode the message. Further interaction between the teller and the learners/listeners in the form of both reflection [Reflect] and discussion [Discuss] provides an opportunity for the teller to continue to shape the message in response to learner/listener questions and conversation. The teller's awareness of learner/listener behavior, characteristics and possible mental models [Audience] should serve as benchmarks for the exchange. How these physical, social, biological

variables function both individually and in concert with each other affects the achievement of mutual understanding through each act of communication.

The Sociocultural tradition is used during message encoding [B/M/E] to contextualize message content. This tradition provides insight into how the meaning of the words used to express the message varies depending upon social groups and culture. Recognition that meanings are shaped during interaction emphasizes the importance of discussion [Discuss] to arrive at shared meanings.

The Critical tradition is used during narrative reflection [Reflect]. Messages conceived and built from teller experience are infused with the teller's beliefs. After the learners/listeners decode these messages, providing an opportunity for discursive interaction [Discuss] will encourage higher order thinking and strengthen or weaken suppositions. When learners/listeners question their basic ideological assumptions, it cultivates a broader understanding of society and their place in it. This interaction increases the likelihood of retention.

Tables 14, 15, 16, 17 map each of Craig's (1999) seven communication traditions to a model element. The defining questions explain how the teller (instructor/facilitator) and learner/listener would apply or would be influenced by each tradition.

Table 14

Model Step 'Describe' and its Elements Linked to Communication Theory Traditions

Element	Contributing Tradition	Defining Questions
Audience	Sociocultural	What are the learner/listener demographics?
	Phenomenological	What experiences do the learners/listeners share?
	Sociopsychological	What are the attitudes, emotions, personality traits, mental models of the learners/listeners?
Content .	Semiotic	How is the meaning translated by the teller into symbols (language) for understanding by the audience?
	Phenomenological	How can the designer/tellers direct experience impact what the learners/listeners must know or be able to do?
	Sociocultural	How will reality be described?
	Rhetorical-Invention	How will meanings be assigned using language (symbols) to enable interpretation by the learners/listeners?
	Cybernetic	How will the message be encoded for transmission?
Environment (Instructional context)	Sociocultural	Where are the learners/listeners situated (culture, groups, physical location)?
	Cybernetic	What are the physical, social and biological processes that may affect message transmission from the sender to the receiver?

Table 15

Model Step 'Operationalize' and its Elements Linked to Communication Theory Traditions

DOTS Element	Contributing Tradition	Defining Questions
Roots (Prior Knowledge)	Phenomenological	What prior experience(s) do the learners/listeners have that is/are related to the message?
	Sociopsychological	How will the teller connect to what the learners/listeners already know cognitively and affectively?
	Rhetorical-Invention	How will the teller assigned meanings connect with the learners/listeners inherent meanings?
Significance	Phenomenological	What is the relationship between the learners/listeners and the object, event or experience?
	Sociopsychological	Why is the message worthy of the learners/listeners attention?
	Rhetorical-Arrangement	How will the message be organized to enable learners/listeners interpretation?
Beginning, Middle, End (B/M/E)	Phenomenological	Beginning: What is the actual state, situation or problem? Middle: What is happening to the people in the environment? End: What is the desired state, outcome, resolution?

Table 16

Model Step 'Tailor' and its Elements Linked to Communication Theory Traditions

DOTS Element	Contributing Tradition	Defining Questions
Own	Semiotic	How will the teller covey meaning and reduce miscommunication?
	Phenomenological	Does the teller's interpretation of his/her experience clarify it for the learners/listeners?
	Sociopsychological	Is the teller cognitively, affectively and kinesthetically connected to the message? Is there visible evidence of that connection (deep knowledge display, emotion, enthusiasm)?
	Sociocultural	Does the teller infuse the message with culture and sense of self?
	Rhetorical-Style	How will the teller present the message (voice, body language, visuals)?
Practice	Sociopsychological	Does the message connect the audience, the content and the environment?
	Rhetorical - Memory	Does the teller remember the message?
Tell	Rhetorical-Delivery	How will the message be expressed in physical form (audio, visual)?
	Sociopsychological & Sociocultural	Does the teller convey a sense of self through attitude, beliefs, behavior?
	Cybernetic	How will the message be transmitted?

Table 17

Model Step 'See' and its Elements Linked to Communication Theory Traditions

DOTS Element	Contributing Tradition	Defining Questions
Imagine	Semiotic	Did learners/listeners assign meaning?
	Phenomenological	Did learners/listeners recall a similar experience?
	Sociopsychological	Did learners/listeners see themselves in the message? Did the message spark an emotional response?
Reflect	Semiotic	Did learners/listeners interpret the message based on previous experience?
	Phenomenological	What was the learners'/listeners' relationship to the experience?
	Sociopsychological	Did the message reaffirm what learners/listeners already knew? Introduce something new?
	Critical	Did the message prompt the learners/listeners to question what was already known?
Discuss	Rhetorical	Did the learners/listeners share what the message meant to them with others?
	Semiotic	Did initial learner/listener meaning match the teller's intended meaning?
	Phenomenological	What were the learners/listeners thoughts about the message?
	Sociopsychological	How did hearing the message make the learners/listeners feel?
	Sociocultural	Is the reality depicted in the message the same reality known by the learners/listeners? How is it different?
	Cybernetic	Did each new encoded and decoded message shape the conversation?
	Critical	Did the learners/listeners question their assumptions? What will the learners/listeners do (performance) because of the message?

Information processing. The model uses Richey's (1986; 2011) information processing model for the transmission of messages. This model incorporates the practical, linear, systematic information processing attributes of Shannon and Weaver's (1967) engineering model and adapts it for the purpose of face-to-face communication through the inclusion of encoding and decoding processes to make meaning. This model, coupled with the four message elements of structure, organization, load and attention-getting properties, serves as the communication framework for designing instructional narratives.

Narrative is a communicative event (Georges, 1969). The model incorporates activities for learners/listeners to determine narrative event significance by imagining self in a similar social situation [Imagine], test hypotheses through consideration of their knowledge or beliefs [Reflect], and to talk about the story with other learners/listeners and the teller to arrive at shared meanings [Discuss].

Narrative paradigm. The model uses narrative as the basis for communication. This approach considers human beings to be storytellers and suggests that humans developed symbols (language) to organize and share human experiences for the purpose of finding a way to live with each other (Fisher, 1984). This narrative paradigm assumes that narrative understanding is innate in human beings and that learners/listeners will use logic to make decisions based on good argument (Griffin, 2009). Narrative rationality is predicated on both narrative probability and narrative fidelity. The learners/listeners [Audience] and the teller use these two tests or standards to determine the acceptability of the narrative.

Narrative probability is an assessment of story coherence. It is closely associated with the story plot. Are the characters behaving in expected ways? Is the plot organized and does it unfold predictably? Does the story reach a logical conclusion? Does the story make sense as a way to

understand and explain how the world works? Such questions test how well the narrative "hangs together" (Griffin, 2009). Narrative fidelity addresses whether the "story rings true with stories already accepted as true" (Littlejohn & Foss, 2011, p. 144). The story will seem similar to those the learners/listeners may have already experienced. There is a "congruence between values embedded in [the] message and what the listeners regard as truthful and humane, the story strikes a chord" (Griffin, 2009, p. 204). Fidelity provides a "logic of good reasons" to guide future actions (Fisher, 1984).

In the model, the teller (instructor/facilitator) applies the tests of narrative probability and fidelity to determine the coherent nature of the plot and assess how well the story will resonate with learners/listeners. When the teller uses these criteria to evaluate the story, the teller takes ownership [Own] of the story. The teller also uses narrative probability and fidelity as criteria for narrative discussion [Discuss] by the learners/listeners. It is through discussion that the meaning of the story will be more fully understood by the learners/listeners. Discussion is also used to address Warnick's (1987) contention that the inherent power of narrative can lead to errors in judgment. The teller (instructor/facilitator) should recognize narrative experiences as "moving forces" and offer guidance on judging the value of their claims (Dewey, 1938).

Tables 18, 19, 20, 21 show how findings from the communication theory literature were applied to support the *Describe*, *Operationalize*, *Tailor*, and *See* model elements.

Table 18

Model Step 'Describe' and its Elements Linked to Communication Theory

Audience	Content	Environment
Sociocultural, Phenomenological & Sociopsychological traditions (Craig, 1999). Narrative events are communicative, social and unique (Georges, 1969).	Semiotic, Phenomenological, Sociocultural, Cybernetic & Rhetorical-Invention traditions (Craig, 1999; Littlejohn & Foss, 2011). Meaning is shaped by message structure, organization, information load and attention-getting properties (Richey, 1986).	Sociocultural & Cybernetic traditions (Craig, 1999). Narrativity is acquired through the natural process of socialization (Goody & Watt, 1962, 1963; Krashen, 1982 as cited in Fisher, 1984, p. 8).

Table 19

Model Step 'Operationalize' and its Elements Linked to Communication Theory

Roots (Prior Knowledge)	Significance	Beginning Middle End
Phenomenological, Sociopsychological, & Rhetorical-Invention traditions (Craig, 1999; Littlejohn & Foss, 2011).	Phenomenological, Sociopsychological, & Rhetorical-Arrangement traditions (Craig, 1999; Littlejohn & Foss, 2011). Narrative becomes the basis of communication (Barthes, 1975).	Phenomenological tradition (Craig, 1999).

Table 20

Model Step 'Tailor' and its Elements Linked to Communication Theory

Own (Think)	Practice	Tell
Semiotic, Phenomenological, Sociopsychological, Sociocultural, & Rhetorical-Style traditions (Craig, 1999; Littlejohn & Foss, 2011). Teller ownership of the story occurs through the application of the tests of narrative probability and fidelity (Fisher, 1984, 1987).	Sociopsychological & Rhetorical-Memory traditions (Craig, 1999; Littlejohn & Foss, 2011).	Rhetorical-Delivery, Sociopsychological, Sociocultural, & Cybernetic traditions (Craig, 1999; Littlejohn & Foss, 2011).

Table 21

Model Step 'See' and its Elements Linked to Communication Theory

Imagine	Reflect	Discuss
Semiotic, Phenomenological & Sociopsychological traditions (Craig, 1999).	Semiotic, Phenomenological, Sociopsychological, & Critical traditions (Craig, 1999). Narrative rationality is determined by narrative probability & fidelity (Fisher, 1984).	Semiotic, Rhetorical, Phenomenological, Sociopsychological, Sociocultural, Cybernetic, & Critical traditions (Craig, 1999). Narrative paradigm (Fisher, 1984, 1987) suggests meaning is created through teller/listener interaction to build a shared story by discussing reasons for his/her interpretation.

Findings from Learning Theory

This section addresses research question four: "What major findings from learning theory contribute to an understanding of how adults learn?" The relationship of the research finding to a specific model element is noted by the placement of the element in brackets next to the finding.

Recognition that narrative fosters learning and that learning itself may be a narrative process reinforces the need for the use of narrative as an instructional modality for adult learners. Based on Schank's (1990) contention that knowledge is experience and stories, and intelligence is using stories to construct and tell stories, and "memory is memory for stories" (p. 16), the model includes opportunities for both tellers and learners/listeners to construct, tell, listen, imagine, reflect and discuss stories of personal significance to produce learning and retention.

The model brings together two views of learning, cognitive learning theory which focuses on learner's internal, brain-based processes of learning, retention in memory and retrieval for use; and social learning theory which enables learners to deepen their understanding. Stories, "packages of situated knowledge" (Lave & Wenger, 1991, p. 108) are used to connect practice with internal learning in two ways. In terms of story development, stories create situations, introduce characters that engage in activities and produce knowledge as a result of these interactions [B/M/E]. In terms of post story deployment (after telling), teller facilitated story discussion [Discuss] enables learners/listeners in a community of practice to arrive at shared meanings.

Information processing. The structured, episodic, nature of narrative makes it an effective means of producing learning based on the information processing theory of how cognitive learning works. Narrative enables information processing in working memory where meanings are established because narrative structure, an organized whole with a beginning,

middle, end connected through plot [B/M/E/], lends itself to chunking. Numerous studies have shown that what is structured narratively is retained in memory (Mandler, 1984). Learners possess narrative competence; they know what a story is, how it works and how to understand it (Polkinghorne, 1988; Stein & Glenn, 1979; Sutton-Smith, 1981, 1986). The experiential, episodic nature of narrative makes it a viable means of accessing both prior knowledge [Roots] and episodic memory stores (schema) in long-term memory.

Narratives are considered to be the "generative process in cognition" (Tenkasi & Boland Jr, 1993, p. 1). Schemas are produced through the cognitive activity of making experiential stories. Based upon their organized, recognized beginning, middle and end structure connected through plot [B/M/E], narratives enter long-term memory as schema ready for learner interpretation. Since narrative competence develops in early childhood, narrative schemas are likely to be tuned or re-structured as learners are exposed to both story and life experiences (Rumelhart & Norman, 1976). Learning occurs and development is advanced as these automated schemas (prior knowledge) are recalled [Roots] and modified to accommodate new information [Imagine].

Mental models expedite the manipulation and interpretation of story elements during thinking (making meaning) to produce learning and understanding. "Stories are narrative mental models that allow us to learn about the world" (Kintsch, 1998, p. 18). These interpretative models enable the study of relationships, the formation of inferences, and the decomposition of elements for analysis. Based on the recognition that learners access mental models to interpret events, the model suggests consideration of existing learner mental models [Audience] during story development by the teller.

Prior knowledge. Learning is a holistic process that works through the activation of prior knowledge [Roots], the organization and connection of new knowledge to this previous knowledge (Ambrose, et al., 2010). Learning is retained based on the strength and the number of these connections. Educators and facilitators should be cognizant of the knowledge and beliefs that learners bring into the learning environment [Audience]. Recognizing that learners understand new knowledge based on their prior knowledge (Willingham, 2009), the teller (instructor/facilitator) should consider the nature of learner prior knowledge, assess its appropriateness to the learning task and determine if insufficient or inaccurate learner prior knowledge possess an impediment to learning. When using narrative for the purpose of making analogical comparisons, the teller must use appropriate prompts to ensure learners activate prior knowledge and correctly apply it to the new context. The model includes a post story discussion [Discuss] to enable the teller to ascertain how learners' used their prior knowledge to advance their understanding.

Cognitive load. Given the limitations of working memory as described by cognitive load theory, instructional narratives should be designed with consideration given to the learners' prior knowledge and experience [Roots] and focus on producing germane load to facilitate schema construction, automation and future retrieval from long-term memory. These stories contain high element interactivity enabled by plot development [B/M/E]. Since germane load can also be produced through learner self-explanations, the model includes time for learners to mentally hypothesize about [Imagine] information relationships or procedures embedded in the instructional narrative. This deliberate opportunity for mental practice enables learner working memory processing and strengthens long-term memory schemas (Leahy & Sweller, 2004).

Adult Learning

Adult learning is collaborative, experiential, reflective, transactional, and practice oriented (Brookfield, 1986). Recognizing that there is no one theory that explains our knowledge of adult learning (Merriam, 2001), the model draws upon Malcolm Knowles' (2005) andragogy, Knud Illeris' (2004a) dimensions of learning, and Peter Jarvis' (2006) learning process for elements likely to support learning, retention, and transfer to practice.

Andragogy. Application of the principles of andragogy [noted in italic type] to the model suggests that the *learner's need to know* be considered during audience assessment [Audience]. The questions of why, what and how in terms of the content to be learned through story is considered [Content]. Recognition that adult learners have progressed from dependent learners to independent self-directed learners (*self-concept of the learner*) warrants the inclusion of planned time for learners to reflect [Reflect] and discuss [Discuss] their narrative experience. The *prior experience of the learner* [Roots] is a critical element in the activation, tuning and formulation of schemas and mental models associated with cognitive learning. Inclusion of learner experience is important. The role of experience in adult learning "is viewed as a given" in the adult learning literature (Brookfield, 1986, p. 98).

Predicated on the assumption that learners are ready to learn when they recognize a need to know, the learners' *readiness to learn* is considered by the teller (instructor/facilitator) during learner assessment [Audience]. By assessing readiness to learn, narratives can be planned to close the gap between where the learner is now (present state) and where the learner needs to be (future state) in terms of what he/she needs to know to change their performance. The teller will incorporate the importance and relevance to the learner of what is to be learned [Significance] in the narrative. The problem-oriented, contextual nature of narrative *(orientation to learning)*

makes it a natural fit for adult learners who enter learning situations looking for problems to solve. By incorporating an opportunity for learners to mentally consider beliefs and knowledge through reflection [Reflect], the model addresses the learners' internal need to determine the intrinsic value *(motivation to learn)* of the learning event for them.

Three dimensions of learning. Narratives embody the cognitive, emotional and social dimensions that Illeris (2004a) deems essential to learning. Narratives inherently contain all of the five interaction elements; perception, transmission, experience, imitation, activity and participation that comprise a learning event. For example, using Aristotle's beginning, middle and end sequence connected through plot [B/M/E], narrative stimulates the senses (*perception*) as the story opens. Impressions begin to form as the story is communicated to the learner/listener (*transmission*). As the story progresses, the learner/listener connects the message to what is already known (*experience*) [Roots]. The learner/listener may also mentally plan how best to attempt to model the story action (*imitation*) [Imagine]. The learner/listener engages individually to put the story into a personal context (*activity*) [Reflect]. The final interaction (*participation*) occurs through learner/listener conversation about the story [Discuss] and its implications for practice (performance contexts). The model leverages the effects of the learning event through the inclusion of interaction post narrative by learner/listener participation through conversation [Discuss] and reflection [Reflect]. These interactions are a learning transaction between the learner's/listener's inner knowledge acquisition process (cognitive and affective) and their social interaction process.

Jarvis' learning model. The inclusion of the model element of ownership [Own] originates from Jarvis' (2006) explanation of learning as a holistic process. Ownership is conveyed by the relationship of both the cognitive and emotional elements that are part of the

teller's personal learning experience are a significant part of how the narrative experience will both be told and perceived by the learners/listeners. By "owning" his/her experience, the teller re-connects with the thinking and emotions that lead to the actions described in the story. Ownership incorporates the affective (emotional) aspects of the experience into the cognitive (thinking) aspects. This fusion renders the experience relatable to the learners/listeners on both cognitive and affective levels.

Learning and experience. The model uses the experiential stories of the teller to connect content to be learned [Content] with the prior knowledge and experience of the learners/listeners [Roots]. Teller narrative construction enables the assimilation of experiences into a narrative schema for meaning making (Gudmundsdottir, 1995). The rich reservoir of experiences possessed by adults make them both psychologically and developmentally ready to learn on the basis of experience. If the criteria of continuity and interaction are met, learning is retained for future use (Dewey, 1938). To enable the transformation induced by the interaction of content [Content] with experience through narrative development and deployment (telling and listening), reflection, the mental exploration of experience as a means of enhancing understanding (Boud, et al., 1985) is a model element [Reflect] (Kolb, 1984).

Learning and development. Based on the literature, by using teller experiential stories to address content, the model not only provokes learner/listener learning but also advances learner/listener development through the cognitive process of meaning making (Mezirow, 2000). Development occurs not only in the learners/listeners during telling [Own], but also during the teller's preparation for telling the story [Practice]. During story design and development the teller determines the relevance and importance [Significance] of the content to be learned [Content] for the learners/listeners, associates the content with the learners/listeners prior knowledge [Roots],

and organizes the content into a beginning, middle, and end sequence [B/M/E] to operationalize the story for the learners/listeners. This process strengthens the teller's schema of the original experience.

Reflection. The model provides an opportunity for reflection [Reflect]. After a story has been told, the link between the narrative experience and learning can be strengthened by reflection (Boud, et al., 1985). Setting aside time for reflection enables learners to return to the experience, re-frame it, re-visit the positive and negative feelings it generated, and re-evaluate the experience in lieu of their prior knowledge and experience [Roots] to determine what should potentially be integrated to produce new understanding.

Transformative learning. Mezirow's (2000) seven conditions of rational discourse are used to inform the model to support narrative design and development by the teller and story receiving by learners/listeners (Tyler, 2009).

The first condition, participants will have "accurate and complete information" (Mezirow, 2000, p. 13) is met by the teller through the building and sharing their experiential story. This ownership [Own] means that the teller can address clarifying questions and invoke both curiosity and interest [Significance] in their learner/listeners. The second condition is "freedom from coercion and distorting self-deception" (p. 13). The teller addresses the first element, "freedom from coercion" by establishing a safe environment [Environment] for sharing experiential stories. The second element, "self-deception" can be worked through during teller facilitated post telling reflection and discussion [Discuss] with the learners/listeners. During these activities, learners/listeners can test and validate their assumptions. The third condition, "openness to alternative points of view: empathy and concern about how others think and feel" (p. 13), represents the "heart of the storytelling process" (Tyler, 2009, p. 140). As the

learners/listeners hear a story, associations are made to their own experiences (prior knowledge) [Roots]. These associations lead to alternate points of view and speculation about their situational responses as if they were the story protagonist. By imagining themselves as an actor in the story [Imagine], learners/listeners become deeply engaged. Each participant can formulate a perspective that although initially is based on the teller's perspective, is now imbued with characteristics the learner/listener can relate to both cognitively and affectively. These alternate perspectives are the starting points for the post story telling discussion [Discuss]. It is through this discussion that the learner/listeners can pose teller questions to clarify their cognitive and affective understanding of the teller's story. These questions enable the teller to review and re-assess their interpretation of the experience as well. This interaction between teller and learners/listeners also supports the fourth condition of rational discourse, the "ability to weigh evidence and assess arguments objectively" (Mezirow, 2000, p. 13).

The fifth condition, "greater awareness of the context of ideas and, more critically, reflectiveness of assumptions including their own" (Mezirow, 2000, p. 13) activates several communication traditions; the phenomenological tradition of sharing direct experiences, the Sociopsychological tradition which addresses individual characteristics and mental models, the sociocultural tradition of interaction between people, and the critical tradition of discursive reflection, deep thinking through discussion (Craig, 1999). As the teller and the learners/listeners collaborate on meaning making, assumptions are formed and/or modified. Learners/listeners consider consequences by imagining themselves in the story [Imagine]. During discussion, teller and learner/listeners can incorporate what-if scenarios based on these assumptions and try out different story endings (Tyler, 2009) [Discuss]. This discussion supports the sixth condition, "an equal opportunity to participate in the various roles of discourse" (Mezirow, 2000, p. 13). It is

important for the teller (instructor/facilitator) to provide an opportunity for all learners/listeners to try out both the role of the teller and the role of the listener and to respect the choice of listeners who do not want to tell. Sufficient time should also be provided by the instructor/facilitator so all participants' can reflect, react and discuss the story.

The seventh condition, "willingness to seek understanding and agreement and to accept a resulting best judgment as a test of validity" (Mezirow, 2000, p. 14) is accomplished through post story discussion [Discuss]. During discussion, learners/listeners will collaboratively consider the story, query the teller, share related stories of their experience, develop and try-out alternate scenarios, and engage in dialogue, inclusive of critical reflection and ideology to reach consensus. Consensus is necessary for practical action. The role of the instructor/facilitator is to "thwart attempts to manipulate conclusions and decisions to the point where they cease to be consensual or valid" (Tyler, 2009, p. 141).

Transformative learning in practice. Narrative is an effective means of enabling transformational learning (Brookfield, 2000; Daloz & Cross, 1986; C. A. Jarvis, 2003; Mezirow, 1991, 2000). Through narrative, a disorienting dilemma can be introduced. The teller can situate himself or herself as the protagonist, hero or villain in the story. Learners/listeners can envision themselves in the situation and try out different roles and problem resolution scenarios [Imagine]. This subjective reframing enables reflection [Reflect] on underlying assumptions (Brookfield, 2000). Narrative also enables learners/listeners to safely question their existing meaning perspectives. Narratives spark critical reflection, conscious exploration between the learners'/listeners' present problematic story situation and similar problems based on their previous experience (Mezirow, 1991). To complete the transformative learning process, the model includes an opportunity for learner/listener discussion [Discuss]. The importance of this

active collaboration through discussion is well recognized in the literature (Dewey, 1916; Lindeman, 1926; Bryson, 1936; Bergeuin, 1967; Rogers, 1969; Freire, 1970; Houle, 1972; Kidd, 1973; Knowles, 1980; Knox, 1980, 1986; Brookfield, 1986; Daloz, 1986; Marsick, 1987, and Galbraith, 1990a as cited in Galbraith, 1991, p. 2).

Brain-based meaning making. Narrative is an instructional modality that engages the back and front cortex of the brain. This balanced approach uses our experiences, memories, ideas, actions, and feelings. Stories enable learners to package experience and knowledge into "complex neuronal nets" (Zull, 2002, p. 228). Stories provide the raw materials for learning and they enable the formation of cognitive meaning by providing context [B/M/E] and a means of analyzing experience and forming an action plan [Reflect]. Schank (1990) contends "memory is memory for stories, and the major processes of memory are the creation, storage and retrieval of stories" (p. 16).

The model's use of narrative as an instructional modality capable of producing learning, retention and transfer to practice (performance contexts) is supported by neuroimaging evidence that narrative is represented as a coherent whole in the brain (Xu, et al., 2005), that it activates prior knowledge (Maguire, et al., 1999) as well as areas of the brain associated with both cognitive (language comprehension) (Fletcher, et al., 1995) and affective (emotional) processing (Ferstl, et al., 2005).

Tables 22, 23, 24, 25 show how findings from the learning theory literature were applied to support the *Describe*, *Operationalize*, *Tailor*, and *See* model elements.

Table 22

Model Step 'Describe' and its Elements Linked to Learning Theory

Audience	Content	Environment
Learner predisposition to learning requires activation, maintenance & direction (Bruner, 1966). The learner's need to know, self-concept, prior experience, readiness, orientation and motivation to learn (principles of Andragogy) are essential for adult learning (Knowles, et al., 2005). Story influences both cognition & attitude (Martin & Powers, 1983a).	Information processing theory suggests information be "chunked" in a meaningful way based on what is already stored in long-term memory (Ericsson & Kintsch, 1995). Learning through schema acquisition reduces cognitive load (Sweller & Chandler, 1994). Narratives embody the cognitive, emotional and social dimensions deemed essential for learning (Illeris, 2004a). Context shapes content (Schank, 1990). Narratives are "packages of situated knowledge" (Lave & Wenger, 1991, p.108).	"Knowledge is situated, being in part a product of the activity, context and culture in which it is developed and used" (J. S. Brown, Collins & Duguid, 1989, p. 32). Cognitive load depends on learner interaction with three components; the content, prior knowledge and the environment (Clark, Nguyen & Sweller, 2006). Stories are narrative mental models that allow us to learn about the world (Kintsch, 1998). Knowledge is a product of the relationship between the learner and the environment (Choi & Hannafin, 1995). Interest originates from learner interaction with the environment (Tobias, 1994). Learning in context is effective (Miller & Gildea, 1987).

Table 23

Model Step 'Operationalize' and its Elements Linked to Learning Theory

Roots (Prior Knowledge)	Significance	Beginning Middle End
Prior knowledge is the single most important factor in influencing learning (Ausubel, 1968). Prior knowledge enables learners to make "cognitive connections between what they already know and what they are being asked to learn" (Driscoll, 2005, p. 77). Prior knowledge enables higher order thinking (Jonassen, 1997). The greater the effort expended by the learner to assign meaning and connect information to prior knowledge, the greater the likelihood that the information will be remembered (Craik & Lockhart, 1972; Craik & Tulving, 1975). Working memory connects material to be learned with memory from previous learning (Gagne, 1985).	Significant learning must personally affect & be subjectively valued by the learner (Merriam & Clark, 1993). What makes an experience memorable is its significance to us personally (Anderson & Conway, 1993 as cited in Schank, 1999). When meaningful information is mapped to prior knowledge in an organized, significant way, meaningful learning occurs (Driscoll, 2005). Story schemas enable transfer to new contexts (Thorndyke & Hayes-Roth, 1979). Recall through schema is automatic (M. Brown, 1985). Interest assigns value to knowledge and facilitates learning (Krapp, Hidi & Renninger, 1992).	Developing a story establishes the memory structures that will later be used to recall and tell the story (Livo & Reitz, 1986, K. Young & Saver, 2001). Story schemata are present in young children (Mandler & Johnson, 1977; Poulsen, Kintsch, Kintsch & Premack, 1979, Stein & Glenn, 1979). Story schemas help learners organize story elements and develop propositions about the relationship of those elements (Kintsch & Greene, 1978). Schemas enable production of more structurally complex narratives as we age (Kemper, et.al., 1990). Criterion of continuity & interaction (Dewey, 1938). More structured stories are easier to recall (Mandler, 1984; Rumelhart, 1975).

Continued

Table 23 Continued

Model Step "Operationalize" and its Elements Linked to Learning Theory

Roots (Prior Knowledge)	Significance	Beginning Middle End
Prior knowledge activation is necessary to enable transfer (Bransford & Johnson, 1972; Dooling & Lachman, 1971). "People learn from experience" (Merriam, et al., 2007, p. 163). Stories are constructed by reflecting on our experience (Robinson & Hawpe, 1986). Narrative activates prior knowledge (Maguire, Frith & Morris, 1999). Retention is affected by the activation of prior knowledge (National Research Council, 2000; Vygotsky, 1979). Brain scans confirm that when new learning is connected to past experiences (prior knowledge) "there is substantially more cerebral activity followed by dramatically improved retention" (Maguire, Frith & Morris, 1999, as cited in Sousa, 2006, p. 49).		Schemas enable recall when there is a causal connection between schema elements (Bradshaw & Anderson, 1982). Narrative activates both cognitive (language comprehension) and affective (emotional processing) (Fletcher, et al, 1995). Neuroimaging evidence indicates that narrative is represented as a coherent whole in the brain (Xu, Kemeny, Park, Frattali & Braun, 2005). Retention is affected by the organization of knowledge around "meaningful features and patterns" Ambrose, et al., 2010, p. 56).

Table 24

Model Step 'Tailor' and its Elements Linked to Learning Theory

Own (Think)	Practice	Tell
During meaning making relationships are studied, assessed and combined (Polkinghorne, 1998). The interplay between thought and emotion leads to action (P. Jarvis, 2006, 2010).	During each practice, retrieval cues are strengthened through elaborate encoding (Driscoll, 2005).	Teller experiential stories produce significant learning (Brookfield, 1986; P. Jarvis, 1992; Knowles, et al., 2005; Merriam, et al., 2007; Mezirow, 2000; Tennant & Pogson, 1995). Experiential learning (Kolb, 1984). We learn by hearing stories, and by telling stories (M.C. Clark, 2010). Telling is how we remember an experience (Bruner, 1990; Mandler, 1984; Schank, 1999). Listening to a story activates prior knowledge of both story structure and previously learned stories enabling the connection of the new story to the previously learned story or experience (Mandler, 1978; Mandler & Goodman, 1982).

Table 25

Model Step 'See' and its Elements Linked to Learning Theory

Imagine	Reflect	Discuss
Inclusion of an imagination strategy can enable learning if learners possess prior knowledge & the content contains high element interactivity (Leahy & Sweller, 2005). By imagining procedures or relationships, learners advance their performance (develop expertise), automate schemas and free up working memory (Cooper, Tindall-Ford, Sweller, 2001). Imagining oneself in a behavioral script produces changes in intention (Anderson, 1983). Self-explanations contribute to learning & problem-solving performance (Bielaczyc et al., 1995; Chi, DeLeeuw, Chi & LaVancher, 1994). Mental models facilitate comprehension (Bower & Morrow, 1990).	Reflection enables "reframing," the re-interpretation of past experiences in terms of newer experiences (K. Taylor & Lamoreaux, 2008). "The outcome of reflection is always some kind of learning and development" (Merriam & Clark, 2006, p. 40). Reflection enables transformative learning (Mezirow, 1991, 2000). Reflection is a form of thinking (Dewey, 1933). Reflection transforms experience into meaningful knowledge (Rodgers, 2002). Reflection is a cognitive & affective process that involves the examination of the learner's responses, beliefs, and premises in light of the situation (Rogers, 2001). The link between the narrative experience and learning can be strengthened by reflection (Boud, et al., 1985).	Knowing is a matter of active engagement (Lave & Wenger, 1998). "Narrating our evolving understanding of something is how we make our learning visible to ourselves & others" (M. C. Clark, 2010, p. 6). Three dimensions of learning (Illeris, 2004a). Transformative learning (Mezirow, 1991, 1997, 2000). Learners use mental models to understand stories (Bower & Morrow, 1990; Bransford, Barclay & Franks, 1972; Rumelhart, 1977a; Schank & Abelson, 1977; van den Broek, 1990 as cited in Golden & Rumelhart, 1993). Active collaboration through discussion is well established in the literature (Galbraith, 1991). Mirror neurons enable the recreation of the "experience of others within ourselves and to understand others' emotions and empathize" (Sousa, 2006, p. 23).

Findings from Instructional Design Theory

This section addresses research question five: "What major findings from instructional theory contribute to how to design instruction for adult learners?" The relationship of the research finding to a specific model element is noted by the placement of the element in brackets next to the finding.

Based on instructional theory, the model includes information about the learner [Audience], the learning task [Content] and the learning environment [Environment]. These conditions of instruction are paired with Reigeluth and Carr-Chellman's (2009) values about instruction, learning goals, priorities, methods and power to determine the nature of the narrative to be designed. Additionally, the frame of reference or context is included in the model. Based on instructional theory, the model can be considered an instructional method.

The model uses all nine of Gagne's (1985) external events of instruction [noted in italic type] during story design and deployment to bring about the internal processing that leads to learning. An instructional story should be designed (operationalized) to prompt the learners' (1) *attention*. The *objective* of the story should be clearly stated to induce learner motivation (2) to stick with the story as it unfolds. The story structure and the story itself are catalysts for the *stimulation of prior knowledge* (3). The *stimulus material* (4) is the story as presented by the teller (instructor/facilitator). The story itself has been designed by the teller to provide *learning guidance* (5); this is the purpose of an instructional story. *Eliciting performance* (6), *giving feedback* (7) and *assessing performance* (8) occur through post story discussion. During this discussion, alternate endings and solutions are tested and explored and related listener stories are exchanged. These conversations serve to enhance learner *retention and learning transfer* (9) to new performance contexts.

The model considers the conditions of learning, the internal [Audience] and external [Environment] learner factors. By aligning the events of instruction with learning theory, the resulting instruction will more likely produce learning, retention (preservation of learning in long-term memory) and transfer to practice (multiple learning outcomes). The act of telling a story requires the activation of all five of Gagne's (1985) learning outcomes; intellectual skills, cognitive strategies, verbal information, attitude and motor skill in the teller.

Context. The model contains the contextual landscape broadly defined as the 'environment,' inclusive of the orienting, instructional and transfer contexts as well as their sub contexts: learner, immediate environment, and organizational factors. These contexts are inputs essential to an analysis of the audience [Audience], the content [Content] (to be contextualized through the application of narrative design) and the learner environment [Environment]. Armed with an understanding of this landscape, the teller (instructor/facilitator) can consider how best to operationalize and tailor the narrative to enable learning, retention and transfer to practice. As Gagne (1985) suggests, encoding is a critical act of learning. The inputs the teller uses to design and develop the story are critical to the way the story will be decoded by the learners. The "necessity of considering the learning environment and its support systems is widely recognized in education and instructional design" (Tessmer, 1990, p. 55).

Narrative itself can be considered contextualized instruction. When narrative is paired with instruction, the "intentional arrangement of experiences leading to learner acquisition of particular capabilities," (P. L. Smith & Ragan, 2005, p. 5) conceptual information is contextualized in the narrative structure. This contextualized information prompts the learner's episodic memory and initiates a search for meaning. The output of this mental interaction is

learning and retention of that learning in long-term memory. Such retained learning is more likely to be transferred to practice (performance contexts).

Transfer. Recognizing that the capacity of learners to recognize something learned in one context to be relevant in another context (transfer) is not easy or automatic; the model includes facilitated opportunities for learners to make comparisons, explore underlying principles, deep meanings, and other application contexts to enable transfer of their new knowledge and skills to other relevant performance contexts. This is accomplished through the inclusion of model elements to imagine [Imagine], reflect [Reflect] and discuss [Discuss] the instructional narrative.

Tables 26, 27, 28, 29 show how findings from the instructional design theory literature were applied to support the *Describe*, *Operationalize*, *Tailor*, and *See* model elements.

Table 26

Model Step 'Describe' and its Elements Linked to Instructional Design Theory

Audience	Content	Environment
The nature of the learner is a condition of instruction (Reigeluth & Carr-Chellman, 2009). Using learner experience stories to inform design (Lloyd, 2000; Parrish, 2006). Learner assessment of prior knowledge is necessary for instructional design (Ambrose, et al., 2010).	Content, the nature of what is to be learned, is a condition of instruction that affects the selection of the instructional method (Reigeluth & Carr-Chellman, 2009). Knowledge should be structured in one of the three modes of representation; enactive, iconic, symbolic and should be economical and powerful (Bruner, 1966).	Context is "a multibody of factors in which learning and performance are embedded" (Tessmer & Richey, 1997, p. 87). Context is part of every learning experience (Tessmer & Richey, 1997; Young, 1993). The "necessity of considering the learning environment and its support systems is widely recognized in education and instructional design" (Tessmer, 1990, p. 55). "Contextualizing instruction makes abstract concepts more complete, promotes understanding and retention, as well as facilitates reinforcement and transfer of training" (Tessmer & Richey, 1997, p. 64).

Table 27

Model Step 'Operationalize' and its Elements Linked to Instructional Design Theory

Roots (Prior Knowledge)	Significance	Beginning Middle End
Stimulating prior knowledge is one of Gagne's (1985) nine events of instruction. Retention of new knowledge is enabled by connecting it with the learner's prior knowledge (Reigeluth & Carr-Chellman, 2009).	Informing the learner of the objective activates learner motivation (Gagne, 1985). Effective content sequence is one that is "meaningful to the *learner*" (Mager, 1961, p. 405).	Contextualized instruction prompts episodic memory and uses a narrative structure that "has been shown to enhance meaningfulness and memory of acquired knowledge" (Jonassen, 1991, p. 37). Context provides meaning for learners and "activates relevant schemata" (Jonassen, 1991, p.36). "Instructional sequence should be organized in contextual form" to enable learning (Tennyson & Park, 1980, p. 65). Presentation sequence is important for transfer & retention (Bruner, 1966).

Table 28

Model Step 'Tailor' and its Elements Linked to Instructional Design Theory

Own (Think)	Practice	Tell
Design stories are used for formative evaluation (Parrish, 2006).	Practice is an external condition that makes possible the internal processes of retention and transfer (Driscoll, 2005).	The act of telling produces all five of Gagne's (1985) learning outcomes: intellectual skills, cognitive strategies, verbal information, attitudes and motor skills.

Table 29

Model Step 'See' and its Elements Linked to Instructional Design Theory

Imagine	Reflect	Discuss
Imagine is a cognitive strategy and a learning outcome (Gagne, 1985).	Reflection enables the retrieval of previously learned content from long-term memory (Gagne, et al., 2005).	Discussion enables learner response (elicit performance) and provides an opportunity for feedback (Gagne, 1985).

Model Introduction

This section addresses the sixth research question: "What model for designing instructional narratives can be constructed based on findings from these five areas (narrative, development, communication, learning and instructional design theories)?" The answer to this research question, the result of this research study is *A Model for Designing Instructional Narratives for Adult Learners: Connecting the DOTS.* This section introduces the model and defines each model step and its associated elements. The purpose of each step in relationship to the other model steps is described. How the model is applied to design, develop and deploy

instructional narratives to enable learning, retention and transfer to practice (performance contexts) is explained. To provide guidance on when the DOTS model should be selected for an instructional situation, the instructional design application criteria suggested by Edmonds, Branch and Mukherjee (1994) are applied to the model. This section concludes with a discussion of model validity.

The *Model for Designing Instructional Narratives for Adult Learners: Connecting the DOTS,* Figure 20 was built from the research literature using Rubenstein's (1975) five step model development process. The model uses narrative as an instructional modality, to design, develop, encode, deploy and explore instructional content to influence learning, retention and transfer to practice (performance contexts). The model contains four steps. Each model step contains three elements. The elements are underpinned by findings from narrative, development, communication, learning, and instructional design theories.

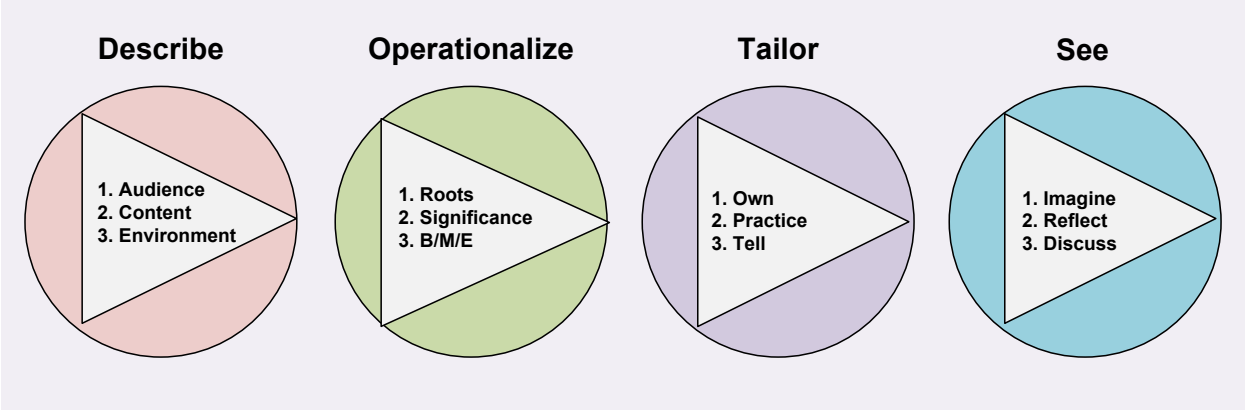


Figure 21. A Model for Designing Instructional Narratives for Adult Learners: Connecting the DOTS.

Model Step: Describe

The word '*describe'* can be defined as a brief account in words about the details of the learning event. This step addresses the questions of 'who,' 'what,' and 'where.' The purpose of the *Describe* step is to gather information about the learner [Audience, who], the content to be learned [Content, what] and the environment (context) [Environment, where] in which learning will occur. This information forms the basis for making decisions about how to operationalize the content [encode the message] for deployment. The output of this step is information about the Audience, the Content to be learned and the Environment in which the learning will occur. Table 30 contains definitions of the *Describe* step elements.

Table 30

Model Step 'Describe' and its Elements Defined

Describe	Audience	Content	Environment (Instructional context)
A brief account in words about the details of the learning event	Learners/listeners gathered for an event. Learners/listeners are imbued with unique social and psychological attributes.	Substance of what the learners/listeners must know or do. Content inherently contains meaning.	The "physical, organizational and psychological variables that surround the instruction and the learner" (Tessmer & Richey, 2008, p. 38). Context enables the assessment and understanding of an event.

Model Step: Operationalize

The word *'operationalize'* means to convert knowledge into executable procedures. This step addresses the question of 'how.' This step describes the actions by the teller (instructor,

facilitator) necessary to put the information gathered from the describe step [Audience, Content, Environment] into use (encoding). The teller will convert this information into knowledge (meaning is assigned) so it can be used to inform an instructional story.

During operationalization, the content is adapted (contextualized through story) for the Audience and the Environment. The purpose of the *Operationalize* step is to make decisions using the information from the *Describe* step. The learners' prior knowledge [Roots] is used to determine how best to frame the relevant content aspects so they may be recognized by the learners as something they deem worthy of their attention [Significance] and to develop a content story with a beginning, middle and end [B/M/E] sequence held together by an organized plot that connects the content concepts with the concrete experience of the teller. Building a good story that listeners find significant and value begins with the establishment of a narrative point, a context with a specific purpose. Knowing the point is what gives the story its meaning; it is what is needed for recall (Zull, 2002). The narrative point forms the basis for robust event description, knowledge of the mental state of the characters, their inner thoughts, feelings, motives (plot complexity) and a progression from beginning to end filled with possibilities. The product of these activities is an authentic story that is cognitively and affectively owned by the teller.

The output of this step is an instructional story expressly designed for the purpose of enabling learners to alter their perspective, make decisions, take action, and acquire particular capabilities leading to a change in behavior (learning). This design and development of content is the story portion of the narrative. Table 31 contains definitions of the *Operationalize* step elements.

Table 31

Model Step 'Operationalize' and its Elements Defined

Operationalize	Roots (Prior Knowledge)	Significance	Beginning, Middle, End (B/M/E)
To convert knowledge into executable procedures	What the learner/listener already knows (Ambrose, et al., 2010).	The quality of being worthy of attention to the learner/listener. Significance is assigned through reflective thinking (Dewey, 1911).	The basic components of narrative, a structure that imitates a complete action, a whole, through the arrangement of events in an organized sequence (Aristotle, 1999).

Note. The model uses the word 'roots' to refer to the prior knowledge of the learner. The word 'root' can be defined as the origin of something. In the context of the model, it represents the collective knowledge of the learner from past experiences and learning.

Model Step: Tailor

The word *'tailor'* means to adapt for a special purpose. This step addresses the question of 'why.' The *Tailor* step completes the operationalizing of the story. Operationalizing a story requires more than a beginning, middle, and end sequence. Building a good story that learners find significant and value requires robust event description, knowledge of the mental states of the characters, their inner thoughts, feelings, motives (plot complexity), and a progression from beginning to end filled with possibilities. Learners will likely view such purposeful stories as worthy of attention. The attributes of event description, wholeness, narrative orientation and narrative point contribute to the production of a good narrative (tellability). The purpose of the *Tailor* step is to assess the tellability of the story and imbue the story with the cognitive and affective attributes that make the story personal [Own]. This is accomplished by rehearsing the telling of the story [Practice]. The output of this step is the actual telling [Tell] of the story to the

learners [Audience]. This expression of meaning is the discourse portion of the narrative. Table 32 contains definitions of the *Tailor* step elements.

Table 32

Model Step 'Tailor' and its Elements Defined

Tailor	Own	Practice	Tell
Adapt for a special purpose	The cognitive, affective and kinesthetic possession of an idea, image, action or object.	The application or use of knowledge, an idea, belief or process (Jewell & Abate, 2001). Practice implies action and is grounded in experience (Driscoll, 2005).	Using language to communicate (express) information to learners/listeners in spoken or written form.

Model Step: See

The word '*see*' means to discern or deduce mentally, to understand. During this step, the learner/listener decodes the instructional narrative (teller's story as told to the learners/listeners). The purpose of the *See* step is to enable the learners/listeners [Audience] to reach understanding by imagining themselves in the story [Imagine] and by engaging in an internal dialogue on how the story affects what they already know. This process involves addressing assumptions, testing hypotheses, making new meanings [Reflect] and talking with other learners and the teller to reach a mutual understanding of the intended story meaning. It concludes with the exploration of other contexts for the application of this new knowledge [Discuss]. The output of this step is retained learning and possible transfer to practice (performance contexts). Transfer to practice is dependent on the nature of the teller facilitated post story discussion. It is incumbent on the teller (instructor/facilitator) to encourage the exploration and thoughtful consideration of various

performance contexts during discussion. Table 33 contains definitions of the '*See*' model step elements.

Table 33

Model Step 'See' and its Elements Defined

See	Imagine	Reflect	Discuss
To perceive, to become aware, to discern or deduce mentally, to understand (Jewell & Abate, 2001).	The mental formation of new ideas, concepts or images based on objects and events not physically present.	Exploring experience as a means of enhancing understanding (Boud, Keogh & Walker, 1985). Reflection is an internal dialogue with oneself (Schon, 1983).	Talking with other learners/listeners about something for the purpose of understanding the intended meaning of an experience.

Model Application

The DOTS model provides a framework for setting conditions suitable for transfer to practice. The first three steps (*Describe*, *Operationalize*, and *Tailor*) enable learning and retention through the design (using input about the Audience, Content and Environment) and communication of content rich contextualized instructional story based on the teller's experience. The teller's (instructor/facilitator) instructional story (assembled based on the teller's prior knowledge) is connected to the audience [Roots, Significance] and organized in a beginning, middle and end [B/M/E] sequence) is prepared [Own, Practice] for transmission and told [Tell] to the learner/listeners [Audience]. During the fourth model step, *See*, the message is decoded by the learners/listeners and the internal processes [Imagine, Reflect] and external process [Discuss] are initiated. These activities enable the learner/listener meaning making process. Facilitated peer interactions provide an opportunity for learner/listeners to access [Imagine] their retained

knowledge (both prior and new knowledge) and to expand and contract that knowledge (learning) through reflection [Reflect] and facilitated discussion [Discuss]. During discussion, the learners/listeners can explore and assess potential transfer contexts.

Although depicted as a linear process, as the teller and the learners/listeners make content decisions, previously addressed model elements are re-visited during both teller story encoding and learner/listener story decoding. For example, the tellability assessment by the teller (instructor/facilitator) during the *Tailor* step will likely lead to changes in the story plot developed during the *Operationalize* step. During reflection, learners/listeners will assume the role of teller as their prior knowledge [Roots] is retrieved and applied to what they heard. A new story [B/M/E] will take shape based on what they deemed important and relevant [Significance]. The emerging story is imbued with cognitive and affective meaning [Own] and it will be shared with others [Tell] during the discussion of the teller's story [Discuss].

Selecting the model for an instructional situation. The successful application of a model in practice is predicated on how well the model is matched to an application context based on the model's purpose. Edmonds, Branch and Mukherjee (1994) suggest that models used for practice provide guidance on when the model should be selected for an instructional situation. Grounded in the work of Andrews and Goodson (1980) who identified emerging factors in instructional design practice, they integrated the factors into a conceptual framework with four model application classifications:

(1) Type of orientation: prescriptive or descriptive

(2) Type of knowledge: procedural or declarative

(3) Required expertise: novice, intermediate, expert

(4) Theoretical origins (structure): hard systems, soft systems or intuition

In addition to these classifications, they added the categories of context, (K-12, higher education, business, government) and level, (unit, lesson, course, institutional, mass instruction) for model application. These factors affect the situational application of the model.

Recognizing the appropriate model application context enables the efficient use of resources toward the development and communication of effective instruction for the target audience. The level is essential for design based on the nature of the instruction. The unit level addresses tasks to be learned. The lesson level contains the events during specific episodes of instruction. The course level addresses the entire subject. The institutional level refers to curriculum planning and the mass level refers to global instruction. Table 34 shows how the *Model for Designing Instructional Narratives for Adult Learners: Connecting the DOTS* can be applied in practice based on the instructional design application matrix proposed by Edmonds, Branch and Mukherjee (1994).

Table 34

Model for Designing Instructional Narratives for Adult Learners: Connecting the DOTS applied to Edmonds, Branch and Mukherjee (1984) Instructional Design Application Matrix.

Matrix Criteria	DOTS Model Application	Criteria Selection Rationale
Orientation A. Prescriptive B. Descriptive C. Elements of both	Prescriptive	The model uses values and conditions of instruction to select (prescribe) the instructional method.
Knowledge Structure A. Procedural (how to reach a goal) B. Declarative (why) C. Elements of both	Elements of both (procedural and declarative)	Procedural aspects are the use of examples and practice with feedback. Declarative aspects are the use of analogies and learner discovery through reflection.
Expertise Level A. Expert B. Intermediate C. Novice D. Suitable for all	Suitable for all	The model provides application instructions and defining questions to assist users with applying the steps and associated elements.
Structure A. System B. Soft-system C. Intuitive D. Aspects of each	System	The model is a system that uses a systemic approach to instruction; it is focused on the learning situation dynamics.
Context A. K-12 B. Higher Education C. Business D. Government	Higher Education, Business, Government	The model is designed for adult learners. Learning is applied to performance contexts.
Level A. Unit B. Lesson C. Course D. Institutional E. Mass [global instruction]	Unit, lesson and course. Application with modification at the course, institutional and mass [global] levels	The model is designed for application at the unit and lesson level. At the course, institutional, and mass [global] levels the facilitated discussion portion of the *See* step is challenging.

Model Validity

Theorists and model developers assume model validity if the model is a "logical, coherent entity with literature support" (Richey, 2005, p. 174). Support for the validity of the *Model for Designing Instructional Narratives for Adult Learners: Connecting the DOTS* can be found from three sources:

- Narrative, development, communication, learning and instructional design theories
- Formal research
- Educational practice

Theoretical Support

As previously detailed, the model was developed based on the findings from narrative, development, communication, learning, and instructional design theories. Data were collected from the five theory bases and assembled into tables. The conceptual support from the five theory bases provides empirical support for the model (Reigeluth & Stein, 1983), strengthens the case for inclusion of the elements, and confirms the element's contribution to the model step it supports.

Internal validation of the model addressed the following concerns identified by Richey and Klein (2007):

- Are all steps included in the model necessary?
- Are the steps manageable in the prescribed sequence?
- To what extent does the model address all relevant environmental factors?
- To what extent is the model usable for a wide range of design projects and settings?
- Can the steps be completed efficiently under most working conditions?
- Is the use of this model cost effective? (p. 23)

The model internal validation review determined that all the model steps are necessary. Each step supports the model purpose and contributes to desired result, transfer of learning to practice. None of the model steps or elements can be removed without sacrificing instructional narrative effectiveness. The steps are manageable in the sequence indicated. However, the researcher notes that although the model steps are depicted in a linear fashion, its processes are iterative and feedback from one step may lead to the return to a previous step. The model addresses the relevant environmental factors in the *Describe* step. The model is applicable to most design projects and can be used in a variety of settings given that sufficient time is allocated for the post story activities identified in the last model step, *See*. Time for the learners/listeners to imagine, reflect, and discuss the teller's story, and possibly develop and share a related story, are the activities that are strongly associated with learning retention leading to transfer to practice.

The model steps can be completed efficiently under most working conditions. The cost associated with using the model is the cost for the time it takes for the teller to design, develop and deploy the story and the time for the post story deployment learner/listener activities. Given that the expected outcome of deployment is a change in learner/listener behavior, the cost of design, development and deployment could be offset by the learner/listener performance improvement after the learning event. This improvement should be quantified through a confirmative evaluation.

Formal Research Support

Although no formal studies of the model have been conducted, there is empirical support for the model steps and elements because the model integrates the work of other theorists and researchers (Reigeluth & Stein, 1983).

Educational Practice Support

In addition to the previously cited empirical and theoretical support for the model, there is abundant support for the use of narrative to influence learning, retention and practice from the "field." This support is in the form of anecdotal and empirical evidence provided by practitioners who have used narrative to inform teaching (Banks-Wallace, 1998; Bell, 2002; Connelly & Clandinin, 1990; Georgakopoulou, 2006; Moen, 2006), to advance organizational learning (Argyris & Schon, 1978; Boje, 1991a, 1994; G. P. Huber, 1991; Levitt & March, 1988; Weick, 1979), to understand people and situations in practice (Boje, 1991b; J. S. Brown & Duguid, 1991; K. Carter, 1993; Charon, 2001; Lave & Wenger, 1991; Lowenthal, 2008; Luwisch, 2001; Mattingly, 1991a, 1991b), to affect performance (J. Martin & Powers, 1983b), to support narrative pedagogy, a research-based pedagogy that considers narrative to be an interpretative pedagogical tool used in practice to create meaning and advance knowledge through understanding (Abrahamson, 1998; C. A. Andrews, et al., 2001; Burk, 2000, November; Coulter, et al., 2007; Diekelmann, 2001; Gudmundsdottir, 1991, 1995; Ironside, 2003, 2004; McAllister, et al., 2009), to guide student learning (teaching strategy) (Butcher, 2006; Cangelosi & Whitt, 2006; C. Cooper, et al., 1983; Ferguson, et al., 1992), and to solve problems (Ackerman & Maslin-Ostrowski, 1995, April; Hernandez-Serrano & Stefanou, 2009; Jonassen & Hernandez-Serrano, 2002; Lave & Wenger, 1991; Orr, 1996; Schon, 1983). The widespread use of narrative in these contexts suggests it produces good results.

Additionally, several professional conference presentations of the model have received positive practitioner feedback. Although not experimental data, practitioner appeal, provides important support for the model.

Summary

This chapter addressed research questions one through five, the analysis and synthesis of the findings from the narrative, development, communication, learning, and instructional design theory research literature used to inform the development of a model for designing, developing and deploying instructional narratives. The sixth research question: "What model for designing instructional narratives can be constructed based on the findings from these five areas (narrative, development, communication, learning and instructional design theories)?" was addressed through the introduction of the model, the product of this research study.

The four model steps and their 12 elements were defined. The purpose of each step in relationship to the other model steps was described. An explanation of how the model should be applied to design, develop, and deploy instructional narratives to enable learning, retention and transfer to practice (performance contexts) was offered. Application of the model in an instructional situation was described using criteria suggested by Edmonds, Branch and Mukherjee (1994). The section concluded with a discussion of model validity.

CHAPTER 5

Discussion

The purpose of this study was to develop a research-based model for designing and deploying instructional narratives based on principles derived from narrative theory, development theory, communication theory, learning theory and instructional design theory to enable adult learning and retention and the effective transfer of that retained learning to practice (performance contexts). Findings from these five areas were used to identify elements to inform the development of a model for the design and deployment of instructional narratives. An instructional narrative is a narrative expressly designed for the purpose of enabling learners to alter their perspective, make decisions, take action, and acquire particular capabilities leading to a change in behavior. This research study examined narrative in terms of its use as an instructional modality. A modality addresses the manner in which information is encoded for transmission.

This chapter addresses the study limitations, implications of the research study for practitioners, recommendations for future research, and conclusions.

Study Limitations

Given the interconnected nature of the experiential background of the researcher with the literature, researcher bias is a research study limitation inherent in all model design and development research projects. This affects not only the selection of the literature to be reviewed for inclusion, but, most importantly, the inductive processes used by the researcher to aggregate conceptual elements and assemble the model. Another limitation of this research study is the lack of external validation of the model. External validation studies assess the deployed model's impact (Richey & Klein, 2007).

Implications for Practitioners

This research study formalized the process for using narrative to elicit a change in learner/listener performance leading to the transfer of learning to practice. The *Model for Designing Instructional Narratives for Adult Learners: Connecting the DOTS* establishes a framework for educators and performance improvement practitioners to use to design, develop and deploy instructional narratives for the purpose of enabling learners to alter their perspective, make decisions, take action, and acquire particular capabilities leading to a change in behavior. The model can be applied in higher education and in organizational settings to teach or train adult learners.

In higher education the model can be applied to assist learners/listeners with grasping abstract concepts, to fill knowledge gaps, to correct misconceptions from prior learning experiences, and for problem solving. In each of these applications, the model step activities of *Imagine*, *Reflect* and *Discuss* are where the teller (instructor/facilitator) and the learners/listeners work together to make abstract concepts seem real, to connect existing knowledge with new knowledge, re-think past experiences and work through problems. When the model is applied in situations where narrative alone is used, the effect of the interaction will likely be increased due to the structured time spent exploring the meaning and the implications of the narrative. The model can also be used for educator development. Using the model to share educator stories provides an opportunity for educators to not only benefit from the exchanges between colleagues but also to practice building and deploying instructional narratives by applying the model steps.

In practice, the model can be used in situations where narrative has already been successfully applied to increase the likelihood of meaningful learning and transfer. For example, the use of narrative to support problem solving is well documented in the literature (Ackerman &

Maslin-Ostrowski, 1995, April; Hernandez-Serrano & Stefanou, 2009; Jonassen & Hernandez-Serrano, 2002; Lave & Wenger, 1991; Orr, 1996; Schon, 1983). In organizational settings, the power of narrative to shape culture and enable change (Boje, 1991c; Boje, et al., 1999; Boyce, 1995, 1996; Denning, 2001; Gabriel, 1991, 2000; Hazen, 1993; Kreps, 1990; J. Martin & Powers, 1983a, 1983b; McCarthy, 2008; Pondy, 1983; Rhodes & Brown, 2005; S. Taylor, et al., 2002; Tyler, 2007; Wilkins, 1983, 1984) and to advance organizational learning, inform practice and teach management and leadership skills (Argyris & Schon, 1978; Boje, 1991a, 1994; Boland Jr, et al., 1994; J. S. Brown & Duguid, 1991; Crossan, et al., 1999; Cullen, 2008; Czarniawska, 1998; Gargiulo, 2005b; G. P. Huber, 1991; Kaye, 1995; Lave & Wenger, 1991; Levitt & March, 1988; Rhodes, 1996, 1997; Swap, et al., 2001; Tenkasi & Boland Jr, 1993; Vance, 1991; Watson, 2001; Weick, 1979; Zemke, 1990) is well established in the literature and suggests that narrative and its practical application in education and performance environments is a powerful heuristic. Martin and Powers (1983a) found that stories caused commitment more than other forms of communication which lead to changes in performance. In medicine, narrative has been used to understand patient stories (Charon, 2001; Greenhalgh, 1999), to solve clinical puzzles and to shape the patient therapeutic experience (Mattingly, 1991a) for diagnosis and healing (Sandelowski, 1994) as well as to educate nurses on how to create a professional identity and build an experiential knowledge base of care practices (Sandberg, 1998).

Use of the model in a variety of educational and performance (practice) contexts will produce valuable information on the model's adaptability and flexibility to accommodate a variety of educational and organizational challenges. An example of the model's adaptability and flexibility can be found in the model Performance Support Tool (PST) shown in the Appendix. This PST has been developed to enable educators and practitioners to rapidly apply the DOTS

model steps. For each step the tool provides the user with a defining question, a user prompt that further delineates the model element, and an application guideline that adds specificity to the element. Space is provided for the user to write a response to the element's defining question based on the guideline, Figure 22.

Step 1: Describe (Finding out what is important)

Element	Defining Question	Guideline
Audience	Who are your learners?	Demographics, social and psychological attributes Readiness assessment
Content	What work do you want your learners to know or do?	Apply a concept, use a process, solve a problem
Environment	Where will your learners be situated (instructional context)?	Physical, social and instructional factors

Briefly describe your Audience, Content and Environment

Audience	
Content	
Environment	

Figure 22. DOTS model Performance Support Tool (PST) for the *Describe* step.

Recommendations for Future Research

The model provides a framework to test the effectiveness of instructional narratives as a means of producing contextualized content stories meaningful enough to enable learning, retention and transfer to practice. Future research should be conducted to externally validate the

model. External validation research is concerned with the effects produced by using the model. External validation studies address questions focused on the product characteristics, how well the instruction meets learner needs and client requirements, and the impact of the instruction. For example, "to what extent do changes occur in learners' knowledge, attitudes, and/or behaviors after instruction" (Richey, 2005, p. 175)? An external validation study is considered to be a summative or confirmative evaluation of the model (Richey & Klein, 2007). Although external validation studies can be complex, due to the "large number of extraneous factors that can influence the findings" (Richey, 2005, p. 176) they provide valuable information on model effectiveness. In addition to the external validation of the model, the DOTS model Performance Support Tool (PST) as shown in the Appendix should be externally validated. This PST for the rapid deployment of the model should be validated to ascertain its impact on both the instructional design process and the resulting learner performance.

Another area for future research is transfer. The means for accomplishing transfer have not been made clear in the literature (R. Thomas, et al., 1992). "Researchers have been more successful in showing how people fail to transfer learning than they have been in producing it" (McKeough, et al., 1995, p. vii). Specifically, research is needed on the internal and external learning factors that may contribute to the successful transfer of learning to new, similar (low road transfer) and dissimilar (high road transfer) performance contexts (Ambrose, et al., 2010; Woolfolk, 1995).

In addition to these areas, research by educators and brain scientists working in tandem to understand the synergistic relationship between communication, brain-based learning, and adult development is necessary. Given advances in brain scanning technology, there is an opportunity for researchers to explore how we come to know, retain, retrieve and transfer knowledge to new

performance contexts by recording human biological reactions to physical stimuli in learning situations.

Conclusions

Transfer, the application of learned knowledge and skill to different performance contexts or applications, can be considered the objective of education (Ambrose, et al., 2010; Butterfield & Nelson, 1989; Halpern & Hakel, 2003; McKeough, et al., 1995) and a goal of instructional design (Richey, et al., 2011). Ford and Weissbein (2008) identified a need for instructional design strategies to enable transfer.

This research study showed how instructional narratives, narratives expressly designed for the purpose of enabling learners to alter their perspective, make decisions, take action, acquire particular capabilities leading to a change in behavior, can be designed and deployed to enable learning, retention and the transfer of learning to practice (performance contexts). This was accomplished through the development of a research based model for designing and deploying instructional narratives based on principles derived from narrative, development, communication, learning and instructional design theories.

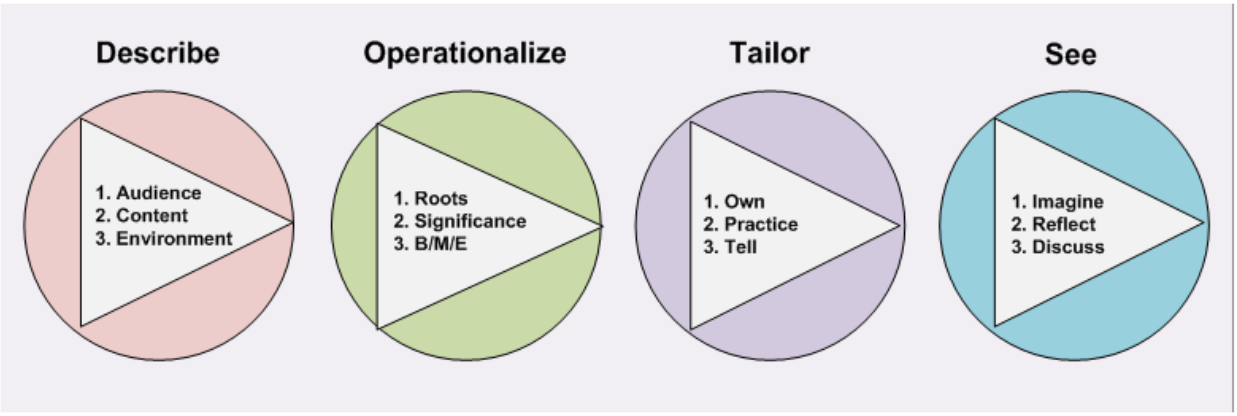
Model development research addresses "questions that contribute to our knowledge base and to the improvement of our practice" (Richey & Klein, 2007, p. 15). This research study contributes to our knowledge base by bringing together communication, learning, development and instructional design theories by using narrative as a means of leveraging the synergistic relationship between communication, learning and adult development to produce a model for learning and understanding through the activation of meaning making in both the teller (instructor/facilitator) and the learner. Most significantly, this study contributes an original

model for enabling learning, retention and transfer to practice (performance context) for adult learners.

The model benefits practitioners by providing a simple means to design, develop, and deploy instructional content that is universally recognized by all learners/listeners. Use of the model encourages learner engagement with the content through communities of practice to arrive at shared meanings. The application of the model to adult learning and performance contexts contributes to the fields of Educational Technology and Performance Improvement by providing validation for an instructional modality that describes a clear path for learning transfer.

APPENDIX

Model for Designing Instructional Narratives for Adult Learners: Connecting the DOTS Performance Support Tool (PST)



Step 1: Describe (Finding out what is important)

Element	Defining Question	Guideline
Audience	Who are your learners?	Demographics, social and psychological attributes Readiness assessment
Content	What work do you want your learners to know or do?	Apply a concept, use a process, solve a problem
Environment	Where will your learners be situated (instructional context)?	Physical, social and instructional factors

Briefly describe your Audience, Content and Environment

Audience	
Content	
Environment	

Step 2: Operationalize (Connect what is important with your lived experience)

Element	Defining Question	Guideline
Roots	How does your content connect with what your learners already know?	Tap into existing knowledge, beliefs, assumptions
Significance	Why is this content worthy of the learner's attention?	Addresses meaning, importance, purpose
Beginning	What is the actual state, situation, or problem?	Answers questions who, what, where, when Sets the stage by putting audience, content, and environment into context
Middle	What is happening to the people (characters) in the environment?	Explains why (significance) and how (plot) Depicts change, conflict or decision Details actions that build up to a turning point
End	What is the desired state, the outcome, resolution?	Where you want to be…always positive!

Briefly identify your story Roots, Significance, and Beginning-Middle-End

Roots	
Significance	
Beginning	
Middle	
End	

Step 3: Tailor (Putting you into the story)

Element	Defining Question	Guideline
Own	Are you cognitively (head) and affectively (heart) connected with your story?	Make sure your story conveys how you think and what you believe/feel about the content to your learner's (audience)
Practice	Does your story connect audience, content, and environment?	Perform a mental storyboard Check your event sequence & character relationships
Tell	Will your story resonate with your learners?	Express your story! Be yourself!

Briefly describe how you will put yourself into the story

Own	
Practice	
Tell	

Tell your story!

Step 4: See (Listener reaction to the story)

Element	Defining Question	Guideline
Imagine	Did you see yourself in the story? Did you recall a similar experience/story? Did you connect with the story events/characters? Did the story spark an emotional response?	Try to picture yourself inside the story
Reflect	**Did the story…** Reaffirm what you already knew? Cause you to question what you thought you knew? Introduce you to something you did not know?	Explore the impact the story had on your understanding
Discuss	What are your thoughts about the story? How did hearing the story make you feel? What will you do (performance) because of the story?	Take your story listening experience apart Share what you learned, what you will do

Briefly identify what the story meant to you

Imagine	
Reflect	
Discuss	

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ABSTRACT

A MODEL FOR DESIGNING INSTRUCTIONAL NARRATIVES: CONNECTING THE DOTS

by

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May 2013

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The purpose of this study was to develop a research-based model for designing and deploying instructional narratives based on principles derived from narrative theory, development theory, communication theory, learning theory and instructional design theory to enable adult learning and retention and the effective transfer of that retained learning to practice (performance contexts). Findings from these five areas were used to identify elements to inform the development of a model for the design and deployment of instructional narratives. An instructional narrative is a narrative expressly designed for the purpose of enabling learners to alter their perspective, make decisions, take action, and acquire particular capabilities leading to a change in behavior. This research study examined narrative in terms of its use as an instructional modality. A modality addresses the manner in which information is encoded for transmission.

This design and development research study used three interrelated literature reviews to build the conceptual framework to address the problem, develop the model to operationalize the conceptual framework, and to formatively review and internally validate the model.

The result of this study is a research based model for designing instructional narratives that can be applied in higher education and organizational settings to enable learning, retention and transfer to practice (performance contexts).

The model contains four steps: *Describe*, *Operationalize*, *Tailor*, and *See*. Each step contains three elements. *Describe* identifies the *audience*, the *content* to be learned and the *environment*. This output of this step is used by the teller (instructor/facilitator) to adapt the content (contextualize through story) for the audience (learners/listeners). The *Operationalize* elements of *roots*, (prior knowledge), *significance*, and the story *beginning, middle* and *end* are used to build the story. The story is adapted during the *Tailor* step through teller actions to *own*, *practice* and *tell* the narrative. During the final step, *See* the learners/listeners, *imagine*, *reflect* and *discuss* the narrative.

AUTOBIOGRAPHICAL STATEMENT

Debra M. Smith is the Instructional Designer for Online Programs at Wayne State University, Detroit, Michigan where she acts as a liaison between the Office of Online Programs and the University's Colleges, Schools, Programs and Academic Departments to facilitate the development of online programs and courses. As an adjunct faculty member at Wayne State University she teaches project management for instructional designers. Her academic credentials are as follows: AAS, BS, Ferris State University; MBA Madonna University. In addition to these degrees she holds a certificate in College and University Teaching from Wayne State University and has achieved certification as a Project Management Professional (PMP). She is a member of the Project Management Institute (PMI), the Association for Educational Communications and Technology (AECT), and the International Society for Performance Improvement (ISPI).

During her 30 year business management career, Debra worked with a diverse group of business professionals to conduct needs assessments, develop and execute project plans, implement quality initiatives, design and develop project management training, and manage evaluations. She has published a book chapter explaining how to match a workplace to one of five measurement and evaluation plans commonly used in business today: Balanced Scorecard, Strategy Maps, Appreciative Inquiry, Total Quality Management and Six Sigma. As a corporate trainer she used role play, case studies, narratives, simulations, and team building exercises to teach business professionals from Europe, South America and Asia.

Debra has spoken about instructional narratives at national and local professional conferences and meetings. Her research agenda is focused on narrative, adult learners, instructional design, and the Scholarship of Teaching and Learning.