ABSTRACT

SPRING, MARK JEREMY. Teaching a Practical Philosophy of Mind: Design, Rationale, & Illustration of a Philosophy-Based ELA Curriculum Model. (Under the direction of Drs. Angela Wiseman and Ruie Pritchard).

This study presents an intricate design and illustration of a high school ELA curriculum model conceived to help students improve their critical thinking and interpretation skills. The model is infused with philosophy-based exercises that prompt students to closely examine their thinking as part of their ELA coursework. Writings by the early pragmatist philosophers, reader response theorist Louise Rosenblatt, and critical thinking scholars provide fine-grained analyses of reading, writing, and thinking, all of which inform the design for each model stage. The final two chapters of this study feature close examination of the model in action. I use qualitative content analysis to peruse 70 artifacts created by ten students who were immersed in the ELA curriculum model's connected stages. I report my findings in three layers of analysis: close study of the teacher's perspective; detailed analysis of a student's complete learning arc; and comparison and contrast of artifacts that all ten study participants created throughout the course. The findings of this study provide a foundation for answering two research questions, the first concerning how high school ELA teachers can guide students to develop a practical philosophy of mind, and the second concerning how student work displays critical thinking and interpretation. These findings provide a foundation for curriculum design and open a path for focused research on how teachers in ELA and across disciplines can use studies of critical thinking, reader response, and pragmatism to create standards-aligned exercises that spark critical thinking, interpretation, and development of a practical philosophy of mind.

Teaching a Practical Philosophy of Mind: Design, Rationale, & Illustration of a Philosophy-Based ELA Curriculum Model

by
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DEDICATION

I dedicate this study to my mother, who read to me from my first year of life and with whom I read my first books; to my father, whose constant intellectual companionship and warm, steady support buoyed me throughout many years of graduate study; to my 11th-grade English teacher, Dr. Marcia Swenson-Davis, whose visionary teaching inspired my life's work; and to my daughter, who frequently asked about my progress on the "prehistoric dinosaur," a.k.a., the Ph.D. Maeve, I am pleased to report some surprising news: dinosaurs live!

BIOGRAPHY

Mark Jeremy Spring has worked as a teacher of English, creative writing, philosophy, social studies, and psychology since 2000. He chose to become a teacher in belief that students' mastery of reading, rhetorical analysis, and writing is essential for the health of American society: students' collective critical-thinking and creativity skills will eventually form the backbone and power the imagination of the country. A citizenry that can deeply contemplate the panoramic worlds of novels, skillfully analyze the subtleties of poetry and rhetoric, and ably reproduce or surpass the richness of films and paintings in the inner theater of imagination will prove resistant to deception, remain poised amidst complexity, show courage in adversity, and use patience and reason in the midst of inspired endeavors.

Spring is fascinated by the intersection of English literature with the fields of psychology, philosophy, and neuroscience, and he draws ideas from each of these fields in the lessons and units he designs for his students. He presents this dissertation as a synthesis of literature from across these disciplines in hope of making abstract ideas useful to students. He believes that teachers can position themselves to serve as conduits that connect the voices of advanced researchers and writers to the minds of a full spectrum of students, thereby helping to establish a cycle of cross-generational and multidisciplinary communication.

ACKNOWLEDGMENTS

I have drawn inspiration and fulfillment from a vibrant community of mentors, colleagues, family members, and friends. This dissertation reflects the richness and depth of conversations I have enjoyed with people who stoked my motivation and helped me to discover ever-clearer forms of my project. It is my pleasure to consider those people here and express to them my heartfelt thanks.

Dr. Ruie Pritchard strongly endorsed my application to the doctoral program, nominated me for a fellowship that enabled me to commit full-time to graduate school for two years, and helped me focus my investigations into philosophy of mind through her cogent suggestions about how to structure my research and organize my essay. She gave excellent advice, too, in helping me to navigate my course selection and sequencing throughout my time in the doctoral program. In retrospect, I do not know how I would have brought so many of my ideas into communicable form without her prompting and feedback on many drafts of this dissertation. Ruie, thank you for your patience, vision, and wisdom.

I am fortunate that I met Dr. Angela Wiseman early in my doctoral studies. Dr. Wiseman devised a superb course on literacy that altered the course of my work at N. C. State, helping me to establish a clear link of my previous work in philosophy and education to the literacy theory developed by the pragmatist writer Louise Rosenblatt. Dr. Wiseman's class provided me with essential experiences and materials that helped me to form the foundation of my research. Dr. Wiseman became my first dissertation committee member—and eventually the committee co-Chair—and for many years she offered crucial guidance that helped me to profoundly improve every aspect of my study. Her thoughtful, timely advice and encouragement shaped my work at every turn in this long process. Angela, thank you for your wisdom, devotion, and vision.

Dr. Michael Maher inspired me through his example of passionate leadership and devotion to teaching, not only in the memorable and impactful class he taught on pedagogy, but in his work as leader of the teacher training program at N. C. State. Dr. Maher's blend of steady, kind collegiality and volcanic enthusiasm for his work awoke in me an even deeper sense of commitment to my own projects and to the larger community of schools across our state and nation. Dr. Maher, thank you for your fire, your integrity, and your follow-through. Your spirit propelled me to complete this dissertation.

Dr. Margareta Thomson designed a brilliant course, "Emotion and Motivation," which provided me with a chance to profoundly deepen my understanding of my own work. Dr. Thomson called forth my earnestness, exuberance, and grit through her combination of brilliance, intensity, and love for her research. In her energetic presence and in response to the readings she selected for our class, I conceived a model of the emotional and motivational systems that power people to acquire and apply a practical philosophy of mind. For the duration of my career, I will continue thinking about the important subjects Dr. Thomson introduced in her course. Margareta, thank you for your creativity, your insistence on high standards of writing and research, and your mentorship.

Prior to my enrollment in the doctoral program at N. C. State, Dr. Michael Grimwood, Dr. Thomas Hester, and the poets John Balaban, Dorianne Laux, and Peter Makuck at N. C. State helped me to strengthen my grasp of literary analysis and creative writing throughout my studies in N. C. State's M.F.A. program. I am forever grateful for their contributions to my life.

Professors at Ohio University and the University of Toledo helped me to find my way to the M.F.A and doctoral programs at N. C. State. Dr. Ralph Martin, Dr. George Hartley, Dr. Joan Safran, and the poet Mark Halliday provided wonderful mentorship and crucial support during

my years in Athens. During my undergraduate years at the University of Toledo, I first learned about pragmatism and became a much stronger writer and researcher, especially under the guidance of Dr. James Campbell, Dr. Thomas Barden, Dr. David Stern, Dr. Charles Blatz, and the poet Joel Lipman. To all of my mentors in Athens and Toledo, I offer my continuing and profound gratitude.

This dissertation reflects my latest response to Dr. Marcia Swenson-Davis's call to lead a life of critical and creative thinking. The year-long high school course she designed and taught in literature, language, and composition changed my approach to reading, writing, thinking, and living. In many ways, the curriculum model I present in this study and which I have developed in my classrooms over the past twenty years stems from lessons and experiences I gained in Dr. Swenson-Davis's class in the 1990-1991 school year at Ann Arbor Pioneer High School. Marcia, thank you for your belief in me and especially for your lifelong commitment to the field of teaching. Your passion and vision live on in my service to students.

The longer I have taught at the high school and college levels, the more I have come to understand the profound importance of early childhood education and experience. I may owe my life in reading and scholarship to the choices my mother made to read to me from early in my first year of life, coaching me enthusiastically through all of my school years to love books. She did this for me before any large-scale studies or experiments showed to us the vital importance of literacy and language experiences in the first three years of life. Mom, your intuition and gifts as my first teacher put me on a promising path for the rest of my life. Thank you for your love, enthusiasm, and imagination.

Throughout my life, my father has played a central role in sparking my imagination and introducing me to ideas from the fields of psychology, literature, philosophy, and world

religions. His constant and thought-provoking companionship has opened me to a life of intellectual exploration and nurtured a spirit of academic adventure. His example of indefatigable service to his clients has likewise inspired my effort to be a present, mindful, and energetic teacher for the students I have come to know since 2000. Time and again, my father's service to me throughout my work in the doctoral program made a special, game-changing difference. His gifts of time, close feedback, and financial support enabled me to continue working on this project through periods of marked adversity. I would not have completed this work without his steadfast presence. Dad, thank you for your loving commitment.

To all of my mentors, colleagues, family members and friends, I look forward to growing with you in years to come. Our life-giving conversations call me into a better version of myself. I am thankful to have you in my life.

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CHAPTER 1: INTRODUCTION

Renowned literacy scholar Louise Rosenblatt (1904 - 2005) committed her major works (1938; 1978; 2005) to the purpose of merging literacy instruction and American philosophy. Implicit in her reader response theory, which she grounds in American pragmatism, is her search to align literacy instruction with philosophy's deepest goals: knowledge of self; knowledge of nature and reality; and mindfulness of the methods and logic readers use to form understanding. Like her pragmatist inspirers—John Dewey (2000), William James (1977), and Charles Sanders Peirce (2011)—Rosenblatt takes intense interest, finds compelling beauty, and sees practical value in exploring the workings of the mind. However, despite Rosenblatt's prominence and the enduring appeal of her ideas, and despite the continuing influence of American pragmatism on literary theory (Connell, 2008), education researchers have generated a relative paucity of work on the questions of *how and why* pragmatic literary theory may improve English Language Arts (ELA) instruction. Only five articles from the past ten years explore this subject directly and with sophistication.

In the present study, I bring pragmatism, reader response theory, and current education research germane to pragmatism and reader response into the frame of a concrete discussion about accessible exercises that enhance ELA instruction. I aim to complement Rosenblatt's work by illustrating a year-long progression of stages through which students may learn to synthesize cognitive sub-elements that operate in Rosenblatt's constructs of "aesthetic" and "efferent" reading, i.e., reading to gain aesthetic experience, and reading to acquire practical information.

Rosenblatt's most enduring work, *The Reader, The Text, The Poem* (1978), presents a theory of how readers form comprehension by combining their internal schemas—e.g., ideas,

memories, images, and emotions—with the patterns in the texts they read, creating a synthesis—"the poem"—that stands for meaning in a text. Rosenblatt emphasizes that the "poem" is not a solipsistic projection of the reader; nor is it a statement of "pure" objectivity, even if objectivity is the reader's goal. The poem is an artifact of aesthetic experience and efferent reading, emerging from an effort to participate, appreciate, and understand. The poem thus reflects a tenuous and evolving agreement between the reader's internal schemas and patterns that may exist in a given text.

The curriculum model presented in this study reflects my goal to help students become aware of how they create "the poem" of meaning. This analytical and creative work blends radical constructivist (von Glaserfeld, 1995) and social constructionist (Gergen, 1995) processes (Shotter, 1995) in what Greene and Yu (2016) call "epistemic cognition: the ability to construct, evaluate, and use knowledge" (p. 45). These processes center on students' development and application of procedural (i.e., interpretive) and declarative (i.e., conceptual) schemas in any given semiotic medium (Danesi, 2001; Danesi, 2002). The model's stages begin with simple, accessible steps that support gradual progress in longer, more sophisticated stages of developing a practical philosophy of mind.

Building on Ideas from the Work of Rosenblatt and Pragmatist Philosophers

Whereas Rosenblatt's book illuminates the reading process, the present study describes a philosophical foundation and a practical system for teaching the reading process and guiding students toward development of a practical philosophy of mind. I proceed in the spirit of inquiry that guided the original pragmatists, who pondered the design capacity of the imagination and devised ways to advance its development. These philosophers—Dewey (2000), James (1977),

Meade (1981), Peirce (2011), and Royce (1969) being foremost among them—built models of cognition based on their analysis of the "elements of mind" that inspire the current study.

The pragmatists' efforts did not conclude with mere description of consciousness. They drove earnestly at a more ambitious goal: discovering the means by which people understand self and world through disciplined, wide-ranging imagination. Their project is implicitly a philosophical work of education.

I aim to gather important outcomes and insights stemming from pragmatism into a singular object of contemplation—a model of cognition—and then to use that model as a foundation on which students may develop their own practical philosophy of mind.

A Rationale for Merging Philosophy and Literacy Instruction

Reading and thinking become ever more important determiners of private and communal quality of life as American culture and global society grow more complex. Reading material itself has become more abundant, diverse, and multimodal (Haji & Cuypers, 2011; Roksa et al., 2017). Our increasingly overwhelming media environment thus presents challenges to teachers intent on helping students build an orienting historical, emotional, and logical background to facilitate coherent thinking.

In this study, I argue that a philosophy-based ELA curriculum may help students gain greater control of the cognitive and emotional elements that shape their interpretive processes. Far from impractical, a philosophical skill set plays a necessary role in helping readers grow historical consciousness (Yogev, 2013), master logical processes and literary content (Topping & Trickey, 2007; Cleghorn, 2002), and navigate the domains of social, political, and cultural rhetoric (Robinson, 2016).

A chief aim of this study is to help students develop a practical philosophy of mind by enhancing the concrete applicability of both Rosenblatt's theory and the pragmatists' models of cognition. Through reading, writing, and thinking, students learn to connect their particular circumstances to the life of larger communities, and they learn to become thoughtful, reflective participants in a wider social, political, and intellectual realm. Rosenblatt's philosophy and the reader response model of interpretation built upon her arguments place students in roles of meaning construction and meaning discovery, which provide rich forms of rehearsal for navigating life as individuals and as collectives in a democracy (Dewey, 1916; Raines, 2005; Rosenblatt, 1978).

Origins of This Study: Readings in Classical American Philosophy

Prior to conducting this current study, I concluded my undergraduate studies in philosophy in 1997, making a close study of writings by the original pragmatist philosophers: John Dewey, William James, George Herbert Meade, Charles Sanders Peirce, Josiah Royce, and Alfred North Whitehead. Essays and books by James (1977), Peirce (2011), and Royce (1969) played especially prominent roles in shaping my understanding of cognition. A pragmatist model of cognition served, in turn, as the basis for my first attempts to weave philosophy of mind into classroom-based reading and writing exercises, beginning in the year 2000.

My early efforts to combine philosophy of mind and language arts instruction first consisted of one brief unit of lessons. I presented the first lesson--which now anchors Stage One in the seven-stage model--near the start of an academic year. My goal was to help students acquire technique and vocabulary for recognizing and labeling sub-elements of consciousness,

framing these sub-elements--perceptions, concepts, and interpretation--as objects for analysis and as materials for creative and philosophical exercises.

This first experience helped me to realize that students need more than one brief unit to form a clear conception of the "elements of mind," much less to apply awareness of cognitive sub-elements to improve their reading and writing. I began to combine literary- analysis exercises with stories and conversations about philosophy of mind to help students develop a practical philosophy of mind over the course of a semester and, later, over the course of a full academic year. I intended to help students grow metacognition to aid them in their analytical and creative work. I was also starting to explore the role of the teacher-researcher conduit—a scholar who links research and teaching by applying theory and research in concrete, applicable exercises, someone who completes the research-practice circle in the classroom. The model I describe in this study has developed from my work to meet these goals through 20 years of teaching and research in high school and university classrooms.

An Early Insight: A Conversation Overheard

A memorable conversation provided a moment of inspiration for the present study when I had begun to focus my studies in pragmatism, philosophy of mind, and history of knowledge into a single project: designing ELA lessons that help students gain command of a practical philosophy of mind.

I fortunately overheard this conversation while riding on the Boston T in late April of 1998. The story of this encounter illustrates a core concept that runs throughout this study: the story shows why mastery of a practical philosophy of mind makes a significant difference in the life of a student.

Three musicians stepped onto the T near Berklee College of Music, discussing songs they had composed by hand on sheets of paper. One of them passed a composition to his friend and said to him, "listen to this." The reader looked down silently at the page; then he looked back at the writer, and they began a lively conversation about the music. "*Listen* to this", the writer had urged. For these trained musicians, the symbols penned on the sheet were imbued with sensory content--likely indicating sounds for piano, violin, perhaps French horn, or possibly a combination of instruments. I further wondered how a trained reader--listener--might imagine inflections in the musical score. For such readers and writers, a vibrant world of auditory perception opens in sensory imagination. In the quiet of one's mind and in conversation with like-minded readers, one can comprehend symbols, listen to visual signs, and create songs.

By contrast, people who are not trained to read music would see only written forms. They would hear nothing in accurate correspondence to the symbols--the symbols are, for them, empty of auditory sensory-imagination content. In order for the markings to hold meaning, the reader must synthesize sensory imagination and concepts--at a natural, if not also a quick, tempo--in order to hear the music. A formal, classical education in music thus requires one to learn the art of synthesizing perceptions with concepts, signs that would otherwise remain empty and arbitrary (Emerson, 1982; Royce, 1969; Saussure, 1915; Thoreau, 1962). I began to wonder how internal perceptions and interpretive processes combine with concepts.

Combining perceptual and conceptual cognitive elements enables readers of literature to immerse themselves in novels and gain life-like experiences (Berns et al., 2013; Butler, 2005; Gardner, 1999; Rosenblatt, 1978), whereas other readers may not transform the symbols into anything at all like an actual experience. The process of synthesizing symbol and sense may also explain how some mathematicians can view a river and visualize, in real-time, the water's

surface undulations as changes in a rippling and minutely pixelated three-dimensional x-y-z graph field, with ideal Euclidean x-y-z points rising and falling in waves, describing intricately the movements of wide sweeps and distances of water, even to the point where, in imagination, the fine-grained field of x-y-z representations merges with the phenomena its points represent, whereas for other observers, the graph field may never hold significance of any kind; may remain an empty abstraction, a curious or vexing field of ciphers wholly unrelated to the movement of the river.

In each case, when the musician, the reader, and the mathematician apply *interpretation* to blend sensory *perceptions*, real and imagined, with *conceptual* forms, then textures, depths, and features of many kinds appear in their ideas. These ideas become full of detailed information—perceptual, conceptual, and interpretive in nature—which, in turn, supports richer communication (Einstein, 1970) and sparks understanding (McGinn, 2013).

I began to wonder: how can students learn to blend the elements of mind--concepts, perceptions, and interpretations--in the subjects they study? Why do they experience ease or difficulty in this particular kind of learning process? By late spring of 1998, I had formed a hypothesis: in order to understand a sign, whether word, note, or number, one must combine perceptions, concepts, and acts of interpretation to fully form an idea.

The Reader as a Creator of Meaning

Rosenblatt ends and begins her masterwork with her portrait of the sophisticated reader. Near the start of *The Reader, the Text, the Poem* (1978), she writes: "'The poem' comes into being in the live circuit set up between the reader and 'the text.' . . .[a] specific reader and a specific text at a specific time and place: change any of these, and there occurs a different circuit,

a different event--a different poem" (p. 14). Rosenblatt thus describes the reading process as an event structure (p.16), an encounter, wherein a perceiving, imagining, conceptualizing reader interacts with the signs of a text. Meaning rises from this interaction and "involves both the author's text and what the reader brings to it" (p. 14), resulting in an artifact of the encounter of reader and text: the "poem," the creation mutually constituted by writer and reader. Rosenblatt (1978) refers to this creative process as a "transaction" (p. 14) between the reader and the text, which is the central focus of what is commonly known as her *reader response theory*.

Rosenblatt explains that a reader's complexity of interpretation appears in the reader's stated awareness of, discussion about, and reflections concerning the "dynamic, personal, and unique activity" (p. 15) by which meaning emerges in the interactions of these triadic elements. The reader makes of him- or herself, and of each constitutive element in the "poem," an object for reflection and refinement. This process is both creative, drawing upon perceptual and intrapersonal aesthetic experience, and critical-analytical in nature.

To master the process of strategically activating and combining elements of mind in such ways, across one or more functions of mind, and to reflect on each triadic aspect of the reading and thinking process, is to gain useful self-knowledge about the nature and applications of one's own cognition. That is, to participate skillfully in the operations that occur within one's cognition is to acquire and apply a practical philosophy of mind.

I have invested more than twenty years in refining a system of lessons and stages of a curriculum model which position a teacher to immerse students in the creative, analytical, self-evaluative process. I use the curriculum model that has emerged from this decades-long process to help students learn a practical philosophy of mind. Exploring in detail the stages of this curriculum model is a primary purpose of the present study.

Purpose of the Curriculum Model

In this study, I argue that strategic immersion in pragmatism-inspired reflection, analysis, and creative exercises affords students opportunities to develop a practical philosophy of mind. A "practical philosophy of mind" refers to *useful* self-knowledge of the workings of one's creative and analytical thought. A well-developed practical philosophy of mind will enable one to label perceptual, conceptual, and interpretive elements. It will also enable one to purposefully activate and grow these elements and apply them in everyday and novel contexts.

Teachers can interlace a philosophy-based curriculum into core classes (e.g., an 11th-grade ELA course), taking an "infusion"-based approach (Ennis, 1989) to blending critical thinking instruction into core content studies. Teachers of core classes, meanwhile, can remain focused on propelling students toward accomplishment of traditional goals: acquainting students with a variety of literary and cultural traditions; moving students toward mastery of formal learning standards; and cultivating students' strategic thought (Baines & Ferrell, 2003).

With the goal of making students more aware of how their minds function, and with a focus on teaching students a vocabulary for speaking about cognition, I have designed the content and sequence of a curriculum model that may help students develop language about language, and thought about thought—essential elements and strategies for critical thinking and innovation (Facione, 2015; Haller, 1988; Watkins, 2001).

Implications of Learning Interpretation for Critical Thinking Instruction

American scholars have devoted decades of collaborative work to accurately define and measure critical thinking (Berliner, 1993; Dewey, 1933; Facione, 2015; Glaser, 1941; Paul, 2019), which depends on mastery of higher order thinking skills (Mulnix, 2012; Paul, 2004).

With this study, I hope to make a unique contribution to this extensive body of work: to describe in detail a field-tested year-long system of exercises designed to help students to concretely identify and apply distinct elements in their cognition. I conjecture that by observing and manipulating these elements, students may gain leverage and precision in a range of creative and analytical tasks.

Using terminology sharpened by the American pragmatists and by Rosenblatt, I describe a system for leading students to precisely define *thinking* in terms of distinct layers and elements--perceptual, conceptual, and interpretive; to gradually gain first-hand command of a system of identifying and applying sub-elements of cognition that operate in critical thinking; and to strategically practice higher-level applications of critical thinking which operates at a finer level--with a granular understanding of *what thinking is*. In this study, I illustrate a process of teaching students to acquire and use this system.

Merging Research on Reader Response Theory, Pragmatism, and Critical Thinking

To support the current study, I have engaged with the extensive body of literature on critical thinking by first, in the following pages, weighing prominent consensus definitions of critical thinking. I subsequently align those definitions with philosophy of mind, in the tradition of pragmatism, and with the literary reader response theory of Rosenblatt. I ultimately describe how to translate and combine the contributions of literary theorists, pragmatists, and critical thinking scholars into an accessible, practical system designed to teach higher-order thinking skills to students.

I have used versions of this system throughout several academic years, at little to no added cost to the required content, in the context of established classes ranging from AP courses

to remedial GED-based classes. In each case, I have planned for students to acquire and apply a practical philosophy of mind in a related series of concrete stages. In each stage, the teacher attempts to take the construct--the process--of critical thinking out of the abstract and present it in the form of accessible, interrelated, sequential forms of practice. In this study, I chart a path through which students travel in an 11th-grade ELA course infused with philosophy-based exercises.

An essential step in framing discussion of this proposed curriculum model is to consider landmark scholarship on critical thinking. The extensive body of literature on critical thinking provides a sound basis for research that may advance our collective conversation about how to improve critical thinking by learning to apply a practical philosophy of mind.

Critical Thinking: Movements, Constructs, Goals, and Controversy

Research on critical thinking took a decisive turn in December of 1987, when the American Philosophical Association commissioned Dr. Peter A. Facione to convene an interdisciplinary panel of 46 scholars to define critical thinking. This initiative marked a wave-crest of decades of research on critical thinking and its role in American K-12 and college instruction (Facione, 1990). The panel produced its comprehensive response, *The Delphi Report*, in 1990. Two years later, a group of researchers led by Dr. Facione unveiled the California Critical Thinking Disposition Inventory (CCTDI), a test of critical thinking dispositions for subjects age 15 and older. The CCTDI has become globally influential: scholars have translated it into at least eighteen additional languages (RAND, 2018). Researchers have translated the *Delphi* construct of critical thinking into twenty languages, applying it in studies conducted in sixty countries (P. Facione, personal communication, July 18, 2019).

The eighty-page *Delphi Report* features a paragraph-length consensus definition of critical thinking, an elaboration of two critical-thinking dimensions--*skills* and *dispositions*--and a set of fifteen recommendations for critical-thinking instruction and assessment. In the same year that Facione et al. published the *Delphi Report*, Facione (1990) published a four-part series of technical reports on the college-level California Critical Thinking Skills Test. Facione's reports present statistically-significant evidence that the CCTST, based on the Delphi construct, can detect growth in critical thinking. Later definitions of critical thinking, such as those published by The Critical Thinking Foundation (Elder, 2007; Paul et al., 2019), closely echo the *Delphi* consensus in terms of both skills and dispositions (see each full definition in Appendix A: Definitions of Critical Thinking).

The Delphi scholars define a critical thinker by the following characteristics: one who is "...open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, ...willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit" (Facione et al., 1990, 3). Many of the functions the Delphi scholars list as marks of critical thinking imply the presence of metacognition and creativity: for example, "honesty in facing personal biases" requires a capacity for skillful self-reflection and evaluation of one's thinking; and "flexible" thinking, "inquiry," and the ability to "reconsider" and devise novel syntheses of ideas require creativity, aided by analytical acumen. The construct of critical thinking is thus marked by complexity. The overall character of critical thought features metacognitive (Facione, 2015) and creative dimensions (Gardner, 2011; Thayer-Bacon, 2000), dimensions that likewise appear in Rosenblatt's transactional reading process.

Leading scholars (Paul et al., 2019) at the Foundation for Critical Thinking highlight similar features of critical thinking, with shades of metacognition and creative thinking implicitly woven into their critical-thinking construct. Note Paul et al.'s emphasis on fair-mindedness, open-mindedness, cooperative spirit, and deliberate resistance to forms of bias: Paul et al. state that critical thinking is "the art of analyzing and evaluating thinking with a view to improving it. …[It] raises vital questions and problems, formulating them clearly and precisely...; comes to well-reasoned conclusions and solutions...; thinks open-mindedly within alternative systems of thought…; and communicates effectively with others…. Critical thinking...entails a commitment to overcoming our native egocentrism and sociocentrism" (Paul et al., 2019). Like the Dephi scholars, Paul et al. (2019) emphasize the self-driven, self-regulated nature of critical thinking, governed implicitly by metacognition that "evaluat[es] thinking with a view to improving it."

This "improvement" process is implicitly creative. Paul et al. (2019) refer to the metacognitive process as the "art" of improving "critical thinking:" a creative pursuit, not merely an evaluative enterprise. Creativity operates in the practice of critical thinking, in Paul et al.'s definition, in a thinker's "formulati[on]" of "vital questions and problems" and in his or her ability to construct meaning in "alternative systems of thought," which involves forming novel syntheses of concepts. Critical analysis can draw from and support both creative effort (Alfaro-LeFevre, 2004; Gardner, 2011; Harris and de Bruin, 2018; Paul, 2018a; Pavill, 2011; Venugopalan, 2019; Weston and Stoyles, 2007) and metacognition (Byrnes and Dunbar, 2014; Kuhn, 1999; Kozikoğlu, 2019; Lai, 2011).

The complexity of the critical thinking construct derives in part from its overlap with reading comprehension, listening comprehension, social skills, self-regulation, and motivation--significant and complicated skills and capacities in their own right (Abrami et al., 2015).

Emotional energy, social interaction, self-reflection, literacy and numeracy, and creative thinking enrich and fold into the complex construct of critical thinking.

This complexity may explain why scholars have required decades to define critical thinking. We may need decades more to develop finer instruments to teach and assess critical thinking in different contexts, such as at various ages and in different content areas. Further, emergent literacies, new epistemologies and political perspectives, and practical challenges (e.g., gaining access to various populations; developing and validating testing curriculum and assessment instruments; and matching time and money to technology and human resources) lend more perspective on how and why the quest to understand, teach, and assess critical thinking, far advanced as it is, will require years of research to refine educators' understanding of critical thinking (Abrami et al., 2015; Biesta and Stams, 2001; Marshall, 2001).

The project of building a consensus understanding of critical thinking through concept- and applications-refinement, however, can and often does proceed from a clear foundational definition. As evidenced by its global reach, the Delphi construct has become the standard. Though multifaceted, the Delphi definition remains consistent with many definitions promulgated by scholars of critical thinking. The CCTDI, moreover, which is based on the Delphi definition, continues to grow in influence internationally, as evidenced by RAND, 2018; Wang et al., 2018; and Tung & Chang, 2009. American scholars have made "widespread use [of the CCTDI]...in many universities in a variety of academic disciplines and in professional programs" (Walsh and Hardy, 1999) and in several contexts around the world. The CCTDI provides a provisionally unifying construct and a practical basis for measuring critical thinking dispositions.

I view the Delphi definition (and its similar peer definitions) as a rich starting place for teaching students to acquire and sharpen critical thinking skills and dispositions. Abrami et al. (2015) concur with this view and make the Delphi definition the standard in their quantitative meta-analysis of impacts of critical thinking instruction. I have observed, however, that educators and education researchers are not universally aware of Delphi and similar definitions of critical thinking. This fact diminishes the prospect of fostering a cohesive, potentially-unifying discussion about which skills and dispositions constitute critical thinking.

The possibility of a unifying national discussion is further complicated by how scholars do and do not share data. Results from decade's worth of the most rigorous and extensive studies of critical thinking in American schools remain secret--i.e., proprietary--belonging to institutions that commission the studies and withhold them from the general public (Facione, personal communication, July 18, 2019). A result of the public-private divide in critical thinking research is that researchers, administrators, and teachers continue to make siloed forays into defining and assessing critical thinking, often without reference to the landmark *Delphi Report.*

For example, in 2014, the *Educational Psychology Review* dedicated a special issue to the topic of how to define critical thinking, taking on the same task that the Delphi team had taken two years to complete. Surprisingly, not one of the articles makes reference to *The Delphi Report*, and only one later article by Facione, published in 2000, appears as a reference in the special issue, and then in but two of the nine papers. The special issue gives evidence of American scholars' continuing interest in returning to foundational questions about the nature of critical thinking, but it also shows fragmentation, even among leading scholars committed to this area of research.

Publication of the *Educational Psychology Review* special issue came on the heels of an interdisciplinary conference, "Seeking Common Ground," where scholars worked to "form... shared claims about critical-analytic thinking that crossed philosophical, psychological, and methodological lines and that could guide future research and instructional practice in the years to come" (Anderson, 2014, p.472). Conference attendees arrived at a "Shared Claims" statement (see Appendix A), which bears many similarities to the critical thinking consensus statement in *The Delphi Report.* Despite strong similarities in the two outcomes, education scholars continue to debate core definitions and functions of critical thinking (Hayes, 2015; Mulnix, 2012). In recent decades, researchers have also revised the concept of critical thinking within the theoretical framework of new epistemologies (Anderson, 2014; Paul, 2018b). Researchers have also considered new problems that have emerged since the publication of *The Delphi Report*, especially concerning apparent differences in how critical thinking operates in readers' interpretation of online and print texts (Carr, 2011; Davidson, 2011; Mod, 2017).

I thus began the present study in view of a pointed, unresolved issue that confronts educators, administrators, and researchers: how to decide which specific approaches teachers should embrace to teach critical thinking skills and dispositions. Equally important is the question of how researchers, administrators, and teachers should evaluate student growth and proficiency in critical thinking. The matter of assessment includes assessing critical thinking about media such as websites and videos compared to print text (Brown et al., 2014). Moreover, standardized grade-level critical thinking tests are only now beginning to emerge. The first such test, launched in 2019, aims to assess critical thinking at the K-2 level (Facione, personal communication, July 18, 2019). Nearly thirty years after Facione et al.'s publication of *The*

Delphi Report, publically-available scholarship consists largely of newly sprouting branches of age-, context-, population-, and domain-specific (Willingham, 2008) studies of critical thinking.

These branches of research represent new lines of debate about which epistemologies, instruments, and measures yield authentic insights into the nature and variety of critical thinking among American students (Alexander, 2014). In the present research study, I begin with the prevailing definitions of critical thinking while also acknowledging the significant, heavily-debated questions in the extensive body of critical thinking literature about how to apply this core definition in teaching and assessment.

How the Present Study Enters the Ongoing Conversation about Critical Thinking

I begin this study with the advantages afforded by scholars' collective decades-worth of careful critical thinking research. I also respond to the wider theoretical and modality-centered debates about critical thinking: in each theoretical and modal context, pragmatist models of cognition offer materials and methods for flexibly analyzing ideas at their conceptual, perceptual, and interpretive roots.

Pragmatist models offer tools that a variety of theorists may find useful, both within like-minded camps and in constructive conversations that may connect their areas of discourse to those of a diverse audience. For example, theorists may debate the role of the hierarchical or non-hierarchical status of concepts and weigh the question of whether to privilege central concepts and master texts, e.g., religious scriptures, or to favor idiosyncratic processes of individual interpretation.

Designing the Present Study in Light of Concerning Tests of Critical Thinking

Questions concerning teaching and assessment of critical thinking take on added urgency in light of a series of recent publicly-available studies and surveys on critical thinking. These contemporary studies of critical thinking skills (e.g., The Stanford History Group led by Wineburg, et al., 2016; and ETS's study led by Goodman et al., 2017)—among very few publicly-available large-scale studies and surveys on the subject—show that many American middle school, high school, and college students score at poor or below-average levels on a variety of measures of critical thinking. Separate studies and workplace surveys conducted by the Wall Street Journal (2017), the Association of American Colleges and Universities (2015), MindEdge (2017), and PayScale and Future Workplace (2016) parallel the findings reported by ETS and the Stanford History Education Group.

It is important to note that these studies do not operationalize critical thinking in precisely the same form. None of them claim to use the Delph*i* construct or any other organization's construct as a point of departure; nor do the various researchers look at the same types of student performance to rate critical thinking. The researchers of these studies consider adult work performance, middle-schoolers' online reading comprehension, and standardized test results to assess Americans' ability to reason critically. These important differences limit the inferences we can draw about critical thinking instruction and assessment in American schools.

These studies and reports also fail to share what went right for those who did perform well on the tests each organization's researchers employed to produce their findings. Further, Facione's (2019) examination of private studies counters the narrative these foreboding reports appear to suggest: Facione states that statistical distributions of critical-thinking ability remain largely stable over the past 30 years. However, these public studies aid the present research in

the sense that they underscore widespread national interest, in the scholarly and general communities, in understanding what critical thinking is, how to assess it, and how to improve it. They also further illustrate the richness, variety, and fragmentation of our national conversation about critical thinking.

Further, close comparison of critical thinking research--from *The Delphi Report*, to The Foundation for Critical Thinking, to the Seeking Common Ground Conference--reveals deep consistency in core, general conceptions of critical thinking. Despite their different populations and methodologies, each contemporary publicly-available study of Americans' critical thinking, cited in this introduction, calls for improvement in the teaching and assessment of critical thinking. Scholars of education clearly continue to heed this call: the reality--or at least the widely-held perception--that people will benefit from improvements to critical thinking instruction, learning, and assessment in the United States.

How the Present Study Addresses the Problem of Critical Thinking

American and global information environments grow more complicated each year (Friedman, 2019; Hillis, 2016; UNESCO, 2015). Novice readers, especially, face challenges in navigating distracting social media (Bessi & Ferrara, 2016) and online bullying (Anderson, 2018), with realistic "deep fake" videos (Chivers, 2019) on the horizon, adding social adversity and epistemic complexity to the public media environment. These facts underscore the importance of research that helps students learn to master critical thinking skills and adopt critical thinking dispositions. Rosenblatt and her pragmatist inspirers--primarily John Dewey (2000), but also James (1977), Meade (1981), Peirce (2011), and Royce (1969)--offer models of

reading and cognition that may provide teachers and students with strategies and tools to improve critical thinking.

I aim to help teachers improve student training in critical thinking by linking Rosenblatt's reader response theory and the pragmatists' core concepts in philosophy of mind. The model specifically consists of tools and strategies to help students link abstract concepts to inner perception; initiate and regulate symbol formation; and refine interpretive processes. I conjecture that learning pragmatic interpretation provides a basis for improving critical thinking.

I see advantages in helping students develop a practical philosophy of mind that helps them to frame "critical thinking" in terms of interacting sub-elements and processes. I aim to illustrate that learners may thereby gain a fine-grained view of thinking, a language for describing the elements and energies that interact in thinking, and a method for questioning and refining thought--all of which are hallmarks of critical thinking (Facione et al., 1990).

The increasing pace of social change and complexity in media adds urgency to the cause of strengthening the teaching and assessment of critical thinking. In their survey of critical thinking among online readers, Wineburg et al. (2016) opine that "[f]or every challenge facing this nation, there are scores of websites pretending to be something they are not….[a]t present, we worry that democracy is threatened by the ease [with] which disinformation about civic issues is allowed to spread and flourish." In such a charged, often deceptive and complicated information environment, *reader response*—emotional, cognitive, and social—plays a crucial role: it is the node that binds together many strands of information into a worldview. Reader response techniques now require more sophistication: readers face the challenge of interpreting the modern media environment's speed, layers, graphic nature, political intensity, and

multimodality (Greene and Yu, 2015). Readers need to develop a means of organizing and checking their means of truth-finding and sense-making (Bailin & Battersby, 2017).

The questions I ask are these: How, in a practical sense, do teachers engage students in a curriculum that strengthens critical thinking skills? How do teachers bring abstruse conversations about mind and thought to the level of student perception, proto-conceptual thought, and emotion, building up to higher stages of complexity? The present study provides in-depth answers to these questions.

Connecting the Worlds of Research and Teaching

I entered the present study of interpretation and critical thinking with two realities in view: university- and institute-based researchers must spend months and years to define, isolate, study, and verify conclusions about precisely-defined constructs--and elements within constructs. Teachers, meanwhile, must be practical generalists who, in limited amounts of time and in varying circumstances, work to help students develop a wide range of social, emotional, and cognitive skills. I proceeded from the assumption that stronger *conduits*--people who play a dual role--are needed in order to connect the disparate but deeply-linked worlds of research and teaching. I see the present study as an effort to honor the realities of both worlds and to play the part of a conduit by applying scholarly writing and research in a year-long cross-disciplinary program in ELA classrooms, and, in turn, sharing classroom data with an audience of researchers in order to advance scholarly discussion.

Overview of the Curriculum Model

The model proposed herein aligns with the critical-thinking *infusion* approach to CT instruction described by Ennis (1989), in which instructors weave explicit training in critical thinking and interpretation into subject-focused learning. Teachers of subject-based critical-thinking instruction may be best positioned to help students acquire and refine critical thinking skills (Abrami et al., 2015; Facione, 1990; Greene & Yu, 2015; Huber & Kuncel, 2015; Murphy et al., 2014; Pluta, Chinn, & Duncan, 2011; Sinatra & Chinn, 2012; Tabačková, 2015).

The sequence of the model begins with minute-long, accessible, concrete activities designed to make students aware of symbolic, perceptual, and processual layers in their cognition. These introductory activities serve as microcosms of increasingly lengthy and complicated analytic and creative functions, spanning minutes, hours, days, and months, which the teacher prompts students to perform when reading and writing.

I focus on student work in seven stages that mark key points in the curriculum model sequence: 1) an abstract symbol game; 2) a literary interpretation exercise; 3) an extensive cognitive self-profile; 4) a neologism-synthesis exercise; 5) a persuasive composition concerning the nature of cognition and reading; 6) a student-generated lesson-plan based on each of the previous steps; and 7) a summative reflection. These activities challenge students to apply the interpretive reader-response process elucidated by Rosenblatt and the pragmatists, e.g., Dewey (2000), James (1977), Meade (1981), Peirce (2011), and Royce (1969). I prompt students to reflect on the roles they play and the skills they exercise as they link each dimension of Rosenblatt's triad: reader, text, and poem.

Significance for the Field of Language Arts Education

Historical evidence, appearing in the work of innovators, along with reader response literary theory and pragmatist epistemology, suggest that teaching interpretation in language arts classes may propel student learning and performance toward the development of higher-order creativity and critical thinking skills (Koek et al., 2019; Kidd & Castano, 2013; Tabačková, 2015; Tung & Chang, 2009; Watkins, 2001). Not all students aspire to high-level expertise, though a number go on to become highly creative and analytically skillful. I wonder how some students may help to eventually define new paradigms. I am also motivated by the idea that, even in view of the developmental "thirty-million word gap" phenomenon (Hart and Risley, 1995; 2003), a wide range of students may learn how to think critically and creatively, starting from simpler exercises (Merzenich et al., 1999; Miller et al., 1999; Weber et al., 2019; Tallal et al., 1996).

With the latter goal in mind, I have built my language arts philosophy and focused on principles of pragmatic interpretation throughout the past twenty years. The curriculum model described in the present study draws lessons from these twenty years of experimentation and charts a step-by-step process to help students become more flexible with interpretation and with functions of mind such as critical thinking.

Two Guiding Research Questions

To present outcomes of this process, and to illustrate the workings of the model, I address two primary research questions. In the first question, I focus on the role of the teacher: **(1) How does an English Language Arts teacher guide students through steps to develop a practical philosophy of mind?** Outcomes of student work in the philosophy-infused ELA curriculum

model may lend insight into how teachers could be helpful in this regard while they lead traditional ELA activities in pursuit of perennial goals such as improving reading comprehension, refining multi-genre writing skills, and strengthening students' approaches to research, debate, analysis, and persuasion.

The second question flows from the first and concerns artifacts of student work: **(2) In an English Language Arts classroom where the teacher guides students through steps to develop a practical philosophy of mind, how does student work exhibit interpretation and critical thinking?** This question guides my analysis of artifacts which a sample population of high school students created while immersed in the ELA curriculum illustrated in this study.

The body of student work may indicate whether and to what extent the curriculum model enables students to acquire skill with interpretation and critical thinking. The primary purpose of my examination of evidence is to illustrate the model in concrete demonstrations of its interconnected stages.

The pedagogical aims and logical rationale of the model also align with seminal conversations, writings, and debates (Einstein, 1970; Emerson, 1982; James, 1977; Keller, 1984; Thoreau, 1962) that both precede and inspire standards frameworks such as Common Core (2015). In this study, I examine my grounding assumptions in an extensive literature review and provide a step-by-step outline for how teachers can place emphasis on interpretation in an infusion-style (Ennis, 1989) ELA curriculum model.

Key Terms

The following terms function together as operational elements of the curriculum model described in detail throughout this study:

(1) Concepts – symbolic forms that define meaning for oneself and potentially for others.

(1a) Intrapersonal concepts: instrumental symbolic forms not yet encoded in a social, communicable form (Einstein, 1970; Sanborn, 1971).

(1b) Interpersonal concepts: instrumental symbolic forms encoded in shared, communicable forms such as words, numbers, shapes, notes, and images (Einstein, 1970; James, 1977).

(2) Perceptions – data derived from the senses, including raw sensory information (James, 1977).

(2a) Sensory data: the combination of sight, hearing, touch, taste, and smell, as well as kinesthetic awareness (James, 1977).

(2b) Sensory-imagination: the mind's ability to create a sense-world without stimulation, as in dreams, daydreams, memories, creative states, and thought-experiments (Einstein, 1970; McGinn, 2013).

(3) Interpretation – combining perceptions and concepts to form ideas (Royce, 1969).

(3a) Individual interpretation: meaning one develops in one's own imagination (Royce, 1969).

(3b) Social interpretation: meanings one develops as an outcome of group interactions that bring out new ideas, feelings, and experiences (Royce, 1969).

(4) Idea – a clearly defined unit of meaning that embodies an individual's interpretive synthesis of perceptions and concepts.

(5) Schema – a meaningful network or system of ideas.

(5a) Declarative schema: a system of ideas that encodes meaning in conceptual representations.

(5b) Procedural schema: a psychological tool or strategy that enables and facilitates interpretation of declarative schemas. Procedural schemas operate automatically and unconsciously in "System 1" thinking (Kahneman, 2011); they operate deliberately and consciously in strategic "System 2" thinking (Kahneman, 2011).

(6) Creativity – the ability to generate original ideas and schemas by synthesizing the elements of mind—perceptions, concepts, and interpretations—into novel declarative and procedural forms that reorganize, differ from, or wholly depart from preexisting innovations.

(7) Metacognition -- the ability to use individual interpretation to draw from System 1 and System 2 thinking for the purpose of noticing, analyzing, and working with the perceptual, conceptual, and interpretive content of one's thinking.

(8) Critical Thinking -- interpretation governed by principled, self-questioning System 2 thinking that actively seeks to improve itself (Facione et al., 1990: see full definition in Appendix A). It is always analytical, often metacognitive, and sometimes creative.

(9) Creative Reading – a process of change whereby an interpreter transforms interpersonal concepts (e.g., the words of a novel, the notes of a score, or the numbers of a blueprint) into an idea with novel conceptual, perceptual, and interpretive dimensions (Butler, 2005; Emerson, 1982; Gardner, 1999; Rosenblatt, 1978). Creative writing inverts this process: a writer transforms perceptions and intrapersonal concepts into words (Butler, 2005; Gardner, 1983).

(10) Poem –Rosenblatt's term for a tenuous and evolving agreement or alignment between the reader's internal schemas and patterns that may exist in a given text.

(11) Practical Philosophy of Mind – a model of one's own cognition that enables one to activate, combine, and modify elements of mind in critical thinking, interpretation, and creative thinking.

(12) Consilience – the ability to synthesize schemas from different knowledge domains to form coherent cross-disciplinary understanding (Wilson, 1999), a skill supported by interpretation.

Chapter One Summary

I present pragmatist philosophy of mind, concepts of critical thinking, and Louise Rosenblatt's reader response theory as foundations for an ELA curriculum model.

Of special interest throughout this study is a triadic model of cognition inspired by pragmatist philosophers, especially James (1977) and Royce (1969); informed by Rosenblatt's (1978) triadic model of reading; and organized in terms of two categories of perception, two categories of concepts, and two modes of interpretation, all of which interact to form ideas. I assert that teachers may use a philosophy-based curriculum model to infuse into their traditional instruction training in critical thinking and interpretation, which, I conjecture, may help students acquire a practical philosophy of mind. I cite two central reasons for teaching students to master a practical philosophy of mind based on perceptual, conceptual, and interpretive elements: (a) the model may facilitate development of critical-analytical thinking in ELA, and possibly across disciplines; and (b) the model may help learners navigate the increasing complexity of social, political, and rhetorical contexts in national and global society.

In the following chapters, I describe the basis for and details of a seven-stage curriculum model and analyze student work--ten sets of seven artifacts--to answer two primary research questions: **(1) How does an English Language Arts teacher guide students through steps to develop a practical philosophy of mind? (2) In an English Language Arts classroom where the teacher guides students through steps to develop a practical philosophy of mind, how does student work exhibit interpretation and critical thinking?** In the next chapter, I conduct a review of literature to place the present study in the context of past and current research. I examine ideas in pragmatism, reader response theory, and classroom-based research, all of which deepen the basis for this study.

CHAPTER 2: REVIEW of LITERATURE

Percepts and concepts interpenetrate and melt together…[n]either, taken alone, knows reality in its completeness. We need them both, as we need our legs to walk with…a man can no more limit himself to either than a pair of scissors can cut with a single one of its blades (James, 1977, p. 232)

--William James, pragmatist philosopher and psychologist, *Percept and Concept*

Interpretation is a third type of knowledge which is closely interwoven with perceptual and conceptual knowledge, very much as they in turn are bound up with it, but which is not reducible to any complex or combination consisting of elements which are merely perceptual or merely conceptual (Royce, 1969, p. 741).

--Josiah Royce, pragmatist philosopher and psychologist, *Mind*

Peirce's formulation [of sign, object, and mind] is triadic…[and] had from 1938 on strengthened my transactional view of language. . . . Each individual...brings to the transaction a personal linguistic-experiential reservoir, the residue of past transactions in life and language. As William James pointed out, each is carrying on a process of selective attention, choosing from the elements brought into the stream of consciousness during the transaction (Rosenblatt, 1978, p. 182).

--Louise Rosenblatt, reader response theorist, *The Reader, the Text, the Poem*

Chapter Two Overview

I begin by discussing philosophy of mind in pragmatism, followed by Rosenblatt's reader response theory, both of which I employ as guiding theoretical frames for the present study. I then proceed to link these frames to current reader response research in classrooms and current research in applied pragmatism in education research (see Figure 2.1). In order to establish a clear link of theoretical frames to relevant subtopics in the literature review, I frame my analysis of literature in two categorical themes. I examine the experiences of students immersed in reader response and pragmatism-based lessons; and I study the roles of teachers in guiding reader response and pragmatism-based lessons. These two themes derive directly from the research questions that motivate the present study.

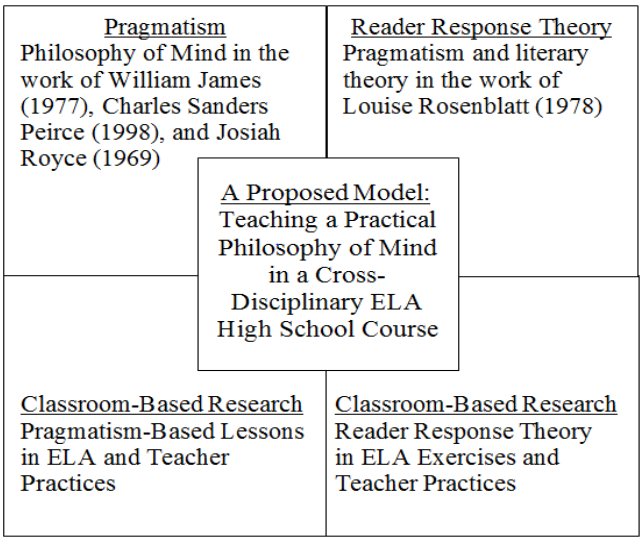


Figure 2.1. *Theoretical Framework and Research Foundations for the Curriculum Model.*

In Chapter Two, I anchor the model in a theoretical framework based on pragmatism and reader response theory, and I situate the model in the context of current classroom-based research articles connected to pragmatism, to reader response theory, or to both areas of study.

Pragmatism and Models of Cognition

The present study connects to pragmatism, the theoretical framework on which I have founded the model, primarily through avid study and appropriation of pragmatist models of cognition. I draw primarily from the work of William James (1977) and Josiah Royce (1969). James, the first American psychologist (1890) and a prominent pragmatist philosopher of mind, and Royce, psychologist and one of the first American pragmatists, engaged one another in an intense debate on epistemology and philosophy of mind that lasted nearly thirty years.

Friends and colleagues at Harvard in the 1890's and early 1900's, these two early American philosophers wrote extensively about conceptual and perceptual knowledge. Their ideas have inspired and guided my development of the curriculum model since its inception in 1999. Their writings supply readers with a wealth of ideas to understand concepts, perceptions, and the ways individuals combine them to develop knowledge (James, 1977; Royce, 1969).

Like all of the original pragmatists, who together founded a new school of philosophy in the late nineteenth century, Royce and James examined logic, ethics, semiotics, epistemology, theology, linguistics, and psychology, all of which framed their thinking about the symbol- and reason-based processes that operate in every field of inquiry. The collective project of the pragmatists is sweeping in scope; Royce and James played prominent roles in starting and advancing the far-reaching projects of pragmatist philosophy. James, in fact, developed the first experimental psychology laboratory in the United States and authored the first psychology textbook for university students (1890). The groundbreaking work of the pragmatists opened new fields of inquiry that profoundly shape contemporary society.

The legacy of the original pragmatists lives on in the work of contemporary pragmatist philosophers (Davidson, 2001; Putnam and Putnam, 2017; Quine, 1992; Rorty, 2009) and in the

work of researchers and practitioners in the disciplines of psychology, educational psychology, philosophy, statistics, logic, theology, philosophy of science, and education, whose fields bear the mark of the early pragmatists' collective influence. Most relevant to the present study is the influence of the pragmatists on literary theory: Rosenblatt credits the pragmatist John Dewey (1933) as the main inspirer of her system of reading. She further explains that Dewey's approach to thinking "has its roots in William James and Charles Sanders Peirce" from whose work Dewey distilled "various phrasings during his long career" (p. 17) to describe interpretation.

James' Fascination with Concepts and Perceptions and Royce's Triadic Model of Mind

James (1977) emphasizes the primacy of the "perceptual flux," the always-changing field of knowing that draws together data from all the senses, from the "raw information" of the immediate. In language that recalls the ancient philosopher Heraclitus's fragments (Wilcox, 1993), James states that perception gives rise to conceptual knowledge, grounds it, and continuously shapes it: "...concepts flow out of percepts and into them again, they are so interlaced, and our life rests on them so interchangeably and undiscriminatingly, that it is often difficult to impart quickly to beginners a clear notion of the difference meant" (p. 232).

A key difference, James elaborates, is that "percepts are continuous and concepts are discrete. Not discrete in their being, for conception as an act is part of the flux of feeling, but discrete from each other in their several meanings" (p. 232). Perception, however, is "much-at-once," ripe with possible conceptual meanings, and from which individuals derive all such conceptual meanings. "Data from all our senses enter into [perception], merged in a general extensiveness…its boundaries are no more distinct than are those of the field of vision," James

continues (p. 232). He explains that out of the flux of perception, concepts arise, gather, conjoin, and change.

Concepts, James explains, are tools for navigating the rich world of perception. They are tools for maneuvering in the "stream of thought." They are discrete parts of the ever-continuous "World of Pure Experience." James asserts that "[o]ut of this aboriginal sensible muchness [perception], attention carves out objects, which conception then names and identifies forever—in the sky 'constellations,' on the earth 'beach,' 'sea,' 'cliff,'…out of time we cut 'days' and 'nights,' 'summers' and 'winters.' We say what each part of the sensible continuum is, and all these abstracted whats are concepts" (p. 232).

James also sees concepts as the essential partner of perception: "Percepts and concepts interpenetrate and melt together, impregnate and fertilize each other. Neither, taken alone, knows reality in its completeness. We need them both, as we need our legs to walk with…" and: "…a man can no more limit himself to either than a pair of scissors can cut with a single one of its blades" (p. 232). James emphasizes the mutually supporting and mutually corrective role these modes of cognition play in interpretation, a philosophy embraced by scientists whose worldviews change with new perceptual and conceptual evidence (Kuhn, 1969), and a philosophy ignored or explicitly defined by those who favor embracing a fixed conceptual order at all costs, even in the face of contradictory perceptual and conceptual evidence (NOVA, 2006).

A key question teachers face, then, in light of the conflict about the nature of authentic interpretation, is how to teach students to recognize these types of knowledge in their own experience and, further, to teach them how and why to think about strategically combining these elements of mind to develop ideas. This topic has always been a key issue in philosophy, for it is clear that we can misperceive an object, an event, or a gesture, but it is also clear that concepts

are equally capable of leading interpretation astray (Wilcox, 1993). James and Royce debated how to coordinate the elements of mind to arrive at truth: by leading with an idealist conceptual framework to evaluate percepts and concepts, or by cultivating readiness to adapt to new perceptions, even those that overthrow core tenets of a conceptual worldview.

"Interpretation" is the term that pragmatist Josiah Royce (1969) uses to label and further define the mediating mode of cognition, to which James also alludes. Royce states that, in addition to conception and perception, a third type of cognitive process exists that has been overlooked—although "everyone is constantly engaged in using and in exemplifying it" (p. 741). Royce names this third cognitive process "interpretation." He explains that "interpretation is a third type of knowledge which is closely interwoven with perceptual and conceptual knowledge, very much as they in turn are bound up with it, but which is not reducible to any complex or combination consisting of elements which are merely perceptual or merely conceptual" (p. 741). Royce stands out among all of the pragmatist philosophers who inform the content of this study, in large part because of his definition of this category of mind.

Though James does not name a third kind of cognition, and while he refers to his system as a dyadic one concerning only "concepts and percepts," he does refer to another process which is dependent on neither point of the dyad. Shades of Royce's concept of interpretation are clearly evident where James talks about a "mediating attitude" as the essential subject of his essay, *Percept and Concept*, wherein James discusses at length the individual interpreter's "coordinat[ion]" of concepts and percepts.

It is this process of "coordination" that has so deeply interested scientists, mathematicians, and artists across disciplines, language barriers, and historical periods. The curriculum model proposed in this study may help students learn how to direct their

"coordination" of concepts and perceptions into progressively more nuanced forms, both in ELA and across the curriculum, especially where writing and reading play central roles in teaching and learning.

An English Language Arts (ELA) course makes an ideal setting in which to ground a cross-disciplinary discussion of the elements of mind. The "elements" provide a unifying framework for examining the widest range of literature, because ideas in all fields of thought are comprised of combined perceptual, conceptual, and interpretive elements. English Language Arts courses thus provide a wide and sturdy platform to allow all of the voices of many disciplines to come together. ELA's primary focus—the development of language and thinking skills—also helps to give such a broad, varied curriculum a clear focus and a larger energizing purpose: to enable students to personally connect their academic learning, through literature and writing, to life in its many textures and forms (Abram, 1997; Emerson, 1982; Thoreau, 1962; Wilson, 1999).

Rosenblatt's Reader Response Theory: An Interpretive Frame Derived from Pragmatism

Rosenblatt (1978) refers to her reading philosophy as "[t]ruly pragmatist" (p. 180). Joined to the pragmatists' models of cognition, her reader response theory completes the theoretical framework of this study. Rosenblatt evolved her pragmatist literary theory between 1938, when she published *Literature as Exploration*, and publication of her masterwork, *The Reader, the Text, and the Poem*, in 1978. She created a bridge that links pragmatist philosophy of mind to theories about the nature of reading and meaning-making. Rosenblatt may identify more with pragmatist philosophers than with reader response theorists, whom she criticizes for assigning "...dominance to either reader or text" in dualistic meaning-making processes.

Rosenblatt's works serve as primary interlocutory texts that connect my background in philosophy with research on teaching English Language Arts.

Rosenblatt's reader response theory describes reading as "transactional" in nature, meaning that the text and the reader mutually shape content in literary interpretation (p. 14). The outcome of literary interpretation in Rosenblatt's system forms a third node in the triad of reader, text, and "poem," which all depend in part on "the reader's creativity" (p. 15) in concert with--importantly but not only--the writer's vision.

Rosenblatt seeks to "admit into the limelight the whole scene—author, text, and reader" (p. 5) in order to examine in detail, "as though we are reconstructing a slow-motion picture from stills of various moments" (p. 10) in the reading process, the variety of ways that meaning may take form in a reader's encounter with a text. In this study, I examine the "slow-motion picture" of consciousness in students as they immerse themselves in seven stages of a year-long curriculum model based in pragmatic philosophy of mind and reader response theory.

The pragmatists, likewise, place the individual interpreter in the creative role of forming novel understanding from concepts and perceptions. For both Rosenblatt and the pragmatists, a reader engages in a distinctly individual meaning-making process. The reader responds thoughtfully to the world of the text as well as to internal responses, forming syntheses of the text and intrapersonal responses to it. Rosenblatt explains that "once the creative activity of the author has ended, what remains for others--even for the author himself--is a text. To bring a poem into being always requires a reader, if only the author himself" (p. 15). In Rosenblatt's vision, reader and writer both immerse themselves in a meaning-making process, whereby meaning arises from the creative writer's and the creative reader's contact with a world of signs.

This particular connection linking reader response and pragmatism explains why I find such helpful advantages in describing the curriculum model with reference to Rosenblatt's theory. The curriculum model and Rosenblatt's theory both stem from the same pragmatist theoretical framework: centering on a triadic conception of cognition (Dewey, 1933; James, 1977; Royce, 1969; Peirce, 2011); focusing on subtle processes and patterns in perceptions and concepts; and embracing of a longstanding idea in American thought that the inner world of the individual interpreter, responsive to detail and uniquely creative, is of essential value in our larger intellectual, social, and political life.

Recent Classroom Research, Pragmatism in Education, and Reader Response Theory

I aim to show the relation of current reader response and pragmatism research to the central topic of this study: teaching students to acquire and apply a practical philosophy of mind. I see education researchers moving in the direction of defining and testing systematic applications of pragmatism and reader response in classrooms. I present the current study as an expansion of this relatively nascent trend in education research.

Themes in education research on pragmatism and reader response.

The research questions that frame the present study concern (1) the experiences of students immersed in reader response and pragmatism-based lessons and (2) the roles of teachers in guiding students through reader response and pragmatism-based lessons. I employ these two concerns as themes to focus this discussion of recent and current research.

Pragmatism in education. Pragmatism influences current research in the teaching of English, particularly in the form of *applications* of pragmatism inspired by Rosenblatt. *The Reader, The Text, The Poem* (1978), in which Rosenblatt uses pragmatist models of cognition to study elements of the reading process, remains a formidable force in literary theory and education circles. Next to her pragmatist inspirer and mentor, John Dewey, Rosenblatt did as much or more than any other twentieth century scholar to form a research agenda at the intersection of pragmatism and literacy instruction.

While pragmatism continues to endure as a rich field of research in philosophy, and while research on literacy instruction gains urgency and widespread interest among scholars of psychology and neuroscience (Seidenberg, 2017; Armstrong, 2013; Dehaene, 2009; Doidge, 2007), recent publications focused jointly on pragmatism and literacy consists of a relatively sparse number of published articles, dealing with both theoretical and practical applications of pragmatist literacy theory. Collectively, these few articles identify a continuous, though somewhat subtle, thread running through education research across disciplines.

My comprehensive search through the ERIC, PsychINFO, Education Research Complete, and Google Scholar databases yielded a small subset of four ELA-focused articles that mention pragmatism (Taylor, 2011; Levine, 2014; Ryan and Dagostino, 2015; Semetsky, 2014) which strongly rate mention in this study. These articles define an area of education research which, coupled with the robust original texts in pragmatism, establishes a stage for expanded research and calls for fuller applications of pragmatism in literacy instruction. These articles gain more significance when considered in light of leading thinkers' common practical philosophy of mind, which is describable in terms of pragmatist conceptions. The present study may be interpreted

as a figure on that research stage and a response to the call to understand how a common practical philosophy of mind operates across disciplines, languages, and historical periods.

The Student Reader as a Pragmatist. The mechanics of learning a practical philosophy of mind align most closely with Taylor's (2011) description of "meaning making." Taylor describes the student as a "pragmatist reader" engaged in a dialogic "transaction" with text. The active dialogic mode of reading that Taylor espouses grows from his synthesis of Rosenblatt's (1978) "transactional" theory, Pike's (2003) "aesthetic model of reading," Wiley's (2006) model of "pragmatism's self," and original pragmatist C. S. Peirce's (2011) "internal conversation" model of symbolic reasoning. Taylor's model of cognition bears similarity to the model I describe in the present study: Taylor examines the "interpersonal and intrapersonal dimensions" (p. 151) of the "dialogic transaction[s]" in reading, as demonstrated in work completed by a group of ten students (in this case, younger students: age 13-14). Taylor's study suggests that the effort to develop a practical philosophy of mind need not wait until the high school years.

Cushing (2018) offers a confirmatory argument, combining reader response techniques with Text World Theory (Gavins, 2007; Werth, 1999) to merge the "creative nature of reading" with systematic analysis of text. Drawing from research on image-based reasoning by Benton (1992; 2000) and Giovanelli (2016; 2017), Cushing's illustration of early readers' "world-building" interpretations presents guiding principles for introducing students to creative reading. Taylor describes middle-school readers' "triadic transaction[s]" (p. 152) with text in a qualitative case study, wherein he closely tracks patterns in student writings and statements in response to reading four different kinds of texts.

Echoing pragmatist writings, Taylor emphasizes the interpersonal, intrapersonal, and "multimodal" nature of the reader's "semiotic power" (p. 153), a pattern which Einstein (1977) also describes--multimodal coordination of concepts and perceptions--in his definition of "thinking." Taylor's description of dialogic interplay of intra- and interpersonal concepts within the reader lends further definition to the nature of reader response: it identifies a locus of meaning-formation in Rosenblatt's "poem" and centers on the moment-to-moment contact of a text with a reader's internal schemas.

However, Taylor (2011) argues that "'little is known about the silent processes in which students engage in given contexts'" (p. 159), highlighting a need which I address in the present study. The curriculum I describe herein is designed to awaken students' awareness of this intra-and-interpersonal locus of "meaning-making" (Rosenblatt, 1978; Taylor, 2011). Each stage in the model prompts students to reflect on, describe, activate, and shape the "silent processes" that unfold at the locus of concentration Taylor identifies.

Emotion factors into these "silent processes," highlighting another important dimension of interpretation at the juncture of intra- and interpersonal thought (Levine, 2014). Levine argues that emotional responses to literature can drive student development of interpretation. She explores how systematically prompting students to notice affect-laden passages may help "novice readers" make "interpretation visible" (p. 284), i.e., enable novice readers to form strategies that move their reading beyond literal and into "interpretive" reading. The strategies Levine describes, stemming from a constructivist view of reading developed in part by Rosenblatt (whom Levine cites), cue students to link concepts and emotions. Levine depicts a type of interpretive conversion that a practical philosophy of mind can help students to perform.

Levine conducted her quasi-experimental instructional intervention study in a "high-poverty, low-performing" urban high school. Levine focuses on 12th-grade "regular" (as opposed to "honors") ELA students to examine their growth in "aesthetic reading," Rosenblatt's phrase for reading for the sake of immersion in imagination and aesthetic pleasure. Levine's study involved an experimental and a control group. In the experimental group, students engaged in four-and-a-half weeks of training to identify, write about, and discuss "affect-laden" passages in literature. The teacher in the experimental group guided students in applying an "affect-based interpretive heuristic [which] involves identifying language in a literary text that a reader feels is particularly affect- laden, ascribing valence to that language, and then explaining or justifying those ascriptions" (p. 283). Levine's results show that students in the experimental group gained sophistication in their interpretive responses, whereas the control group remained level.

Levine's outcome bolsters a core premise of the current study: close-reading activities involving synthesis of the intrapersonal and interpersonal elements of mind can help students improve interpretation of literature. In the concluding lines of her study, Levine calls for further study "...to explore the constellation of classroom practices that support students in interpreting texts, as well as...the many ways teachers make such practices visible to students. Hopefully, such research will help teachers and students understand and access the richness of literary reading and interpretation" (p. 297). The research questions and the curriculum model I respectively pose and describe in the present study focus on a "constellation of classroom practices" designed to "make interpretation visible."

Reader Response in ELA Education.

A variety of qualitative research articles and dissertations (Blake, 1998; Catterson, 2017; Gordon, 2018; Simpson, 2001) represent how middle and high school ELA teachers and researchers can help students develop skill with interpretation through reader response pedagogy. Reader response interpretation is a student-centered exercise, which may be improved with expert guidance (Blake, 1998; Catterson, 2017). Gordon (2018) likewise emphasizes the importance of the teacher's participation in nurturing reader response. He finds that the reader response approach may be enhanced by using meta-texts to frame a focal-point text, by activating and developing background knowledge, and by introducing "judicious teacher intervention" to frame discussion of primary texts in his study of English and Irish high school students' efforts to understand poetry.

Catterson (2017) emphasizes elements of reading strategy similar to those of Blake (1998), Gordon (2018), Park (2012), and Simpson (2001) in her five-point plan for "21st century close-reading pedagody," including emphasis on "background knowledge, authentic reading and writing, meta-discursive awareness, critical literacy, and dialogically organized discussion." Catterson explores how these elements and activities may improve cross-disciplinary close reading, a pursuit which implicitly calls upon synthesis of internal schemas and concepts in at least two subject areas.

Catterson's (2017) cross-disciplinary reading research reveals the importance of forming "argument-generating" questions about science texts as a means of stimulating critical thinking, prompting synthesis of information from multiple texts, and calling for deeper interpretive work to form understanding. Catterson's work is consonant with my focus on helping students

develop “consilience” (Wilson, 1999), the ability to form novel syntheses of concepts across disciplines, as a higher-order application of interpretation (see Appendix H).

Catterson also finds that student-centered close-reading of digital texts drives student engagement in reading and draws on “existing funds of knowledge about digital literacies.” Catterson’s finding presents another example of the importance of culturally-relevant material in sparking student engagement, echoing findings by Blake (1998), Park (2012), and Simpson (2001). Wineburg et al. (2016), authors of a recent Stanford-based study of critical thinking in online reading tasks, show that online texts pose special challenges for readers, e.g., concerning authentication of claims of fact. Catterson’s study suggests that students could be engaged by exercises that draw upon their interest in online texts. Such exercises may prove especially important in helping students learn to critically navigate the world of online reading.

The curriculum model described in this study may be useful in this regard. The exercises in the model prompt readers to reflect on the architecture of arguments, built from simpler elements of cognition--and online media is especially rich in perception (e.g., audio recordings, images, and videos). While the student-generated artifacts described and analyzed in the present study focus primarily on interpretations of print text and original works of writing and self-reflection, students regularly engage with perception in images and in films throughout the year, taking time to carefully analyze and debate the contents and meanings carried in perceptions (both media-generated and internally created).

In the model’s stages, one role of the teacher is to coach students to cast critical-interpretive frames around perceptions and around concepts couched in perception-rich texts such as commercials, films, and cable news editorials. Developing a system for reflection on different types of perception-rich media may help students to more strategically parse online

texts, particularly those which appeal strongly to readers' senses in image- and video-augmented rhetoric. Learning to counterpose their own concepts and internally-generated sensory-imagination content to online media may help students match the online and television worlds' hypnotic, high-stimulation rhetoric (Schill and Hendricks, 2018; Sobieraj and Berry, 2011) with ideas and images students develop on their own with "deliberate, conscious, System 2 thinking" (Kahneman, 2011), which is an explicitly stated goal the teacher pursues with students while guiding them through the curriculum model.

The significant role of the teacher in helping students improve their aesthetic reading strategies is the central topic of another study that supports the rationale of weaving a philosophy-based curriculum into ELA studies. Ryan and Dagostino (2015) make Rosenblatt's concept of aesthetic reading the primary focus of their work with 15 elementary school teachers enrolled in a summer graduate course on reading instruction. Their findings indicate that exposure to Rosenblatt's techniques of aesthetic reading makes teachers more likely to nurture personal aesthetic response, which is one of the primary roles performed by a teacher leading the philosophy-based curriculum described in the present study.

Ryan and Dagostino (2015) call for "further research into theories of reading that validate Rosenblatt's theories," a priority the present study addresses. They also emphasize the "critical role personal response [plays] in engaging students in the learning process, and in assisting them in developing their intellects, imaginations and identities" (p. 58). Ryan and Dagostino argue that when teachers elicit personal responses from students, they help students notice meaning and deepen their engagement with texts—enriching what Taylor (2011), following pragmatist C.S. Peirce, calls the "internal conversation." I echo Ryan and Dagostino (2015) and Taylor (2011) in his emphasis on immersing students in extended, probing reflection on their own thinking as they

variously respond to several dozen individual prompts, all of which aim to elicit aesthetic responses, spark critical thinking, and exercise strategic interpretation.

Reader Response and Critical Thinking.

Coaching critical thinking in a reader response context emerges as a common pattern in recent research. Park (2012) argues for infusing reader response with discussion and critical thinking in her year-long study of middle and high school girls engaged in analysis of the novel *Speak*, a story focused on a socially isolated adolescent female protagonist. Park focuses on channeling emotion and identity-based conversations into enriching dialogue and writing, which demonstrates that the quality of reader response depends in part upon the teacher's selection of reading material.

It is also important to note how culturally-relevant reader response exercises can energize and engage minority students by helping them see themselves in literature, prompting students to use their experiences to think critically about their own world in comparison and contrast to the world of the characters (Blake, 1998; Simpson, 2001). Blake notes that teacher assistance in providing background information and in modeling the interpretation process helps students to feel more competent: it is a student-centered exercise, which is improved with expert guidance. The teacher in the philosophy-based ELA curriculum proceeds from a triadic model of cognition, as does Rosenblatt's model of the reader's mind (Rosenblatt, 1978, p. 182), but the teacher remains open to a variety of epistemological stances a reader can take toward a text.

Coaching Students to Become Attuned to Perception.

In the tradition of Emerson (1982) and Thoreau (1962), McMillan and Wilhelm (2007) describe perceptual experience—in natural settings, especially—as both an ally to reader response and an enrichment of content. McMillan and Wilhelm study the impact of "directed nature writing" as a vehicle for improving student engagement, close-reading, and observation skills. The writing exercises McMillan and Wilhelm describe involve students' immersion in sustained concentration as they transform their own sensory perceptions into sensory imagination and concepts in their journals--making what they see into what they say; harnessing what they hear to words that hew closely to perception.

Drawing from the philosophy of nature writer and conservationist Ana Botsford Comstock (1939) and the reader response theory of Louise Rosenblatt (1978), McMillan and Wilhelm find that assignments promoting sustained reflection on nature produce many learning outcomes: enhanced self-perception, sharper observation skills, improved construction and comprehension of imagery in writing, and stronger grasp of figurative language in and beyond language arts classes.

Collectively, studies in ELA classrooms illustrate the power of perception to enrich thought and to guide it astray (Cushing, 2018; Levine, 2014; McMillan and Wilhelm, 2007; Schill and Hendricks, 2018; Sobieraj and Berry, 2011; Taylor, 2011; Wineberg et al., 2016). This particular feature of the studies--the challenge of gauging the epistemic value of perceptions--traces back to an ancient conundrum that incited debate 2,500 years ago among the pre-Socratic philosophers, who debated the role of concepts and perceptions in knowledge formation (Wilcox, 1993). Most of the studies I cite describe approaches for enriching reading experiences and developing students' interpretation and critical thinking skills, which students

can use to evaluate concepts and perceptions alike. However, none of the studies describe explicit efforts to systematize critical thinking about perception as part of a year-long effort to acquire a flexible philosophical skill set, a contribution I make in the present study.

Student Learning in Reader Response and Pragmatist Modalities.

In each of the reader-response and pragmatism-based articles I cite, reader response drives critical discussion and activates synthesis of background knowledge, life experience, surrounding texts, and concepts in a culturally relevant focal-point text. Pragmatist models of cognition shed light on the nature of reader-response processes, lending insights to teachers, such as the present researcher, who aim to stimulate these cognitive elements and support student development of reader response processes that Blake (1998), Catterson (2017), Cushing (2018), Gordon (2018), Levine (2014), McMillan and Wilhelm (2007), Park (2012), Simpson (2001), and Taylor (2011) describe.

The role of the teacher remains important in each of these studies. This fact is especially noteworthy as a background consideration for the present study. A goal of teaching students to develop and apply a practical philosophy of mind is to make students more effective at designing and scaffolding their own reading experiences. Levine, for example, emphasizes the teacher's role in helping students hone their ability to form and justify their interpretations of affect-laden passages. I similarly describe in detail how a teacher may lead students to self-assess their reading techniques as they progress through stages of the curriculum.

The researchers I cite in this study often emphasize the importance of specific elements of mind—e.g., social interpretation; sensory imagination—and describe exercises that draw upon these elements to energize reader response. For example, Catterson (2017) explores how to drive

reader response with discussion and debate-based curricula. Taylor (2002; 2011) describes how reader response can activate sensory imagination and synthesize it with concept development in intrapersonal thought. The elements of cognition that frame the curriculum model described in this study provide a basis for comparing articles and considering how the curriculum model may complement and draw from each researcher's project.

Combining Reader-Response and Pragmatism in the Curriculum Model.

The curriculum model I propose in this study can blend into ELA curricula such as those described by Blake (1998), Catterson (2017), Levine (2014), McMillan and Wilhelm (2007), Park (2012), Ryan and Dagostino (2015), Simpson (2001), and Taylor (2011). The model can enhance the lessons described by each researcher by adding purposeful, stepwise training in a method for analysis and creative thinking. In the model's stages, teachers and students weave a philosophy of mind curriculum into ELA lessons along the lines of the infusion model described by Ennis (1989) and recommended by Greene and Yu (2016).

The teacher's role in guiding students into each stage of the philosophy-based curriculum is of prime importance, especially in the first half of the curriculum path. Since the curriculum exercises prompt students to ask and synthesize so many questions and to tap such a variety of internal and external sources to improve their thinking, the teacher's initiating questions and explanation of the purpose of each exercise helps students to see the coherent pattern—synthesis of the elements of mind—that connects each stage of the curriculum model sequence.

Students participating in the nature-writing study by McMillan and Wilhelm (2007), for example, could take note of the forms of knowledge and representation they draw upon in nature writing. Using this reflection exercise, they could build a model of their own cognition (e.g.,

describing how perceptions change into concepts) as they engage in observation, journaling, reading, and discussion. Similarly, students in critical discussion and debate groups studied by Blake (1998), Gordon (2018), and Park (2012) could note how social interpretation processes influence their sensory imagination and personal concept formation (Taylor, 2011), thereby gaining awareness of distinctions between individual and social meaning construction, and examining the motivations and means by which they form their own views. Cushing's (2018) students could begin labeling the elements of mind early in their education, noticing how and in what disciplines they awaken and draw upon sensory imagination in concept refinement.

The curriculum model rests on evidence that supports my conjecture that infusing (Ennis, 1989) layers of reflection about cognition into reader response ELA exercises can help students acquire a new vocabulary about mind and imagination, a vocabulary that could serve as a foundation for applying a practical philosophy of mind.

Chapter Two Summary

My review of literature forms the basis of this study. The pragmatists' models of cognition and Rosenblatt's model of transactional reading present fine-grained views of thinking and reading processes. Their models, which together form the theoretical framework for the present study, facilitate careful analysis of student work and inform detailed plans for lesson design. Results of promising contemporary studies of classroom practices and outcomes, grounded in applications of pragmatism and reader-response theory, justify the status of interpretation as the central focus of this study.

In my perusal of academic databases and throughout my survey of literature, I have not found a study devoted to describing a multi-step system to teach students to acquire a practical

philosophy of mind, revealing a gap in research literature on teaching critical and creative thinking in an ELA context. I aim to describe and fill this gap by merging models of cognition developed in pragmatism and reader response philosophy theory, describing in detail a year-long curriculum model that teachers and students can begin to use right now. In the next chapter, I give an outline of the curriculum model, explain how it fits within a standards-based classroom, and widen the context of literature and research that inspires, guides, and justifies the current study.

CHAPTER 3: THE MODEL IN CONTEXT

The purpose will be to admit into the limelight the whole scene--author, text, and reader...as though we are reconstructing a slow-motion picture from "stills" of various moments in the film.

--Louise Rosenblatt, *The Reader, the Text, the Poem* (1978)

We read five words on the first page of a really good novel and we begin to forget that we are reading printed words on a page; we begin to see images…[w]e slip into a dream…. We recreate, with minor and for the most part unimportant changes, the vivid and continuous dream the writer worked out in his mind.

--John Gardner, *On Becoming a Novelist* (1999)

Sensory imagination employs sensory elements...much as perception does…. Cognitive imagination employs conceptual elements, much as thinking does…. What is in common is the general faculty that works on these elements--the imagination.

--Colin McGinn, *Mindsight: Image, Dream, Meaning* (2013)

Chapter Three Overview

The model I describe in this study has evolved as a cross-disciplinary ELA curriculum since the late 1990's. Each stage anchors in ELA exercises and leads to opportunities for cross-disciplinary analysis and creativity. In this chapter, I place the model in a cross-disciplinary context. I begin by showing that Rosenblatt (1978; 2005) conceived of her philosophy as a study of reading across the disciplines. I then examine evidence of reader-response and pragmatist ideas that appear in seminal scholarship. I subsequently use these opening passages as a platform to introduce the model's stages, to show how the model fits within common standards-based curricula, and to establish a basis for prompting students to explore cross- disciplinary applications of thinking skills they develop in ELA (see Figure 3.1).

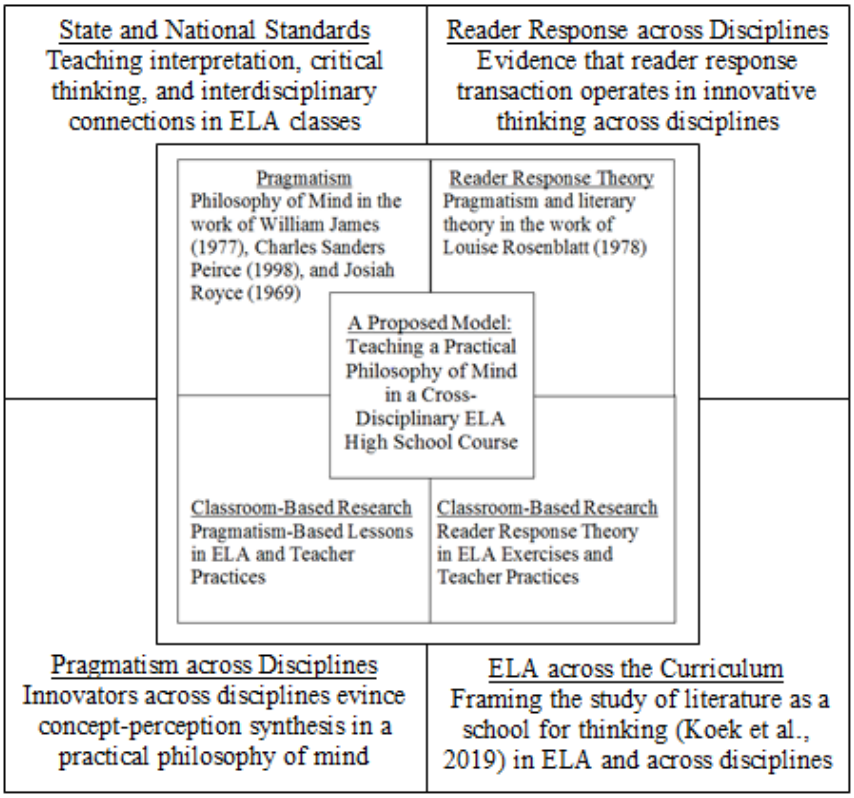


Figure 3.1. *The Model, Theoretical Framework, and Research Foundation in Context.*

In Chapter Three, I show how the curriculum model--and, with it, pragmatism and reader response theory--draws from and relates to a wider context of research. This chapter traces origins of the model and illustrates how and why I link ELA to cross-disciplinary study.

Reader Response in Cross-Disciplinary Thinking

Rosenblatt asserts that transactional reading processes occur across disciplines. She writes: "Meaning — whether scientific or aesthetic, whether a poem or a scientific report — happens during the interplay between particular signs and a particular reader at a particular time and place" (Rosenblatt, xxxiii, 2005). The text establishes an essential part in Rosenblatt's system, but "[m]eaning emerges from the reverberations of [many] factors, personal and social, upon one another" (1978, p. 182). Rosenblatt's model of interpretation entails that the text plays a critical and necessary role in reader response, while creation of the "poem," especially in a paradigm-shifting "poem," depends with equal necessity upon intrapersonal, social, and sub-symbolic perceptual elements that, with the text, establish the larger field of imagination in which the creative reader dwells.

A reader's imaginative and perceptual elements thus constitute part of the meaning-making process. One's focus on a text gives direction to and context for thinking. The emergent "poem," however, equally consists of energies and elements the reader draws from intrapersonal thought and from perceptions of the external world. It is precisely because readers can join the larger field of their consciousness to a text that readers can evolve new understanding. In the context of scientific or mathematical reading, creative dialogical transactions are subject to rigorous review according to established scientific practices. Even still, the emergent "poem" may be highly creative. Some readings abound with groundbreaking insights (see Appendix J).

The poem of a new paradigm, for example, represents a reader's synthesis of closely-vetted concepts--entrenched texts with explanatory power--and a world newly perceived. The reader in such cases applies a practical philosophy of mind to develop and share new forms of knowledge.

A Common Philosophy of Mind among Pioneering Thinkers

> The aesthetic order includes all other orders but is not limited to them.
> --Wallace Stevens, "Adagia" (1996)

The pragmatists' landmark works on the nature of thought, belief, and learning inspired my vision and teaching philosophy. At the same time in my undergraduate education, and in the many years ever since, I found reinforcing inspiration to examine possible links of pragmatism to teaching. Writings by leading scholars across disciplines, time periods, cultures, and languages evince a practical philosophy of mind that drives many forms of creativity and analysis (Einstein, 1970; Feynman, 1997; Keller, 1984; Lakoff and Núňez, 2000; Zabel, 1947). Since many pioneering innovators describe their theories of mind in terms of the interplay of concepts, perceptions, and interpretation, the writings of the pragmatists helped me to develop concrete descriptions of similarities that appear in the conceptions of mind articulated by leading scientists, writers, artists, and mathematicians.

Albert Einstein's conception of knowledge serves as a prime example. Einstein views interpretation as an essential basis for analysis and creativity. In his *Autobiographical Notes*, Einstein (1970) develops his definition of thinking, which he composes in terms that a pragmatist philosopher might have chosen. He asserts, "[A]ll our thinking is of this nature of a free play with concepts; the justification for this play lies in the measure of survey over the experience of the senses which we are able to achieve with its aid" (Einstein, 1970, p. 7). Einstein's colleague,

the physicist Richard Feynman (1997), likewise expresses a lively interest in the distinctions of the elements of mind. Elaborating on this topic in a story from his own classroom, Feynman emphasizes the importance of teachers' and students' grasps of these elements, their distinctions, and their interactions (p. 213).

Biologist and Nobel laureate Barbara McClintock represents the significance of mastering the interpretative skill set that Feynman sought to help his students develop. Science writer Evelyn Fox Keller (1984) examines how McClintock synthesized perceptions and intrapersonal concepts to gradually formulate a model of genetics that revolutionized the field of biology. Keller notes that McClintock held an understanding of scientific phenomena that did not align with prevailing conceptions of truth--but which she considered plausible. She worked back and forth between perceptions (observations and thought experiments) and intuition ("a feeling for the organism") and formal concepts—a "communicable form" to quote Einstein (1970, p. 7); words that fit into "their frame" to quote McClintock (Keller, 1984, p. 203)—in order to gradually develop new ideas about gene-environment interactions. Her ability to reason in both conceptual and sub-symbolic perceptual domains gave her the capability to create, test, and prove new ideas--giving what Rosenblatt (1978) would term a creative, novel reader response.

Similar examples abound in a wide range of testimonies, showing the importance of mastering a practical philosophy of mind. Linguist George Lakoff and mathematician Rafael Núňez devote an entire book to explore the link between concepts and perceptions in mathematics (Lakoff and Núňez, 2000). Scientists such as the late Stephen Hawking attest to the richness and essential importance of sensory-conceptual synthesis in mathematics (Overbye,

2018), reinforcing the role of perceptual (especially visual) thought that operates in concert with symbolic concepts in mathematics (Boaler, et al.; Sazdanović, 2012, 2018).

Field-based scientists and artists provide equally compelling evidence that creativity and analytical insights evolve from the vivid interplay of concepts and perceptions. The groundbreaking anthropologist Jane Goodall speaks of her childhood immersion in sensory imagination while reading literature as the essential educational experience that prepared her for her forays into wilderness and discoveries about chimpanzee society (Morgen, 2017). Like Goodall, the visionary nature photographer Ansel Adams began in childhood to explore, in music and in art, how to merge perception, emotion, and visual concepts, a lifelong pursuit that enabled him to contribute ideas to improve camera technology and which propelled his quest to compose images in an idiom of "pure perception...a blazing poetry of the real" (Burns, 2002). Active imaginative synthesis of concepts and perceptions formed the core of Goodall's and Adams's educational experiences. Each creator mastered and applied a practical philosophy of mind.

More recent examples illustrate the profound impact of learning the art of combining concepts and perceptions to form communicable ideas. Globally-celebrated perfume developer Sophia Grosjman spent a lifetime building an inner-library of scent memory, composing from her sense for scents some of the world's finest perfumes (Klein et al., 1995). Iconic American chef Jeremiah Tower forged a new culinary language, fusing perception, contemplation of landscapes, culinary style, and cooking technique to place American cuisine on par with French and Italian food cultures (Bourdain, 2016). Legendary athlete Michael Jordan attributes his mastery of basketball in part to his ability to interpret concepts and perceptions at higher speeds (Hameroff, 1997), and six-time Superbowl champion Tom Brady emphasizes the importance of

sensory perception and sensory imagination in improving athletic performance (Brady, 2018). Recent and contemporary masters of arts and athletics are masters of combining concepts and perceptions.

These modern examples of interpretation echo patterns in the work of ancient artists, musicians, philosophers, and scientists. Classical master Leonardo da Vinci coordinated sensory imagination, sensory data, and materials-development and painting technique to first mix and then organize thirty superfine layers of transparent color to create the eyes of Mona Lisa (Steindl, 2014). Ancient music theorists fiercely debated the roles of concepts (e.g., idealized "divine" ratios) and perceptions (e.g., chords discovered through experimentation) to develop new philosophies of instrument-tuning and song composition (Isacoff, 2003). And even before the age of Socrates, the philosophers Heraclitus and Xenophanes weighed the roles of perceptions and concepts in the formation of ideas, determination of beliefs, and verification of claims (Wilcox, 1993). In ancient thought as in contemporary art and science, interpretation acts as a creative force at leading edges of thought, technology, and culture (see Appendix C for detailed elaboration).

The above-cited passages from physics, genetics, music, athletics, literature, linguistics, and math show that interpretation--the synthesis of concepts and perceptions--exerts a powerful shaping influence across the disciplines. Collectively, these examples represent only a fraction of testimonies that converge in similar conceptions and applications of what I terms a "practical philosophy of mind." I have long pondered these illustrations, which have propelled me to help students understand how the elements of mind interact.

The experts' testimonies demonstrate what the pragmatists argue: that knowledge often originates in a hybrid form—part word, part intrapersonal perception and concept—which then

progresses from nascent to symbolic form that is a shared concept. Such refined forms may subsequently influence the thinking of other individuals by virtue of being communicable. In response to this recurring creative pattern of symbol-synthesis in the work of leading innovators, I decided to study how people learn to develop and apply imagination in critical and creative modalities.

Rosenblatt's theory of reading enables one to form a deeper grasp of the meaning-creation process we witness in these pioneering innovators. Rosenblatt's most enduring work, *The Reader, The Text, The Poem* (1978), presents a theory of how readers form comprehension by combining their internal schemas—e.g., ideas, memories, images, and emotions—with the patterns in the texts they read, creating a synthesis—"the poem"—that stands for meaning in a text. Rosenblatt emphasizes that the "poem" is not a solipsistic projection of the reader; nor is it a statement of "pure" objectivity, even if objectivity is the reader's goal. The poem is an artifact of aesthetic experience and efferent reading, emerging from an effort to participate, appreciate, and understand. The poem thus reflects a tenuous and evolving agreement or alignment between the reader's internal schemas and patterns that may exist in a given text.

The pioneering thinkers whose work inspired my career path in teaching give examples of such "poems." In their transactions, they synthesize paradigmatic concepts--the central texts and concepts of their respective fields--with novel perceptions and emergent intrapersonal thought. In this process, they produce readings (and, subsequently, writings) that are truly creative, with paradigm-shifting power (see Appendices C and J). These innovators are meaning-discoverers and meaning-creators, giving illustrations of the importance of the creative-reading process that Rosenblatt and the pragmatists describe. They display mastery of idea-synthesis in their novel applications of creative and critical thinking.

Idea synthesis, according to the pragmatists, occurs in acts of interpretation: the intrapersonal combination of concepts and perceptions (James, 1977; Royce, 1969). Learning the art of interpretation thus appears as a major point of focus in the works of the pragmatists. I have since worked to promote students' discoveries of techniques and patterns of interpretation within themselves. The year-long curriculum model described in this study presents a late-model iteration of a system of lessons I have refined for 20 years. At the heart of my teaching mission is my effort to bring students to a personal, internal creative edge, and then to help them become receptive, creative, analytical, and resourceful at that edge of existing knowledge and novel internal experience.

We witness instances of this internal creative process in the work of our leading innovators, whose mastery of metacognition and critical analysis informs their creativity and displays many advantages of mastering a practical philosophy of mind. McClintock, Feynman, and Einstein each embrace a condition of intellectual life that the American poet Wallace Stevens describes in one of his adages: "To live in the world but outside existing conceptions of it" (Stevens, 1997, p. 902)—and then to go on listening, naming, and creating. Stevens' adage describes a mode of thinking--interpretation--that teachers can, and arguably should, help their students acquire. The aim of this study is to present a model that may support this endeavor.

The curriculum model presented in this study reflects my goal to help students become aware of how they create "the poem" of meaning. The students' analytical and creative work blends radical constructivist (von Glaserfeld, 1995) and social constructionist (Gergen, 1995) processes (Shotter, 1995) in what Greene and Yu (2016) call "epistemic cognition: the ability to construct, evaluate, and use knowledge" (p. 45). These processes center on students' development and application of procedural (i.e., interpretive) and declarative (i.e., conceptual)

schemas in any given semiotic medium (Danesi, 2001; Danesi, 2002). The model's stages begin with simple, accessible steps that support gradual progress in longer, more sophisticated stages of developing a practical philosophy of mind.

Cross-Disciplinary Evidence for Reader Response Theory

Rosenblatt's vision of the reader as part of a creative triad finds deep confirmation in the work of the leading innovators I have cited. Scholars such as Barbara McClintock (Keller, 1984) and Jane Goodall (Morgen, 2017) give vivid evidence that world-shaping visions emerge as creations. In Rosenblatt's system and in the works of these innovative thinkers, the creator is not independent of the text she studies; likewise, the material she studies is not pre-organized into a final explanation of itself. As Rosenblatt states, "[w]e cannot simply look at the text and predict the poem" (p. 14) The first version of each creator's reading of the text—the first "poem"—does not hold deterministic sway over "reader" and "text."

The creative transaction thus draws both reader and text toward discovery. Both are involved in a teleological process akin to a "musical performance" (Rosenblatt, 1978, p. 13) of a composition, which proceeds through a continuous flow of creative interpretive events. Rosenblatt (1978) explains that "[b]oth text and reader are essential aspects or components...of that which is manifested in each reading as the poem. The text...patterns and delimits, but it ultimately functions like a chemical element: it itself is merged in the synthesis with the other elements to produce a particular event--a poem, a novel, a play" (p. 15). New poems, new readings, emerge in a reader's state of creative and disciplined engagement, bringing reader, text, and poem into a dynamic transactional unit: an evolving interpretive community.

Within each individual reader, the creator's novel conceptions arise from transactional engagement with symbolic texts in juxtaposition to close study of perception, actual and imaginary. The reading *responses* of these innovative, critical-analytic readers produce improvements in the arts and sciences, visions and versions that did not exist before the readers--the innovators--created their transactional works or "poems," in Rosenblatt's idiom.

This creative approach to reading aligns closely with reading and meaning-making as Emerson (1982) describes it in "Nature," and it explains a pattern of inquiry and creative interpretation that brings about paradigmatic change in the sciences (see Appendix J), as described by Thomas Kuhn (1996). Rosenblatt's philosophy of creative reading describes readers as responsive to the idea that valid meaning, intent, and authorial voice inhere in the text: there may be objective patterns to discover which enter into a "responsible" reading of a text.

This principle likewise operates in the innovative work of scientists such as Einstein (1970) and McClintock (Keller, 1984), whose readings of established science, considered in juxtaposition to novel ideas and sub-symbolic perceptions, show careful engagement with shared logical rules (see Appendix C), while their novel thinking, as with Rosenblatt's creative reader, grows in conjectural space which such thinkers create to entertain possible, as-yet-unrealized readings--new versions of the "poem"--that may best explain natural phenomena.

Such creative readers synthesize internal visions with external data in cycles of close reading. "The reader's attention," Rosenblatt elaborates, "constantly vibrates between the pole of the text and the pole of his own responses to it" (p. 129). Inner, alternate readings to widely accepted readings of a text occur within the reader, as opposed to strictly appearing in the formal body of a given text, often stemming from the reader's attunement to the broader field of related subject matter that the reader's memory and imagination brings into relation to the text.

Other readers, e.g., scientists in the same field, may shape the interpretive process, too, playing the parts of interpretive referees or creative inspirers, critiquing and informing the poem's evolving and eventual structure, a process Rosenblatt describes in detail. In reader response theory as defined by Rosenblatt (1978), readers balance belief in external meaning (a principle which deconstructionists challenge) against alertness to the possibility of other, possibly richer alternate readings of the text--which she conceives as a "general medium of communication *among readers*" (p. 146)--which other readers may help an interpreter to notice in new ways through social interpretation.

Rosenblatt's transactional reader thus creates meaning while remaining attuned to limits and guides built into the text. Rosenblatt depicts the reading process as a constantly renegotiated relationship of power among the elements of the reader-text-poem triad: "[t]he transactional view...liberates us from the absolutist rejection of the reader, preserves the importance of the text, and permits a dynamic view of the text as an opportunity for ever new individual readings, yet readings that can be responsibly self-aware and disciplined" (p. 130). Thus, in instances of internally-generated inspiration, the reader still responds to a given text, but in this case the reader responds to a vision that arises partly within imagination centered in its own processes. Here imagination is superimposed on a "text" of reality, viewed as a palimpsest on which new readings may appear. The imaginative plane of a reader's interpretation of a text hovers a measure above the text field while also deeply engaging with it.

For example, before any new understanding is formed by a reader while reading a text, it must occur in the imagination of a reader who carefully responds to what the text offers and to what his or her perceptions bring to the reader's understanding. New conceptual descriptions evolve from a reader's novel ways of interpreting data—e.g., recognizing what the author of the

text presents to persuade or influence the reader (see Appendix J). Such readers understand both "the openness and the constraints of language...without abnegating the possibility of responsible readings of the text" (p. 183). These creative readers refer to the text in part "...to regulate what shall be held in the forefront of the reader's attention" (p. 11). Such disciplined, novel methods of reading yield creations: in Rosenblatt's terms, "poems," created from a world of concepts and perceptions.

The Importance of Perception in Reading

Perception, particularly sensory imagination--the internally generated sensory world that sees, that hears, that models worlds represented by textual symbols--plays a central role in creative reading and writing (Butler, 2005; Gardner, 1999; Rosenblatt, 1978). The contemporary fiction writers Robert Olen Butler and John Gardner, both lifelong writers and creative writing instructors, speak about the "dream," in particular, as an analogue of the narrative that a writer creates and that a creative reader constructs.

Gardner (1999), author of several critically acclaimed novels, coaches his audience to contemplate the experience that novelists intend to evoke in their readers. He writes, "We read five words on the first page of a really good novel and we begin to forget that we are reading printed words on a page; we begin to see images…[w]e slip into a dream…. We recreate, with minor and for the most part unimportant changes, the vivid and continuous dream the writer worked out in his mind…" (p. 5). Gardner's reader fuses sensory imagination with the novelist's interpersonal concepts, engaging in acts of interpretation that inform the reader's comments and writings about the "dream"-like text.

Butler's how-to book on writing fiction (2005) places the same idea of dream-like interpretation at the center of the reading and writing experience. Butler asks his audience to "[p]ause a moment and consider what goes on within you when you read a wonderful work of fiction. The experience is, in fact, a kind of cinema of the inner consciousness…. The primary senses—sight and sound—prevail, just as in the cinema…. [I]t makes sense that the techniques of literature are those we understand to be filmic" (p. 64). Butler's and Gardner's choice of analogies is even more compelling in light of the fact that when we dream and when we imagine, our bodies and brains react to and change in the acts of dreaming and imagining (Berns et al., 2013; Doidge, 2007; Moseley, 2004; Ramachandran, 2003; Pascual-Leone et al., 1995; Yue and Cole, 1992).

Gardner, Butler, and Rosenblatt describe the interpretive experience of accomplished readers, however. I am concerned with *if* and *how* teachers may help students to develop such mature interpretation and to use it to foster critical thinking. To meet these ends, I turn to pragmatic philosophy of mind and Rosenblatt's reader response theory for guidance in designing the system described in this study. Interpretation equally operates in thought that begins with perceptions--sensory and sensory-imagination--and then evolves toward symbolic expression in speech or writing, as evidenced by the work of novelists whose books begin as interior visions (Butler, 2005; Gardner; 1999) and by the innovations of scientists (Einstein, 1970; Keller, 1984), whose theories proceed in large part from reasoned interpretation about observational--i.e., directly perceived--data.

The fact that interpretation supervenes in the process of transforming perception into concepts underscores the importance of becoming attuned to novel perception and developing skill in symbol synthesis. Perception is a garden for new concepts--for new scientific insights

and for original poetic and novelistic visions, for example. For testing hypotheses and refining claims of fact, perception also serves as a resource that interpreters may use to sharpen concepts. The creative reader, and more broadly the interpreter, thus emerges as a synthesizer of both perception, which is rich with possible meanings, and concepts, expressions of an inner world of reason and imagination.

Rosenblatt (1978) aims to illuminate the subtle processes of the creative reader's synthesis of meaning. She aspires to "admit into the limelight the whole scene—author, text, and reader" (p. 5) in order to examine cognition in detail, "as though we are reconstructing a slow-motion picture from stills of various moments" (p. 10) in the reading process, the variety of ways that meaning takes form in a reader's encounter with a text.

Rosenblatt's pragmatist predecessors likewise focus on minute elements and subtle processes in cognition. William James (1977) characterizes the "slow-motion picture" of consciousness as a stream of blended concepts and perception, navigated by interpretation. He observes that "…whatever we distinguish and isolate conceptually is found perceptually to telescope and compenetrate and diffuse into its neighbors." He frames concepts as the essential partner of perception. He states: "percepts and concepts interpenetrate and melt together…[n]either, taken alone, knows reality in its completeness. James' writings lend insight into Rosenblatt's reader and into the cognitive elements the reader uses to create an interpretation, i.e., the reader's "poem."

Philosopher Inna Semestsky (2014) agrees with and expands this view of consciousness as a fine intermingling of concepts, perceptions, and interpretive processes. Echoing Rosenblatt's interest in "the whole scene," Semestsky notes how "[a]n…unconscious thought expresses itself in terms of subliminal, or micro-, perceptions that…become part of the

cartographic microanalysis, which involves mapping of 'an unconscious psychic mechanism that engenders the perceived in consciousness'" (p. 502). The careful reader, in Semetsky's view, joins "the perceived in consciousness" to background knowledge and, from there, forms novel syntheses of perception and concepts. In the present study, I draw together core elements of Rosenblatt's, James's, and Semetsky's related descriptions of a reader's mind and present a series of stages through which students may become discerning participants in the processes unfolding within "the whole scene" of imagination.

Semetsky adds a question to her observation about the reader's conscious-unconscious interface—one that echoes a central focus of this proposal: "How do we practically make, remake, and unmake…concepts?" (p. 502). Koek et al. (2019) emphasize a similar process in their description of "deautomatization and reconstruction" of thinking in their description of literature as a "school for thinking," wherein teachers work to enable this process of making, remaking, and unmaking concepts, using critical appreciation for and "reconstruction" of literature across disciplines. Semetsky (2014) and Koek et al. (2019) help to describe a context for learning a practical philosophy of mind. In the model I describe in the present study, students begin this process in simple exercises, and then in increasingly sophisticated forms. The teacher in the curriculum model gives students ample time, several entry points, and many chances to reflectively use the elements of mind—concepts, perceptions, and interpretation.

The Model: A Brief Outline.

The curriculum model features seven stages. The first stage involves playing a very simple game which helps students to recognize how the elements of mind function in their thinking. The game also helps students develop a vocabulary for naming and describing the

elements of cognition. Students and teachers can repeat and vary this game throughout the rest of the model's stages in order to return to clarify the ideas and processes that connect each subsequent stage to the others and to frame the stages as a coherent system.

The outcome of playing the game in Stage One forms the first of the seven artifacts that represent the students' stages of development. The remainder of the artifacts are as follows: (2) a student's design for dramatizing a passage of fiction, including a reflection on the role of the elements of mind in creating the design; (3) a student's comprehensive cognitive self-profile, involving the student's reflection on how the elements of mind do and, importantly, do not factor into his or her learning in all of the classes and in non-academic activities; (4) a student's synthesis of a new concept and reflection on how the new concept developed from layers of schema; (5) a student's essay about reading strategy; (6) a student's design for a lesson that explains a concept or procedure the student finds challenging; and (7) a reflection on the process of completing the interrelated steps in learning a practical philosophy of mind. Each of the first six artifacts in this sequence represents a more complex and extensive illustration of interpretation—the skillset that enables comprehension, powers innovation, and guides cross-disciplinary creativity.

Goal for Students: Understand and Apply Interpretation

Students master writing and reading—the heart of ELA—to the degree that they master interpretation and apply a practical philosophy of mind. A vivid illustration of this process appears in Zabel's (1947) biography about the novelist Joseph Conrad, in which Zabel quotes Henry Adams to describe the language-artist's creative process: "…the white paper ask[s] to be covered with elusive words, the thoughts grouping themselves into architectural forms, and

slowly rising into dreamy structures, constantly changing, shifting, beautifying their outlines" (p. 48). Adams' description creates a picture, like an aerial map, of the paths of the creative thinker, which Butler (2005), Gardner (1999), Rosenblatt (1978), and Semetsky (2014) describe.

Recalling William James's description of the interplay of concepts and perceptions, Adams focuses on the writer's development of internal "architectural forms" and "dreamy structures," compounds of sensory imagination and intrapersonal concepts, which the writer may eventually represent by tracking down "elusive words"—concepts— that convey impressions of the writer's dream to imaginative readers. Adams presents the creative writer as a synthesizer of words and internal images, emotions, and concepts. Aesthetic reading as described by Rosenblatt (1978) and Taylor (2011) inverts this process: the reader begins with concepts and, from reaction to and reflection upon them, develops sensory worlds and infers meaning. Skillful interpretation, in reading and in writing, appears at the heart of a creator's work.

Leading this learning process, and distributing it regularly through the seven stages of the curriculum sequence, emerge as a key role for the teacher. The teacher sparks philosophical discussions and guides students to notice detail in a text or to represent detail more clearly and evocatively in writing. The students may thereby practice consciously coordinating the elements of mind in combinations of System 1 (automatic) and System 2 (conscious, effortful, intentional) thinking (Kahneman, 2011) (see Appendix B for a concise overview of System 1 and 2). The purpose of introducing students directly to knowledge of the elements of mind is to activate an inner teacher within each student, and to help each student learn to apply interpretation.

Aesthetic responses and strategic interpretation may go beyond affect and conceptual thought, both proceeding from and influencing bodily experience as a broader ground of perceptual experience and understanding (e.g., Doidge, 2007; Semetsky, 2014). Such perceptual

knowledge presents yet another form of interpretive conversion: concepts may elicit physical sensation, and body states may influence a reader's experience of a writer's concepts. For example, a writer might experience the elation of a character in the written work, while, in turn, a reader might connect with the character and physically experience a similar emotion.

Semetsky (2014) refers to this process as "the edusemiotic turn" in her argument that the study of literature may be couched in "a body-mind" approach to interpretation. Semetsky presents a complex map of such affect-laden, perception-rich, symbol-mediated interpretation, proposing a bodily dimension to the "silent processes" (Taylor, 2011) of intrapersonal cognition. Semetsky argues that meaning, engagement, and deep learning occur in thought that activates affective and physical processes both of which arise from and influence conceptual thought.

Like Rosenblatt and Taylor, Semetsky's theory of reading is inspired in part by the pragmatist Charles Sanders Peirce (2011), whose triadic model of cognition also informs Rosenblatt's transactional theory of relationship among the reader, the text, and the poem (Rosenblatt, 1978, p. 182). Notably, the triadic model at the center of the interpretation-based ELA curriculum also features triadic structure within cognition and centers on the interaction of the same three elements: concepts, perceptions, and interpretation. Semetsky's special contribution to the study of triadic interpretation is her in-depth exploration of the loops of relationship connecting bodily experience and interpretation.

Semetsky's model of the body's interactions with abstract interpretation finds justification in a study by Gregory S. Berns, et al. (2013) in the journal *Brain Connectivity*. Berns et al. examine short- and long-term effects of reading a novel on "brain connectivity." Using fMRI analysis of subjects' brain activity, they show that after just nine days of reading 30 pages per day in the novel *Pompeii*, by Robert Harris, subjects showed lasting increases in levels

of connectivity in the right and left somatosensory cortices, areas of the brain which border the motor cortex and which create maps of bodily perception. The key finding by Berns et al. that the brain's body maps can and do shift in response to abstract interpretation lends credence to Semetsky's body-mind theory of interpretation and highlights what Semestsky calls "edusemiotic" conversions among elements of mind.

Throughout the stages of the philosophy-based ELA curriculum proposed in the current study, the teacher reminds students to use combinations of each element of mind (concepts, perceptions, and interpretation) to understand a text. The teacher guides students to consider how such combinations expand the basis for making inferences. The synthesized elements enrich the texture of information from which students may form impressions and derive conclusions. If students are capable of activating and steering this interpretive process, then they may also give explanations of how they form their views on a text. They may also more readily navigate a discussion about how they strengthen their reasoning. Such students gain an advantage by understanding and applying knowledge of the elements of mind: they learn to think at the epistemological level, the level at which Rosenblatt (1978), Semetsky (2014) and Taylor (2011) regard as necessary for readers to grow self-awareness and engage with texts.

James (1977), Rosenblatt (1978), and Royce (1969) present detailed models of interpretation. Enabling students to bridge perceptual and conceptual worlds through interpretation is a primary goal that inspires the design for the curriculum model explained in this study. I take particular inspiration from the alignment of Rosenblatt's vision of transactional reading, the pragmatists' conceptions of mind, and leading innovators' multiple demonstrations--across disciplines, languages, and historical periods. Together, these writers present creative

reading as a world-shaping force. Their works inspire and inform my argument that scholarly research should be devoted to the topic of how to teach and learn a practical philosophy of mind.

Interpretation as an Operating System in Disparate Modes of Thought

In considering the preceding paragraphs and sections of this chapter, one may notice that a variety of creators, fields, and functions draw upon interpretation, the synthesis of concepts and perceptions. This variety reveals a hierarchy of cognitive functions, wherein interpretation is akin to an operating system that supports many functions of mind. Critical thinking, creative writing, reading comprehension, thought experiments, athletic performances, mathematical analysis, and many more modes of thought feature combinations of concepts, perceptions, and interpretations. Interpretation thus operates as a versatile platform for cognition (see Figure 3.2 for an outline of roles that concepts and perceptions play in each interpretive modality).

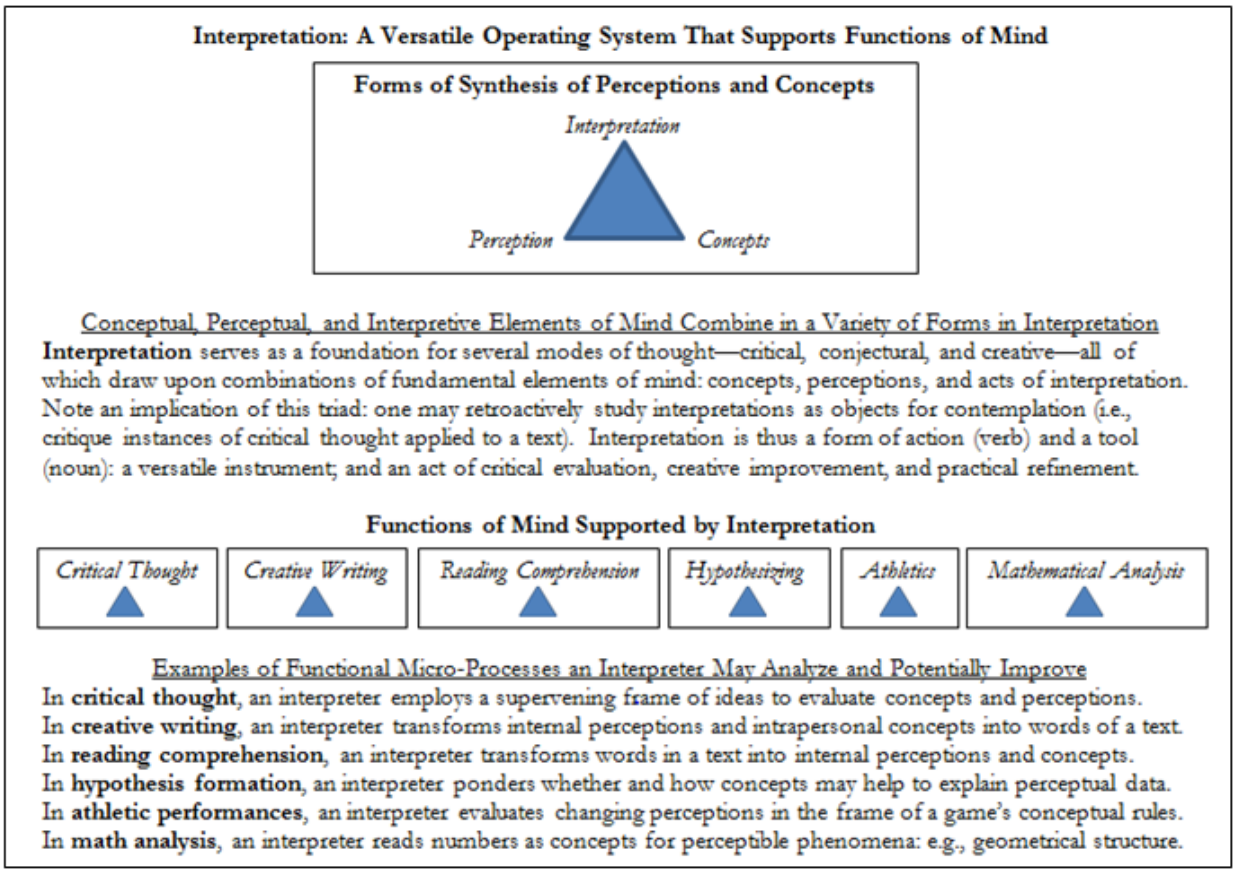


Figure 3.2. *Interpretation: A Versatile Operating System that Supports Functions of Mind.*

While I strongly resist strict comparisons of minds to computers, I see a practical explanatory advantage in describing interpretation as a universal operating system that supports a range of cognitive functions. By becoming conscious of interpretation, innovators become aware of the sub-elements and the micro- and macro-processes of meaning-creation and thereby learn to control their creative and analytical thought at a fine-grained level, as outlined in Figure 3.2.

The content knowledge one acquires through self-awareness of interpretation may in turn enable one to make subtle adjustments to one's cognitive processes, enabling one to meticulously assess outcomes of one's creative and analytical processes. For example, a skillful reader could use interpretation to trace his or her conclusions about a passage to his or her responses to singular cognitive elements (e.g., images) and events (an action stemming from an emotional

response). Figure 3.3 displays a hierarchy in systems and functions of mind that enable an interpreter to reflect on the contents, processes, and outcomes of the functions of mind.

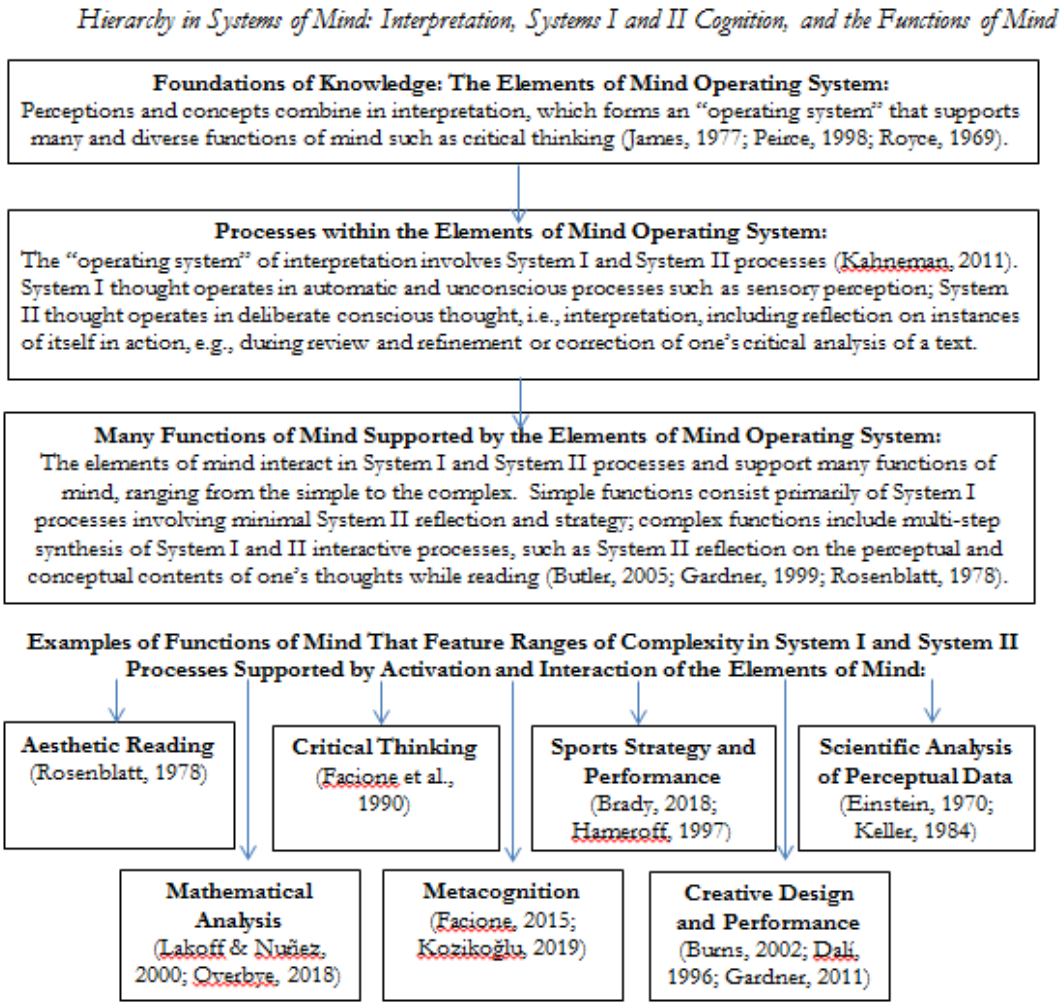


Figure 3.3. *A Hierarchy of Systems and Functions of Mind.*

A thinker exercising complex interpretation within a given function of mind, e.g., aesthetic reading (Rosenblatt, 1978), will be able to trace the content of thoughts to fine-grained elements of concepts and perceptions that shape the interpreter's ongoing reading experience.

As a classroom teacher, I have long acted on this conjecture that such interpretive self-awareness is useful. I explain the potential value of learning interpretation in the following manner: reflective people who can examine their own critical thought, rhetorical performance,

experimental methods, and creative processes at a granular level may then assess whether the presence or absence of the elements of cognition that facilitate functions of thought, e.g., perceptions--images, for example--helpfully and accurately appear within mathematical analysis, reading comprehension, or scientific hypothesizing.

The interpreter may then evaluate the epistemic roles of these elements--i.e., concepts and perceptions, alone and in combination. For example, one may consider the effectiveness of steps in a concept-evaluation process, such as systematically editing speeches, checking equations for accuracy, or modeling molecular processes. The reflective interpreter may then determine if and how more or less of a cognitive element could improve a function of thought, e.g., if augmented resolution of internal imagery may inform one's approach to making inferences about characters while reading, or if such imagery, internally generated, would create a richer basis for a writer while creating poetry and fiction.

An interpreter may then develop a means of deliberately stimulating, growing, and synthesizing these conceptual and perceptual elements of mind to improve a function of thought, such as rhetorical composition or rhetorical analysis, both of which involve weighing possible or actual effects of concepts, expressed through diction, tone, imagery, and other rhetorical elements, on an audience's perceptions, emotions, thoughts, beliefs, and actions. My curriculum model aims to bring students' awareness to this granular level of cognition and then to stimulate growth of each element--perception, concepts, and interpretation--alone and in combination, while students perform a range of ELA-based activities.

Developing Critical Thinking in Each Stage of the Curriculum Model

The content and strategy of the curriculum model rest on the premise that critical thinking consists of an interconnected set of skills that enable one to broadly utilize symbolic, sub-symbolic, and processual elements of cognition to evaluate competing axiological frames, representations of history, and varying political principles and social norms. The model is designed to allow for responsiveness to spontaneity and unconscious inspiration--System 1 thinking (Kahneman, 2011)--while teachers coach students to complete deliberate, methodical, semi-structured tasks--System 2 thinking (Kahneman, 2011)--such as editing an original play or fine-tuning a cross-disciplinary research project. The model is flexible--suitable for unique minds. I have designed it with the aim to bridge one-of-a-kind intrapersonal cognition to shared logical foundations and formal content-knowledge domains.

I see advantages in helping students develop a practical philosophy of mind that helps them to frame "critical thinking" in terms of interacting sub-elements and processes. I aim to illustrate that learners may thereby gain a fine-grained view of thinking, a language for describing the interacting elements and energies in thinking, and a method for refining thought--all of which are hallmarks of critical thinking (Facione et al., 1990).

Objectives and Relevance of Study

The model can augment the English Language Arts (ELA) curriculum and that of its partner disciplines in the arts, sciences, and humanities. I use the model with the aim to strengthen curricula by taking advantage of the connection between ELA and fields across the arts, sciences, and humanities, all of which are bound together with the substances that define the core of English Language Arts: literature and communication.

The elements of mind—concepts, perceptions, and interpretations—function together in the model as creative and analytical instruments. By equipping students with these instruments, students may learn to recognize symbolic and perceptual patterns in their thinking. The goal of the first stage of the model is to help students acquire core vocabulary to talk about perceptions, concepts, and interpretations. Subsequent stages in the model aim to strategically guide students to use these instruments as they explore literature, communication, and cognition across the disciplines. Together, these three subject areas—ELA and cross-disciplinary literatures; communication, in the forms of writing, speaking, and projects; and cognition, in the form of cognitive self-evaluations—merge to form a context to learn a practical philosophy of mind.

The Sources of Data

Table 3.1 illustrates the stages and the artifact-creation sequence. At each stage interval, I obtained artifacts that serve as focal points for illustration and analysis of the model.

Table 3.1. *Stages of Instruction and Sequence of Student Artifact Creation*

STAGE 1: I introduced students to the Elements of Mind in the Abstract Symbol Game (and repeated on occasion throughout the term to refresh and reinforce memory).
STAGE 2: I taught students to use creative reading to annotate poems, essays, screenplays, and fiction, with the goals of involving each element of mind and giving evidence of interpretation (synthesis of concepts and perceptions) in each analytical entry. Students repeated this exercise 50 or more times throughout each semester, using a variety of texts in order to hone the method. I will analyze a typical example of annotation (as one part in a chain of seven artifacts).
STAGE 3: Students began to systematically complete an Elements of Mind Self-Profile (conducted over one month to maintain consistent dialogue and to blend discussions about reading and thinking with the overall ELA curriculum). Stages 1 and 2 continued throughout 3.
STAGE 4: Students created a new word by synthesizing perceptions with concepts in a novel form to identify a new pattern, bringing an intrapersonal concept into communicable form.
STAGE 5: Students composed a Philosophy of Reading essay in which they describe their reading methods.
STAGE 6: Students used their understanding of the elements of mind to design a lesson plan on a subject that challenges them.
STAGE 7: Students submitted artifacts with a summary reflection on the set of six pieces.
YEARS LATER: I chose ten artifact-sets to illustrate the model's form, functions, and outcomes.

The first three stages of the curriculum model introduce students to the elements of mind, engage them in dozens of literary analysis exercises with reflections on the elements of mind, and prompt them to complete a comprehensive cross-disciplinary reflection. In each stage, students work with the elements of mind vocabulary, gradually learning to apply these concepts in their ELA assignments and in their reflections on their own thinking.

Stage One: Play the Abstract Symbol Game. The first curriculum model exercise calls for students to generate aesthetic responses to Rorschach-like abstract symbols. Each round of the game requires only sixty seconds to play and sixty seconds to discuss; and each cycle of the game affords students opportunities to become attuned to the lightning-quick, largely subconscious operations of the mind—System 1 cognition—along with deliberative rational conscious processes—System 2—which enter into interpretive responses.

This abstract symbol game frames students' introduction to literary analysis, which students conduct on a range of texts, including screenplays. Well-written screenplays, matched with writing exercises and critical analysis of films, help students to model and externalize many steps of the multimodal reading process that supports learning interpretation, i.e., developing the ability to strategically synthesize perceptions and concepts. A screenwriter begins with sensory imagination, intrapersonal concepts, and a relatively select few interpersonal concepts, and converts these forms into a story that, in the mind of a resourceful reader, models a world. Filmmaking teams invert this process: they begin with the set of concepts presented by the writer and work—read, logically and creatively—to convert the explicit and implicit patterns they interpret in the text into a lifelike sensory, psychological, and social world. Together, the writer and the filmmaking team model the processes of creative and analytical reading.

Stage Two: Literary Interpretation: Compose a Detailed Scene-Design. In order to proceed from the abstract symbol game to greater skill in literary interpretation, students create up to 20 responses (per text they read) to a prompt to meticulously design the tangible and intangible features of a scene from a screenplay or a novel in response to a passage that engages them. The teacher asks the students to activate sensory imagination and to pay attention to explicit and implicit clues in the writer's concepts in order to develop "interior" (psychological, emotional) and "exterior" (sensory, physical) features of a text. Students model scenes in detail and test the logical plausibility of their models with the goal of producing meaningful dramatizations in the larger schema of a given text. The teacher uses sub-questions to prompt students to control sensory, psychological, and tonal features of the designs they create. Students gradually internalize these questions and use them with increasing skill.

Stage Three: Complete a Cognitive Self-Profile. Soon after beginning phase two, in which students repeatedly call upon and synthesize a range of elements of mind to interpret passages of literature, students begin the month-long sequence of phase three: completing a comprehensive cognitive self-profile. In this third stage, the teacher asks students to examine how they and their peers differ from one another in how they do—and, importantly, do not—summon the elements of mind into the ways they read and write with different types of concepts. Do some students intuitively model sensory worlds in response to numbers and notes? Do others model worlds based on the words of novels but not when reading formal history texts? Can students change the intensity and speed of perception they experience when reading the concepts of equations, stories, songs, and schematics of various kinds? These are a few of the questions

students repeatedly ask and answer as they complete the cognitive self-profile, a project they methodically finish while working on the repeated steps within phase two, literary interpretation.

In the midst of these tasks, the teacher adds a creative writing prompt in short-fiction writing and screenwriting. The teacher's goal is to put students on the creation side of the types of text they analyze. The students' reflections on overlapping patterns in their literary interpretation tasks, creative writing projects, and cognitive self-profiling are designed to help students notice the universal applications of the elements of mind.

Stage Four: Create a New Word. When students near completion of the cognitive self-profile, the teacher asks students to perform tasks that steadily become more complex. The first of these tasks (while phase two remains a continuous presence in the curriculum, with new texts entering the conversation) is to create a new word—a new interpersonal concept—that gives communicable form to an intrapersonal concept or to a perceptual experience.

The teacher requires the students to begin with nonlinguistic phenomena and then to slowly work a nascent idea into definite conceptual form, concluding with a definition of the new term, an illustration of its meaning(s), and an account of the student's creative process in developing the new word. This exercise is intended to serve as a microcosm for how language grows from each of the distinct elements of mind. It also aims to give students a map of how to develop a new concept while starting from pre-linguistic elements of mind. The exercise is designed to position students to be deliberate, reflective creators of meaning. The process affords the teacher an opportunity to talk to students about how they can design more of their thinking to unfold at this proto-linguistic, proto-formal level in a logical, strategic, reflective manner, bridging the worlds of language and perception.

Stage Five: Compose a Philosophy of Reading. Students describe their thinking methods in the next step of the curriculum model. Using the "elements of mind" language, the students describe their thinking processes while reading. This essay comes in response to the teacher's prompt for students to give a comprehensive definition of "real reading," by which the teacher means "skillful interpretation." Students reflect on the reading and writing activities they have done in each phase of the model. Combining their knowledge of literary analysis, cognition, and strategy, they state and defend a perspective on what constitutes "reading" at a high level of mastery.

Stage Six: Redesign and Improve a Learning Strategy. The penultimate step in the model asks students to use their cognitive self-profile, interpretive frame, creation and reflection skills, and reading method as a basis for improving their thinking in an area where, to some degree, they have struggled to comprehend a topic. The teacher asks the students to choose a task that challenges them and to design a lesson, i.e., to use interpretation to tackle confusion, defy boredom, and challenge a weakness. The lesson must place emphasis on activating and synthesizing all cognitive elements, with the aim of understanding and then teaching the challenging content to another novice learner. This complex form of lesson-creation asks students to become designers of their own thinking in areas where their level of understanding has previously disappointed them.

Stage Seven: Reflection on Developing a Practical Philosophy of Mind. The lesson-design and reflection stages conclude the description of the curriculum model. For a given student to become a capable designer of his or her own thinking, starting from pre- and proto-

linguistic levels of cognition and moving across disciplinary boundaries, marks a significant milestone in a student's development. Forming this cognitive design capability sets one on a path toward greater resourcefulness and independence of mind.

The sixth stage may present the hardest challenge. The outcome of work in that stage presents a concrete data point—not the only one, but a very significant one—that exemplifies the higher-order thinking goals students may set and achieve in this philosophy-based curriculum. Since students use the interpretation method to improve their skills in a different academic subject (in the lesson-design stage), this late step in the model's sequence also sets students on a path of cross-disciplinary thinking, prompting them to transfer reading, thinking, and writing skills to one or more classes. Later stages of my work on the curriculum model will test students' abilities to develop and demonstrate "consilience," i.e., to show their ability to group ideas together from across disciplines into novel, coherent forms.

Practical Implementation of the Model in a Standard Classroom Setting

The model aligns squarely with Common Core Standards (2015). The standards explicitly emphasize "shared responsibility for students' literacy development," meaning that teachers in all subjects should—if not *must*—incorporate literacy training into their lessons and projects. The writers of the standards employ a rationale that echoes the argument for making ELA a cross-disciplinary curriculum. They state that "[p]art of the motivation behind the interdisciplinary approach to literacy promulgated by the standards is extensive research establishing the need for college and career ready students to be proficient in reading complex informational text independently in a variety of content areas." This is precisely what the model positions students to endeavor: to read and comprehend "complex informational text in a variety

of content areas." The model also prompts students to apply metacognition to impose their analytical and creative reading processes on various kinds of texts—fiction, poetry, and informational—to become more self-reliant with interpretation.

The emphasis of the model on helping students learn self-reliance through distributed practice also aligns with the standards. The writers of the standards observe that "[m]ost of the required reading in college and workforce training programs is informational in structure and challenging in content; postsecondary education programs typically provide students with both a higher volume of such reading than is generally required in K-12 schools and [offer] comparatively little scaffolding." Learning the art of interpretation over a semester or a year of distributed practice immerses students in a process focused on strategically analyzing a range of texts from across the disciplines, a process intended to help them master techniques for scaffolding their reading and thinking processes.

Developing the Model in the Context of Current Research.

I address a variety of needs and trends in the context of current education research as described by the former longtime editors of *Research in the Teaching of English*, Judith A. Langer and Arthur N. Applebee. Langer and Applebee (2016) consider methodology, process and product, conceptualization of teacher as researcher, instructional research, and developmental models as useful categories for organizing their discussion about thirty-plus years of English Education research. In light of Langer's and Applebee's reflection on each of these categories, the relevance and substance of this study becomes clearer.

Langer and Applebee (2016) state that "methodological narrowing" limited the range and power of education research from 2000 to 2015. They call for more "conceptually and design-

driven interdisciplinary studies…looking at schools, students, teachers, and learning from a number of vantage points" which, they state, had only recently begun to reemerge by the time of publication. The present study modestly moves in the direction that Langer and Applebee recommend. The philosophy-based curriculum model, and pragmatic theory specifically, may be useful and even essential in teaching across disciplines. I examine evidence for this claim.

Why We Need to Teach Interpretation.

English is a global language. Citizens in more than seven dozen nations communicate in distinct forms of the language. Within the United States, numerous dialects exist as markers of region, race, and, often, socioeconomic class. Literature reflects this breadth and diversity in English writing and speech; and the language's breadth and diversity widen when one considers changes in the language over centuries; and the inclusion of nonfiction English texts written across the arts, humanities, and sciences broadens the field still further.

English is thus a remarkably versatile language—a system of interpersonal concepts—that serves as a primary medium for communication and interpretation across historical periods, disciplines, cultures, economies, and national boundaries. Its breadth and diversity call for an approach to teaching that introduces students to a wider field of participants in the conversations that English facilitates: conversations about art, values, culture, history, science, economics, and politics—and, perhaps above all, about our shared project to learn how to share the world peacefully, prosperously, and sustainably.

Rosenblatt reserves the final paragraph of *The Reader, the Text, the Poem* (2005) to articulate a deeply kindred vision for how reading, writing, and criticism can shape national and global society, and her closing remarks remain equally relevant at the time of this present study.

She observes, “At this time of great upheavals in the world, whole nations are groping their way toward their definitions of freedom, democracy, socialism, capitalism. It is the essence of democracy that our own society, too, should be continuously reviewing and refining its efforts to move more closely to embodiment of our ideals” (p. 188). Such transformative action and democratic conversation depend on citizens’ critical thinking and cross-disciplinary creativity (Sass, 1992; Wilson, 1999), skills supported by interpretation.

Teachers thus need to help students interpret critically and creatively in order to navigate an increasingly complicated world that demands collaboration, flexibility, adaptability, and broad-mindedness that aligns the strengths of multiple perspectives and ideas of several disciplines and professions. The subject matter of English literature—poetry, fiction, drama, and essays, the classical materials of the field proper—has always reached into related knowledge domains: philosophy, psychology, history, law, economics, government, and science. George Eliot’s *Middlemarch*, Joseph Conrad’s *Heart of Darkness*—and Chinua Achebe’s response to Conrad, *Things Fall Apart*—and Mary Shelley’s *Frankenstein*, among thousands of other examples, all reflect each author’s grasp of content knowledge borne of other fields of inquiry. Reading these authors’ great works with deep understanding leads readers to contemplate the varied phenomena and disparate materials that inspire and inform each author’s work.

In order to read well and to comprehend literature on a high level, students must be prepared to read across disciplines to develop a larger picture of reality that each author forms from coherent collections of disparate insights, all yielded in part through research and innovation originating in several fields of the broader human enterprise. The field of English is genetically heterogeneous—interdisciplinary—in nature. Its curriculum prospers and serves the larger social good insofar as its content reflects this clear and perennial fact.

This fact justifies a teacher's selection of an eclectic collection of course materials for students to consider and synthesize as they develop interpretation. And, after all, this present study is not wholly ground-breaking: the *North Carolina Standard Course of Study for English Language Arts, K-12* (NCDPI, 2017) directly invites teachers to explore cross-disciplinary instruction with students. The ELA cross-disciplinary standards add justification and spark incentive to look more deeply at how synthesis of the disciplines may support desirable outcomes in individual learning and in our national discourse. The standards, and the heterogeneous nature of the discipline itself, demand that we think systematically about how we teach students to interpret, which may be the essential skill that students need to master.

Chapter Three Summary

Rosenblatt and the pragmatists offer insights into reading and thinking across disciplines. I call upon these insights to create exercises designed to support student growth of critical thinking and interpretation in ELA and across disciplines. The curriculum model described herein fits within and responds directly to prompts in state and national standards guidelines, which call for teachers to help students improve in critical thinking, interpretation, and cross-disciplinary imagination. The core premise of the model is that interpretation, which powers a practical philosophy of mind, acts as a driving creative force across multiple historical periods, cultures, and fields of study while it operates in several modes of thought, critical and creative. Seminal work by innovators in several fields supports this premise. I developed the curriculum model within a conceptual frame afforded by the writings of Rosenblatt and the pragmatists, and I shaped particular lessons and stages of the model in response to vivid examples of a practical philosophy of mind that leading scholars evince in their groundbreaking poems.

CHAPTER 4: RESEARCH DESIGN AND METHOD

Data analysis starts with reading all data repeatedly to achieve immersion and obtain a sense of the whole as one would read a novel…[highlighting] exact words from the text that appear to capture key thoughts or concepts.

Three Approaches to Content Analysis

Hsieh & Shannon (2005)

Qualitative content analysis is a deductive and an inductive method which is useful in providing knowledge, new insights, a representation of facts, and a practical guide to action...leading to…a condensed and broad description of [a] phenomenon, [with] the outcome of the analysis [being] concepts or categories describing the phenomenon…. Usually the purpose is to build up a model, conceptual system, conceptual map, or categories.

The Qualitative Content Analysis Process

Elo & Kyngäs (2007)

The many-stanzaed sea, the leaves
And it all spoke together….
...The world lives as you live,
Speaks as you speak, a creature that
Repeats its vital words, yet balances
The syllable of a syllable.

The Search for Sound Free from Motion

Wallace Stevens (1996)

Chapter Four Overview

For this study, I collected and examined 70 student artifacts (ten sets of seven artifacts), which ten students created in an advanced 11th-grade ELA course. To analyze their work and illustrate the model, I employed a qualitative content analysis approach to scrutinizing, coding, categorizing, and understanding the artifacts; I used inductive and deductive analysis protocols to guide my discovery and analysis process. In this chapter, I explain qualitative content analysis, show how it fits my intentions, data set, and research questions, and describe my analysis plan and process in detail. Figure 4.1 represents the artifacts which the students created, highlights my reading pathways, and indicates the main outlines of my data-reporting strategy.

PHASE→ *Participant* ↓	1 Symbol Game	2 Scene Design	3 Cognitive Portrait	4 Word Synthesis	5 Philosophy Statement	6 Lesson Design	7 System Reflection
Vincent	*	*	*	*	*	*	*
Gillian	*	*	*	*	*	*	*
Eliot	*	*	*	*	*	*	*
Zora	*	*	*	*	*	*	*
Curie	*	*	*	*	*	*	*
Griffin	*	*	*	*	*	*	*
Gwendolyn	*	*	*	*	*	*	*
Wendell	*	*	*	*	*	*	*
Ezra	*	*	*	*	*	*	*
Austen	*	*	*	*	*	*	*

Figure 4.1. *Matrix of Model Stages, Participants, Artifacts, and Data Analysis Strategy.*

The diagram shows an * for each artifact I individually studied. Vertical red arrows indicate my analysis of each like artifact-set. Horizontal blue arrows represent my study of each student's personal learning-arc through the stages. The large blue arrow represents my close focus on work completed by "Curie" in each stage. The full grid represents the set of sets.

Chapter Four Introduction

My purpose in the present study is to present a curriculum model which is based on philosophy of mind in pragmatism and the reader response theory of Louise Rosenblatt; inspired by analysis of exemplars of interpretation; tested and refined for several years; and illustrated by examples of student work. For this study, I analyzed 70 artifacts created by students immersed in the curriculum model described herein. In this chapter, I explain the artifacts, describe the lesson plans and processes I used to prompt students to create each artifact, and present my plan and rationale for data analysis using a qualitative content analysis method.

The body of student work (ten sets in all; each set containing seven artifacts) displays vivid examples of students' efforts, confusions, and insights as they work to develop a practical philosophy of mind. In my preparations to report the data, I devoted close study to the path of one particular student, "Curie," through each stage of the model; I then doubled back and explored the seven stages by juxtaposing Curie's artifacts to works completed by all of the study participants. The students' outcomes reveal details of the model, evoking a picture of the day-to-day flow of the curriculum.

Two primary research questions guide my analysis of data: **(1) How does an English Language Arts teacher guide students through steps to develop a practical philosophy of mind?** The second question flows from the first: **(2) In an English Language Arts classroom**

where the teacher guides students through steps to develop a practical philosophy of mind, how does student work exhibit interpretation and critical thinking?

I used qualitative content analysis to answer these questions and completed a two-layered picture of the curriculum model: a theoretical layer—a logical skeleton; and a real-world concrete layer—a set of original works that shows how theory relates to practice.

Method: Qualitative Content Analysis

The method of *qualitative content analysis* best matches my research objectives. Since the mid-20th century, researchers have used content analysis to provide clear description of patterns, quantitative and qualitative, that appear in data sets such as images and written texts (Hsieh & Shannon, 2005; Elo & Kyngas, 2007; Schreier, 2014). Qualitative content analysts examine explicitly-present or "manifest" content; analyze inferred "latent" content; or consider both manifest and latent meanings in a given data set (Graneheim & Lundman, 2003). The aim and proposed data set of the present study squarely fit this method's standard form and process.

Many versions of content analysis have developed in several countries since the early 1940's, with the primary consistent feature of the method being "the focus on presenting results in terms of coding frequencies" (Schreier, 2014). I used content analysis to discover, categorize, and describe examples of interpretation and critical thinking in samples of student work. Following my analysis, I considered all student outcomes with an eye to answering the research questions concerning (1) how teachers can help students develop a practical philosophy of mind, and (2) how student work displays critical thinking and interpretation.

Schreier (2014) explores common features of the qualitative modes of content analysis that have evolved since the early 1950's. She explains: "Three features characterize the method: it reduces data, it is systematic, and it is flexible." It reduces data by focusing on pre-selected

aspects of meaning, which I will do in the deductive mode of analysis, using the research questions to determine a priori themes. The method is systematic in that it requires comprehensive examination of the material, it follows a consistent sequence of steps, and it requires a double coding process to test the quality of category definitions, with the goal of making coding categories "so clear and unambiguous that the second coding yields results that are very similar to those of the first coding."

My method was systematic in the manner Schreier describes (see Tables 3.2 and 3.3). Qualitative content analysis is also flexible in that the coding categories are not derived only from theory, but from the data set itself, requiring the analyst(s) to respond to the text as a starting place for determining meaning. The 70 student artifacts taught me, in inductive and deductive stages of research, about whether, how, and to what degree students learned interpretation and critical thinking in the curriculum model sequence.

Because qualitative content analysis is suitable for a wide range of materials, visual or verbal, self-generated or sampled from available sources (Schreier, 2014; Elo & Kyngäs, 2007), researchers have applied the method across a wide range of disciplines, includ[ing] research in education, psychology, sociology, political science, empirical study of literature, and research in health-related fields (Schreier, 2014). I employed the method to analyze 70 artifacts of students' written work, which students completed in response to seven prompts given throughout a year-long ELA course.

Coding: The Heart of Content Analysis.

The coding frame is central to content analysis (Mayring, 2000, 2014; Schreier, 2014; Elo & Kyngäs, 2007). Schreier (2014) states that "the coding frame…consists of at least one

category and at least two subcategories. Main categories are those aspects of the material about which I would like more information, and subcategories specify what is said in the material with respect to the main category or categories." I created two main categories: (1) whether and how student work demonstrates interpretation and critical thinking; and (2) whether and how teachers may help students develop skill with interpretation and critical thinking. From these categories and the research questions, I developed three *a priori* themes to guide my deductive analysis process: (a) how student work illustrates interpretation; (b) how student work illustrates critical thinking (CT); and (c) what teachers can learn from students' learning arcs to understand how to guide students through the model. These themes fold neatly into the two main categories, which derive directly from my main research questions.

Schreier (2014) emphasizes the importance of selecting parts of an overall data set to avoid overload while reflecting the "full diversity of data sources." Structuring and generating coding categories may be conducted in a concept-driven ("theory-driven") and a data-driven approach. I created concept-driven codes, categories, and *a priori* themes based on the research questions. Data driven codes emerged in my close reading of student work. The qualitative content analysis method may be used inductively and deductively, and in either mode, content analysis is work-intensive and time-consuming (Elo & Kyngäs, 2007). I used the research questions to make my analysis process more efficient and focused. Staying within the bounds of the research questions, I observed patterns in student work that I did not anticipate, patterns which educated me about students' experiences of working through the curriculum model stages.

Elo & Kyngäs (2007) describe qualitative content analysis as a deductive and an inductive method which is useful in "providing knowledge, new insights, a representation of facts, and a practical guide to action..." leading to "…a condensed and broad description of [a]

phenomenon, [with] the outcome of the analysis [being] concepts or categories describing the phenomenon." They continue: "Usually the purpose is to build up a model, conceptual system, conceptual map or categories." In each case, clear and full *description* of meaning in a data set is a central goal.

Hsieh & Shannon confirm the importance of making multiple passes through the data analysis process. They explain that "[d]ata analysis starts with reading all data repeatedly to achieve immersion and obtain a sense of the whole (with Tesch 1990) as one would read a novel." Next, I will read the data again, word by word, to derive thematic codes (with Miles & Huberman, 1994; Morgan, 1993; and Morse & Field, 1995) by highlighting "exact words from the text that appear to capture key thoughts or concepts," which, again, may be explicitly or implicitly present. I will next "make[s] notes on first impressions, thoughts, and initial analysis…[until] labels for codes emerge…[to form] the initial coding scheme. Codes are then sorted into meaningful clusters…[up to] 10 to 15 to keep clusters broad enough to sort a large number of codes." Categories may be compressed to form a smaller number of categories, which may be subsequently represented in hierarchical structures, such as tree diagrams, which illustrate relationships between codes and categories.

Directed Qualitative Content Analysis: Focusing the Deductive Process.

Schreier (2014), Mayring (2014), and Elo & Kyngäs (2007) establish a clear road map of steps for researchers to conduct deductive analysis, inductive data-driven analysis, and qualitative measurement of variables. I aligned and integrated these researchers' approaches into the present study.

In the following section of this chapter, I establish why qualitative content analysis fits each stage of the present study. I argue how a particular form of qualitative content analysis—*directed content analysis*—provided rigor and focus for the project, enabling me both to answer questions about students' progress through the model and to arrive at valid and trustworthy outcomes in my presentation of the model's stages.

Evaluating Student Artifacts with Directed Qualitative Content Analysis

The 70 samples of student work generated within the curriculum model fall neatly within the purview of qualitative content analysis. Qualitative content analysis researchers Hsieh and Shannon (2005) describe qualitative content analysis as "…a flexible method for analyzing text data" (1277) such as the writings I analyzed. Hsieh and Shannon identify three different approaches to qualitative content analysis: "conventional, directed, and summative," all of which proceed within "a predominately naturalistic paradigm," i.e., with a guiding focus on analyzing data derived from and about subjects in a natural environment (such as a classroom) rather than in a structured laboratory environment. My approach in the present study precisely fit the "directed" analytical procedure.

In my directed qualitative content analysis process, I began by "examining existing theory or prior research which exists about a phenomenon that…would benefit from further description," (Hsieh and Shannon, 2007), a step I completed in the first three chapters of this study. "Existing theory or research can help focus the research question," Hsieh and Shannon note. This technique, which I employed in this study, involves starting with a set of codes based on existing theory; it is known in content analysis literature as "deductive category application," which Mayring (2000) describes in his model of content analysis. Hsieh and Shannon state that

the "goal of a directed approach to content analysis is to validate or extend conceptually a theoretical framework or theory." This goal accords with my present purpose: to "[conceptually extend]" the theoretical model by vividly illustrating its content and functions.

Hsieh and Shannon state that "[a]ll approaches to qualitative content analysis require a similar analytical process of seven classic steps, including 1) formulating the research questions to be answered, 2) selecting the sample to be analyzed, 3) defining the categories to be applied, 4) outlining the coding process and the coder training, 5) implementing the coding process, 6) determining trustworthiness, and 7) analyzing the results of the coding process." I describe my approach to completing each of these steps in the closing sections of this chapter, and I summarize these steps in Tables 3.2 and 3.3.

With Krippendorf (2004), Hsieh & Shannon (2005) state that "[c]reating and adhering to an analytic procedure or a coding scheme will increase the trustworthiness or validity of the study." I employed an analytic procedure and a coding scheme in the inductive and deductive analysis stages, thereby raising this study's trustworthiness. My proposed research process fit comfortably within the boundaries of content analysis as explained by these researchers.

Context of Research

Site Selection. I collected student artifacts from a charter high school located in a suburban area of a mid-sized city in central North Carolina. I taught upper-grades humanities classes at this school, which is part of a K-12 organization that functions as its own LEA. I have drawn my data set from work students completed in two of the classes I taught.

The selected site allows me to complete a first stage of research on the curriculum model: examination of his own design and implementation of the model. The outcome of the present study, featuring thorough local analysis of theory and practice, sets a foundation for later stages of experimentation.

School Curriculum. The high school presents itself to the community as a project-based learning school. Traditional methods of teaching, such as lecturing, quizzing, testing, and essay writing all help students to complete projects that provide overarching contexts for pursuing content knowledge and skill development. Each project, which lasts between a few days and several weeks—and, in rare cases, months—grows around a central, driving question and joins each exercise within the project unit to a larger, framing idea. The artifacts I examine in the present study come from several projects students completed in seven stages. These stages form building blocks in a larger project: developing a practical philosophy of mind.

Most projects require collaboration with peers and public presentation of part or all of the project outcomes. Some public displays of student work occur in public settings—at museums, farmers markets, or public theater spaces in parks and at malls. The school aims to engage students intellectually and socially in projects that require them to participate in abstract thinking, cooperative learning, and well-planned public communication.

Twice per year, the school transforms its classrooms into displays of major projects students have completed during each semester; hundreds of people walk through the school to observe—and sometimes to take part in generating—outcomes of students' projects.

School Demographics. Between 2013 and 2017, between 400 and 420 students have attended grades nine through twelve at this charter school. The female-to-male student ratio is approximately 49% to 51%. Approximately 60% of the students enroll in at least one AP class during their four-year education. The school's population is approximately 72% Caucasian, which is nearly three times the average Caucasian population in area schools, and 25% higher than the average Caucasian population in North Carolina schools. Approximately 15% of the high school's students are African-American. Fewer than five percent of the student body identifies as Latino; even fewer identify as Asian. The school does not run buses to its campus and has long been criticized as a "white flight school" that caters to families in upper socioeconomic classes (e.g., families with at least one vehicle-owning parent or guardian who is reliably free to transport a student to and from school or to purchase a car for a child). Some students drive from as far as an hour's trip from home. The school's demographics have shifted markedly, however, since the school's inception. Present enrollment in lower grades at the charter school consists of 50% minority students, with an even greater percentage of students receiving free or reduced lunch from the school, and a growing number of students carpool or take public transportation to within walking distance of the campus.

Student Participants. The 70 artifacts I analyze in this study represent work completed by ten students (seven females; three males—two African Americans; eight Caucasians) in an advanced high school English class. I selected these students because, years after teaching them, I found that I had saved well-preserved samples of their work. I thereupon decided to make their work a central focus of my dissertation. These students vary by race, ethnicity, socioeconomic status, and political affiliation. To protect their identities, and as a condition of IRB approval, I

assigned each student a pseudonym. No personal detail—e.g., graduating class; race; ethnicity—may be inferred from the pseudonyms. Detailed academic portraits of the students' work emerged in the data. The students' nonetheless remains intact.

Data Collection. The students did not know that their work could become a subject for this research project, nor did I pre-select classes or students as research subjects and participants. The students completed each phase of work in the curriculum model as a normal part of participating in class. The students remained blind to the research purpose throughout the entire class and throughout my research process, which I began long after they had finished the course. None of the study participants were coached differently from the overall class population. Only years later did I select artifacts for analysis: upon obtaining IRB permission, I used extant data generated by students from past academic years (between 2013 and 2017). Specifically, I have selected work sets by ten students for the purpose of showing how a variety of students may progress through the model's sequence. I selected artifacts with the aim of illuminating details in each stage and in hope of analyzing a wide range of outcomes from a variety of students.

Hundreds of students completed examples of work within similar iterations of the curriculum model between August of 2013 and May of 2017. All students completed this work as part of the English Language Arts classes I teach. More than 97% of the work samples I examined in four years do not appear in the data set. Students therefore participated in this study blindly, with no risk to their identity and with no incentive to strive or to slack in order to affect this project's outcomes.

Table 4.1 illustrates the timing and outcomes of the model sequence. The table highlights intervals at which I obtained focal-points artifacts for my illustration and analysis of the model

Table 4.1. *Focal-Point Artifact Creation, Outcomes, and Timing of Collection.*

ARTIFACT 1: All on one form: Students wrote lists of interpretations of two abstract symbols; they subsequently wrote reflections on the activity in response to three typed questions. **Collected near the start of the academic year.**
ARTIFACT 2: On one form: Students read an excerpt from a novel and wrote responses to reflectin questions about Stage One and Stage Two in the curriculum sequence. On a separate form, linked to this stage: each student wrote a reconstruction and interpretation of the excerpt. **Collected at the midpoint of the year.**
ARTIFACT 3: Students hand-wrote their responses to prompts on both sides of the 11” x 17” form on which I printed the Elements of Mind cognitive self-profile. I collected all of the forms. **Collected after the midpoint of the year.**
ARTIFACT 4: Students typed or hand-wrote neologisms, definitions of their new words, descriptions of how their new words originated, and examples of how their words may be used. **Collected before the three-quarter point of the year.**
ARTIFACT 5: Students created a typed Philosophy of Reading essay in which they describe their reading and thinking methods which they have developed in the model’s first five stages. **Collected with a month remaining in the year.**
ARTIFACT 6: Students created a typed or handwritten lesson plan on a challenging subject. **Collected with a week remaining in the year.**
ARTIFACT 7: In response to three typed reflection questions, students submitted handwritten or typed reflections on the set of six pieces they created throughout the stages of the model. **Collected as part of students’ final exam.**
YEARS LATER: I selected ten sets of these seven artifacts for the purpose of illustrating the model’s form, functions, and outcomes. **Saved incidentally. Complete, organized work sets found in good condition.**

My purpose in the present study is to provide deep descriptions of data that vividly illustrate a curriculum model. My descriptive goal fits squarely within the range of standard qualitative content analysis. Schreier insists that the qualitative content analysis method is, in fact, purely descriptive (2014). Morgan (1993) and Hsieh and Shannon (2005) contend it may provide support for critical analysis of texts, with Morgan comparing it to grounded theory analysis and Hsieh and Shannon claiming that it may provide supporting or non-supporting evidence for a model or theory.

Once I decided to analyze the particular 70 artifacts of student data, I considered studying them in a number of different formats, such as mixed methods analysis, case study format,

phenomenological analysis, and grounded theory. I selected qualitative content analysis for its precise fit with my intention to analyze written artifacts and explore applications of an existing body of theory and research. From my readings in content analysis literature, I developed a two-stage approach to analyzing the data, which I summarize in Tables 4.2 and 4.3.

Summary of the Two-Stage Data Analysis Process

I employed a two-stage qualitative content analysis approach to examining student artifacts. The first stage featured inductive, open-ended analysis of the artifacts, with the goals of (*a*) describing unforeseen insights pertaining to the research question and (*b*) adding breadth and depth to the resulting illustration of the model's structure, function, and potential outcomes. The second stage consisted of deductive analysis of the same artifacts, aimed at illuminating where and how interpretation and critical thinking appear in student work.

Table 4.2. *Stage One: Inductive Data Analysis Steps and Sequence.*

STAGE ONE: INDUCTIVE QUALITATIVE CONTENT ANALYSIS
1.1 Re-read the two primary research questions and review the key terms.
1.2 Read artifacts and develop an initial coding frame.
1.3 Begin open coding, subsuming meaning units and codes into existing categories; and create new categories and codes where necessary. Complete this initial coding.
1.4 Check coded meaning units (e.g., phrases and sentences) and their category placements.
1.5 Complete a second pass through the data set, improving code accuracy and data coverage.
1.6 Check all meaning units in the coded data set and repeat 1.3–1.5 till saturation, guided by the goal of illuminating unforeseen findings about the model's form, function, and/or outcomes.
1.7 Upon assurance of accurate and complete data coverage, abstract meaning from coded data.
1.8 Present a statement of findings derived from each emergent coding category.
1.9 Following inductive analysis, use new insights and a priori themes to hone in on the research questions throughout the process of deductive analysis: (1) How does an English Language Arts teacher guide students through steps to develop a practical philosophy of mind? (2) In an English Language Arts classroom where the teacher guides students through steps to develop a practical philosophy of mind, how does student work exhibit interpretation and critical thinking?

In Stage One, I responded in a reader-response style to develop codes. Hsieh & Shannon (2005) explain that a researcher may develop codes based on existing theory or prior research before analyzing data, and then "…additional codes are developed [as analysis proceeds], and the initial coding scheme is revised and refined." Working in the format Hsieh and Shannon describe enabled me to globally explore the model's structure, function, and outcomes, during which I began data-driven reading and open coding as defined by Schreier (2014).

After completing this process for each of the seven curriculum model stages in inductive analysis steps 1.2 - 1.7, I had become thoroughly acquainted with details in each element of each artifact in all sets. Insofar as my inductive analysis revealed patterns relevant to critical thinking and interpretation, I took steps toward answering my primary research questions: describing how student work demonstrates interpretation and critical thinking, and learning how teachers can help students achieve this outcome.

Stage Two of data analysis commenced after I completed inductive analysis steps 1.1 - 1.8. Table 4.3 lists the order in which I moved through the clearly defined steps in my deductive analysis of the artifact sets.

Table 4.3. *Stage Two: Deductive Data Analysis Steps and Sequence*.

STAGE TWO: DEDUCTIVE DIRECTED QUALITATIVE ANALYSIS
2.1 Re-read research questions and key terms. Evaluate examples of interpretation identified in inductive analysis (1.1 - 1.8) as material evidence that may help answer the research questions.
2.2 Read artifacts, identify anchor samples, and complete deductive analysis coding agenda. *Note*: in 2.2–2.10, record observations and identify meaning units for analysis.
2.3 Complete an initial coding, focusing on identifying instances of interpretation.
2.4 Check coded meaning units (e.g., phrases and sentences) against anchor samples.
2.5 Complete a second pass through the data set, improving code accuracy and data coverage till reaching saturation.
2.6 Check all meaning units in the coded data set against anchor samples.
2.7 Upon assurance of accurate and complete data coverage, abstract meaning from coded data.
2.8 Evaluate outcomes for each artifact across all ten elements of each given set.
2.9 Evaluate four students' artifact sets, piece by piece and as a whole, to study students' various learning arcs as they move through stages one through seven of the curriculum model.
2.10 Evaluate the set of all seven sets to illustrate the model's form and function.
2.11 Use outcomes of analysis steps 1.1 - 1.9 and 2.1 - 2.10 to answer the two research questions: (1) How does an English Language Arts teacher guide students through steps to develop a practical philosophy of mind? (2) In an English Language Arts classroom where the teacher guides students through steps to develop a practical philosophy of mind, how does student work exhibit interpretation and critical thinking?

Keeping the research questions and key terms in mind, I examined the ten artifacts in each given stage, noting patterns of interest. After the first cycle of reading in each given stage, I reflected on patterns in the ten artifacts and evolved a framework for studying commonalities and differences in each set of ten. My goal was to identify patterns that would help me to coherently describe each artifact set while resisting overgeneralization, allowing unique features of individual artifacts to emerge in data analysis. For example, when students' interpretations of literature featured diction that describes sensory-imagination perceptions, I noted this pattern, and I then classified which different types of imagined perceptions each student described, e.g., visual or auditory. With this approach, I noticed common features in each artifact set while

allowing distinguishing details to stand out clearly. In my analysis of artifacts in each curriculum stage, I followed this process: identifying unifying patterns in sets while revealing unique differences in individual artifacts.

The codes and themes that emerged in my inductive close-reading process streamlined my deductive analysis process in Stage Two of this analysis method, especially where the emergent codes and themes concerned students' System 2 thinking, conscious synthesis of the elements of mind (see Appendix B), which is a hallmark of mature interpretation (James, 1977; Kahneman, 2011; Royce, 1969). Throughout my deductive analysis, I looked primarily for complex "System 2" (Kahneman, 2011) types of interpretation . Kahneman explains that System 2 thinking consists of conscious control of declarative and procedural schemas. Skillful application of System 2 thinking indicates mature development of interpretation (see Appendix B for a concise description of Systems 1 and 2).

However, System 1 patterns of interpretation proved equally worthy of discussion. For example, students' spontaneous heuristic interpretations of abstract symbols in Stage One represent "automatic" System 1 thinking. This automatic process, and the students' subsequent System 2-driven reflections on it, yielded insights into how students learn interpretation and critical thinking.

Whereas I read broad-mindedly in inductive analysis, I focused my deductive analysis of the data on finding direct answers to the research questions. My initial close-reading process, completed in the inductive analysis stage, served as an excellent primer for deductive analysis, helping me to link concrete examples of student work to specific instances of critical thinking and interpretation. This process helped me to form preliminary answers to my research questions. I used three *a priori* themes, derived from my primary research questions, to focus

my deductive analysis: (1) how student work illustrates interpretation; (2) how student work illustrates critical thinking (CT); and (3) what teachers can learn from students' learning arcs to understand how to guide students through the model. I made disciplined progress through analysis steps 2.1 - 2.7, making repeated cycles through deductive data analysis until reaching saturation, combing through the artifact sets to identify details that most directly enabled me to ask and answer the research questions.

Reporting the Data

In the following chapter, I report my findings from inductive and deductive analysis by organizing my discussion of the data into three sections. First, I describe in detail how I guided students in each of the seven model stages, using my close study of student data, along with curriculum model lesson plans and course notes, to help me to answer the first research question concerning the role of the teacher in guiding students to develop a practical philosophy of mind. I then devote the majority and remainder of data analysis to two remaining sections, wherein I make two meticulous passes through students' "learning arcs" or paths through the stages.

In the first arc, I follow the work of Curie (pseynonym for the student), whose detailed writing in each stage affords many opportunities to discuss features of the model throughout the year-long process. In the second arc, I juxtapose Curie's work to artifacts created by all of the student participants, which establishes a panoramic picture of each outcome and process in the model's seven stages. Figures 4.1 and 4.2 illustrate the "learning arc" sections of my data-reporting schema.

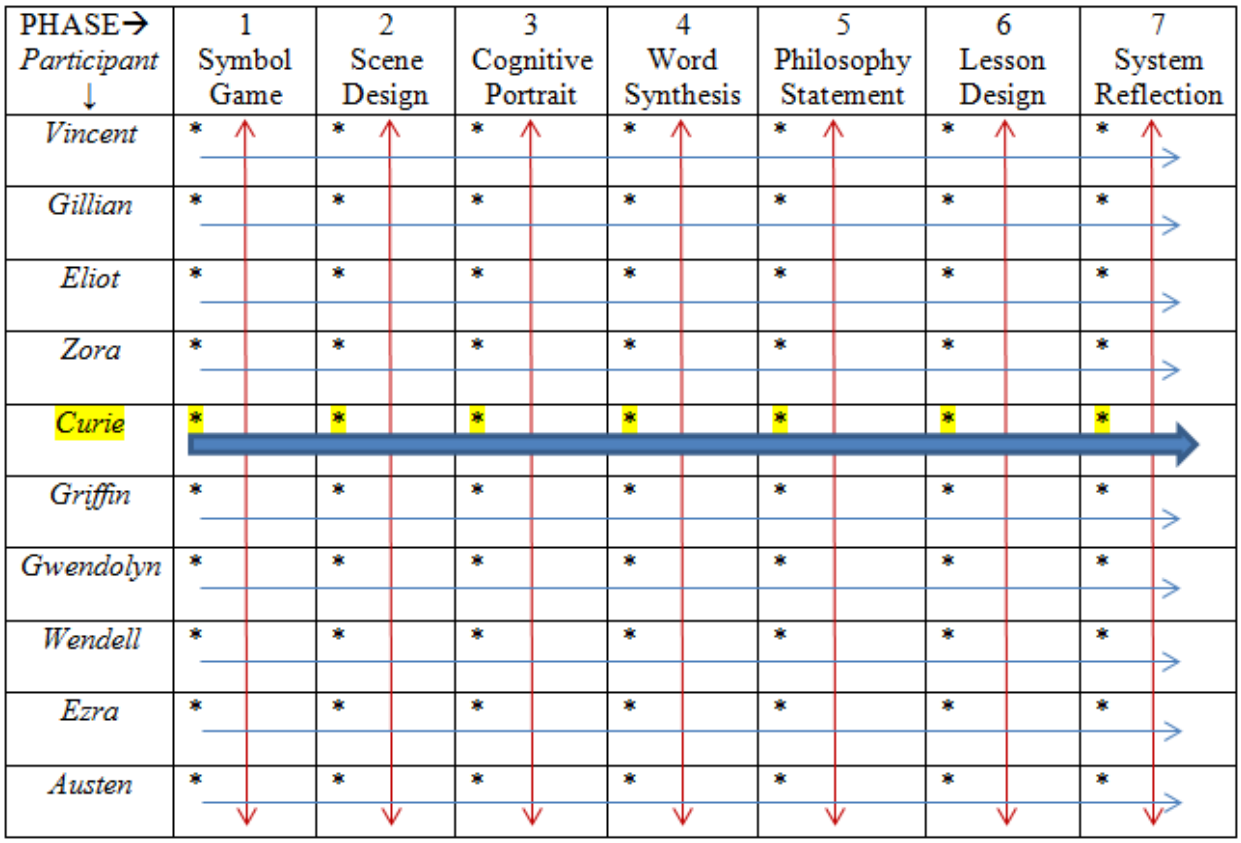


Figure 4.2. *Matrix of Data Analysis and Data Reporting Strategy.*

This figure shows how I organized my inductive and deductive data analysis into three data analysis processes: (1) red vertical lines show my examination of like-artifacts created by each student (e.g., all ten Stage One artifacts), which I analyzed as individual elements and as a set; (2) blue horizontal lines indicate my study of the personal learning arcs of each of the ten students; (3) the large blue arrow denotes my close focus on work completed by "Curie," which I described to illuminate details in each stage of the model. I subsequently deepened my presentation of data by juxtaposing Curie's artifacts to work created by all student participants. I concluded my data analysis by using each section of my data report to describe patterns in the total data set. This enabled me to write about findings in response to each *a priori* theme and to expand on two emergent themes that developed from my data-driven analysis. Figure 4.3 illustrates my final stage of data analysis and presentation.

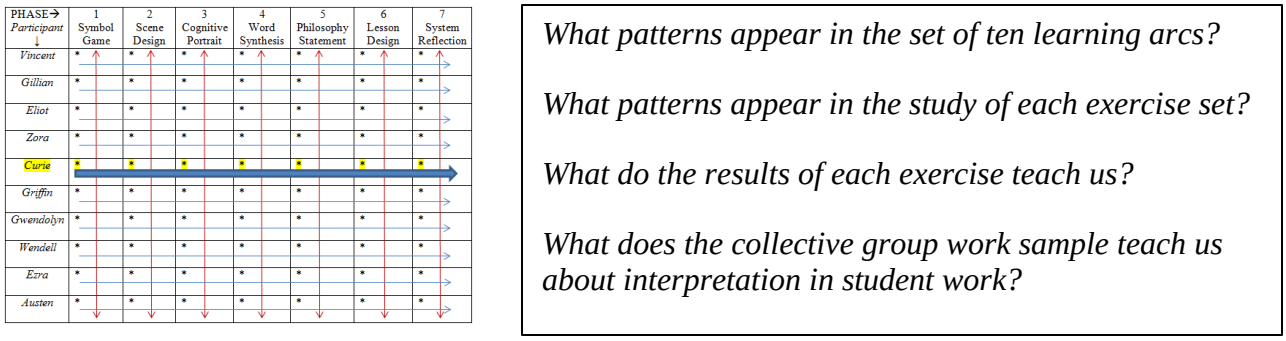


Figure 4.3.*Model of the Final Stage of Data Analysis and Reporting*.

Trustworthiness.

The students in the present study aimed, at my direction, to demonstrate interpretation and critical thinking, but the students did not know about my research, nor did I know that I would study their particular artifacts at the time I collected them. The students' blindness to my purpose makes participants' bias for or against this project unlikely if not impossible, thus improving the trustworthiness of this study.

Risks to the trustworthiness of directed qualitative content analysis include the possibility that "researchers approach the data with an informed but, nonetheless, strong bias. Hence, researchers might be more likely to find evidence that is supportive rather than non-supportive of a theory" (Hsieh & Shannon, 2005). In order to counteract potential bias and bolster the trustworthiness of this study, I have taken several steps. Throughout my report on data and in my subsequent discussion of findings, I described my analysis of data transparently, linking claims to concrete elements of data, offering "thick description" of the data (Anney, 2015; Li, 2004) so that readers may conduct their own examination of evidence and determine how I derived my findings.

A biased researcher might also cue subjects to respond in certain ways and could also miss features of a phenomenon under investigation by overemphasizing theory. To achieve

neutrality or "confirmability of trustworthiness…the parallel concept to objectivity," Hsieh & Shannon (2005) recommend keeping an audit trail and using an audit process before, during, and after the study. I followed each of these steps and stated clear limitations on the findings of this context-grounded study.

The curriculum model I illustrate in this study would, if replicated elsewhere, need to flex to meet the needs, draw upon the skills and resources, and fit the political and economic contexts of the people in each classroom. I encourage readers to carefully question the transferability of this model to other contexts. Stand-alone qualitative studies may not provide sufficient grounds for recommending direct changes to practice (Finfgeld & Connett, 2010).

Mindful of this fact, I take several steps in my study to help readers proceed from a sound foundation to evaluate the potential transferability of my findings to other contexts. Throughout my close reading of student artifacts, I closely compared emergent patterns in my inductive and deductive stages of analysis to continuously test and refine my impressions. I kept careful, detailed notes, and I routinely juxtaposed my preliminary findings to my literature review, especially with respect to my theoretical framework, to maintain clarity and consistency in my analysis. I maintained substantive conversation with two independent researcherswho advised me on how to improve my analytic process and justify my claims about student work. In my report on the data, I provided a rich and dense presentation of data (Slevin and Sines, 2000), which I aligned with my research questions and *a priori* themes. I also adhered consistently to my goal of description, remaining within the declared limits of my study. My goal is to present a model that teachers and researchers may scrutinize, evaluate, and adapt to their purposes.

Limitations of the Study.

Chief among the limitations of this study is that I conducted data collection and analysis on my own. This limitation compounds problems that may arise from my potential biases in favor of a curriculum model I have developed and refined for many years, biases which critical readers could highlight and correct. I present my reading assumptions, goals, data sets, data collection strategies, and reading methods for the audience to evaluate their merits.

I envision as my audience a diverse group of reader response theorists, pragmatist philosophers, critical thinking researchers, linguists, scholars and teachers of literature, creative writers, neuroscientists, and educational psychologists, all of whom hail from fields that have contributed important ideas to my project, and whose collective input on whether and how to teach a practical philosophy of mind could help to clearly define a stimulating arena, if not a mutually-reinforcing consortium, of discourse.

This study ultimately derives its trustworthiness from the credibility and dependability of the research process and product. I followed the steps I have described in this chapter in order to honor the following contract with my scholarly audience: I will be systematic, clear, and definite in my description of the model in order to enable, invite, and receive scholarly challenges and critiques of each aspect of the present study.

CHAPTER 5: DATA ANALYSIS—PATHS THROUGH THE MODEL STAGES

> Every golfer knows the feeling. You finish your swing and remain in the stance with the driver above and behind the back of your head. Your eyes follow the path of the ball, your breathing is steady, the ball finally reaches its peak, and you let out a breath of relief that you finally had a good shot. ...To this feeling I assigned the word *excrown*: "the breath of assurance released when a good flight reaches its peak."
>
> —from Artifact 4 by "Eliot," describing the origin of her neologism

> Students who use sensory imagination more often enjoyed and performed better in certain classes. During the class discussion, students who enjoyed AP U.S. History...said they could imagine the events of history. They were watching their own personal movies of the Revolutionary War, Reconstruction, and Yalta Conference in their heads. Students who struggled and disliked the class were not able to use sensory imagination like this. This discrepancy proves that sensory imagination is vital in comprehension and real reading.
>
> —from Artifact 5 by "Griffin," reflecting on imagination, beauty, and flow

> If I were to lack sensory imagination in biology, I wouldn't be able to apply the knowledge to abstract concepts or to situations in my life. Biology allows me to better understand myself and others, so my self-awareness, awareness of the intricacies in my environment, and enjoyment of everyday life situations would dramatically decrease. I rely heavily on being an observer, so part of me would be lost.
>
> —from Artifact 3 by "Curie," writing a response on the mind profile

Chapter Five Overview

I designed the stages of the curriculum model to start with simple exercises, progress to more complex stages, and spread across an entire school year to give students varied, distributed practice that could help them acquire and apply a practical philosophy of mind.

In this chapter, I explain how I guided students through each of the seven stages. I closely describe the learning arc of one of the study participants, Curie, in order to give a concrete illustration of how a student can connect these stages into a coherent system of lessons. Curie's path through the stages illuminates details of each stage in the model. I conclude my presentation of data by juxtaposing Curie's work to artifacts created by her peers, offering an expanded picture of the model and of student outcomes in each stage.

I invite readers to use this chapter to intimately acquaint themselves with the processes and source-materials I used to create the model, guide the students through the stages, and conduct analysis of 70 student artifacts. I intend for this discussion to clarify my data analysis and findings, which I present here and in the final chapter of this study.

The Teacher's Role as Guide, Listener, and Co-Participant

One of my primary research questions centers on the role of the teacher: **How does an English Language Arts teacher guide students through steps to develop a practical philosophy of mind?** In order to begin my answer to this question, I use the first third of this 100-page chapter to describe the roles I played and the assignments I designed for each stage of the model sequence. I contextualize students' work on each artifact, bringing out details of conversation students and I shared in our day-to-day efforts to develop a practical philosophy of mind. My goal for this opening section is to bring readers into a vicarious experience of each stage, thereby deepening readers' understanding of student artifacts and preparing readers to make their own journeys: first along Curie's path, and then in company with each participant.

Stage One: Abstract Symbol Game

The first stage begins with an elementary game. Students completed Stage One near the start of the academic year; the purpose of this game is to make abstract ideas about cognition accessible to students. The game is brief--sixty seconds, followed by minutes-long conversation--and several rounds of the game can be quickly repeated. These repetitions afford the teacher and the students more opportunities to discuss how the elements of mind interact--thus making the elements observable--in this simple game.

As students pass through each round of the game, the teacher prompts students to notice how and when they use perception--sensory data and sensory imagination--and concepts--intrapersonal and interpersonal--in the process of individual interpretation, which consists of their synthesis of concepts and perception. When students begin to share their symbol interpretations, the teacher draws students' attention to effects of social interpretation, especially:

how each peer's observations prompt others to reconfigure their perceptions to fit a different conceptual frame.

All of these cognitive data and processes, which together constitute the six elements of mind highlighted in this study, become active and observable within the span of one to two minutes in each round of the game. In the context of this playful creative exercise, students gain exposure to the elements of mind vocabulary and begin using it to describe cognition from a first-person perspective. This game prepares the way for the students to observe these elements in action in other types of exercises, such as literary interpretation and composition, ranging from the simple to the complex.

The teacher's role in this symbol interpretation game is to elicit interest, invite a playful attitude, and model an observant approach to reflecting on salient moments and processes within the game, pulling students into conversation about the elements of mind. To begin the game, the teacher explains that everyone will have 60 seconds to interpret all or part of an abstract object, coming up with as many readings as one would like to list. The teacher then draws a large obscure shape--at which point all students begin observing, interpreting, and writing (see Figure 5.1 and Figure 5.2 for exact and full reproductions of student writings from the first and second games).

Designing a Practical Philosophy of Mind
STAGE #1: GAME #1

In 60 seconds, list as many interpretations of the object as you can.

AUSTEN	GWENDOLYN
1. shoe 2. Pac-Man 3. a bed 4. a leaf	1. planets 2. a head 3. an alien 4. one of those aluminum foil hats on top of a head
GRIFFIN	**VINCENT**
1. cursive G 2. Disney princess carriage 3. magic carpet 4. lawn mower 5. heart 6. peach	1. acorn 2. jumping bean 3. train 4. choking person 5. bathing suit 6. make-up
ZORA	**GILLIAN**
1. cursive letters mixed together 2. ribbon 3. a ghost bending over 4. pig's head	1. girl twirling strings 2. Face 3. confusion 4. balloon string 5. cursive 6. apple cutter
CURIE	**ELIOT**
1. Pac-Man 2. apple w/ bite 3. platypus 4. fish hook 5. fetus	1. tornado 2. bow 3. ribbon
WENDELL	**EZRA**
1. A bowling ball crashing into pins and making them all fall down. 2. Turned on its side, the world is on fire and entering Armageddon.	1. I see a banner that a ballerina or a dancer would twirl around as she's dancing

Figure 5.1. *Juxtaposition of Student Responses to the First Abstract Symbol Game*.

Students looked at the shape pictured at the top of this diagram and took sixty seconds to open-endedly interpret the shape as an object of some kind. After creating lists, students compared interpretations, and the teacher introduced the elements of mind vocabulary, on which students took notes in preparation for reflection on subsequent symbol games.

Designing a Practical Philosophy of Mind:
STAGE #1: GAME #2

In 60 seconds, list as many interpretations of the object as you can.

AUSTEN	GWENDOLYN
1. boat 2. ballerina slipper 3. tap shoe 4. Christmas tree 5. car 6. telephone (turned sideways)	1. woman in a car in France with scarf blowing in wind 2. clog shoes with shoe strings
GRIFFIN	**VINCENT**
1. snowmobile 2. sideways "dub" [w] 3. dog	1. immigrant escaping on a boat 2. hot sauce bottle guy in a German clog 3. French art critic on an Italian river
ZORA	**GILLIAN**
1. person driving a car 2. person rowing a boat 3. shoe	1. headless dog 2. hot dog bun w/ ketchup 3. shoes w/ laces 4. dog wagging tail 5. cartoon letter "D" 6. Car 7. someone's face w/ glasses
CURIE	**ELIOT**
1. canoe with a person in it 2. wiener dog with no head on a leash 3. shoes with untied laces 4. telephone on a curly wire 5. a bridge with a bungee-jump rope	1. a clog 2. a dog 3. an untied shoelace on a shoe 4. a rabbit
WENDELL	**EZRA**
1. A man is riding a jet ski while he is standing up. 2. A shoe is untied and all the laces are tangled. 3. A genie lamp being rubbed and smoke coming from it.	1. shoe 2. underwear 3. bunny

Figure 5.2. *Juxtaposition of Student Responses to the Second Abstract Symbol Game.*

After reflecting on Game #1 and sharing interpretations of the shape in Figure 5.1, students repeated the exercise, interpreting the shape pictured at the top of this diagram. This time, the

teacher also prompted students to "watch" the elements of mind interact as they interpreted the shape, observing the elements of mind in action.

Stage Two: Reader Response and Detailed Scene-Design

Students began to work on Stage Two exercises--literary interpretation--in the first month of class, and they continued to hone their Stage Two skills throughout the academic year.

The Stage Two work sample I analyze in this study comes from a mid-year reading assignment--after students had practiced their interpretation skills through close reading of several poems, essays, and short- to mid-length works of fiction.

I gave the students a passage from *The Great Gatsby* along with a writing prompt. Students had recently completed reading the novel, and they were preparing to write another essay about the book in response to a set of prompts. I gave them a special Stage Two exercise, too, and titled the students' prompt, "Creative Reading: Literary Interpretation as Reconstruction." I gave them the following instructions: "As you did in the symbol interpretation game, be deliberate in calling each element of mind into play as you design a response to any part of this passage. Choose a small fragment of text and bring into focus <u>the physical details of the scene</u> and <u>the psychological states of the characters</u>, both of which you infer from the text. Feel free to write your scene design on a separate page."

I mentioned the symbol game to the students in order to prompt them to recall their elements of mind vocabulary, to elicit a playful and speculative approach to reading, to prompt their System 2 thinking to observe and interact with their sensory and associative System 1 processes, and to activate their strategies of close reading and inference-making.

I designed this and other Stage Two literary interpretation exercises for several purposes: to train the students to read closely, transforming details into cues to inner experience (turning "words into worlds"); to encourage students to practice integrating the elements of mind and their questioning strategies into their reading process; and to measure the students' growth, over the course of a year, in close-reading and in writing and reasoning about texts they analyze.

I remind students about the symbol game to remind them of their ability to change perceived abstract symbols into forms in sensory imagination--and, from there, into conceptual forms. I wonder aloud with them *if* and *how* they can transform the text in a somewhat similar manner. I ask students to take two steps: to do the work of transforming textual details into clear inner worlds to experience, scrutinize, enjoy, and use as a basis for making inferences; and to examine their reasoning about the data they select (and omit) as they form a foundation for their interpretation. Once they read closely and further examine their justification for committing their thinking to a belief and a creative reconstruction of the text, they make adjustments to their interpretation as necessary or as desired.

The students' writings then form a basis for detailed group and whole-class discussions and debates about meaning in the text--a social interpretation stage--wherein students may solidify, expand, or change their thinking about the text. The sets of carefully written interpretations students create for each novel or nonfiction book they read--between 15 and 20 close analyses per text--serve as foundations of data that students use while writing essays, performing on tests, and, in some cases, engaging in formal debates based on persuasive research essays each student has composed from multiple sources. The students' interpretations and writings become objects of close study for the whole class. The students' writings stem from

close attention to and reasoning about the elements of mind--from moment-to-moment thinking, carefully cultivated and meticulously observed and recorded.

Figure 5.3 displays the passage and the follow-up reflection questions I gave to students for this particular exercise near the beginning of our discussions about *The Great Gatsby*. Students closely read and annotated the following passage to prepare for their reconstruction of the scene in their own writing. The accompanying follow-up questions prompt the students to reflect about the elements of mind and their individual interpretation process.

Already it was deep summer on roadhouse roofs and in front of wayside garages, where new red gas-pumps sat out in pools of light, and when I reached my estate at West Egg I ran the car under its shed and sat for a while on an abandoned grass roller in the yard. The wind had blown off, leaving a loud, bright night, with wings beating in the trees and a persistent organ sound as the full bellows of the earth blew the frogs full of life. The silhouette of a moving cat wavered across the moonlight, and turning my head to watch it, I saw that I was not alone—fifty feet away a figure had emerged from the shadow of my neighbor's mansion and was standing with his hands in his pockets regarding the silver pepper of the stars. Something in his leisurely movements and the secure position of his feet upon the lawn suggested that it was Mr. Gatsby himself, come out to determine what share was his of our local heavens.

I decided to call to him. Miss Baker had mentioned him at dinner, and that would do for an introduction. But I didn't call to him, for he gave a sudden intimation that he was content to be alone—he stretched out his arms toward the dark water in a curious way, and, far as I was from him, I could have sworn he was trembling. Involuntarily I glanced seaward—and distinguished nothing except a single green light, minute and far way, that might have been the end of a dock. When I looked once more for Gatsby he had vanished, and I was alone again in the unquiet darkness.

(1) Does the process of transforming the passage from reading to recreating DIFFER from the symbol interpretation process? How?

(2) If the process of transforming the passage into your own design is similar to the symbol reading game, describe how.

(3) What element of mind stands out to you as especially important in completing this creative reading process?

Figure 5.3. *Excerpt from* <u>*The Great Gatsby*</u> *and Three Reflection Questions*.

Stage Three: Creating a Cognitive Self-Profile

In Stages One and Two, students learned about the elements of mind and reflected on how they operate in literary interpretation. In Stage Three, students pondered *whether* and *how* they use the elements of mind across several disciplines and contexts.

Stage Three--completing a cognitive self-profile--began near the midpoint of the academic year after students had taken time to practice the method of applying the elements in their reading, writing, and formal debating. Stage Two, literary interpretation, continued alongside Stage Three in order to segue smoothly from a now-familiar task into a related cross-disciplinary reflection.

Throughout Stage Two, I asked students: how do you experience and apply the elements of mind in your reading? In Stage Three, I asked them to think about this same question in the context of their classes in math, science, art, history, and more, marking a beginning to our exploration of how the elements of mind operate universally.

I had students complete Stage Three incrementally over three weeks. I sought to keep them immersed in consistent, frequent reflection, and to have them work patiently as they learned about the broad applicability of the elements of mind beyond the standard purview of English Language Arts. Stage Three involves a sequence of several phases, and I had students work with me in class on every phase in order to renew each phase's assignment instructions and to have students share reflections after each step in completing the cognitive self-profile.

Four figures shown on the next several pages display the prompts that students complete as they move from phase to phase in Stage Three. The first of these is Figure 5.4, which shows a scale that students complete to rate the speed and vividness of their sensory imagination in response to different kinds of concepts across disciplines and contexts.

Rate the vividness of your experience of sensory-imagination when you read each of these types of symbols or subjects. Place a number from the scale next to each symbol or subject. Next to the #, name a speed at which your perception flows.

SCALE

7	6	5	4	3	2	1
Very Vivid			*Mild*			*Inactive*

Words (English)

Words (History)

Words (Sports Strategy)

Printed Musical Notes

Equations (Math)

Equations (Sciences)

Words (Foreign Language)

Printed Musical Lyrics

Instrumental Music (No Words)

Song Lyrics (Listening to a Singer)

Figure 5.4. *Instrument for Vividness and Speed of Sensory Imagination across Mediums*.

Students completed the first step in the cognitive self-profile by reflecting on and assessing the vividness and speed of their formation of sensory-imagination content in response to their interaction with concepts across different subject domains. When I introduced the self-rating instrument shown in Figure 5.4, the students and I had just reviewed (i.e., played again) a round of the abstract symbol game, and we had just completed an interpretation of another passage of literature from a novel. Having refamiliarized the students with the elements of mind involved in interpretation, I turned our discussion toward a new step in our process: to think about how the elements of mind work across several contexts.

I distributed the 11” x 17” forms on which each phase of the cognitive self-profile appears. The students looked over the form; I explained that they would take time to complete a cognitive self-profile, and that our first step in the process would be to rate the vividness and

speed of their sensory imagination in response to different kinds of symbolic representation. "Choose a number to rate the vividness of your sensory imagination in each subject area," I suggested, reinforcing the written directions on the form. "Next, choose a word that accurately describes the speed with which your mind forms sensory imagination content that conforms to the concepts in each area listed in the form." I raised the students' expectations that they would see differences in each area--as well as differences in comparison to their peers. "This will likely give us a picture of the many kinds of minds we have present in our class," I stated.

The students took approximately five minutes to work alone on completing the rating scale. Once everyone had finished, I asked for a show of hands: "Who recorded a one or a two on any of the types of symbols?" A number of students raised their hands and shared which areas gave them most difficulty in forming sensory imagination. Some listed "Equations in Math" as a subject area in which the symbols elicit little to no sensory imagination.

Interestingly--and helpfully for the purposes of our discussion--other students later mentioned "Equations in Math" as a "6" or "7" on the vividness scale. Students made this comparison and engaged in small-group and whole class conversations to find similarities to and differences from their peers. After students had taken time to finish their comparisons, I remarked: "We can agree that the symbols on the page are the same, but we now see that they become very different kinds of signs once they enter our individual interpretive processes." I continued: "I'm going to invite each of you to take time to learn how interpretation works in the subject areas listed on the back of this form." With that, we turned over the page, and we began working on our first of eight class self-profiles (see examples in Figure 5.5).

ENGLISH	MATH	HISTORY
_____	_____	_____
Emotional Tone(s)	*Emotional Tone(s)*	*Emotional Tone(s)*
Driving Element(s)	*Driving Element(s)*	*Driving Element(s)*
Self-Portrait/ Reflection	*Self-Portrait/ Reflection*	*Self-Portrait/ Reflection*
Beauty: _____ **Goals:** _____ **Flow:** _____	**Beauty:** _____ **Goals:** _____ **Flow:** _____	**Beauty:** _____ **Goals:** _____ **Flow:** _____

Figure 5.5. *Matrix for Self-Profiles of Emotion, Cognition, Aesthetics, Goals, and Flow*.

As shown in Figure 5.5, I devoted the first three of the eight columns on the self-profile to English, Math, and History, and I prompted students to write the specific course they had most recently taken in these categories above the subject area heading. The next three columns I left blank for students to fill in with the names of three additional courses in which they were currently enrolled or had recently completed. The final two columns I reserved for students to reflect on a sport or hobby--something outside of the classroom environment--to make the profile reflect each student's thinking patterns in a wide variety of contexts.

Once the students had labeled all eight columns with proper titles for courses and extracurricular activities, we started the class-by-class self-profiling process. "First," I asked the

students, “which one of these classes is your hardest? This might be a class you like or dislike, and never mind that feeling--I’m just asking you to specifically consider the level of difficulty. Let’s take time to analyze your thinking in that class.” Once students had chosen which of the classes they would analyze as their most difficult, we took the next step: “Explore how you feel when you are working with the ideas, with the subject matter, of that course. Feel free to list many emotions--positive, negative, and/or neutral, and to briefly elaborate on each feeling.”

Students plumbed their memories and began writing. Within a few minutes, they had finished, and I had students share honestly about the feelings they usually experience in their hardest class. We took time to discuss how their feelings affect their thinking and their participation in the class--a topic I promised to revisit several times as we continued working on the self-profiles over the next few weeks. Students checked to see if they had completed the form adequately, and they felt reassured that they had done so after hearing examples of others’ work and after sharing their own answers.

“Now,” I continued, “go to the next phase. Consider how your thinking does--and, importantly, does not--operate in this difficult class. Focus your answer on this topic: which elements of mind seem to help you most as you think, create, be, analyze, and do in this subject area? Does one element seem especially important, or are all or several elements equally active?” I paused, and then asked: “Is one element barely active or maybe even missing entirely from the process?” Students took time to ask clarifying questions and to begin the process of listing the elements of mind that usually lead their thinking processes in their most difficult class.

Once they had completed this second step, I asked students to look over their notes about their emotions and their cognitions (i.e., the elements of mind). I then prompted them to take the final step in the reflection for this first of eight class self-profiles. “Use the lists and brief

statements you created to compose a written portrait of yourself as a learner in this difficult class. Tell the story of your learning in that subject, using your reflections about your emotional patterns and your leading (or missing) elements of mind to make the story clear and detailed."

As they completed their self-portraits, students could look at the same part of the page to remember the language they had chosen to describe their feelings and thoughts in their most difficult class. I reminded students during each phase of this process that they could at any time use the definitions of the elements of mind, shown on the front page of their 11" x 17" documents, to make sure that they build their self-profiles with accurate usage of the terminology for the elements of mind (see Figure 5.6).

Many students shared their narrative self-profiles, using the elements of mind terminology to write their portraits. It was our first time through the process; we had completed one course profile right after completing the vividness and speed self-rating instrument; and we had refreshed our elements of mind vocabulary. I decided we were ready to take one more step to complete the first day of our work on Stage Three.

Concepts – thought-forms that define meaning for oneself and for others.
Intrapersonal: thoughts a person understands that are not yet translated into symbolic form for others.
*Inter*personal: shared thought-forms—such as words, numbers, and notes—that can facilitate communication.

Perceptions – data from all of the senses; raw sensory information.
Sense: including the combination of sight, hearing, touch, taste, and smell, as well as emotion;
Sensory-Imagination: the mind's ability to create a sense-world without stimulation, as in dreams.

Interpretation – a process involved in combining perceptions and concepts to form ideas.
Individual: meanings one develops in the past-present-future community of one's own imagination.
Social: meanings one develops as an outcome of group interactions that bring out new ideas, feelings, & experiences.

Figure 5.6. *Core Definitions of the Six Elements of Mind on the Cognitive Self-Profile.*

I asked the students to complete one more class profile. "This time," I suggested, "choose the class you perceive to be your easiest. This may or may not be your favorite class--you might not like it, in fact. Focus solely on the quality of ease you find in the work. Now, let's go through the same process." Like they did the first time, the students wrote about the emotions they usually experience, this time in their easiest class.

Students subsequently compared notes with partners or small groups, and a few students volunteered to share comments with the whole class. "Now look at the elements of mind again, and tell which ones, if any, lead your thinking, creating, being, analyzing, and doing in this subject area," I instructed. The students went through the process again--and many, in the reflection phase, noticed contrasts in how the elements work for them in their hardest and easiest classes. "Read the two reflections you've completed, one after another, and make a comparison," I suggested.

Once students had completed the elements of mind profile sketch, they moved on to the final step, and with more confidence and self-initiative this time. Students read their profiles to one another, and a few students read their work to the whole class. Whenever students had created very different profiles for the same class (e.g., when two students chose the same class

but for different categories--“most difficult” and “easiest”), we took time to look at *if* and *how* the students’ elements of mind profiles differed and compared.

On a periodic basis over the next three weeks, students took ten to fifteen minutes in class, every two or three days, to complete another class self-profile. Taking this process slowly allowed students to remain immersed in reflection over a longer period of time while continuing to use the elements to reflect on literature in Stage Two, i.e., to complete standard ELA tasks and practice metacognition in reflecting on how the elements enter into ELA activities.

On the day that students completed their eighth and final class self-profile, we took extra time to reflect on the set of all eight profiles--examining the overall data set for patterns. Figure 5.7 shows the question set I gave to the students for this reflection activity; the question set appears next to the vividness and speed self-rating scale that students used to start Stage Three.

Complete your self-profile on the next side of this form; then write a description of your thinking style or styles.

Does your style differ or remain similar from class to class?

Which element(s) of mind do you apply most frequently?

Do you notice a relationship between emotional tones and the elements of mind that influences your thinking style?

If you could increase the strength of one element of mind in any subject, which element would it be, and in which subject?

Figure 5.7. *Reflection Questions on Patterns in the Eight Subject-Area Profiles*.

I encouraged the students to take their time, to write detailed answers in complete sentences, and to reflect on each of their eight profiles as a set before answering the questions. I walked around the classroom as students wrote, asked for some of the students to read strong examples of work, and allowed the students to continue their work at home, noting that we would discuss the reflection set soon thereafter in preparation for the final questions and writings in Stage Three.

The final question-set and reflection exercise in Stage Three requires students to complete one more layer of reflections about each of the eight contexts they analyzed, and then, last of all, to write and answer three more questions about the overall cognitive self-profile. I asked students to conclude Stage Three by prompting them to reflect one more time--making one more new observation for each class--about each of the eight self-profiles they had completed. I asked them to tell how often they perceive beauty in the content of each subject, what kinds of goals they had formed in each field, and how often they experienced flow states while immersed in activities related to each discipline.

For each of these three dimensions of experience--beauty, goals, and flow--I asked students to choose one of five terms on a value spectrum to describe their stance on, or awareness of, each dimension. For beauty, I asked the students to rate each subject area as *always*, *often*, *sometimes*, *rarely*, or *never* beautiful. I presented five options for students to describe their goals in each area: *no goals*, *short term (minimal effort)*, *short term (sincere effort)*, *long term*, and *long-term personal* goals. Students concluded their new observations about each subject area by estimating how often they experience flow in each activity: *always*, *often*, *sometimes*, *rarely*, or *never*.

I added this feature to Stage Three because, years before teaching the study participants, I had formed a hypothesis that a triad of aesthetic experience, personal goal-formation, and desire for flow experiences motivates learning. I began collecting data in a wide variety of literature and in my classroom observations of student learning that suggested to me that this motivational triad imbues the cognitive process of interpretation with layers of significance--i.e., makes concepts “attractive” and “meaningful” to a given perceiver.

I use the word “perceiver” in the latter sentence because, in my hypothesis, it is in perception and its resultant correlate forms in intrapersonal concepts that the systems of interpretation and motivation first spark, connect, and interact (see Figure 5.8).

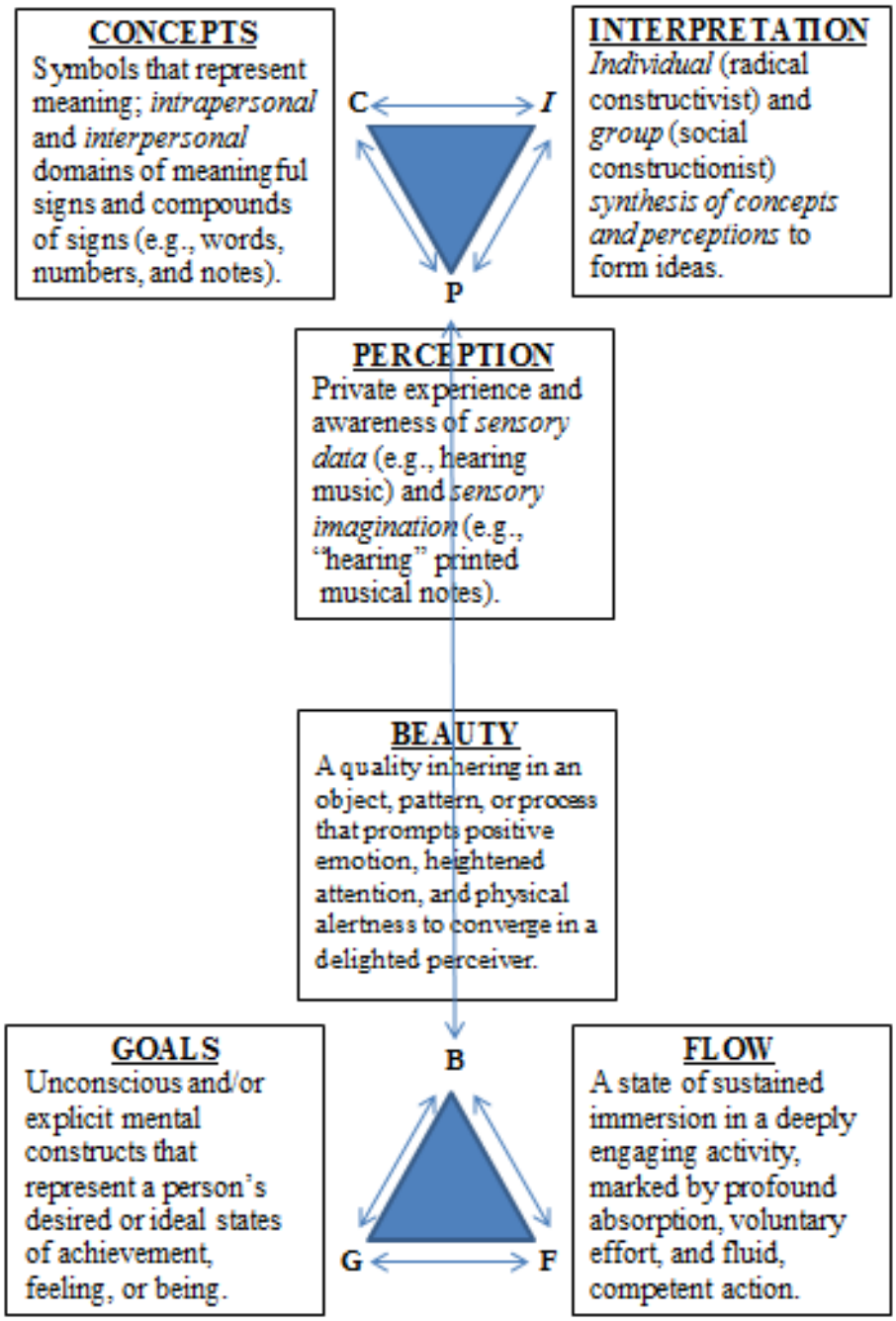


Figure 5.8. *A Model of Interacting Systems: The Elements and Beauty, Goals, and Flow.*

Without telling the students why I posed these questions, I encouraged them to complete each prompt and to ponder how their perception of beauty, formation of goals, and experiences

of flow (if any) could relate to, if not expand, their self-profiles in each class area. I left the prompt somewhat mysterious because I did not wish to lead the students' answers.

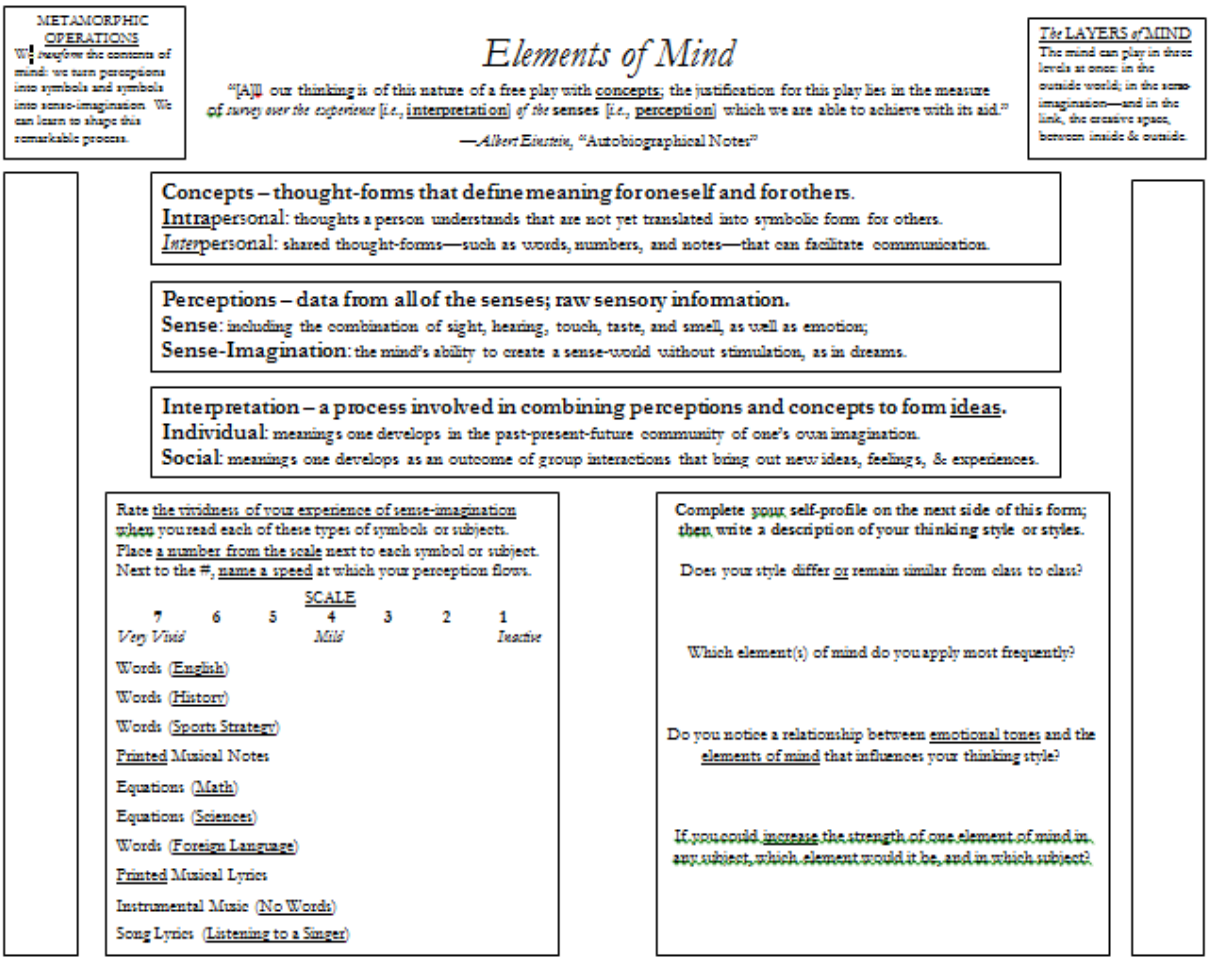
However, by this time in my work with the students, I had formulated a hypothesis about how the cognitive and emotional elements of mind system I describe in this study could link to an underlying aesthetic-emotional motivation system, linking one's perception of beauty to goal formation and to deliberate seeking and cultivation of flow experiences (see Appendix I: Beauty, Goals, and Flow). Specifically, I wanted to see if students' experiences of strong sensory imagination and fluid application of all or most elements of mind correlate with high ratings on the beauty, goals, and flow indices. Again, I kept this hypothesis private. My final questions for Stage Three take students deeper into contemplation of each class profile and of patterns in the total set (see Table 5.1).

Table 5.1. *Concluding Questions for the Cognitive Self-Profile*.

Q	Sequence of Concluding Questions
1	If you could add or increase the vividness and speed of sensory imagination to any subject--particularly your hardest one--how might it affect your understanding?
2	If you were to remove sensory imagination from your strongest subject, how would your analysis and creativity in that class be affected? Describe.
3	Choose a subject you find most "attractive" or "beautiful." Describe four things: **(a)** Which element most contributes to the subject's "beauty" or "attractiveness?" **(b)** What emotions do you usually experience when thinking about this subject? **(c)** Could you transfer your learning approaches in this subject to another subject? **(d)** How many of the six elements of mind enter into your activity in this subject?

In the context of pondering these questions, one should recall the definition of "interpretation." Interpretation involves combining perceptions and concepts--but one cannot complete a synthesis of the elements of mind if one lacks proper conceptual knowledge or if one does not map conceptual labels onto perceptual forms, be they derived from direct sensory data

or from sensory imagination. Questions one and two shown in Table 5.1 prompt students to notice the significance of their capacity (or lack thereof) to form perceptions from conceptual cues. The quality of this synthesis gives an indication of the depth and texture of one's comprehension in a given subject. "Can one comprehend novels if the words never transform into an internal world of lived experience? Can an engineer draft equations to describe a model if the engineer cannot imaginatively perceive the object of her design in sensory imagination?" In the closing steps of Stage Three, I ask the students to ponder such questions in depth and to give clear answers to them. Figures 5.9 and 5.10 show both sides of the 11" x 17" form on which students complete their answers to all Stage Three exercises.



METAMORPHIC OPERATIONS
We transform the contents of mind: we turn perceptions into symbols and symbols into sense-imagination. We can learn to shape this remarkable process.

Elements of Mind

"[A]ll our thinking is of this nature of a free play with concepts; the justification for this play lies in the measure of *survey over the experience* [*i.e.*, interpretation] *of the* senses [*i.e.*, perception] which we are able to achieve with its aid."

—*Albert Einstein*, "Autobiographical Notes"

The LAYERS *of* MIND
The mind can play in three levels at once: in the outside world; in the sense-imagination—and in the link, the creative space, between inside & outside.

Concepts – thought-forms that define meaning for oneself and for others.
Intrapersonal: thoughts a person understands that are not yet translated into symbolic form for others.
*Inter*personal: shared thought-forms—such as words, numbers, and notes—that can facilitate communication.

Perceptions – data from all of the senses; raw sensory information.
Sense: including the combination of sight, hearing, touch, taste, and smell, as well as emotion;
Sense-Imagination: the mind's ability to create a sense-world without stimulation, as in dreams.

Interpretation – a process involved in combining perceptions and concepts to form ideas.
Individual: meanings one develops in the past-present-future community of one's own imagination.
Social: meanings one develops as an outcome of group interactions that bring out new ideas, feelings, & experiences.

Rate the vividness of your experience of sense-imagination when you read each of these types of symbols or subjects.
Place a number from the scale next to each symbol or subject.
Next to the #, name a speed at which your perception flows.

SCALE
7 6 5 4 3 2 1
Very Vivid *Mild* *Inactive*

Words (English)
Words (History)
Words (Sports Strategy)
Printed Musical Notes
Equations (Math)
Equations (Sciences)
Words (Foreign Language)
Printed Musical Lyrics
Instrumental Music (No Words)
Song Lyrics (Listening to a Singer)

Complete your self-profile on the next side of this form; then write a description of your thinking style or styles.

Does your style differ or remain similar from class to class?

Which element(s) of mind do you apply most frequently?

Do you notice a relationship between emotional tones and the elements of mind that influences your thinking style?

If you could increase the strength of one element of mind in any subject, which element would it be, and in which subject?

Figure 5.9. *Image of the First Side of the 11" x 17" Cognitive Self-Profile.*

The three-to-four-week process of completing Stage Three guides students into detailed contemplation of how they apply (or do not apply) the elements of mind across multiple academic and life contexts. I intend for Stage Three to set a foundation for later stages of the model, wherein I ask students to apply their emerging practical philosophies of mind in a series of creative and analytical challenges.

Personal Profile: Domains of Knowledge and Styles of Cognition

In each of the eight columns, list the name of your course, and then describe how you do (or, importantly, do not) involve each element of mind in learning each subject. Describe HOW each element (concepts, perceptions, and interpretation) shapes your thinking in these activities.

STEPS

1st: ANSWER for EACH: What words would describe the emotional tone of your involvement in this activity? How do you feel about this material?
2nd: ANSWER for EACH: Is the activity driven mainly by one element, such as sensory-imagination (perception) or interpersonal concepts, or by many?
3rd: ANSWER for EACH: Consider the feelings and modes of thought that you use in this area; use your notes to reflect on how you create in this field.

ENGLISH	MATH	HISTORY	CLASS_____	CLASS_____	CLASS_____	Sport/Hobby	Sport/Hobby
Emotional Tone(s)	Emotional Tone(s)	Emotional Tone(s)	Emotional Tone(s)	Emotional Tone(s)	Emotional Tone(s)	Emotional Tone(s)	Emotional Tone(s)
Driving Element(s)	Driving Element(s)	Driving Element(s)	Driving Element(s)	Driving Element(s)	Driving Element(s)	Driving Element(s)	Driving Element(s)
Self-Portrait/ Reflection	Self-Portrait/ Reflection	Self-Portrait/ Reflection	Self-Portrait/ Reflection	Self-Portrait/ Reflection	Self-Portrait/ Reflection	Self-Portrait/ Reflection	Self-Portrait/ Reflection
Beauty: _____ Goals: _____ Flow: _____	Beauty: _____ Goals: _____ Flow: _____	Beauty: _____ Goals: _____ Flow: _____	Beauty: _____ Goals: _____ Flow: _____	Beauty: _____ Goals: _____ Flow: _____	Beauty: _____ Goals: _____ Flow: _____	Beauty: _____ Goals: _____ Flow: _____	Beauty: _____ Goals: _____ Flow: _____

Figure 5.10. *Image of the Second Side of the 11" x 17" Cognitive Self-Profile.*

While students work through the seven stages of the model throughout the academic year, and particularly during the 100 or more repetitions of Stage Two literary interpretation exercises, I prompt students to work at their synthesis of concepts and perceptions. In Stage Three, students examine their capacity to synthesize elements across disciplines and contexts.

In Stage Two, I often use questions and prompts to awaken sensory imagination in response to passages of poetry, fiction, and nonfiction: "Describe the quality of light, clarity, and space: is the scene bright or dim, hazy, grainy or clear, spacious or tightly enclosed?" I also prompt students to lock onto details in their internal visualizations or sensory reconstructions of passages and then to zoom in, zoom out, pan in different directions, and to hold on certain details, meticulously describe them, and then explore how their created reading resonates within the overall frame of the text. I encourage them to create order and detail within the frame of the

space they have inferred with reference to textual clues, larger contextual patterns in the text, and internal responses. By the midpoint of the year, and especially as we commence Stage Three, I ask students to think about how their capacity to model phenomena in a similar manner may play a role in their thinking and creativity in other classes and in other areas of life outside of school.

I bring the latter topic into heightened focus in the concluding questions on the Elements of Mind Self-Profile in Stage Three. My point in closing Stage Three with this reflection is twofold: to bring students further along in their development of a practical philosophy of mind, especially concerning how and why to activate and combine elements of mind to form ideas; and to begin more complex stages of creation and analysis with the elements of mind, which will require them to put their emerging philosophies of mind to work in creative and analytical tasks.

In Stage Four, which immediately follows the conclusion of Stage Three, students begin this application process: synthesizing elements of mind to form a new concept.

Stage Four: Use the Elements of Mind to Create a New Word

In Stage Four, I prompted students to directly explore language as a living artifact of human creativity. I prepared students for this word-creation activity by discussing general properties of languages, beginning with the fact that approximately 7,117 languages exist today (Eberhard, et al., 2020), of which 23 dominate communications among half of the 2020 global population. I contended that the fact that thousands of language systems exist proves two important facts: first, that concepts (e.g., words of a language) are distinct from perceptions (e.g., visual data), and that, for words to become comprehensible, one must synthesize (i.e., interpret) conceptual and perceptual domains of mind. Second, I argue that conceptual signs must be forged and clarified by common agreement in order to transcend purely arbitrary status, which

the linguist Ferdinand Saussure famously argued in 1916 (Saussure, 2011), and which the students and I illustrated together in Stage One of the curriculum model.

In Stage Four, I called upon students to use their understanding of the elements of mind to develop a new word, describe its origins and evolution, and clarify its meaning in concise definitions and illustrative examples. I offered this exercise to students after they had completed an extensive cognitive self-profile in Stage Three of the curriculum model, in which they reflected on their understanding of ideas, considered as amalgams of the elements of mind, across disciplines and life contexts. I presented Stage Four to students as an opportunity to create a microcosm of how they can be creative in *applying* what they know about philosophy of mind at this point in their progression through the model's stages. Through the relatively small, short exercise of Stage Four, I also mean to extend students' understanding of all language as an amalgam of elements of mind, an amalgam they can systematically break down, meticulously analyze, and resourcefully create.

During the same class period in which I introduced basic facts about structure in language, I gave students three examples of neologisms, including stories about their origins, concise definitions, and clarifying examples. I created two of the words, and a student from a previous academic year invented another one which I shared with the students. I presented all of these examples with the hope that each example, particularly the student-created example, would help students to see that they could excel in this exercise--as a peer had done in a previous year (see all three neologism examples and assignment instructions in Appendix D).

I gave students ten days to complete this assignment. Students received this prompt from me right after they had completed and discussed their cognitive self-profiles. They were also immersed in our ongoing study of literature, featuring writing exercises and reflections on the

elements of mind. I judged that we had established a thorough context and advantageous momentum to tackle this project successfully. "You have seen that every form of knowledge requires people to create signs and establish their meanings," I observed. "Take part in this creative tradition. We are fountains of language, originators of language. We will prove this fact and mint new words here in our classroom."

Over a period of four years, I conducted this exercise with more than 400 students. Nearly all of those 400+ students--approximately 97%--completed the exercise. In my discussion of data and findings in Chapters Six and Seven, examples of work from this study's ten participants provide vivid, disparate illustrations of how students can creatively navigate the challenges of Stage Four.

Stage Five: Create a Philosophy of Reading

I asked students to compose an essay about applied philosophy of mind--after I believed they had already formed one. Most of the academic year had passed; students had completed several dozen exercises in Stages One, Two, Three, and Four, with reflection on the elements of mind; and they had applied their analytical thinking to research topics, compositions from multiple sources, and formal debates. I observed that they had benefited from knowing how to work with their own imaginations by deliberately activating and reflecting on the elements of mind in a range of ELA-based and cross disciplinary tasks. I judged that their work improved in proportion to their ability to hold a strategic conversation with themselves about their own work.

Acting on my belief that the students had at least intuitively grasped and applied a practical philosophy of mind, I prompted the students to describe their methods of reading, writing, and thinking in a 10-12 paragraph essay. A month before giving the students the essay

prompt, I led thorough reviews of the definitions of the elements of mind. Students reflected on Stages One through Four, held an essay contest in preparation for an exam and debate, and made close studies of rhetoric in essays, fiction, and film related to a topic of interest: the nature and future of artificial intelligence. This topic gave students another opportunity to examine the question of how to define "real thinking." Continuing with this Turing Test-like theme, I asked the students to define "real reading" and to explain how one does it, through examples and through abstract description (see the detailed prompt in Appendix E). The students took a full week and weekend to compose their responses. I waited until after the students had completed their essays to describe another step in the process: I asked them to use their various stated methods to redesign their thinking in a subject area where they feel especially challenged.

Stage Six: Lesson Design

While completing their cognitive self-profiles in Stage Three, students identified areas of weakness in their applications of the elements of mind. They also reflected on areas of learning that challenged them but no less brought joy into their lives, perhaps even because of the challenge. I asked students to refer to what they learned about their own minds in Stage Three, to assess what they had learned about their own minds in areas where they struggle and in areas where they apply the elements accurately, and then to ask a new question: can one redesign--improve--one's thinking? I asked students to consider a challenging subject and to self-assess the presence, clarity, and connectedness among the elements of mind they experience (or do not experience) while tackling a "difficult" task, and then to use the resulting assessment to design and carry out an effective learning plan.

I began by prompting the students to notice and write about how they can--and, importantly--cannot activate and apply each of the elements of mind in a challenging subject. Example questions in such self-assessment could include the following: does your sensory imagination disappear, fade, or slow down when solving math story problems for volume? Do you notice a marked difference in your intrapersonal understanding of literature compared to your ability to discuss or write about your understanding? I meant with such questions to help students take an important initial step: to notice and describe the involvement (or lack thereof) of the elements of mind in their learning and thinking process.

Once the students had completed this first phase of self-analysis, I asked them to reflect on how they have previously tried to learn the concept, skill, or technique they have found too difficult to master. I asked: where does the learning process stop, take an unpredictable turn, or break down for you? I encouraged the students to persist despite confusion. I noted that one can far more easily describe an idea s/he understands than discuss an experience for which one has not developed accurate and detailed knowledge, or even an applicable set of non-verbal intrapersonal concepts and skills. I also framed this task as "perhaps the most difficult process we will try all year."

In asking students to define their struggles in as much detail as possible, I aimed to help students recognize the variables in the problem they are trying to define and solve. Once they define those variables--be it study habits, a specific kind of writing challenge, or an area of math that seems intractable--they may be able to see the problem's pieces and then to tackle the problem deliberately, as a system of related pieces--but not until they have defined the problem.

Once the students had defined their problems in more detail, their next step was to decide how they would define "mastery" of the problem--to directly define the signs of mastery. My

idea was to get students to go beyond vague intrapersonal notions of what success would look like and to go into explicit detail--in conversation with themselves, first--to internally see and say: "[this is what real knowledge and skill looks like in my given topic]."

These latter three steps prompt students to define a problem, see the elements of the problem, and envision mastery: i.e., clear a problem space, locate a starting place, and see a destination. The next step, I explained to the students, is to ponder how to cross the gap between the formalized starting place and the declared destination. For this purpose, I asked students to create a bridge across their perceived gap, from troubled start to ideal finish, by mapping out a plan for involving each element of mind. "How would you elicit sensory imagination?" to model concepts, I asked?

Further, I prompted the students to consider how they would guide a peer to understand the material. What kinds of tasks and rehearsals they would design to help their peers strengthen their understanding? I invited students to see the problem from the perspective of other students as well as teachers to invite them to take on different points of view and to wield authority to define and work on the problem with more freedom and versatility.

Given the level of abstractness and challenge in this exercise, I encouraged the students that I would determine grades for this work by rewarding disciplined effort and detailed self-analysis, not necessarily requiring fully-realized change in performance, though surely the latter is desirable. I did not want students to unnaturally conform their learning and mastery timeline to the timeline of this assignment, which I have near the very end of the academic year.

Once students could identify a point or points in their learning process where the elements of mind failed to activate or combine with one another, I asked them to make that point or set of points into an area for investigation and lesson design. "That moment where your

thinking stops, goes off track, or slows down considerably--study that place, and then take the next step." The next step for students in Stage Six was to define a mastery target and to describe the criteria they would use to determine what "mastery" means in this context.

Once students had completed the latter steps--defining a target and establishing criteria for determining mastery--I gave them a series of steps to follow in designing a lesson. I asked them to embrace a goal to first teach themselves to master the complex content, and then use their lesson and learning experience to teach someone else about the difficult topic, i.e., to use interpretation to transform confusion into organized perceptions, intrapersonal understanding, and communicable concepts (see Appendix F for the multi-step prompt for Stage Six).

Stage Seven: Reflection on a System

Students and I spent a year exploring literature, creative writing, rhetoric, composition, and formal debate, engaging in discussions and completing assignments that one would rightly expect to see in high school English classes around the country. From near the start of the year, however, we had woven into our curriculum a series of reflections and activities that drew our attention and energy into thinking about how to think, using what we learned to understand literature, improve at creative and analytical writing, and even change how we imagine. To conclude this endeavor to understand thinking and to apply methods to improve it, I asked the students to complete one more concise reflection, presenting Stages One through Six as connected steps in a system that could help them to grow and apply a philosophy of mind.

I hoped to learn more about each student's experience of every stage, and of the system as a whole, so that I could make improvements to the model. I also felt curious to know if they could readily describe the stages as parts of a coherent system. I wanted them to describe the

pattern of connections from their own perspectives, drawing the lines in the constellation of activities as they experienced them (see Appendix G for the concise prompt for Stage Seven).

The 70 artifacts students created along their journeys through the model provide a strong foundation for answering my second primary research question: **In an English Language Arts classroom where the teacher guides students through steps to develop a practical philosophy of mind, how does student work exhibit interpretation and critical thinking?** I turn now to answer this question by presenting an in-depth examination of Curie's effort to develop and apply a practical philosophy of mind.

A Personal Learning Arc: Curie's Progress through the Model Stages

Curie is one of hundreds of students who gave detailed and complete answers in every stage of the year-long curriculum model. In describing her path through the seven model stages, I throw light upon roles that students and teachers can play in each stage. I also present a detailed picture of the processes students mastered to create the set of 70 artifacts.

Curie's Work and Reflection on Stage One

Curie's interpretation of two abstract symbols displays echoing conceptual patterns. Curie's first quickwrite list of interpretations displays clear alliterative echoes. Her first list begins with the concept "Pacman." The second answer features alliteration with 'a' and 'p' sounds: "apple with bite"--and notice that Pacman's biting action appears in this apple. The third list element continues the alliterative pattern: "platypus." Curie then starts a new pattern in her fourth answer: "fish hook." In the fifth answer, an alliterative pattern stems from the fourth: "fetus," echoing the 'f' and 's' sounds of "fish hook." In the first three responses, the biting

pattern cascades through her first two answers (if not also the third, since the platypus is conspicuous for its bill), and the alliteration with ‘a’ and ‘p’ sounds dominates in all three; next, in the fourth and fifth list elements, we see alliteration shift to ‘f’ and ‘s’ sounds. In the 60-second game period for round one, Curie created two self-echoing conceptual loops.

Curie’s second quick-write list in response to a second abstract symbol displays a different but apparently self-echoing cascade of associations in five overall responses. She opens with “canoe w/ a person in it.” The “w/,” short for “with,” subsequently cascades through the next two answers: “weiner dog with no head on a leash” and “shoes with untied laces.” We see a rhyme in “canoe” and “shoe,” consonance in “leash” and “laces,” and assonance in “weiner” and “leash” in these first three answers. Adding Curie’s fourth and fifth responses reveals additional cascades: she describes the object as a “telephone on a curly wire” and as “a bridge w/ a bunjee jump rope.” The last word that appears in responses two, three, four, and five presents a variation on length of cord, cable, or string: “leash,” “laces,” “wire,” and “rope”--creating two alliterative pairs, with *l* and then with *r*, of similar objects. The “w/” reappears in the fifth list answer, and notice, too, that in the consecutive *l*-alliterative answers two and three (“leash” and “laces”), the cord appears more fixed in length and rigidity, whereas in the consecutive *r*-alliterative answers four and five (“curly wire” and “bunjee jump rope”), the cord becomes considerably more flexible. Alliterative patterns appear with answers four and five, too: in answer number four, the “l” sound repeats in “telephone” and “curly” (right below “laces” in the previous answer), and in answer number five, both the ‘b’ and schwa sounds each appear twice in “*b*ridge” and “*b*unjee” and in “b*u*njee” and “j*u*mp,” respectively.

Patterns in Curie’s lists point to a surprising and significant finding from the larger Stage One data set: the effect of apparently unconscious “priming.” Priming occurs when

exposure to a stimulus prompts a subsequent related response which is linked to the cued individual's implicit and working memory (Ratcliff and McKoon, 1988). Studies of the priming effect abound; in my subsequent research on priming in psychology databases, I encountered hundreds of research articles devoted to a variety of priming-effect studies dating to the early 1970's. Some of these studies help to explain the priming effect I observe, particularly a study by Sperber et al. (1979), in which Is observe priming effects in subjects' sequential interpretations of words and pictures, and Ratcliff and McKoons' study (1988), which explores the phenomenon of a "compound cue" formed from a prime and an object.

In the case of this study, Curie and her peers appear to *prime themselves*: after making a first interpretation of an abstract symbol, the students' subsequent interpretations reflect traces of the first interpretation, i.e., of the prime, which, after the first interpretation, subtly becomes a *compound* of the sensory data and the previous conceptual label. These compound-traces appear in rhyme, alliteration, concept-similarity, thematic continuity, or a combination of such features. The students' lists usually vary from one another, but they show internal self-similarity. That is, they show that the students are not only responding to the visual cue, but to a compound of the visual cue and a word they generated independently. Since this apparent priming effect comes from each student's own mind, I will refer to this phenomenon as auto-priming or self-priming.

No one, including myself, noticed at the time of the exercise that conceptual patterns almost immediately began to exercise an influence on each student's perception and classification processes--but with markedly different results. This means that the sounds, letters, and concepts that each interpreter first selected subsequently influenced the next reflex-quick interpretive act. A study on priming by Dehaene et al. (1998) shows that such priming can occur

unconsciously and provides context for understanding why the students and I apparently self-primed without noticing the priming effect.

Curie, however, displays considerable self-awareness of what happened in her cognition when she played the symbol interpretation game. In the reflection that followed our brief minutes-long rounds of play and conversation, Curie writes that the game, in its first instant, begins with "sensory data in order to observe the image," which she notes, is also a "first step in the scientific method," to observe some object in or aspect of the universe. Curie notices that "sensory-imagination immediately comes into play in order to visualize abstract objects and concepts," and she identifies a source of influence in the answers that she and her peers gave in response to the visual prompt: "Objects and concepts that are more familiar from your past and your community might...show up more in our individual interpretations." In reflecting on the game, Curie also displays accurate understanding and application of terms that enable her to label the elements of mind.

Like all of the study participants, Curie found Stage One to be the easiest of the stages, as I intended it to be. My goal in Stage One is to lower conceptual or processual barriers that could inhibit students' interest in, attention to, and understanding of the elements of mind concepts that I introduce and discuss throughout the rounds of the game. Curie writes that Stage One involves "more of an automatic response," an instance of what Kahneman (2011) refers to as a System 1 "automatic" process, and that the game made Stage One "the simplest" of all stages, which she completed "efficiently" and "with joy." Developing a practical philosophy of mind is a complex endeavor; the ease of Stage One helped Curie and her classmates make a confident beginning.

Curie's Progress and Reflection through Stage Two

Several months later, I had students complete another round of Stage One so that they would make an explicit link to our already-ongoing practice of Stage Two, literary interpretation. The class took time to look at literary interpretation in a new way by comparing and contrasting Stage One to our practice of reading. I asked students: "Do the same elements of mind enter into the process of reading fiction? If so, how? If the process is different, how does it differ?"

At this point in the academic year, we had established a method for closely interpreting passages of literature and had written dozens of focused analyses of scenes. In keeping with our usual practice, I asked students to select "a small fragment of text and bring into focus the physical details of the scene and the psychological states of the characters, all of which you infer from the text."

For the purpose of linking Stages One and Two, we played another round of the Stage One game. Then I gave students a 26-line passage from *The Great Gatsby*, which, at this point in the year, the students had just finished reading. In this particular exercise, I asked the students to go back to the last page of Chapter One and to "be deliberate in calling each element of mind into play as you design a reconstruction and analysis of the scene."

Curie's image-rich response to this prompt compares to that of her peers in that her writing draws heavily from sensory imagination: she creates 12 visual images, faintly traces one movement, marks four shifts of perspective--and, notably, she describes zero sounds. This marks a total of 17 perception-related details in her reconstruction and analysis of the passage. Figure 5.11 below shows that Curie's interpretation features 12 visual details, one subtle movement, four shifts of perspective, and zero sounds.

ARTIFACT from STAGE TWO: CURIE'S CLOSE READING of a PASSAGE
The suspense and anticipation upon meeting Gatsby's silhouette reflects a sense of immediate simplicity but then a longing realization of profundity. The camera adopts the lens of Nick, after his physical introduction in the beginning. There is an obvious transition of camera angle: the audience goes from being able to see Nick to seeing what Nick sees. The image of the cat prompts the audience and Nick to notice Gatsby's figure. I envision there to be only two sources of light, initially--Gatsby's mansion and the moon. The light of Gatsby's mansion brings Nick's awareness to Gatsby's wealth and social status. The light of the moon raises attention to Gatsby's contemplative mood -- through his calm and serious body language and his slightly confused and determined facial expression. Nick does not yet know the source of Gatsby's psychological state, but he is curious. The camera pans out to see both characters standing alone, viewing some representation of a person they desire to know. In this change, the green light is now visible, and it is obvious that Gatsby is transfixed by it. There is a sort of triangle of light and people -- the moon illuminating both Gatsby's and Nick's faces; the green light illuminating the sense of Daisy.

Figure 5.11. *Curie's Close Reading of a Passage in* *The Great Gatsby*.

Curie contrasts Stage Two to Stage One, differentiating the abstract symbol of Stage One's free-associative game to the words in the Stage Two exercise with fiction. In Stage Two, she especially relies on "interpersonal [concepts]" and "individual [interpretation]...to take various symbols of meanings (words) and construct my own personal meaning out of them, also drawing from other aspects of the book."

Curie finds Stage Two exercises to be more complex and moderately more challenging than what she describes as the "automatic process" of Stage One. Stage Two, she states, "is a little bit more complex because we had to combine our thoughts on physical aspects [of a scene] and psychological states [of characters]." The added complexity of the interpretation process combines what Kahneman calls System 1 "automatic" processes with System 2--deliberate, conscious, effortful-- processes. Curie explains that, in Stage Two exercises, "we rely heavily on sensory imagination...I would close my eyes and picture the scene--the lights, the props, the characters, the room, the sound…."

As a result of her repeated practice of Stage Two exercises, Curie reports being "more aware of the various psychological and physical states of characters and scenes..." and that "[b]y noticing these things," she reflects,"I am also noticing aspects of my reading. In other words, I am enriching my sensory imagination, in hopes to also enrich my individual interpretations." Curie had gained a sense of how the elements of mind play important roles in how they make sense of literature.

Curie's Self-Analyses and Insights from Stage Three

At this juncture in the academic year--after completing dozens of Stage Two exercises involving close reading of texts--students began Stage Three. Throughout Stage Three, students gradually build a cognitive self-profile, focusing on how they read, imagine, write, analyze, and create, not only in ELA classes, but across disciplines and in activities beyond life at school.

"I would increase the vividness and speed of my sensory imagination in Spanish," writes Curie, "in order to fully immerse myself in the language." Curie embraces fluency in Spanish as a long-term personal goal of hers that transcends immediate concerns for grades and assignment completion. She wants to reach toward mastery, and one outcome of her cognitive self-profile is her realization of the role that sensory imagination could play in her learning.

Curie considers sensory imagination essential in forming deeper understanding. She writes that, with increased vividness and speed in sensory imagination, she "would be able to comprehend conversation, movies, and songs with much more clarity…[and could] read novels in Spanish and truly live in Spanish--feel emotion and joke."

Curie made these remarks in response to the tenth and last closing question I posed to all students at the end of Stage Three: "If you could add or increase the vividness and speed of

sensory imagination in any subject--particularly your hardest subject--how might it affect your understanding of the subject?" Curie concludes her response by aligning her learning goals with her intention to develop sensory imagination in Spanish: "My goal is to be able to think in Spanish--this is a long-term personal goal, and I think sensory imagination would be a huge driving force in getting there. This would open up a whole new world of thought, people, conversations, and personal experiences." Curie here displays a reasoned belief about thinking: in order to "open up a whole new world" of understanding and connection, she would need to vividly and quickly link symbols (spoken and written words in Spanish) to sensory imagination.

Curie's responses indicate that she has formed premises about what elements of cognition play roles in her development; and she has drawn a conclusion from those premises that her learning must involve her effort to awaken and combine perceptions with concepts to truly understand a second language. She has started to apply a practical philosophy of mind by designing a learning pathway, governed by accurate labeling of the elements of mind and self-awareness of whether and to what degree she achieves a synthesis of these elements in forming knowledge.

Curie's Reflection: Interpretation across the Disciplines

At the start of each subject-based self-profile, I asked students first to consider the emotions they typically experience when they "read, create, analyze, be, or do" in a particular subject (see Figure 5.5 and Figure 5.10). Curie's responses vary widely from course to course; and they sometimes vary within the same course. In her math course, for example, she reports feeling "bored" and "unstimulated" while at other times feeling "intrigued" and "amazed." Similarly, in Spanish 4, she reports feeling "wonder, excitement, frustration," and--when she's

stumped: “agitated.” Curie reports liking both classes, overall, which shows that, in some cases, her “negative” emotions sometimes contribute positively to her overall experience: feeling challenged or stumped stokes her motivation.

Curie also displays variety in the types of “positivity” she experiences in several other areas of study: “stress-free” positives and “challenged” or “intimidated” positives. Her hobbies and extracurricular activities display instances of each type: in her hobby of baking, she reports feeling “playful, happy, and stress-free.” In her beloved sport of tennis, she feels “energized, motivated, angry (sometimes), and passion[ate].” She adds that tennis “not only makes my mind feel energized, but also my body.” Both types of positive emotional states propel Curie’s continuous investment in each voluntary activity: she reports that she holds personal long-term goals that go beyond the context of her current class enrollment or team participation.

A striking pattern appears when one organizes Curie’s classes on a positive-negative scale of emotion: most of her negative emotions cluster in her math-related courses; her positive emotions cluster in academic areas related to language-based investigation (e.g., history and English), which includes the science course she includes in her self-analysis; and her most highly-charged positive emotions occur when she is immersed in forms of sensory and physical play (baking and tennis). In her history course, she feels “stimulated, interested, [and] contemplative,” and in her English course she feels “intrigued, intimidated (which drives me towards growth), excited, [and] happy.” She feels equally comfortable in her anatomy course: “Due to the relaxed energy of the classroom,” she writes, she feels “not worried” and “stress-free,” and she adds that she has formed long-term personal goals in this subject area. By contrast, when she studies in her statistics course, she states: “I often feel anxiety and

agitation...slightly angry [and] unstimulated." The latter term also appears in her reflection on her emotions in her math course.

Curie's reflections on her emotion in eight subject areas show that she proceeds from a different emotional foundation in each of her courses. She thus displays emotional flexibility as a learner: she can make advances in a range of emotional circumstances. The differences in Curie's emotions appear most noticeably on the two ends of her positivity-negativity scale, marked by "baking" and "statistics," respectively. Despite these differences, Curie earns high grades in all of her classes, which shows her ability to work through negativity.

Curie's responses to the second prompt in each class self-profile may help to explain why and how Curie remains resilient despite her experience of negative emotions in courses where she nonetheless earns high grades. In this second prompt, I ask students to identify which of the six elements of mind appear most frequently and most helpfully in their work in each specific subject area. I always add: "Importantly: be sure to note if any elements of mind do *not* enter into your thinking in a given subject, or if elements such as sensory imagination operate in daydreams rather than in topic-relevant thinking." The students refer again to the definitions of the elements of mind, and then they begin writing.

Curie's replies show that she finds cognitive and social work-arounds to overcome challenges. For example, in her statistics course, she reports that she "tries to use sensory imagination and intrapersonal concepts when doing specific problems." In math, she likewise draws upon inner resources to make progress: "When I see a math problem, I construct a visual in order to better understand how to move through the problem. In order to get the foundation, I use social [interpretation] and interpersonal [concepts]. I then construct my own mnemonics."

Curie manages her own learning process under stress, and she can accurately describe how she moves from difficulty to clarity.

Final Phases of Stage Three: Students Reflect on Patterns in Their Mind Self-Profiles

Students shared their insights about patterns in their learning, analyzing, and creating by studying their eight mind self-profiles and answering 10 reflection questions. The first four of the 11 questions appear next to the initial miniature mind self-profile--back on the front side of the 11” x 17” form (see Figure 5.7 and Figure 5.9). Curie identifies elements of mind she finds most instrumental in her thinking processes. In response to the fourth question, identifies an element of mind that, if strengthened, could help them improve their learning in a given subject. Curie identifies perception-concept synthesis during both social and individual interpretation as the two elements she would most like to improve to get better at Spanish. Curie and her peers returned to this question--how to use awareness of the elements of mind to improve in a difficult subject--in Stage Six, which involves designing a learning process. Figure 5.12 below shows Curie’s written replies to the first four of 10 Stage Three reflection questions.

Complete your self-profile on the next side of this form;
then write a description of your thinking style or styles.

{Curie}

Does your style differ or remain similar from class to class?

I seem to utilize sensory imagination throughout all of my classes. Sometimes this enriches the experience, and sometimes this distracts me (e.g., in daydreams) from the actual subject.

Which element(s) of mind do you apply most frequently?

Sensory imagination and interpersonal concepts. Both seem necessary for my success. Interpersonal concepts act as the foundation, and sensory imagination allows me to delve deeper.

Do you notice a relationship between emotional tones and the elements of mind that influences your thinking style?

In the classes I dislike, where I feel uninterested and unstimulated, I use social interpretation and sensory imagination (daydreams) to ignore what I don't like.

If you could increase the strength of one element of mind in any subject, which element would it be, and in which subject?

I would increase individual and social interpretation in Spanish in order to improve my comprehension. I want to be able to hold a conversation, and interpretation would aid me.

Figure 5.12. *Curie's Written Replies to Questions on the Cognitive Self-Profile.*

In the next set of reflection items I presented--questions five through seven (see Table 5.1)—I asked the students to reflect, in questions five and six, on the role of sensory imagination in their most challenging and in their strongest classes, respectively. Curie concluded that increasing the speed and vividness of her sensory imagination in Spanish would propel her toward her goal of becoming fluent (at a professional level) in Spanish. In question six, I asked students to imagine a reverse scenario: "If you were to remove sensory imagination from your strongest subject, how would your analysis and creativity in that class be affected?" Years after first reading responses to this question from Curie and her peers, I still return to plumb their answers for new insights about teaching and learning.

Thought Experiment: Subtract Sensory-Imagination from Your Strongest Subject

"Part of me would be lost," Curie concludes, "if I were to lack sensory imagination in biology." Curie's striking remark parallels her peers' responses to this thought experiment. All of the students shared their realization that their creation, analysis, and learning in their strongest subject deeply involves their synthesis of sensory imagination and concepts. Curie's answer anticipates her peers' answers. Without sensory imagination in biology, she elaborates, "I wouldn't be able to apply the knowledge to abstract concepts or life situations. Biology allows me to better understand myself and others, so my self-awareness and awareness of the intricacies of my environment would dramatically decrease, [as would] my overall enjoyment of life." Removing sensory imagination, she finds, would bring existentially significant consequences. "I rely heavily on being an observer," she states, "and so part of me would be lost."

Beauty, Goals, and Flow: Students Reflect on Aesthetics, Ambitions, and Aptitudes

Curie sees beauty in all of her classes--though more so in some than in others. In reply to question seven, Curie rated four classes "always beautiful," two of them "often beautiful," and two of them "sometimes beautiful." In each of the four classes she describes as "always beautiful," she exercises all of the elements of mind and has formed long-term goals in each subject. In the two classes she rated lowest in terms of aesthetic appeal, she has formed sincere short-term goals. In the two classes she rated "often beautiful," she draws upon all six elements of mind, and in one class, Spanish 4, she has developed long-term personal and career goals.

Curie chose to write about Spanish 4 in response to question seven--concerning a "most beautiful" subject. Question seven in the reflection phase of Stage Three prompts students to

describe details of a class they find "most beautiful" among the eight they profiled. The question comes in four parts:

(a) What is the element of mind that most contributes to the subject's beauty?

(b) What emotions do you usually experience when thinking about this subject?

(c) Could you transfer your learning techniques and emotional disposition in this class to another subject?

(d) How many of the six elements of mind enter into your activity in this subject?

Curie did not state that Spanish is "always beautiful"--sometimes she does not understand it or perceive it quickly enough. However, she sees it as "often beautiful" and enjoys the challenge of growing accuracy, speed, and vividness in each element of mind in her study of Spanish. "I use all of the elements to well-roundedly improve my skills," she writes. "Each element contributes a unique aspect to my journey of learning Spanish."

Curie had already decided that she would like to increase the speed and vividness of sensory imagination in Spanish (in reply to question five in the Stage Three reflection phase), but in her experience, it is "individual interpretation," the process of connecting perception and concepts, that makes Spanish the most beautiful class. The process of growing her individual interpretation skills brings her to feel "confusion, wonder, frustration, excitement, challenged, and passionate; even the negative tones make me feel more motivated," she explains.

Curie would like to be able to transfer her learning dispositions in Spanish to the context of AP Statistics. "When I get stuck in [statistics], I feel more like giving up rather than trying harder," whereas in Spanish 4, even negative emotion contributes positively to her motivation. In the "sometimes beautiful" class of statistics, during which she often feels "anxiety, agitation, uncomfortable, [and] unstimulated," Curie shows less resilience amid

difficulty and reports that she is "never in flow." "I generally don't feel motivated or excited to be there; this could partly be because it is the last class of the day," she writes, adding that "[t]he energy in the classroom is tense." Curie draws upon two elements of mind to compensate for the difficulties she experiences in statistics: "I try to use sensory imagination and interpersonal concepts when doing specific problems." Helpful conversation with peers (social interpretation) usually occurs after, not during class, she states, which may identify one more factor that detracts from her experience in the class.

A notable pattern emerges from juxtaposition of Curie's profiles of Spanish 4 and AP Statistics: in Spanish 4, most or all of the elements of mind are already present in the material, right from the beginning--learning proceeds from a stirring point of origin; in statistics, by contrast, Curie must add the elements of sensory imagination, interpersonal concepts, and social interpretation from the margins, and from a starting point of perceived disadvantage and tension. In Spanish 4, the origin-point of departure, from which subsequent learning unfolds, holds allure for Curie. While she likewise experiences "confusion" and "frustration" in Spanish 4, she engages more elements of mind in the process of striving to learn; she finds the subject matter "often beautiful;" and, through her efforts, she finds herself "sometimes in flow." Despite the high level of difficulty she perceives in the subject, she has embraced long-term personal goals in Spanish.

Curie's reply to question/prompt nine in the reflection phase of Stage Three may lend insight into why she persists more willingly in Spanish than in AP Statistics. The prompt is open ended: "Describe one new insight you learned while completing this [cognitive self-profile]." Curie writes in response, "I realize that I have the conscious ability to find beauty in all subjects. However, there are certain subjects that I find more beautiful than others. I tend to find those

subjects more intriguing to learn about. I have the desire to apply those subjects to aspects of my life outside of school." Taking my cues from Curie's response, I envision two types of classes: more and less beautiful, with the former being characterized by an immediate and captivating richness of elements of mind, and the latter being characterized by a relative paucity of elements, requiring higher compensatory effort to add elements in response to a perceived lack.

I use Stage Two, literary interpretation, to generate an aesthetic spark. Enthusiastic teachers of other subjects likewise create contexts for students to inwardly encounter--and engender--concepts imbued with appealing aesthetic qualities (and the selection of literature is one of several very significant factors here!). In statistics, Curie finds a dimmer path to aesthetic reward, a harder path to learning and mastery, and fewer chances to communicate her ideas--but had her teacher in fact held out signs of the beauty of the field? In Spanish 4, however, Curie perceives features in the material that awaken her intrapersonal perception of beauty, which helps her to fix her attention on the concepts' features--and to hold her attention there while her emotions rally and her intrapersonal concepts mature to sharp, accurate, communicable form.

Curie's Answers to the Final Stage Three Questions

Toward the conclusion of the academic year, I had students re-read their cognitive self profiles, reflect on the elements of mind, and answer three prompts: one concerning future prospects, one about a major insight, and one about anticipated obstacles to learning. Curie's responses to the latter two questions already appear in this chapter: Curie speaks of her continuing challenge to focus the element of sensory imagination while reading, rather than allowing it to lure her into distractions--this is her obstacle; and her insight concerns beauty in ideas and its significance in her learning process in and beyond the classroom. Her response to

question eight, concerning her future path as a reader and thinker, shows one of Curie's emergent beliefs about the elements of mind: the importance of using the elements in concert.

"It may be early to judge where you'll focus in your years after high school," prompt number eight begins. I ask the students to "[c]onsider your Elements of Mind Self-Profile and describe what possible roads you might take as a "reader," taken in a broad sense. Where will you do most of your thinking, and with what elements of mind driving and informing your reading process?"

"I plan to utilize as many of the elements of mind as possible throughout my continued career as a student and lifelong learner," Curie's answer begins. She sees the possibility of connecting two fields of study: "I am interested in pursuing both health sciences and international relations. While different, they are both vital to the world as a whole. I imagine I will use all of the elements in order to gain a holistic perspective on each subject." An aspect of Curie's response that intrigues me is its cross-disciplinary dimension: she uses imagination and concepts to establish a coherent frame for picturing these two fields as a logical unity.

Curie pictures how these two fields could come together in a particular career. "A possible career that could result from my focus in these fields is an epidemiologist working some place like the Center for Disease Control (CDC)." Curie explains how she would apply the elements of mind to carry out her work in this field: "I would heavily rely on sense data and sensory imagination. If there were a disease outbreak, I would have to use the data in order to imagine a solution. Also, I would use a lot of social interpretation in order to convey my ideas to those with various powers (e.g., policy makers)." Curie's description provides an aerial view, a metacognitive view, of the individual and social thinking processes she would activate and develop to practice as an epidemiologist.

Curie's Creative Process in Stage Four

In all ten of the study participants' neologisms, a common pattern appears in each word's origin: the words begin with a moment of alteration. Curie's neologism emerges from a shift in emotion in response to an interpersonal connection--of a sort. "I came home one day after school, not in a particularly good nor bad mood. I saw my dog get up and greet me at the door. I felt cared for, wanted. Her smile was contagious...I began to smile, and soon enough I was having a particularly good day." Curie's emotional transition in response to seeing and interacting with her dog drew her attention to a special bond, and the pattern of this bond stood in contrast to Curie's neutral mood just prior to her return home. She noticed the value and effects of the relationship and decided to give this relationship her focus in Stage Four. Curie explains, "I see my dog as one of my best friends (no matter how cliché it sounds), and I thought she deserves a word to describe our relationship. I have experienced, first-hand, a *kincanspien* relationship."

Curie arrived at a point where she could easily break down the components of her word. She began with difficulty, however. "Stage Four was definitely the first real challenge I faced. I took a pensive mood and a couple of days [to find a word], but finally came up with new meaning and then meticulously constructed a word." After days of rumination, her project came together in a transitional moment in her day: receiving her dog's warm greeting. Curie focused her reflection on this experience and distilled from it a compound of concepts: "'Kin' refers to relationship; 'cans' comes from 'canis,' which means dog in latin; and 'pien' comes from 'sapien,' which means human," she states. "All of this together equals "the relationship between a dog and a human." Curie classifies *kincanspien* (kin-CAN-spee-in) as an adjective

"describing the therapeutic relationship between a dog and a human." She clarifies that the word "denotes a caring connection between the two."

Curie exemplifies a creative process exhibited by all of her study participant peers. She began by starting a question concerning what, if anything, might justify a neologism; and the answer does not come immediately--the question-frame remains open. This step appears to play an essential role in each student's word-creation process, for while an answer does not come right away, the student has primed him- or herself to notice details. The question is like a net with water flowing through it--until something moves the net.

Primed to notice patterns in their thinking, mindful of examples we had studied together, and equipped with awareness of the elements of mind, the students proved themselves capable of closing the net around a proto-conceptual form. Automatic System 1 (Kahneman, 2011) consciousness plays an important role in the transitional moments that lead each student to the origin-points of their words: each student had set a deliberate ("System 2") plan in motion with elaborate conceptual priming--and then, at the right moment, something happened; they noticed; and then they could synthesize the elements of mind to coalesce around a novel form.

"This is a small but significant example of concept creation," I shared with students in our reflection after Stage Four. "To invent a new concept in medicine, music, literature, science, or any particular field of interest, you will likely need to knit together a more numerous array of finer perceptions and novel concepts, and you might first need to prime yourself for creation by working through years of knowledge acquisition to come to an edge where our intelligence could be expanded--but you have mastered the principle, creating a complete cycle: looping together your perceptions with concepts to make a communicable idea." As Curie phrases it in her reflection on Stage Four: word-creation "focuses on the 'developing your own meaning' phase of

reading and writing." The students' next step was to take their insights from all four stages, as well as all of our debates, essays, and projects, and compound their knowledge into a coherent statement, an instrument: a philosophy of reading, writing, and thinking.

Forming a Method: Curie's Philosophy of Reading

The student-participants challenged themselves in Stage Five to formalize a statement of their reading, writing, and thinking methods (see Appendix E for the full assignment prompt). Curie's densely-packed ten-paragraph essay, "Reading Amidst Complexity, Chaos, and Care," exhibits themes that frequently appear throughout the body of work submitted by her peers. Primary among these themes are the students' emphasis on the importance of activating, growing, and synthesizing all six elements of mind; their recognition that thinking involves a mix of loose, spontaneous discovery and controlled, poised, deliberate examination; and that metacognitive application of the elements of mind can help one to move from confusion to clarity in the creation of meaning--a process, the students underscore, that requires time, emotional investment, concentration, and attention to details.

Curie's opening paragraphs show how her philosophy aligns with Rosenblatt's notion of the reader as a creator of meaning (Rosenblatt, 1978). Reading is "an experience so personal it varies from person to person, never being exactly the same," Curie asserts. Meaning, in Curie's description of "real reading," is "intimate and slow to evolve" and moves from initial questions, even confusion, to higher states of order. Curie quotes Wallace Stevens' "Connoisseur of Chaos" poem to argue for the value of ignorance and the latent opportunity therein for learning to open one's eyes in a new manner. She states, "Stevens implies that when one views a situation from an aerial perspective," like the eagle distantly views the intricate Alps

in the poem's closing lines, "the main purpose [of a text] can become clearer...we transition into 'real reading' when we find the order in disorder, or when we use the chaos [of confusion] as a tool for growth."

In Curie's understanding, a reader becomes capable of making transitions from chaos to order in reading by developing metacognitive control of the elements of mind. "Once [readers] have become aware of their awareness," she argues, "they can manipulate the intricacies of their reading habits, step by step" in order to overcome "disarray in reading," bringing oneself to "the rim of discovery, on the edge of a deeper personal meaning." Curie here inverts the discovery process from Stage Four, which involves moving from a nebulous mingling of perception and intrapersonal concepts toward eventual conceptual structure; in reading, by contrast, she starts from conceptual structure, loops into imagination and intrapersonal concepts, and joins her personal meaning to features of an author's concepts.

Curie evidently applied the careful analytical method she describes: she followed similar steps while composing her philosophy of reading essay. She found a practical need for this method to meet the challenge of forming and organizing her ideas: "Stage Five was by far the most intimidating and complex stage to tackle," she reflects. "Once I broke it down into various parts, created my outline, and assigned readings to my subthemes, it was far easier to manage. Looking at huge tasks from smaller lenses helps keep the mind at ease," she writes, "and helps me stay motivated." Curie adds that she finds advantages in applying both individual and social interpretation to help herself advance to higher stages of understanding. Together and alone, she observes, "we may discover new meaning and continue to revel in it until it's made personal."

Curie expands on her latter remark about "personal" meaning in her following paragraph. One makes meaning personal by forming "intrapersonal connections" to concepts, subjecting them to careful scrutiny and holding them in critical awareness. To deepen her point, Curie cites the physicist Richard Feynman's account of his students' inability to transfer rote memorization of a physics formula to interpretation of an actual perceptual phenomenon the formula explains. She contrasts rote memorization to "*meaningful* memorization" where one can "*feel* the [meaning of] words," echoing phrase that the Nobel-laureate biologist Barbara McClintock uses to explain her creative methods in scientific research, which center on perception and intrapersonal concepts.

Curie cites McClintock to support her point: "[o]ne must have the time to look, the patience to hear what the material has to say to you, the openness to let it come to you." Curie displayed these habits in Stage Four in her days-long rumination process; and she used it throughout Stage Five to organize her ideas about reading, writing, and thinking "from an aerial perspective," a process, she emphasizes at several points throughout her essay, that requires "time and attentiveness" in order to "see and catch the intricacies of the mind when it is held wide open."

Curie characterizes reading as an exercise in part-to-whole thinking akin to making sense of puzzle pieces with respect to a provisional completed image. She further concludes that culture may significantly vary how interpreters impute meaning to discrete, smaller "puzzle pieces," with the same pieces taking on different meanings within the differing provisional "big picture" frames of varying cultures. Her metaphorical characterization of reading as a form of puzzle-assembly casts reading as a project or even a quest: one begins with a limited perspective

and disjointed fragments of knowledge and slowly ascends to a panoramic view, an "aerial perspective" on a coherent schema.

However, cultural variation may draw interpreters to gaze from different mountaintops. Curie illustrates this point in her discussion of the internationally-renowned trial and eventual acquittal of Amina Lawal, a woman brought to "justice" and sentenced to death by stoning in northern Nigeria for her "crime" of committing "adultery" after a man sexually assaulted and impregnated her. Curie notes that "European human rights leaders believed [Lawal] should be released immediately from 'her unconstitutional sentence,'" highlighting the contrast of the human rights organizations' phrase for Lawal's sentence to the northern Nigerian government's term, "justice," to describe the proposed stoning. Curie asserts that "real reading" creates a wider "puzzle" framework that creates a possibility of bringing differing perspectives into analysis and reconciliation for "the betterment of [multiple] parties." Her assertion underscores her belief that "flexibility and openness of mind is instrumental during real reading," whether the task concerns conflicts of culture, interpretation of poetry, or analysis of scientific evidence.

Curie expands her application of flexibility and open-mindedness to cross-disciplinary thinking. If "real reading" can help to bridge cultural gaps in understanding, perhaps it can also facilitate logical connections among disparate fields of thought. Cross-disciplinary synthesis "is a complex task...however, from learning with confusion to sharing your introspection with others, the elements of mind are all sitting on your shoulder, holding out a book to read." Curie describes a cycle of connections among the elements of mind that helps one to generate new meaning. The cycle consists of "repeated instances of intrapersonal concepts and sensory imagination perceptions to create concrete individual and social interpretations." Curie sees this cycle in her interpretation of a passage in Albert Einstein's definition of knowledge, wherein

Einstein speaks of a creator's transition from dreamy perception to the appearance of "ordering elements" that become a "concept." Curie cites this passage to illustrate and support her claim that "when imagining sensorily rich scenes...you are constructing your own personal concept--your own personal meaning." Through time and attentiveness, a cross-disciplinary thinker may "see and catch the intricacies of the brain" when it is "held wide open."

Curie sees this thinking process, and real reading, generally, as an essentially creative endeavor. She develops the penultimate illustration of her essay by contrasting conceptual rigidity and mechanical memorization to true expertise, which she identifies with flexible, multi-elemental metacognitive thinking. In her example, she describes a doctor who has mastered memorization of prevailing treatment models for a patient suffering from a certain type of disease. The doctor, in her example, somewhat reflexively prescribes a standard treatment when, in fact, the patient's actual condition did not fit the doctor's pre-existing model (concept). New knowledge would be needed to accurately diagnose the patient's real problem--and this process would require synthesis of many elements of mind to support probing research. It would also require "patience and grit" while thinking from an "aerial perspective" to navigate the "perils" of misinterpretation, which may potentially be "transformed into securities."

Curie concludes her persuasive essay and philosophy statement by defining propitious conditions to carry out "real reading." Real reading, she asserts, requires a measure of withdrawal into patient and open reflection: "[r]eal reading needs patience because it is gradual," she observes. The careful reader also benefits from others' "empathy," she writes, because the interpretive process is vulnerable to pressures from within and from without. The reader deserves a secure place from which to inquire and create: original thinking "raw" and tender; it thrives where it can remain "untouched by others' harsh concerns," she declares.

Outcomes of Curie's Completed Philosophy Statement

Curie's essay displays her application of concepts she started to think about in Stage One, reflected upon throughout multiple iterations of Stage Two literary interpretation, analyzed across disciplines in Stage Three, and applied creatively in Stage Four. In Stage Five, Curie explains how metacognitive application of the elements of mind can enhance literary interpretation and facilitate cross-cultural and cross-disciplinary thinking. She concludes Stage Five by implicitly hitting upon the distinction between conceptual representations and real-world patterns and objects, revealing a gap between language and world. This gap may be closed by the real reader's "journey" from a partial to "holistic" perspective. Curie finds this journey "is enticing, but also subtly scary." As Curie's masterful but mistaken doctor discovers, the world may not be as simple as a prevailing conceptual order may suggest.

Curie and her peers had completed the penultimate step in the curriculum model. They had forged an explicit philosophy of mind and pondered how it may be applied as an instrument of creation and analysis. In the next and final creative stage in the curriculum model, Stage Six, I asked students to apply their stated philosophy: I called on them to redesign their thinking in an area of their studies where they feel especially challenged or eager to improve. As Curie suggests in the closing line of her essay in Stage Five, real reading can sometimes feel "raw" and tender, especially so in a difficult reading process. Her peers would likely feel the truth of her claim as they worked against the grain of their usual fear, distaste, or feeling of overwhelm.

My hope, leading into the final creative stage of the model, Stage Six, is that students would feel my support--my "empathy," as Curie said it--so that their thinking could prosper, "untouched by others' harsh concerns"--and touched, instead, by an awakened sensitivity to

beauty and meaning, or at least to noticeable structure and logic, which they hadn't glimpsed before studying how to awaken and grow the elements of mind.

Applying the Method: Curie's Design for a Path of Learning

In Stage Six, students steer their thinking into a dust storm: they try to organize ideas they have not previously organized; they try to develop a skill that has remained out of reach; they try to master content knowledge that has eluded their grasp.

Curie's Long-Term Goal to Become Fluent in Spanish: Mapping a Path

Curie begins Stage Six by identifying a problem in Spanish: she notes her inability "to fully comprehend when someone speaks to [her] in fluent Spanish." She cannot keep pace and experience flow: "Once I've heard one sentence, I begin processing it, which leads me to miss the next two sentences." Her limited listening-comprehension speed and accuracy matches her limited speaking ability. She concedes, "[I]t's a challenge for me to formulate sentences in a graceful, fluid manner." Her opening remarks establish important details about her starting point in moving toward an ambitious goal: fluency.

Curie has evolved this goal over several years. She explains that she has taken Spanish since her 7th-grade year and that she has travelled to two Spanish-speaking countries, each time for a period of weeks. However, despite this long period of study, she remains "slow to develop sentences off the top of [her] head..especially when using multiple different tenses in real-life conversation." Bringing her conjugation skills to the level of automaticity emerges as an important sub-goal in Curie's learning quest.

Curie envisions a picture of fluent mastery. “I want to be able to have a somewhat “normal” conversation in Spanish (jokes and all),” she states, adding: “My goal is to be able to *think* in Spanish. A good way of measuring this would be that I take educational classes in Spanish (in fields other than Spanish) and be able to understand the content and the material.” To the latter academic and professional standard of mastery, Curie adds a personal, internal goal. “I want to be able to *feel* in Spanish: pain, happiness, love, stress….” She identifies talking with native speakers, learning outside of her comfort zone, and more ambitious traveling, especially in future study abroad programs, as essential strategies in moving toward her “lofty goals.”

Her plan takes on more detail when she discusses how she will involve each element of mind. She locates intrapersonal thought as the center of her creative activity and learning process in Spanish. “I am always trying to translate everything in my head, and that takes a lot of attention and concentration.” Most of what she thinks during this process remains intrapersonal, at this point. Her translation skills are not yet fast enough for conversation, and most of her thinking lies beyond her vocabulary: “stream of thought is one of my biggest struggles in Spanish, as I don’t have much attention [left] to devote to it.” Curie explains that she sees learning to read and write accurately as important precursors to increasing her speed and accuracy to keep pace with fluid conversation and moment-to-moment thought.

Curie describes a series of steps she can take in order to approach her goal, starting with sensory data--listening closely to native and expert speakers, letting herself catch on. She expects to gain this speed gradually, and first of all by engaging in slower, deliberate forms of rehearsal in reading and writing with interpersonal concepts. Currently, she admits that she “draw[s] upon interpersonal concepts very slowly in [Spanish].” Her application of sensory imagination and multi-elemental individual interpretation is even slower, she realizes.

"Sometimes I imagine various pictures in order to aid me in accurately writing/talking in Spanish…[but] I haven't gotten to envisioning much." Curie speculates that activating sensory imagination might "make [her] experience more enjoyable," and she arrives at a conception of how to learn a new language: "Learning a language involves all of the elements of mind: creating new intrapersonal concepts and interpersonal concepts, using sensory data and sensory imagination, and utilizing [individual and social] interpretation to bring it all together." She sees social interpretation--relationships--as central to her future in gaining mastery in Spanish, and proposes that sensory imagination can act as a platform for "crafting responses in [her head]" and in "noticing grammatical structures and visualizing verb conjugations."

Curie's accomplishment, as an outcome of Stage Six, is not to have become fluent, but to have charted a more intentional course, to have grown her metacognition as a language learner in Spanish, and to have clarified a sequence of learning goals and strategies to reach them. It is a modest outcome; and Curie, at the conclusion of her reflection on Stage Six, remains modest. She concludes by remarking on "an emotional and intellectual barrier that stops the flow of [her] understanding" in Spanish, soberly estimating that "it is going to take years upon years in order for me to become fluent, or even close to fluent." Her first step, she explains, will be to create her own course of study for the summer, which will involve travel to a Spanish-speaking country with the aid of her mother, who is fluent in the language.

Students completed Stage Six at the very end of the academic year. If Curie and any of her peers were to follow through on their respective re-designs of their thinking and learning about a specific subject or problem, they would need to do it at some future point. In order to raise the likelihood that the students would take this next step after our class had ended, I asked them to complete one more stage: a reflection on the previous six stages which they had finished

over the course of the year--an invitation to contemplate all of their work in the model as connected pieces in a system.

Seeing a System: Curie's View of the Stages as a Connected Process

Students completed Stage Seven as one part of their ELA final exam. I asked them to look back on all stages of the curriculum model, to contemplate relationships of the stages to one another, and to think about their learning experiences in each stage (see the complete prompt in Appendix G). The prompt is brief, and it comes in three parts. I asked the students to focus on making full but concise answers to the questions, acknowledging that they had already reflected thoroughly on each stage at several points throughout the year. Having done 99% of the work, they would now conclude by contemplating the whole system and forming final impressions.

Curie's Year-End Reflections

Curie's answers indicate her careful reflection about each stage and her understanding of their connections to one another as parts of a system. In the first of three questions I posed to students in Stage Seven, I asked them to describe their thinking and insights as they worked on Stages One through Six. I elaborated: "Did you go through confusion? Did you experience moments of breakthroughs? Did you remain the same or did you change in any way?" Curie uses her first, detailed first paragraph to describe her experience in each stage. She completed Stages One, Two, and Three "efficiently" and "with joy," she writes, after briefly starting out in a "choppy" and "inconsistent" process. Stage Four posed the first significant challenge: in order to create a new word, she "spent days trying to notice the intricacies of my house, my feelings,

my bed, the road…[on] the night before the deadline I was able to create a word that was meaningful to me."

She concludes her opening paragraph by describing two changes she experienced while working through stages in the model: one concerning an insight about her cognition, and one concerning her orientation to learning difficult material. "I seemed to have a breakthrough regarding Spanish," she writes; I discovered that my sensory imagination plays an instrumental role in my comprehension and speaking." This reflection harkens back to Curie's Stage Three self-profile reflection, in which she identified "increasing the vividness and speed of sensory imagination" as a key to propelling herself along a path toward fluency. Her second point in the last lines of the opening paragraph concern a change in her learning dispositions: she learned a lot about "the habits of my mind," she begins. "I realized that I get distracted when I get stuck, and in order to fully embrace my confusion, I have to face it head on."

Curie exemplified her willingness to embrace confusion and face it steadfastly, especially in the later stages of the model. She goes into more detail about her experiences in each stage in her second and longest paragraph, responding to my prompt to consider how the six stages fit together in a system that breaks reading and writing into related steps, working from the simple to the complex. Curie relates that she needed to show more grit and strategy in some stages, particularly in Stages Four (Create a Word) and Five (Create a Philosophy of Reading)--"by far the most intimidating and complex"--but also in Stage Two, literary interpretation, which required her to apply sensory imagination to higher abstractions about literature about literature. These stages required hard work for Curie, whereas Stages One (Abstract Symbol Game) and Three (Mind Self-Profile) came more easily. In Stage Three, Curie found herself in a flow state upon looking over her completed work: she spent time "viewing my future and the way I would

use the elements of mind to better my lifestyle; it was enjoyable to me to think about the ways in which I could do that."

Curie resumed and deepened this "enjoyable" reflection in Stage Six (Re-Design Thinking in a Challenging Subject), which she focused on Spanish. She reports experiencing flow more easily in this stage because, by that point in the model, she "had given [this subject] much thought before I actually started writing." In this final stage, Curie used the self-knowledge she earned in previous stages to reach a culminating experience: she formed her plan to become fluent in Spanish, describing how and why to recruit each element of mind into her learning process.

Curie's writings from throughout the year amount to a strong collective response to my third and final question in Stage Seven. I asked all students to speculate on how Stages One through Six could form part of a method, a practical philosophy of mind, which they could continue to evolve. "How could you use and improve this reading method in the future?" The heart of Curie's response to this prompt appears in her reflections on Stage Six--she plans to study Spanish and make it part of her life and career. However, she adds noteworthy points in her final paragraph which lend important insights into how her work in ELA enhanced her thinking Spanish and sharpened her problem solving and thinking, in general, across all contexts.

Foremost in her reflection, she emphasizes the importance of "noticing aspects of her reading...enriching sensory imagination, in hopes of enriching my individual interpretation." She emerges at the end of the year with strategies that "help tremendously" with "being aware of psychological and physical states of characters and scenes…[and] of the interconnectedness of the physical and psychological." Sharpening her reading and thinking skills through the model stages and in each of her classes reinforced her trust in her management and metacognitive

strategies for coping with her most intense challenges. Replying to the closing question about how she could improve her use of the elements of mind, she writes: "If I break up my reading and writing processes into smaller tasks and assign various methods [to address each task]," she reflects, "I will improve those skills drastically…[and] ease any worry or stress." The latter claim remains a theoretical prospect for Curie's academic future. However, it is a point she proved throughout the most difficult stages of this year-long project.

Paths through the Model: Curie's Artifacts Juxtaposed to Works by All Participants

Artifacts created by Curie in each stage elucidate details of the curriculum model. Her path shows how a student may form connections from one stage to the next, yielding a picture of one student's learning process throughout the model's sequence of challenges. My aim in the remainder of this chapter is to depict the model from many angles by juxtaposing Curie's work to that of her peers in each stage. My ensuing presentation of student work deepens my answer to my second research question: **In an English Language Arts classroom where the teacher guides students through steps to develop a practical philosophy of mind, how does student work exhibit interpretation and critical thinking?** Collectively, patterns in the overall data set yield a multifaceted picture of the model as several students experienced it.

Stage One: Patterns in the Complete Set

Curie's quickwrite interpretations of abstract objects display priming (Ratcliff and McKoon, 1988; Sperber et al. 1988) patterns that each student among the ten participants appears to generate unconsciously (Dehaene et al., 1998). I find the "compound cue" concept in Ratcliff and McKoons' study (1988) especially compelling, as students appear to form spontaneous

compounds of internal conceptual primes and the given visual object I displayed for them. As I noted in my description of Curie's work in Stage One, the students appear to prime themselves: after making a first interpretation of an abstract symbol, the students' subsequent interpretations reflect traces of the first interpretation, i.e., of the conceptual prime, which, after the first interpretation, subtly becomes a *compound* of the sensory data (the image) and the student's previous conceptual label. These compound-traces appear in rhyme, alliteration, concept-similarity, thematic continuity, or a combination of such features. The students' lists usually vary from one another, but they show internal self-similarity. I refer to this phenomenon as *auto-priming* or *self-priming*.

Consider the following illustrations of self-priming in the lists of Eliot and Vincent. In response to the first abstract symbol, Eliot interprets first a "tornado" and then, second, a "bow," creating strong assonance with the long *o* sound. Alliteration with the *b*-sound in "bow" carries into Eliot's third and final interpretation, "ribbon." Eliot sees "a clog," "a dog," "an untied shoelace and shoe," and "a rabbit" in response to the second abstract symbol, displaying straight rhyme in her first and second answers, repetition of the word "shoe" in the third answer, and, as in the second answer, an animal in her fourth, final answer. In response to the same symbol, Vincent does not see any animals, but her three answers display a clear self-priming pattern centering on a theme of nationalities: she sees "an immigrant escaping on a boat," and then the "hot sauce bottle guy in a German clog," followed by a "French art critic on an Italian river." Each student similarly interacted with his or her own internal conceptual labels but with different results--about the "same" object.

Griffin and Gwendolyn display a similar pattern of peer-to-peer difference compared to the within-list similarity in each of their sets of responses. In the first symbol game, for example,

Gwendolyn first interpreted the object as “planets.” She next sees “a head”--another approximately spheroid object--and then, likely combining “planets” and “a head,” she sees “an alien,” and, last, “one of those aluminum foil hats on top of a head” (close to a stock UFO image?) cycling back to the second concept in her list, focusing on the word “head.”

Griffin, by contrast, first sees a “cursive G.” This cursive G then becomes, for Griffin, a “Disney Princess Carriage,” apparently viewed from the side and facing right. In Griffin’s third list-response, the mythical princess carriage becomes a “Magic Carpet,” with alliteration of the hard *c* repeating, too, on the final word in the list item. Griffin’s fourth list element continues a vehicle theme from the second and third elements: this time, he sees a “lawn mower.” Notice how the object progressively flattens in Griffin’s sequence: a rounded G, followed by a still round carriage, then a much flatter carpet, and then a somewhat flat “mower.” Griffin’s first auto-priming cascade appears to degrade after the fourth element; he makes a new start with a fifth element: “Heart.” His sixth and final element--“Peach” represents a somewhat similar shape as the fifth element; it is also a five-letter word that repeats the second and third letters exactly, places a letter h on the opposite end, and places a similarly-articulated voiceless consonant on the opposite end: “Heart. Peach.”

Curie’s list--“pacman / apple w/ bite / platapus / fish hook / fetus” differs markedly from Eliot’s, Gwendolyn’s, Griffin’s, and Vincent’s (“acorn / jumping bean / train / choking person / bathing suit / make-up”), but each student displays self-referential interpretive loops, and still others appear in the full set of lists (see Figures 5.1 and 5.2 on pages 114 and 115, respectively). The pattern across the sets is consistent: the students’ concept sets frequently diverge, but self-similarity appears within the sets, illustrating the independent, self-priming nature of these interpretive cycles.

Students' subsequent, brief reflections about the inner workings of their interpretive processes in Stage One give modest demonstrations of qualities of critical thinking: students felt as ease in being "open-minded, flexible, fair-minded in evaluation, willing to reconsider... reasonable in the selection of criteria" (Facione, et al., 1990) in this low-stakes, playful context. Students show more sophisticated critical thinking, however, in their responses to questions three through six, which display their awareness of the emergence of order in their cognition, their appreciation for the uniqueness of individual interpretation, their observations about connectedness among the elements of mind in thinking, and their ponderings on the inner workings of the mind.

Curie's written evidence of critical thinking goes deeper than that of most of her peers. She goes beyond my prompting when she observes that "objects and concepts that are more familiar to you from your past and your community might be more [likely] to show up in your individual interpretations," intriguingly mirroring Rosenblatt's observation that "[e]ach individual...brings to the transaction a personal linguistic-experiential reservoir, the residue of past transactions in life and language" (1978, p. 182). Curie's awareness of the influence of background memory displays self-awareness and suggests her capacity to see beyond what might be built-in limits, or even biases, in her thinking.

Curie also displays a capacity to be "habitually inquisitive" and to notice and name "evidential...considerations" (Facione, et al., 1990) that factor into her thinking. Curie's writings give further evidence for the latter inferences. "I realized the power and importance of social interpretation," she states, "[in] developing your own personal ideas and then expanding them…" through social interpretation. She looks outward as well as within in finding justifications and challenges to her thinking.

Zora and Griffin likewise display striking inquisitiveness and make sound inferences from their internal and social observations of the thinking processes involved in Stage One. "These processes are what guide our learning," Griffin concludes. "The better we use these processes, the better we successfully acquire knowledge." Zora likewise links skillful application of the elements of mind to learning and creation: "[w]hat we are good at [doing] [involves using] more elements." The insights Zora and Griffin share in their writings indicate their readiness to explore and reflect upon how the elements of mind interact in other contexts, which is the subject of later stages in the curriculum model.

Stage Two: Perceptual Frames in Students' Interpretations of Literature

Curie's image-rich response to the literary-interpretation prompt (see Figure 5.11) compares to that of her peers in that she draws heavily from sensory imagination: she creates 12 visual images, faintly traces one movement, marks four shifts of perspective--and, notably, she describes zero sounds, making a total of 17 perception-related details in her reconstruction and analysis of the passage.

Responding to the same passage, Ezra and Gillian create 13 and 14 perceptual details, respectively, showing similar richness in and reliance on sensory imagination to write about the text. However, Curie differs from her peers in terms of the distribution of *types* of perceptions she describes in comparison to those of her peers. Ezra describes only four visual images (to Curie's 12), but he highlights eight sounds (to Curie's zero) along with one reference to temperature. Ezra describes no movements at all (to Curie's one), but Gillian marks a midpoint between Curie and Ezra: she depicts eight visual details, notes three sounds, and traces three movements.

The unique perceptual features of each student's writing may correlate to each student's life-interests: Curie notes her frequent use of visual thought to enhance her interpretation of information across disciplines (a feature that emerges in her cognitive self-profile); Ezra, meanwhile, is a musician (note his eight references to sound in the same passage where Curie mentions zero); Gillian, who describes more movement perceptions than most of her peers, is a devoted dancer. Only Wendell describes more movement perceptions (seven) in his analysis of the same passage, along with nine visual images and five descriptions of sound.

The passage which students interpreted appears in figure 5.3 along with reflection questions students completed after creating their detailed scene-designs. Figure 5.13 shows Curie's (left) and Wendell's (right) interpretations from this particular exercise. Keeping in mind the self-priming effect revealed in Stage One, and noting the different kinds of perceptions that appear in readers' descriptions of the same scenes, I am prompted to wonder how students' personalities, daily habits, and ways of noticing physical details and movements might similarly incline each reader to develop a distinct self-priming pathway--not only in response to individual abstract symbols, but with whole passages of literature.

CURIE	WENDELL
The suspense and anticipation upon meeting Gatsby's silhouette reflects a sense of immediate simplicity but then a longing realization of profundity. The camera adopts the lens of Nick, after his physical introduction in the beginning. There is an obvious transition of camera angle: the audience goes from being able to see Nick to seeing what Nick sees. The image of the cat prompts the audience and Nick to notice Gatsby's figure. I envision there to be only two sources of light, initially--Gatsby's mansion and the moon. The light of Gatsby's mansion brings Nick's awareness to Gatsby's wealth and social status. The light of the moon raises attention to Gatsby's contemplative mood -- through his calm and serious body language and his slightly confused and determined facial expression. Nick does not yet know the source of Gatsby's psychological state, but he is curious. The camera pans out to see both characters standing alone, viewing some representation of a person they desire to know. In this change, the green light is now visible, and it is obvious that Gatsby is transfixed by it. There is a sort of triangle of light and people -- the moon illuminating both Gatsby's and Nick's faces; the green light illuminating the sense of Daisy.	The scene opens with Nick slowly, quietly exiting his vehicle. Suddenly, a gust of wind, disturbing the peace of sound, wakes the leaves from sleep, creating a subtle ruffling sound, a beautiful orchestra of instruments. The camera is focused on Nick's face, exposing every detail. Slowly turning around, while the song created by the wind increases, a silhouette of a cat creeps inside a swimming pool of the moon's milky light. The random cat freely wanders around the street and keeps the attention of Nick and viewers. The cat walks towards Gatsby's house, anticipating the first image of Gatsby that anyone, including Nick, sees in the story. Gatsby is intentionally put next to his giant house, mainly to symbolize the importance of his role and character--hence the title of the book. Nick stands in amazement and wonder, showing that Nick is very curious, but Nick stays at his house instead of disturbing the iconic figure, because Nick is a man of moral values, one of them being: respect everyone.

Figure 5.13. *Curie's and Wendell's Interpretations of the Same Passage.*

Curie contrasts Stage Two to Stage One, differentiating the abstract symbol of Stage One's free-associative game to the words in the Stage Two exercise with fiction. In Stage Two, she especially relies on "interpersonal [concepts]" and "individual [interpretation]...to take various symbols of meanings (words) and construct my own personal meaning out of them, also drawing from other aspects of the book."

Wendell, by contrast, sees more similarity than difference in Stages One and Two, and the driving element in each exercise, he writes, is sensory imagination: "I had an image I wanted

to convey but I needed to find words to build it." Wendell concludes that he "goes through the same process [in Stage Two] as I explained [in Stage One], and this whole exercise is helping us apply the same process to anything we do."

Like Curie, Wendell notes the essential role of interpersonal concepts in Stage Two, but cites a social reason for the importance of communicable concepts: "I need to be able to connect with my peers [through interpersonal concepts] so they can live in the world I designed from my point of view."

Stage Three: Creating Detailed Impressions and Forging an Instrument

Curie's peers arrive at like-minded conclusions about the role of sensory imagination in learning. Gwendolyn, Gillian, Austen, and Ezra state that their math skills could improve if they could quickly form accurate perceptions in response to conceptual symbols in equations--a skill that the physicist and mathematician Richard Feynman sought to teach his students (Feynman, 1997). "I would be able to intuitively answer questions and remember formulas," writes Gwendolyn. She speculates that increasing the speed and vividness of her math-based sensory imagination "would also increase my overall interest in and outlook on the subject because I would be able to understand it." Gwendolyn's latter remark aligns with Curie's assessment of how integrating the elements of mind affects learning: combining the elements of mind vividly and quickly enables one to "understand."

Zora and Eliot (vis-a-vis AP Chemistry), Wendell (AP U.S. Government), and Griffin (AP Biology) concur with Curie and Gwendolyn: quickly and vividly linking sensory imagination and concepts is a mark of fuller understanding. Griffin writes, "I struggle to imagine the intricate maze of the interior human body, so adding sensory imagination would help

me by allowing me to visualize all the processes happening inside me and improve my understanding." Eliot adds that, if she were to develop such greater understanding, she "would have a greater love and appreciation for chemistry," but adds that "because I do not have this capacity for sensory imagination in chemistry, it presents a challenge to understand difficult topics." Wendell, meanwhile, wonders how sensory imagination could help him remember the functions of congressional committees and the significance of landmark cases in Supreme Court history; he speculates that linking these abstract concepts to sensorily-imagined objects could anchor his thinking.

Vincent takes a separate path from her peers. She does not assess how adding vivid and quick sensory imagination to a subject would change her thinking in a specific subject. Instead, she arrives at a more abstract, categorical conclusion about the role of sensory imagination in learning. "Being good at something is where my interest comes from," she explains. "I think everyone can agree that sensory imagination makes you good at something; therefore, no sensory imagination--not good at it; not good at it--no creativity and analysis." If Vincent's assessment is true--that creativity and analysis are weakened or even precluded by a lack of sensory imagination--then one wonders if sensory imagination is a fluid variable across disciplines, and if it is actually changeable, then the question of how to spark it and synthesize it with concepts becomes a central question for researchers, teachers, and students to actively investigate.

Beginning Stage Three: Completing a Miniature Cognitive Self-Profile

Three weeks before students gave their answers to the closing questions of Stage Three, they started their cognitive self-profiles by completing quick initial self-assessments of how quickly and vividly they form sensory imagination in response to different kinds of conceptual

symbols, e.g., “equations in math,” “words in history,” or “printed musical notes.” A picture of the self-assessment instrument appears in Figure 5.4. Figure 5.14 displays Curie’s first cross-disciplinary assessment.

Rate the vividness of your experience of sensory-imagination when you read each of these types of symbols or subjects. Place a number from the scale next to each symbol or subject. Next to the #, name a speed at which your perception flows. {**Curie**}

SCALE

7	**6**	**5**	**4**	**3**	**2**	**1**
Very Vivid			*Mild*			*Inactive*

Words (English)	6 / 5.5 -- moderate in speed
Words (History)	6 -- fairly rapid
Words (Sports Strategy)	4 -- slow-to-moderate
Printed Musical Notes	1 -- slow
Equations (Math)	5 -- moderate
Equations (Sciences)	6 -- moderate
Words (Foreign Language)	4 -- moderate-to-slow
Printed Musical Lyrics	4 -- moderate
Instrumental Music (No Words)	7 -- fast
Song Lyrics (Listening to a Singer)	7 -- fairly rapid

Figure 5.14. *Curie’s Self-Assessment of Vividness and Speed of Sensory Imagination.*

The students were prepared to produce this self-rating in roughly five minutes, largely because they had become familiar with the elements of mind terminology and fluent in applying it in literary interpretation and reflection for more than four months. I emphasized to the students that a reader’s intelligence and general capacity for interpretation may be very strong, but unfamiliar symbols may preclude interpretation that connects meaningfully with the text. I intended for this example to encourage the students to see that the introductory self-rating exercise of Stage Three is not a competition, but rather a discovery, and that the real reward of accurate self-analysis is self-understanding.

The self-assessment that each student produced presents an approximate measure of each student's cognition, and the close juxtaposition of differences and similarities in perception and speed from field to field immediately prompts questions arising from comparison and contrast of a given student's ratings for each type of concept. For example, why does Curie form sensory imagination more quickly and vividly in history than in fiction and poetry? Why does she form sensory imagination more vividly and quickly when analyzing equations in science than in math? Answers to these questions could help teachers understand how students experience (or, importantly, do not experience) the elements of mind in each academic field and area of activity.

These self-assessments helped me imagine how the students differently form meaning for the symbols that anchor discussions and investigations in each subject area. By comparing Curie's self-assessment to Ezra's and to Austen's, for example, I immediately lost my assumption that these students comprehend literature in an equivalent manner. The data prompted me to plumb each student's writings and responses more closely to notice if and how the elements of mind appear and combine in their analyses and reader responses. Consider Ezra's first assessment (Figure 5.15) of his interpretation across disciplines: compared to Curie, he reports fainter and slower sensory imagination when reading in English and in history, but he reports far quicker integration of sensory imagination and concepts when reading printed musical notes. Austen (Figure 5.16), by contrast, reports vivid interpretation in response to sports strategy compared to Curie and Ezra. The instrument yields a concise index for each student's thinking.

	{**Ezra**}
Words (English)	3 -- not very fast
Words (History)	5 -- fast
Words (Sports Strategy)	5 -- moderate
Printed Musical Notes	6 -- fast
Equations (Math)	4 -- moderate
Equations (Sciences)	2 -- slow
Words (Foreign Language)	5 -- fast
Printed Musical Lyrics	5 -- quite fast
Instrumental Music (No Words)	6 -- very fast
Song Lyrics (Listening to a Singer)	6 -- very fast

Figure 5.15. *Ezra's Self-Assessment of Vividness and Speed of Sensory Imagination.*

	{**Austen**}
Words (English)	4 -- moderate
Words (History)	5 -- moderate-to-fast
Words (Sports Strategy)	7 -- fast
Printed Musical Notes	1 -- slow (not present)
Equations (Math)	5 -- moderate-to-fast
Equations (Sciences)	5 -- moderate-to-fast
Words (Foreign Language)	5 -- moderate-to-fast
Printed Musical Lyrics	6 -- fast
Instrumental Music (No Words)	1 -- slow (not present)
Song Lyrics (Listening to a Singer)	6 – fast

Figure 5.16. *Austen's Self-Assessment of Vividness and Speed of Sensory Imagination.*

Ezra's self-assessment becomes even more interesting in light of his analysis of the passage in *The Great Gatsby*. Ezra rates his sensory imagination as vivid (six on a scale of

seven) and “fast” or “very fast” when he interprets music of any kind; and his interpretation of perceptions in the passage features eight references to auditory perceptions. Curie and Austen, by contrast, rate their reading of printed musical notes as very low or not at all present (one on a scale of seven), and their analyses of the same passage from *The Great Gatsby* include zero references to sounds. Ezra sees printed musical notes and simultaneously hears corresponding sounds, whereas Curie and Austen see the same notes but hear no related internal sounds. In a curious parallel, when Ezra read the passage from *Gatsby*, he heard a lively auditory world to perceive; Austen and Curie saw a vivid, detailedand apparently silent world to experience and describe.

The initial self-rating instrument in Stage Three helps students to see how their own minds and those of their peers vary from context to context. In one subject, their concepts and perceptions quickly and intuitively merge to form vivid ideas; in another subject, their sensory imagination does not enter into their interpretive processes at all. Students can use this information to understand, from an informed, detailed cognitive perspective, how and why their thinking works well or does not work at all in one subject area or another. Curie, for example, observes that she sometimes reads “without activating my sensory imagination or intrapersonal concepts...I read a couple of pages and realize that I haven’t comprehended any of the concepts on the pages. My sensory imagination is misplaced and misused for purposes unrelated to the piece of writing.” Eliot arrives at a similar insight: “I have difficulty imagining sections of a book or notes and as a result it makes it tougher to focus on what I’m trying to do.”

The students found greater opportunities to deepen these insights when they advance past the initial self-assessment. In their next steps, they considered their emotional, aesthetic, and cognitive engagement and experience in each of eight subject areas. The initial self-rating

instrument asks students to think only of the vividness and speed of sensory imagination in response to various kinds of concepts. The challenge of creating eight detailed self-profiles, however, requires the students to examine whether and how each of the elements of mind enter into their creation and analysis. The students give a global description of the emotional, social, aesthetic, semiotic, and motivational contexts of their thinking in each distinct case.

Sensory Imagination Comes into Focus

Another noteworthy pattern appears in Curie's eight subject-area self-profiles which may explain her resilience: she constructively uses sensory imagination in each course. This feature distinguishes Curie's self-profile. Gillian, Zora, Austen, Griffin, and Ezra each report low- to zero-level sensory imagination in at least one topic, and in each of these courses, they report having difficulty. The following columns (Figure 5.17) display Curie's, Griffin's, and Zora's self-portraits in math; they differ markedly in terms of emotion and sensory imagination.

{Curie}	{Griffin}	{Zora}
MATH	**MATH**	**MATH**
Emotional Tone(s)	*Emotional Tone(s)*	*Emotional Tone(s)*
Bored Unstimulated Intrigued Amazed	Bored Dull False Hope Occasional Fulfillment Annoyed	Anxious Disappointed Angry Depressed
Driving Element(s)	*Driving Element(s)*	*Driving Element(s)*
Sensory Data Sensory Imagination Interpersonal Concepts Intrapersonal Concepts Social Interpretation	Sensory Data Interpersonal Concepts Social Interpretation Sensory Imagination	Social Interpretation Interpersonal Concepts No Sensory Imagination
Self-Portrait/ Reflection	*Self-Portrait/ Reflection*	*Self-Portrait/ Reflection*
When I see a math problem, I construct a visual in order to better understand how to move through the problem. In order to get the foundation, I use social interpretation and interpersonal concepts. I then construct my own mnemonic techniques.	I understand numbers and enjoy math, but I get annoyed when the math is just knowledge of how to use the calculator. I excel when I can imagine the numbers playing out in real life (money; touchdowns), but otherwise I can't relate to the material.	As a student in this class I felt anxious, angry, disappointed, and depressed due to constantly struggling to understand the concepts. I had to use social interaction and interpersonal concepts to do well. I could not use sensory imagination.
Beauty: *Sometimes Beautiful* **Goals:** *Long-Term Goals* **Flow:** *Sometimes in Flow*	**Beauty:** {No Answer} **Goals:** {No Answer} **Flow:** *Rarely in Flow*	**Beauty:** *Never Beautiful* **Goals:** *Short-Term (Sincere)* **Flow:** *Sometimes in Flow*

Figure 5.17. *Comparison of Three Student's Mind Self-Profiles in Math.*

Note that Griffin's experience in math changes when math becomes concrete and multi-sensory (or multi-elemental). Curie makes her math multi-sensory as a learning strategy. Zora "could not use sensory imagination" and finds that math is "never beautiful."

Curie and Griffin involve sensory imagination more easily in history (see Figure 5.18). They report higher emotional positivity and more awareness of beauty in history, too. Austen loves history--it is her “favorite subject”-- but she rarely uses sensory imagination and reports less awareness of beauty (“sometimes beautiful”) than Curie does (“often beautiful”). The differences each learner brings to a classroom present an intriguing challenge to each teacher: how can a teacher present “the same” material and make it “attractive” to many different kinds of minds? How can each student notice a spark in sensory imagination that sets alight a whole field of concepts related to that initial aesthetic experience?

{Curie}	{Griffin}	{Austen}
HISTORY	**HISTORY**	**HISTORY**
Emotional Tone(s)	*Emotional Tone(s)*	*Emotional Tone(s)*
Stimulated Interested Contemplative I tend to question many historical connections, and I always want to know more.	Energized Opinionated Patriotic Interested	Stressed Motivated Excited
		Driving Element(s)
		Interpersonal Concepts Social Interpretation Sensory Imagination—I don't use this as often as I should. This would allow me to "witness" each event we learn.
Driving Element(s)	*Driving Element(s)*	
Social Interpretation Intrapersonal Concepts Interpersonal Concepts Sensory Imagination	Individual Interpretation Sensory Imagination Interpersonal Concepts Social Interpretation	
		Self-Portrait/ Reflection
Self-Portrait/ Reflection	*Self-Portrait/ Reflection*	
The foundation of this class originates from others' perspectives on matters from history, so it is based on social interpretation and interpersonal concepts. I take those and make sense of things for myself, using intrapersonal concepts. I use sensory imagination in order to insert myself in those time periods—sensorily.	I love this class because I enjoy history, especially involving the U.S. I can imagine the events because people did them, which is unlike most other classes.	History is my favorite subject to learn/study. As a student of history, I experience levels of stress, motivation, and excitement. The stress derives from the amount of work given, but I tend to feel positive when I am organized and do well in this class (I find it interesting). Taking notes in an organized way makes me want to do quality work. Interpersonal concepts and social interpretation help me because I utilize notes and people around me to help me succeed. I wish I were better at using senses so I could understand the content by putting myself "in" each historical event.
Beauty: *Often Beautiful* **Goals**: *Short-Term Goals* **Flow**: *Often in Flow*	**Beauty**: {No answer} **Goals**: {No Answer} **Flow**: *Always in Flow*	**Beauty**: *Sometimes Beautiful* **Goals**: *Long-Term Goals* **Flow**: *Often in Flow*

Figure 5.18. *Comparison of Three Student's Mind Self-Profiles in History.*

Students Create Aerial Perspectives on the Mind Self-Profiles

Students shared their insights about patterns in their learning, analyzing, and creating by studying their eight mind self-profiles and answering 10 reflection questions. The first four of the 11 questions appear next to the initial miniature mind self-profile--on the front side of the 11"

x 17" form (see Figure 5.7 and Figure 5.9). The next three figures display Curie's, Austen's, and Wendell's first reflection responses. Each student identifies elements of mind they find most instrumental in their respective thinking processes. Of special note is that each student, in response to the fourth question, identifies an element of mind that, if strengthened, could help them improve their learning in a given subject. Students return to this question--how to use awareness of the elements of mind to improve in a difficult subject--in Stage Six, which involves designing a learning process.

Complete your self-profile on the next side of this form;
then write a description of your thinking style or styles.

{Curie}

Does your style differ or remain similar from class to class?

I seem to utilize sensory imagination throughout all of my classes. Sometimes this enriches the experience, and sometimes this distracts me (e.g., in daydreams) from the actual subject.

Which element(s) of mind do you apply most frequently?

Sensory imagination and interpersonal concepts. Both seem necessary for my success. Interpersonal concepts act as the foundation, and sensory imagination allows me to delve deeper.

Do you notice a relationship between emotional tones and the elements of mind that influences your thinking style?

In the classes I dislike, where I feel uninterested and unstimulated, I use social interpretation and sensory imagination (daydreams) to ignore what I don't like.

If you could increase the strength of one element of mind in any subject, which element would it be, and in which subject?

I would increase individual and social interpretation in Spanish in order to improve my comprehension. I want to be able to hold a conversation, and interpretation would aid me.

Figure 5.19. *Curie's Written Replies to Questions on the Cognitive Self-Profile.*

Curie identifies perception-concept synthesis during both social and individual interpretation as the two elements she would most like to improve to get better at Spanish. Austen and Wendell, however, narrow in on sensory imagination as the element they would most like to strengthen in order to improve in classes they find most challenging. In each case, each of these responses presages the students' selections for the lesson design challenge for Stage Six.

Complete your self-profile on the next side of this form;
then write a description of your thinking style or styles.

{Austen}

Does your style differ or remain similar from class to class?

My thinking style differs in various classes. For example, in my hardest classes, I tend to think harder and become more motivated. In classes I view less seriously, I don't try as hard because I don't feel challenged.

Which element(s) of mind do you apply most frequently?

The elements of mind I apply most frequently are interpersonal concepts and social interpretation. In all of my classes, interpersonal concepts (like notes) help me gain knowledge, and social interpretation helps me get better at a subject because of group discussions and projects.

Do you notice a relationship between emotional tones and the elements of mind that influences your thinking style?

I notice that whenever I use interpersonal concepts—such as notes—I find that my motivation levels increase. Being challenged by more information influences me to complete quality work. Also, social interpretation makes me feel informed and content through group conversations.

If you could increase the strength of one element of mind in any subject, which element would it be, and in which subject?

I would increase sensory imagination in all math classes I have taken and will take later. When working on math problems, I find that I typically picture equations and then write them down to comprehend them. I would increase sensory imagination so that picturing equations would be an easier and more beneficial process.

Figure 5.20. *Austen's Written Replies to Questions on the Cognitive Self-Profile.*

Complete your self-profile on the next side of this form;
then write a description of your thinking style or styles.

{Wendell}

Does your style differ or remain similar from class to class?

I consistently notice myself using sensory imagination in classes where I excel; also, the more I use social interpretation [for non-work related talk], the less interest I have in the class.

Which element(s) of mind do you apply most frequently?

I use sensory imagination and individual interpretation the most because I strive to figure things out by myself, which advances my learning.

Do you notice a relationship between emotional tones and the elements of mind that influences your thinking style?

The more interested in am in a class, the more willing I am to use my elements of mind.

If you could increase the strength of one element of mind in any subject, which element would it be, and in which subject?

I would increase individual interpretation in my hardest class, AP Government. I would be able to answer questions by myself and independently advance my learning.

Figure 5.21. *Wendell's Written Replies to Questions on the Cognitive Self-Profile.*

The students began to form global impressions of themselves as thinkers in the latter phases of Stage Three. Curie's, Austen's, Zora's, and Wendell's profiles give examples of how each student in this study began to think at length and in accurate detail about patterns in their own thinking, and in eight particular contexts.

Synthesis of the Elements of Mind as a Central Factor in Personal Identity

Curie discovered that "part of [her] self would be lost" if she could not involve sensory imagination in her study of biology. Ezra experienced a similar epiphany. "Music has always been part of my life...I love not only hearing it, but playing it, too," he declares. "If you remove sensory imagination from music, you more than likely can't play very well." Ezra goes on to wonder what he might accomplish if he were to think in math and science as he does in music: "I

have learned through this self profile that all of my strong subjects and everything I'm good at and enjoy revolve around interpersonal concepts and sensory imagination within my own thoughts. ...If I put as much effort into math or science as I do music, there's no telling where I could go in the future." Ezra's mind self profile, however, shows that he struggles to form sensory-imagination correlates to math concepts. " I had a great teacher," he explains, "but the material really challenged me and had me really lost." Ezra ponders how sensory imagination might help him become stronger in math: "If I could add speed and vividness to my sensory imagination in math, math would be much easier because my mind would flow better."

For both Ezra and Curie, one's very identity as a student in a given class, if not as a person, seems intimately tied to sensory imagination. Curie reports that she has developed long-term personal goals related to biology and anatomy; and Ezra states that "music is a huge part of who I am and means everything to me...I flow well in it. Music makes me feel good about myself." These statements prompt me to ponder how sparking and cultivating sensory imagination may be one of the most important roles I play as a teacher of English Language Arts.

Answers from Curie's and Ezra's peers reinforce the latter conclusion. Griffin's "strongest subject, AP U.S. History," he states, "would become [his] worst" without sensory imagination. Recall that in Griffin's subject-area reflections in both math and history (see Figures 5.17 and 5.18), he connects to each subject through "real-life" material which he can access through sensory imagination. He would lose his love for the subject, however, if he could not excel in individual interpretation, the synthesis of concepts and perceptions. "If I couldn't imagine people carrying out actions in history, I would struggle to comprehend the material," he explains. "Sensory imagination is vital to my success in APUSH." Wendell likewise concludes: "If I removed sensory imagination from math, my favorite and best class, my ability to

understand the concepts and formulas would be demolished. I use my imagination to construct the numbers internally and apply tips from my teacher." Wendell creates and understands math by consciously combining concepts and perceptions.

From responses like Griffin's and Wendell's, I conclude that, since sensory imagination is so vital, a teacher will benefit by considering how to help students develop this element of mind. This consideration prompts a question: how might a teacher embark on this endeavor to help students grow sensory imagination since, to anyone but the privately-dreaming individual, sensory imagination is mysterious and personal? Only outward signs--shared (interpersonal) concepts, abstract representations--can show the presence of sensory imagination; from those signs, listeners or readers could form ideas that diverge from the writer's or speaker's statement.

The latter considerations motivates me, as an English Language Arts teacher, to begin Stage Two--literary interpretation with reflection on the elements of mind--early in the year and, most importantly, to continue practicing it consistently throughout the year. It is a difficult skill to master, but practicing it offers the potential reward of enriching each student's inner conversation while also teaching students how to read, listen, communicate, and interpret. I thus conceive of literary analysis exercises as gardens for concept formation, perceptual experience, and interpretive synthesis of cognitive and emotional elements, as well as for tuning communication--social interpretation--about internal cognitive processes. We can take delight in these shared spells of concentration and creativity.

Stage Two is grounded in my conjecture that, coupled to metacognitive reflection, such exercises can help one to form and strengthen a practical philosophy of mind in the realm of language-based reasoning. And the model of creation, reflection, and communication demonstrated in this language arts exercise may provide a model for how students may develop

interpretation across sign mediums and disciplines, as Griffin, Wendell, Ezra, and Curie have done in history, math, music, and biology, respectively, wherein each student's synthesis of concepts and sensory imagination provides a basis for aesthetic reverie and practical competence, if not mastery.

More of Curie's peers speak compellingly to the importance of sensory imagination in language-based reasoning. Gwendolyn, Gillian, and Vincent give special emphasis to the value of sensory imagination in English Language Arts. Gillian observes: "I use all six elements of mind [in English]," a class where she "feel[s] interested, stressed, confused, intellectual, and happy" when engaged in ELA activities. However, she claims that she "would struggle with writing essays and analyzing readings without sensory imagination. My writing would be very boring." Gwendolyn, a poet and language arts enthusiast, similarly remarks that, without sensory imagination, her "creativity would be adversely affected...it would take so much thought and pressure to come up with interesting topics or to analyze texts" in a class for which she usually relies most heavily on "sensory imagination and individual interpretation." Vincent states flatly: "My interest would be removed" if sensory imagination were to be subtracted from her immersion in English Language Arts.

Austen speaks just as powerfully to the value of sensory imagination in ELA. "When writing," she observes, "I usually figure out what to write about when I establish a tone, topic, and theme by imagining how a certain audience would react to it. Also, by imagining ideas to write about, I am able to think about rhetorical devices and how to utilize them." Austen concludes her metacognitive reflection about her work in ELA by noting the value of sensory imagination. "If I didn't have proper command of sensory imagination, then my writing would lack quality and uniqueness."

Later in the year, Austen took her reflection on sensory imagination much deeper. Looking over her completed mind self-profiles once again, she describes a new insight she gained while completing Stage Three. "While completing this reflection instrument, I learned that I use sensory imagination for a lot more than I think I use it for. Before completing the form, I thought I used sensory imagination for the sole purpose of daydreaming when I was bored." Austen's reflection profoundly altered her understanding of how she thinks: "After I analyzed how I learn in my classes," she continues, "I noticed that in math I picture the equations, in history I imagine the events, in English I imagine how readers would respond to my writing, and in sports, such as tennis, I imagine plays. Sensory imagination has helped me gain more knowledge and understanding in all my classes and activities rather than consisting only of daydreaming."

I did not pose a follow up question to Austen at the time, but I pose it now for readers of this study: what would happen if Austen were to remove the functions of sensory imagination across all of the contexts and activities she describes in her responses? And another question: what if Austen were to train her sensory imagination to become quicker and more vivid in response to concepts and perceptions across each of these fields of endeavor? All of the students' writings in reply to questions five and six provide a sound basis for inferring answers to these questions about Austen. Further, the students' responses to these two experiment questions--questions number five and six in the latter phase of Stage Three--rivet my attention to the matter of how teachers across all fields might help students to blend the elements of mind to enrich their knowledge, understanding, analysis, and creativity.

Metacognitive Coordination of Synthesis of All Six Elements of Mind

Curie's descriptions of her thinking in her strongest courses show that she enjoys the advantage of metacognitive involvement in her activation and synthesis of each element of mind. She also sees the most beauty and sets her deepest goals in these areas of study. Curie's peers create similarly detailed metacognitive pictures of their thinking about the future courses of study. All ten of the students cite the advantage of combining and applying most or all of the elements of mind in a future course of study and in a career.

Griffin and Austen, for example, write about how they will use the elements as future students and professionals in business. Austen anticipates a challenge in relying on one element in particular as a future marketer and business person: "Individual interpretation will be one of my challenges because I typically feel more confident in a group setting," she notes. "For example, if I have to come up with marketing strategies and visual rhetorical appeals, I will only feel great about them if they are looked over and critiqued by other people." Griffin shows a similar concern for connecting effectively with his intended audience. He defines "success" as "tak[ing] intrapersonal concepts and mak[ing] them interpersonal," a process of interpretively evolving an idea. "The ideas I form, if I want to pursue them, must be conveyed in a way others can understand. If I am unable to make my concepts understandable for others, they become worthless."

Griffin, Wendell, and several other study participants cite the importance of sensory imagination in meeting the challenges of learning and of interpersonal communication that centers on original ideas. Griffin states, "I came to the realization that sensory imagination is the most important process in my educational experience. The subjects I struggle with...are where I struggle to use sensory imagination. Without [sensory imagination], I am bored and my ability

to succeed is hindered." His creativity will play a role, he notes, in "sharing of concepts between [himself] and others….one of the most vital aspects of a successful career in business."

In his replies to prompts eight and nine in Stage Three, Wendell places similar emphasis on social interpretation and sensory imagination. Wendell, who also plans on a career in business, cites social interpretation as the most important element: "I need to use multiple points of view in hope of advancing my learning." He then explains that sensory imagination plays an essential role. "A major part of my learning is sensory imagination, mainly because my imagination can't be controlled by anyone else, and the limits I can reach have no barriers. Without the use of sensory imagination," he concludes, "I will be unable to model the subject's content"--e.g., to imagine and "use multiple points of view" in order to learn.

Focusing sensory imagination presents a challenge to all students, however. Curie speaks of the difficulty of forming a "bridge between sensory data and sensory imagination," the latter of which remains inert or drifts off course into unrelated daydreams; and Griffin identifies low or absent sensory imagination as a primary obstacle to his understanding in biology and math. Ezra and Eliot arrive at similar insights about their thinking patterns across the set of eight self-profiles. "The biggest challenge," Ezra reflects in response to question ten, "is the time it takes for me to move from sensory data to sensory imagination when interpreting things." Eliot's and Ezra's responses mirror one another. Eliot identifies her greatest obstacle as "forming sensory imagination perceptions." She elaborates, "I have difficulty imagining sections of a book, and as a result, it's tougher to focus on what I'm trying to do." Vincent and Gillian likewise speak of the onerous task of trying to understand material when "fewer elements of mind are active," rendering classes dull, bewildering, and frustrating.

The students' completed mind profiles and reflections in Stage Three reveal each student's detailed impression of what thinking is and how their own thinking, in particular, works in several contexts. A new question then came into view for me as the students' guide through the model: can their self-profiles serve not only as a model of their minds at this time of life but as instruments in helping them to grow and change their thinking as they would hope and intend? Students took their first step to answer this question by addressing the central challenge of Stage Four: creating a new word (interpersonal concept), starting from perception and intrapersonal thought.

Stage Four: Using the Elements of Mind to Create New Concepts

In all ten of the study participants' neologisms, a common pattern appears in each word's origin: the words begin with a moment of alteration. I trace each word to a shift in the word-creator's emotion, interpersonal connection, sensory perception, or conceptual understanding, all of which stand in notable contrast to a just-prior state of engagement. The newly emergent content and its attendant frame of attention draw a provisional line around something as-yet-unnamed, but recognized in intrapersonal conceptual thinking; and structure, from that point forward, accrues to the pattern until it becomes communicable.

The "newly emergent content" of each student's word begins as System 1 "automatic" cognition (Kahneman, 2011)--a perception or sudden intrapersonal shift of attention, for example--when the word is yet a proto-concept. However, this sudden, unplanned, somewhat oracular inner voice of System 1 thinking comes into focus in an open, floating frame of System 2--"deliberate, conscious, effortful"--thinking (Kahneman, 2011): the students begin a search for content to justify creation of a new concept--they open a frame of thinking; the initial effort

proves to be baffling, and they linger in a state of wondering how to proceed--the frame floats. In this state, students mingle System 1 and System 2 thinking. They prime themselves to notice--*something* that emerges.

This primed state may explain why students' words all reflect moments of significant transition in emotion, sensation, social context, or imagination. Dwelling in intrapersonal thought, the sudden correlate changes that occur in a student's conscious thought, awakened and framed by System 2, i.e., "let me look, listen, and feel for a subject to help me discover a word"--draw attentional lines around an emergent phenomenon. The details of that phenomenon suggest features of meaning that could potentially form a concept. This marks a propitious beginning: many elements of mind gather at a point of origin. Emotion, perception, physical arousal, and intrapersonal thought intermingle, primed to mix with the frame of a student's awakened System 2 consciousness. At this juncture, the creator can activate a transformation process, identifying a syllable, fragment, or whole interpersonal concept with subsymbolic perceptions and proto-conceptual intrapersonal thoughts, bringing inner content into a form.

RRRRRRMMMMMMMMMMMMRRRRRBBBBLLLMMMMMM!

Consider the transitional moment that occurs with an irruption of sound. If a listener subsequently creates an onomatopoeic rendering of auditory perception, the listener's response would display a symbolizing of the listener's creative cycle. Gillian created her word in this manner. "While I was riding to my brother's baseball game with my mom," she begins, "I explained to my mom that we had to create a word." Fortuitously, Gillian had opened a frame of System 2 thinking about her project, preparing her to make something of the shift that was about to occur in her automatic System 1 perceptions: "Just as I was explaining all the concepts, we

were merging on the highway and we hit one of the rumble strips which then became known as a *rumbilation*: the action of hitting the rumble strips on the highway."

In her final step of the word-creation process, Gillian blended fragments of pre-existing words to form a new one. Curie used this technique, too, blending parts of the words "kin," "canis," and "sapien" to form the word *kincanspien* to denote the heartfelt bond between a human and her dog. Table 5.2 features a list of words that student participants created. In the table, I highlight how each word emerges in a transitional moment, and I list pre-existing word fragments that the students recombined to generate neologisms.

Table 5.2. *Neologisms: Definitions, Origins, & Appropriated Word Elements.*

Neologism {Creator}	**Definition, Experiential Origin, & Appropriated Word Elements**
kincanspien {Curie}	adjective: "describing the therapeutic relationship between a dog and a human; denotes a caring connection between the two" **a change in mood after coming home to greetings from a happy dog** *kin* for relationship / *can* from canis / *spien* from sapien: modified suffix
rumbilation {Gillian}	noun: "the action of hitting the rumble strips on the highway" **sudden sounds in the midst of conversation** *rumb* from rumble / onomatopoeia: *il* from rumble / *-ation* suffix
excrown {Eliot}	noun: "the breath of assurance released when a good flight reaches its peak" **a shift from tension to relaxation at the peak of a golf ball's flight** *ex* from exhale / *crown* for peak
disdirectaflip {Wendell}	noun: "the awkward but beautiful atmosphere created by two strangers intersecting paths and delaying progress" **a sudden north- and south-going Zak moment of social interaction** *dis-* for "not" / *direct* from direction / *flip* for awkward disruption
imagireministen {Austen}	verb: "the action of getting frustrated due to when you can picture a word you want to express, but you can't remember what it is to say" **an interruption and sticking point in thinking-to-speaking** *imagi-* from imagination / *reminis-* from reminisce / *-ten* adapted suffix

Table 5.2. *Neologisms: Definitions, Origins, & Appropriated Word Elements (continued).*

injeptity {Vincent}	noun: "the anger one feels when one asks a specific person or group a question (of which one already knows the answer) in order to inspect if the party will lie, and they do" **momentary transition from suspicion to anger in a social situation** "Gatsby" and "gypsy" combined, the latter translated into Basque ("ijito"), and then recombined with the English word "gypsy" + *-ity*
fluorexposaphobia {Ezra}	noun: "the feeling one gets when light almost blindingly shines through a window just after the curtain has been opened" **sensory transition from sleep-promoting darkness to bright light** *fluor-* for light / *expos-* from expose / *a* (link) / *phobia for* fear/aversion
payecry {Zora}	noun: "a state of discomfort in which one feels pain and is unsure of how to express what is being felt" **a piercing toe-stub prompting pain and confusion** *pa-* from pain / *ye-* from yell / *-cry* for cry + function as a suffix
ahwoosay {Gwendolyn}	noun: "the tingling and relaxed sensation you get when your scalp is massaged" **"a moment of indescribable sensation before the relaxed stage"** *ah-* interjection / *woo-* from woozy / *-say* suffix + "the word is a pleasure to say, gives off relaxed feelings and tingles as it rolls off the tongue"
fratermize {Griffin}	"to decimate a sibling in a highly competitive contest" **reflecting on a recently completed display of athletic dominance** *frater-* for brother / *m-* (linking sound) / *-ization* for suffix

I hope that reading the neologisms in Table 5.2 has induced a state of lexical ahwoosay. Each word is, in a sense, a rumbilation: they originate in a sense of suddenness. Eventually, the initially confused students could breathe a sigh of relief as their looping creative process at last made contact with sounds that make sense and sent on an arc of thought a new group of syllables that peaked to form a shared concept. The students' words make clear that their neologisms originate in transitional moments that prompt a creative intermingling of vivid System 1 thinking and purposeful System 2 reflection (Kahneman, 2011). I imagine that the first time the students breathed their words aloud that they wreathed their neologisms in an excrown.

The students' Stage Four creations hold lessons for teachers. Moments of transition, according to these artifacts, may provide moments for awakening, memory, engagement, and synthesis. Emotional, sensory, social, and imaginative transitions--both designed and improvisationally received--can become points where the elements of mind gather, jell, and guide imagination toward the creation of new ideas. This process also provides a microcosm for how a creator may bring perceptions and proto-concepts into communicable form in other contexts--and idea I present to students in our conversations about innovative thinking in ELA and across disciplines, in "consilience" projects, and at the outset of Stage Six, wherein students design a learning path to move from confusion to clarity in a difficult subject. Stage Four helped students to see how to walk such a path.

Upon the students' completion of and reflections on Stage Four, and amid ongoing efforts in Stage Two literary interpretation, I asked students to think about what they had learned about reading, writing, and thinking throughout the year, and to organize their reflections to describe a practical philosophy of mind which they can put to use in their analytic and creative efforts in ELA, across disciplines, and elsewhere in life.

Stage Five: Composing a Philosophy of Reading

Students described their paths through the first five stages as a "journey" of "discovery" and "creation of meaning," moving, with the aid of "metacognition," from "confusion to understanding" in a process requiring "time," "emotion," and attention to "detail." Each student composed detailed paragraphs replete with memorable insights. Their insights cluster into two predominant themes: (1) metacognition and strategy and (2) synthesis of all six elements of

mind. These emergent themes guide my ensuing description of the students' essays to define "real reading" and explain their emerging philosophical thought.

Gwendolyn refers to her reading method as a "metacognition process." She describes distinct stages and techniques within her approach. She describes how reading with awareness of one's reading process can help one firmly "demonstrate the connection between the book and [one's] thinking." She links together essential stages "that will enhance your reading process," claiming that "proficient readers continually monitor their own thoughts, controlling their experience with the text and enhancing their understanding." Gwendolyn's method for cultivating focus and creative control centers on using "the elements of mind--concepts, perceptions, interpretation--[in order] to face complexity, find meaning amid confusion, and even experience confusion." Gwendolyn describes continuous movement through cycles of confusion-to-clarity, "...combining perceptions and concepts to form ideas."

Zora's method features similar movement from confusion to clarity. She achieves this transformation with the aid of her method, which remarkably evokes the contours of System 1 and System 2 interaction that Kahneman (2011) describes, thought the students did not read Kahneman's work. Zora observes that "we are able to truly read because the mind is being guided by a process that is guided by its own process," here making reference to aspects of the reading process that occur spontaneously, which is the nature of System 1 cognition (Kahneman, 2011).

However, Zora describes a supervening System 2 frame of awareness that surveys these automatic processes and learns from them. Citing Einstein's (1970) definition of thinking as conceptually framed interpretation of the experience of the senses, Zora explains that "our experience is under our own control, but we can only achieve this [control] by seeing the

concepts, the meaning, loosely." Zora proceeds from these opening statements to explore each element of mind and its role in thinking. She devotes her arguments and fashions her examples to illustrate what she means by reading "loosely" and yet with "control." She elucidates how a creator "translates" a concept from intrapersonal to interpersonal form and cites Gardner (1983) in her description of reading as a "dream." She states that the reader's "sensory imagination… helps see what the deeper meaning[s] of the words are…[and] creates an authentic reading experience." In these "translation" processes linking the elements of mind, Zora states, one discovers "the ability of the mind to be free and think loosely." She emphasizes that one achieves "real reading when "every element of mind is in use."

Zora's emphatic statement about the importance of synthesizing all six elements of mind appears in idiosyncratic form in the student participants' essays. Griffin writes in his conclusion: "The most rewarding reading material is often the most difficult. To overcome the complex content of difficult reading material, readers must employ the elements of mind." Griffin underscores the importance of synthesizing concepts with sensory imagination. Sensory imagination, he observes, enables him and his peers to enjoy complex history texts and find them beautiful. He notes, by contrast, that peers who do not experience sensory imagination while reading history "never, or barely ever, found the material beautiful, seldom experienced flow states." These peers, he observed, "struggled and disliked the [history] class." Griffin concludes that "sensory data and sensory imagination make fuzzy ideas and concepts clear, making the whole comprehension process run much more efficiently."

In these remarks, which typify and predominate the artifacts in Stage Five, the student participants describe experiences of integrating the elements of mind, and they share techniques they use to facilitate the integration processes that help them to experience greater understanding

of their readings. I will use Curie's words to characterize the students' demonstrable steps toward becoming "aware of their awareness (metacognition)." She ponders the advantages people could gain by drawing upon this awareness: "Once they have become aware, they hold the capacity to manipulate the intricacies of their reading habits, step by step. Not only will this aid in reading growth, but in personal growth; they will be able to use these newfound characteristics for the betterment of their lives as a whole." In the next and final project stage before reflecting on the stages as a system, I asked students to apply their newfound awareness and methods in order to chart a course of learning in a subject that eludes their understanding.

Stage Six: Applying a Practical Philosophy of Mind to Design a Learning Path

In the prompt for Stage Six, I prompted students to apply the methods they defined in Stage Five to (re)design their thinking in an area where they have struggled but would like to improve (see Appendix F for the full prompt). Students reported that applying sensory imagination to concepts in Stage Six became much more challenging; that integrating all six elements of mind into their learning and creation processes was much harder; and that defining the target of learning itself was challenging, both in terms of the scale of the learning topic (ranging from a 30-minute lesson, to a lifelong process), and in terms of knowing how to describe, beyond generalities, the content material one does not know, but would like to master. With a short time remaining in the year, I asked the students to match the strengths of their methods to the chaos, stress, and pressure of a steep learning challenge.

Students' lesson designs reflect their efforts to create conceptual frames to organize their respective tasks, and to link perceptions to the concepts they find elusive, boring, or frustrating. Austen and Griffin proposed creating concept maps of anatomical systems, with

images and verbal analogies to introduce supporting perceptual data into their plans. Gillian designed a means of eliciting emotional interest in World Wars I and II by using songs to dramatize how the wars affected people's lives, citing emotion as a driver of her interest in a subject and a portal into imagining people's lives in a more realistic sense. Zora likewise proposed using music, but for the purpose of creating organization in her approach to solving and visualizing math problems. In each of these cases, the students searched for activities or materials that appealed to their pre-existing skills and interests to incorporate energizing elements of mind into the lessons they envisioned.

Wendell found that designing a lesson with an eye to playing the role of the teacher "forced [him] to approach this subject in a new manner." He explained that "[b]eing the teacher gives me more motivation to understanding the subject, because I have kids relying on me." Social interpretation thus emerged as the animating force of his ideas in Stage Six, and this factor showed in his lesson design "to create a hypothetical court case that needs to be justified by one of the Bill of Rights." He asserted that having students use concepts to debate in this format would "demand creativity" and "exercise their sensory imagination." Wendell connected his lesson design to his own struggle to remember congressional committees and their functions. The problem, he stated, is that he "was unable to use sensory imagination on tests and quizzes" in which he perceived an otherwise "beautiful" class, AP Government, as a "2-D subject." To understand ideas in his AP Government class, Wendell "utilized social interpretation so I could understand better," and he places this element at the heart of his plan.

Ezra mapped a detailed plan to improve in an area he loves--music--but in a skill he lacks: fluid improvisation. "Something I really struggle with is using sensory imagination when improvising in music, specifically on guitar." He points out a difference in his interpretive

ability in reading musical notes and in performing them in an expressive manner. "I have a solid understanding of music theory when it is on paper, but when I try to apply the knowledge to express my skills in an original way I tend to freeze up and hit a roadblock." For Ezra, this is a problem that matters to him in a subject that, in his Stage Three reflection, he identifies as the most beautiful and beloved subject. "This lack of creativity is something I really struggle with the most, and it's in a place where I need it the most." Ezra frames his challenge in detail and in emotional terms.

Ezra then proceeds to verbalize his challenge and name a mastery target. "Knowing how to string together chord patterns and notes on the fly is what I find the most difficult," he states. In the remaining steps of his plan, Ezra explains how he would define success. "A solid mastery target in this situation would be the ability for me to improvise a melody under a set chord progression and distinguish what relationship is there." Ezra then steps into the role of the teacher to envision how his plan could unfold. "If I were teaching someone this, I would have him or her start by playing a legitimate chord progression that works under a certain scale. To elicit sensory imagination," he writes, "I would flip the jobs, and I would play chords while I tell him or her to find notes within that scale that work." Ezra drew details for this lesson plan from experience. He explains that "this specific lesson style is one that I've engaged in many times, and at that moment I understand what I'm doing because I think I rely on social interpretation a lot through this."

Ezra's detailed application of the elements of mind concepts to explain the stages of his lesson mirrors principles and steps he discusses in his Stage Five essay, "What Is Reading?" His lesson follows the sequence he describes in a passage about expressing a new idea. "Some concepts within one's mind go unrepresented to everyone else. Then, you must be able to

connect the concepts to your perceptions of reality such as your senses (hearing, smell, touch, etc.), and your sensory imagination (your ability to create sensations without stimulation, as in dreams)" he writes. I pair these lines with his description of himself as he works to form and express a musical idea that he can connect to his senses and imagination in real time. He continues: "Finally after you connect your conceptual and perceptual realities, you can form an idea through individual...and social...interpretation," noting that "influence from others is a great way to develop such [ideas]." The process Ezra describes parallels his depiction of a guitar student, "connecting conceptual and perceptual realities" and then forming new ideas through a combination of individual and social interpretation, with a nod to the educational roles that one can play, as a teacher and as a student, in social interpretation.

Ezra's plan, which involves the six elements of mind, gives a rich example of the students' individual efforts to consciously merge information and energy from each element of mind. The students accomplished this outcome with varying levels of polish and sophistication. They managed this outcome--despite, or perhaps because of the fact, that I gave them the assignment with so little time left in the academic year. A central outcome I notice in the set of Stage Six artifacts is students' idea that learning involves activating and combining every element of mind. To carry out such a plan is a complex process, perhaps requiring a great deal of time. To articulate a plan in these terms and in this detail marks a step on the path of learning a new skill or seeing a subject in a new way.

Curie's plan to become fluent in Spanish plays out over years, decades, a lifetime. She defines her path toward fluency, however, in similar terms: as a path of integrating elements of mind. Her plan is energized by what Wendell describes as meaningful social interactions that shift perspective and elicit greater effort. As with Austen's and Griffin's concept diagrams

augmented by images, mnemonics, and analogies, Curie's plan to imbue words in Spanish with emotion, sensory imagination, and intrapersonal concepts becomes more vivid. Curie moves into her plan--to quote her Stage Three profile of her emotions in Spanish class--with "wonder, excitement, [and] frustration...where even the negative tones allow me to feel more motivated." Ezra conveys a kindred spirit of eager endeavor in the concluding lines of his essay on reading: "We must accelerate toward things unknown, and strive for answers to the problems that those things may bring. In order to be successful at real reading we must fasten the different sections of our minds and look past the physical thing printed onto the page and see things for what they really are."

Stage Seven: Reflections on Creating a Practical Philosophy of Mind

My codes from the students' ten reflections converge into three categories: personal breakthroughs; characterizations of the process; and emergent ideas in students' philosophies of mind. In the students' account, the curriculum model moves from "easier to harder" stages that "require original thinking" and alternate between "stressful" transitions and periods of "flow." Students also see "coherence" in the stages, overall: in Austen's terms, the model is a "system that breaks reading and writing into related steps." Many students describe a recurring pattern in exercises within the stages: a process of evolving from "confusion to clarity," leading to "breakthroughs" and "deeper understanding."

Students' breakthroughs include their development of new strategies and techniques. Gillian's reflection provides examples of how she has become aware of her ability "to have control over my reading and writing skills." She explains that she can exercise this control across disciplines. "As I have other classes, I will think of the elements of mind needed to

succeed in the class," she begins, "and if I haven't used certain elements of mind I will try to incorporate them into my learning even if I'm not very interested." Gillian herein describes characteristics of critical thinking as defined by Facione et al. (1990): "purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference…." Gillian displays creativity in her closing reflection as well, citing her ability to fashion new concepts. "If I come upon actions or feelings that don't have words to describe them yet, I will not let that hold me back. I will just make my own," she states, describing a process which she proved she can master in Stage Four.

Gillian also names a strategy she could use to expand this creative technique to projects at a larger scale. "When I run into problems," she writes, "I can stop to think about how I would teach someone else, then using that method, I would teach it to myself." Gillian here envisions a strategic inner conversation that Taylor (2011) elucidates in his model of the student as a pragmatist reader who evolves awareness of meaning creation in intrapersonal thought. In each of her statements, Gillian tells how she can apply the philosophy she has developed in order to know her habits, evolve her dispositions, and create with her imagination.

Gillian's philosophy rests on a conclusion that she, Ezra, Wendell, and Curie reached in Stages Five, Six, and Seven: to learn means to activate and combine the elements of mind. Wendell makes this point directly in his closing reflection: "If I intend to master a skill, hobby, or sport, I need to utilize all six elements of mind." As Zora notes, the meaning-making process involves an interpreter's active involvement, paired with open reflection; directed thinking and receptive observation of "the mind's own processes." In Zora's terms, this method is both rigorous and "loose," or flexible, allowing for creative synthesis of concepts and perceptions. Students formed these and other insights by taking deliberate steps into confusion, working to

reach clarity through stages of increasing complexity. Their ability to find overlaps in the exercises and translate insights from one artifact stage to the next helped them to evolve and share new meanings, emerging from our conversations and from private worlds of imagination.

Student Learning Arcs Considered in Light of Research Questions and Themes

In a four-year period, approximately 450 students completed work in the elements of mind curriculum model as part of their creation of ELA-based projects. Artifacts created by the ten participants of this study represent a microcosm of patterns that appear in the larger set of hundreds of students I observed: students peak in different stages of the model. Some excel in the mind self-profile, Stage Three, and demonstrate considerable breakthroughs in their self-understanding throughout each section of that multi-step instrument. Others improve profoundly in their interpretation of literature and in their writing about their perceptions and intrapersonal thoughts in response to fiction, poetry, and nonfiction. Still others show the most creativity in Stage Four, neologism, displaying a keenness and quickness of perception that would never have been tangible to me until the students completed the neologism exercise and explained their creative process, revealing their capacity for noticing perception and transforming it ingeniously into communicable form.

Many students grow on a steady upward swinging curve, gradually developing more sophistication; a smaller number of students begin the year slowly but peak in Stages Five and Six, showing marked growth in their command of the elements of mind vocabulary, in their ability to apply it in analysis of material across disciplines, and in their metacognition. As students move through the model's stages, rich variety emerges in students' creations and in their evident insights, which they reveal in their projects and in their subsequent reflections.

In the current study, each of the ten students' works illuminate the model in a particular light, drawing my attention to different features of the students' minds, and suggesting how I might improve, expand, or clarify each assignment. Curie's path, considered alone and in juxtaposition with those of her peers, reveals detail in each of the seven stages highlighted in this study. Collectively, the participants' efforts yield a body of work that throws light upon the model, showing how a variety of students can develop themselves as thinkers by working through the model's stages.

Against the rich informational background created by these ten students, I contemplate the two driving research questions that motivated me to pursue this study. From my scrutiny of the students' outcomes, I have derived answers to the research questions and organized them into five themes--three of which stem directly from the research questions as *a priori* themes, and two of which emerged from my reading and analysis of the data I have presented. In the remaining sections of this chapter, I present answers to the research questions in accord with evidence from student work, which affords ample opportunities to address each of this study's core themes.

Artifacts Illuminate the Model and Yield Answers to the Research Questions

The purpose of this study is to outline and illustrate a curriculum model. I designed the model to help high school ELA students develop a practical philosophy of mind. While leading students through the model's stages, my goal was to have students strive to acquire and apply a practical philosophy of mind by working through specially-designed stages of exercises, all of which intertwine with standard ELA activities such as interpretation of literature, composition, creative writing, and reflective journaling. My twenty years of teaching experience and my close

reading in pragmatism, reader response theory, and research on current classroom practices inform my design for this study.

Evidence drawn from the students' artifacts serves as a sound platform for answering my two primary research questions:

(1) How does an English Language Arts teacher guide students through steps to develop a practical philosophy of mind?

(2) In an English Language Arts classroom where the teacher guides students through steps to develop a practical philosophy of mind, how does student work exhibit interpretation and critical thinking?

As I indicated in Chapter Four, I have abstracted three *a priori* themes from these research questions to organize my discussion of the data and to fulfill the goal of illustrating the model's functions in each stage. The themes are these: (1) how student work illustrates interpretation; (2) how student work illustrates critical thinking (CT); and (3) what teachers can learn from students' learning arcs as they progress through the model. The latter theme may provide teachers with a basis for inferring how to design pathways for students to progress through the model's progressively more complex stages. Two additional themes--the fourth and fifth, overall--emerged from close reading of student artifacts: (4) the uniqueness of reader responses, and (5) the relationship of aesthetics to emotion, goal-formation, motivation, and engagement. I used each theme to focus my data analysis and provide concise answers to the driving questions.

A Priori Theme [1]: How Student Work Illustrates Interpretation

Artifacts from each of the stages display students' interpretation at varying levels of sophistication. In Stage One, students showed that they can recognize, label, and describe each element of mind in a simple System 1 form of interpretation. In Stage Two, students demonstrated that they can transform text into sensory imagination, intrapersonal concepts, and novel conceptual form through individual interpretation. In Stage Three, the students recognized and evaluated the elements of mind as they apply them (or do not apply them) across several academic and life contexts, and they wrote at length about the impacts of specific elements of mind on their thinking in these subject areas.

Students' Stage Four creations demonstrated that the students can use their knowledge of the elements of mind to form new concepts and to describe their creative process in detail. The students' Stage Five artifacts showed that students can form a systematic philosophy of mind that they can apply in reading and writing; and the students' Stage Six artifacts illustrated varying extents to which the students can transfer applications of their stated philosophies of mind to areas of learning where they feel particularly challenged or even disadvantaged. The data set richly illustrates ways in which students learned interpretation, at varying levels of complexity, in tasks pertaining to ELA and to classes across the curriculum.

A Priori Theme [2]: How Student Work Shows Critical Thinking

The Delphi research group led by Facione (Facione et al., 1990) defines critical thinking as a multifaceted construct (see Appendix A for the full 14-line definition). Several facets of the critical thinking construct are richly evident in the data set of student artifacts. Primary among these facets, which may be used to describe the students and their work, are these qualities,

quoted directly from the Delphi team's definition statement: "inquisitive, open-minded, flexible, fair-minded in evaluation, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, focused in inquiry, and persistent in seeking precise results." These qualities in the students' thinking and dispositions, reflected in their work, resulted in "interpretation, analysis, evaluation, and inference, as well as explanation of the evidential...and conceptual...considerations upon which [their] judgement is based."

The data set provides layers of evidence that students engaged in critical thinking and improved as critical thinkers who became more aware of how to define thinking, how their own particular thinking works, and how to continue to apply critical thinking as an "...essential...tool of inquiry."

A Priori Theme [3]: Lessons Teachers Can Draw from Students' Learning Arcs

Analysis of student artifacts shows that teachers can expect a wide variety of responses to the exercises built into each stage. Teachers should therefore be prepared to participate in a wide-ranging conversation about how students interact with the assignments, instruments and challenges of each stage. The journey through the year is a creative enterprise: while the frame of the exercises is sturdy, the timing and content of the conversations the students and teachers create together will feature novelty, surprise, and new questions that may lead the teacher to new understanding of the subject matter--i.e., the elements of mind and their applications in ELA exercises and in classes across the curriculum.

The student data set also suggests that teachers can expect students to create their best outcomes in different stages. Some students will show the most improvement and their best writing in their analysis of literature over the course of a year, growing on an upward swinging

developmental arc. Others will make an impressive, meticulous study of thinking in Stage Three, creating an intricate self profile of their emotions and cognition across several contexts. Still others will show their most innovative work in Stage Four--creating a new word; in Stage Five--codifying a formal philosophy of mind; or in Stage Six--breaking new ground by applying their philosophical method to changing how they think about a hard problem. The model affords different kinds of students a variety of ways in which to grow as critical thinkers and interpreters.

I do not think a teacher can expect students to do so much work in philosophy of mind without distributed practice over a long period of time, such as a semester or an academic year. Spacing the exercises to keep the subject matter fresh, and repeating core themes of the conversation often enough to maintain continuous immersion, provide students with chances to rehearse their comprehension and application of the elements of mind concepts and thinking techniques literally hundreds of times--in unique forms that create novelty along the path.

Each stage also features its own peak moment. In the easiest and hardest stages alike, students create a final artifact and earn a crowning achievement. These milestones provide anchors for memory and opportunities for rehearsal and accomplishment. These culminating moments also introduce a testing effect, whereby students must reach an increasingly higher bar in their understanding and application of the elements of mind, showing mastery of a stage. The students see the tests coming, and they have many opportunities to rehearse and revise their work. Nonetheless, as student reflections in Stage Seven unanimously indicate, the path goes uphill and steepens considerably in the later stages, making each new goal meaningful.

Teachers can expect students to hit sticking points and possibly to experience lingering confusion, especially in later stages. Early in the year and throughout the stages of the model, I encourage students to adopt a disposition of facing confusion deliberately to seek out the “Huh?

Effect," which prepares us to shake free of assumptions and work up toward understanding from fundamental elements of mind which we notice in careful reflection, free association, journaling, and patient processes of refinement of thought, moving experimentally from the intrapersonal to the communicable. We thus learn to value confusion and see it as a sign that we have entered a growth zone. We come ready to experiment and apply the simpler methods we have practiced to try to break new ground.

The earlier, repeatable stages of the model provide a useful foundation to return to, especially in confusing moments, for the purpose of tackling harder stages. We start simply; we return to the simple; and we use simpler principles to break down harder problems. We encourage and help each other in our social interpretation phases of each stage, too, modeling for one another how to apply a practical philosophy of mind.

Experiencing confusion is a necessary and valuable feature of this curriculum model. Working through confusion helps students to explore how to apply their own practical philosophy of mind in actual instances of difficulty and through stages of persistence, strategy-formation, and personal breakthroughs. Without these experiences, students can only form abstractions about philosophy of mind, not actually form and use philosophy as an instrument in the topics they explore. Students need confusion, and they need experiences of resolving it satisfactorily, furnishing proofs of the value of their methods.

Since the elements of mind methods help students think about material in any class or life-pursuit, teachers can explore many ways to keep the year-long project fresh. Teachers can achieve this desirable--if not necessary--outcome by completing the stages as a parallel activity to students' work with a variety of materials: different novels, plays, screenplays, poems, and

works of nonfiction, blending stage exercises (e.g., Stage Two literary analysis) with one-time explorations of texts that students read together, explore in groups, or read on their own.

Combining the students' work in the stages with other, larger projects provides another way for teachers to keep the project fresh and to create incentives for students to work hard. For example, in Stage Four, different classes of students can create their own neologism dictionaries, or they can collaborate across all classes and create a larger single text for students in other grades to study--I plan to support this kind of project in future iterations of the model. In projects such as this one, students learn from one another, share ideas with peers, and rehearse their ability to talk about the core ideas of the curriculum model stages in fun, informal contexts.

The stages also vary in length and complexity, so the experience of working on them differs inherently. I had students complete Stage Three over a three-to-four week period, for example, working in 15-minute bursts alongside other ELA activities. Stage Four, by contrast, lasted for about one week, and students mostly worked independently on creating a new word once I had introduced the assignment. In years past, I have made Stage Five into an anonymous essay competition in two different years, structuring the contest like an NCAA basketball tournament with "rounds" of peer editing, rubric-based analysis, and discussion of the features in the essays that require editing, show potential, and win our interest. Stage Six can also culminate in teaching opportunities for students: if students can design a lesson to teach themselves how to understand a complex topic, then they can take an extra step by teaching the lesson to others. Opportunities abound for creativity within the model.

All of these illustrations support my claim that teachers can develop a rich variety of ways to engage in the teaching of core subject-matter content, completing all types of standards-based, standards-rich assignments while weaving in helpful and enlivening discussions about the

elements of mind. These discussions can begin with a single conversation question, develop from a written question set, or take the form of a formal days-long debate. The conversation formats can vary widely, but each one can help to gradually propel students through the stages of the model and toward refinement and application of a practical philosophy of mind.

Emergent Theme [4]: The Uniqueness of Reader-Response

Students independently and unanimously arrived at the conclusion that individual interpretation shows individuality in the meaning-making process. They formed this impression from the outset of the year, and they deepened this impression through each stage.

Students' Stage One artifacts vividly illustrate this outcome. While the students did not interpret words in the abstract symbol game, the pattern of uniqueness in their interpretation parallels the mechanics of personal meaning-creation that Rosenblatt (1978) describes in her triadic theory of the reader, the text, and the poem (here the student, the symbol, and the list of interpretations). I did not teach the students about Rosenblatt's theory, nor did I know that I would use these particular students' responses as parts of a data set several years after they had answered these questions. The students' game responses and question replies offer an incidental illustration of Rosenblatt's triadic interpretation principles in action (see Table 5.3).

Table 5.3. *Student Comments on the Uniqueness of Reader Response Interpretation.*

Zora	Everyone [gets] their own meaning...people see [the symbol] differently.
Griffin	It guides each person's thinking and makes their conclusions unique.
Gillian	People interpret things differently.
Gwendolyn	We make our own decisions about what [the symbol] is.
Ezra	You can freely think about whatever without outside influence.
Vincent	Personal experience leads you to think of things other people haven't seen.
Eliot	You think to yourself about what the drawing could be. You do that in your own imagination.

Zora and Gillian speak of thinking "differently." Ezra describes thinking freely "without outside influence." One thinks to oneself "in [one's] own imagination," Eliot similarly observes. Gwendolyn states that we "make our own decisions" in individual interpretation, and Vincent notes how we "think of things other people haven't seen." Griffin claims that individual interpretation "makes...conclusions unique." These same and similar phrases students used to describe the role of individual interpretation in artifacts they created throughout the model stages support my logic in identifying an emergent theme: students think of individual interpretation as a source and sign of personal uniqueness.

Further, the students' answers to Stage One reflection questions one, two, and three describe the students' understanding of the roots of the uniqueness of individual interpretation, which grow from perceptual and intrapersonal cognitive processes. The students formed their claims about the uniqueness of individual interpretation by reflecting on their own personal experience and forming reasoned, System 2 observations about their thinking. Notably, the

students use their newly acquired elements-of-mind vocabulary to form and explain their insights in this early stage of the curriculum model.

The curriculum model provides a means of explaining the logic of Rosenblatt's theory: readers may encounter identical sets of shared printed concepts, but those shared printed concepts attach to unique perceptual and intrapersonal conceptual detail in each person's mind. Readers' varying methods of individual interpretation and differing contexts for social interpretation of texts add additional layers of thought and emotion that affect each reader's creation of the "poem" of meaning, developed from interpretation with the elements of mind.

Emergent Theme [5]: The Role of Aesthetics in Learning

Students did not learn of my hypothesis about beauty, goals, and flow before they completed Stage Three. We did not discuss potential links between sensory imagination and perception of beauty in concepts, nor did we discuss possible connections between perception of beauty, goal-formation, and flow. The questions concerning these topics were not printed on the form in advance of the students' work on the eight self-profiles. After students had entirely completed the profiles, I presented the closing questions. Once students had completed the questions, we discussed my hypothesis in a reflection on Stage Three. The students replied to questions about perception, aesthetics, goals, and flow in separate contexts.

Privately, I wondered if the students' responses would bear out associations linking these factors: perception of beauty, a direct relationship of beauty-perception to goal formation, and the frequency of flow states directly linked to both of the former. My guess, before starting the exercise, was that students would be able to use most if not all elements of mind in subjects they find beautiful, i.e., that the content would appear to them in a rich, multifaceted form. Even

before collecting this assignment--indeed, even before starting the academic year--I had set a goal for students to awaken sensory imagination while reading and writing, and to broadly sensitize themselves to beauty in concepts.

Students completed 80 reflections on their classes, overall (eight for each of the ten students). In 17 class reviews, students described a class as "always beautiful," the highest rating. In 15 of those 17 cases, the students had developed long-term or long-term personal goals in these "beautiful" subjects. Regarding the two students who had not formed long term goals in a class that is "always beautiful," one student was referring to a high school sport he would not be able to play after high school, and one student was referring to an upper-level elective in Spanish that had already exceeded the school's minimal graduation requirement.

The 80 student profiles (eight per set in ten sets) show frequent and strong correlations between sensory imagination and perception of beauty; and perception of beauty strongly correlates with goals, flow, or both goals and flow. Absence of sensory imagination also strongly correlates with "no" and "short-term" goal-formation and with students rating a given subject "never" or "rarely" beautiful. Students who form "long-term personal" goals in a given subject always give these subjects high ratings for perception of beauty.

These results justify further research into the apparent relationship of goals, flow, and perception of beauty to a given student's multi-elemental thinking, particularly where students respond to concepts with vivid and fast sensory imagination. The results also motivate me to study methods that teachers have already developed or can develop in the future to help students increase the speed and vividness of sensory imagination in classes across the curriculum, and to see if positive results in this effort produce corresponding positive changes in students' perception of beauty in concepts, goal-formation, engagement, and flow (see Appendix I).

CHAPTER 6: FINDINGS AND FUTURE DIRECTIONS

[T]hose driven purely by curiosity and by a willingness to ask seemingly irrelevant questions will discover the substances that shape the course of history….[P]erhaps new visions will emerge from a union of art, engineering, and science, all of which…share common goals. W[e]…must have the ability to combine, as Adam Smith put it, 'the powers of the most distant and dissimilar objects.' Upon that ability human civilization has always depended.

—Stephen L. Sass, *The Substance of Civilization* (1998)

…[D]raw a series of concentric circles around the point of intersection. As we cross the circles inward toward the point at which the quadrants meet, we find ourselves in an increasingly unstable and disorienting region. The ring closest to the intersection, where most real-world problems exist, is the one in which fundamental analysis is most needed. Yet virtually no maps exist. Few concepts and words serve to guide us. Only in imagination can we travel… …The time has come to achieve the tour in reality.

—E. O. Wilson, *Consilience* (1999)

Findings and Future Directions

The present study constitutes a foundation for further research and classroom innovation. In the following series of brief discussions about the stages and the elements of mind, I describe proposals for teaching a practical philosophy of mind, and I map particular directions for future research programs that fellow researchers and I can develop from this study's findings.

Students as Pragmatist Readers

The findings I derived from analysis of student data confirm characterizations of students as pragmatist readers (Pike, 2003; Taylor, 2002; 2011; 2014; Wiley, 2006), i.e., interpreters who combine the elements of mind (James, 1977; Royce, 1969) in transactional (Rosenblatt, 1978) readings of texts. Students aptly described their cognitive processes in pragmatist terms throughout their work in the model stages.

As I described in my summary of research themes at the end of Chapter Five, the students' work illustrates their applications of a pragmatist model of mind in their self-analysis, reading, and writing projects. They demonstrated applications of what Kahneman (2011) refers to as System 2 thinking: conscious, deliberate, strategic, reflective thought, and they did so while becoming more attuned and sensitive to detail in their "automatic" (Kahneman, 2011) System 1 thought processes, such as in their fluid sensory-imagination modeling of concepts, framed and guided by System 2 observation.

Through such work, the students gave a vivid illustration of what Koek et al. (2019) describe as "deautomatization and reconstruction" of meaning in the context of studying "literature as a school for thinking." They represented, in their series of stage artifacts, a vivid instance of what Rosenblatt (1978) refers to as "a slow-motion picture from stills of various

moments" (p. 10) in the reading process. From the "slow-motion stills" the study participants created, I have found much to learn, and in further reflection, I expect I will continue to form new insights based on their work, which I perceive to be beautiful.

In the long-term, I plan to expand the present study's design to complete an extensive interdisciplinary research program, one involving neuroscience, philosophy, and psychology as partner disciplines in measuring and explaining outcomes of student immersion in a philosophy-based curriculum. My design for this long-term project responds directly to Langer and Applebees' (2016) challenge to build multi-stage research projects. My design also connects to recent neuroscience projects that hold promise to advance literacy and ELA scholarship (Armstrong, 2013; Dehaene, 2017; Merzenich et al., 1999; Miller et al., 1999; Tallal et al., 1996).

I explore the latter proposal in more detail in my proposal to create *PsyPEN*, an organization and a journal by the same title, devoted to merging the fields of psychology, philosophy, education (across all age levels and subject areas), and neuroscience (see Appendix K). In order to establish why such a merger of fields would yield benefits for students and teachers, I will first turn to a closing reflection on each primary feature of the model. My aim is to describe specific future research programs that researchers can grow from contemplation of each stage and element.

Stage One: The Abstract Symbol Game

The game proved an effective means of introducing students to gain quick and accurate command of the elements of mind vocabulary. It also provided a helpful starting point in supporting students' reflections on their reading of symbols across subject-area domains. I will

use the game again to start future groups of students on their respective paths toward developing and applying a practical philosophy of mind.

I will also add features to future games, taking my inspiration from the self-priming patterns that became evident to me in my scrutiny of the data set. The self-priming patterns show the dominance of the concept in shaping perception almost instantly and in cascading patterns. After I have collected future students' responses to the symbol games, I will collate the responses and, in a follow-up exercise, I will ask students to examine the class set for patterns, comparisons, and contrasts. Giving students an aerial view of the whole set of responses will give them a basis for making insights into themselves and their peers, and the shared aerial perspective will provide a platform for a rich discussion about the roles of background knowledge, emotion, and context in interpretation.

From my perspective, I will view future rounds of the Stage One as experiments: do the self-priming patterns appear regularly in few, some, most, or all populations? What are the forms of self-priming that occur most commonly? And what does this self-priming teach us about how we interpret reality? I will design experiments to test for and think about the self-priming phenomenon.

These experiments, which could be conducted in mixed-methods designs, will be valuable for education researchers, psychologists, teachers, and students. My hypothesis is that the quickness and prevalence of unconscious self-priming connects to patterns of quick unconscious bias. Revealing the self-priming pattern within cognition--if it is in fact common--can teach us more about the mechanics of how we make snap assumptions and, importantly, how to deautomatize and reconstruct (Koek, et al., 2019) such thought, learning more about the elements of mind in the process.

The social interpretation phase of the game does just that: deautomatizes thinking and opens all of the players to other perspectives. The context of play facilitates the discovery process in this phase of the game--people actually enjoy changing their minds, or they at least enjoy adding new details to their own perspectives--welcoming plurality.

In future games, I will create a phase where I make the symbol interpretation game competitive, even high-stakes, so that students can contrast their thinking in the "play" and "competition" modes of the game. This altered context may help me to bring students further along in understanding how context affects their thinking and behavior, especially under emotional pressure. The added step of having students scan for and notice self-priming may also help them consider if and when thinking operates by replacing perceptions with an internalized conceptual order--one they actively (but more close-mindedly) defend in "high-stakes" contexts.

I will consider adding a third new feature to Stage One: reading and reflection on layered models of mind, such as the Systems 1 and 2 model advanced by Daniel Kahneman (2011) and theories of conscious and unconscious thought deriving from psychological theory and research over the past 120 years. We can use these theories to think about characters we study in novels, plays, films, and works of nonfiction; and we can use the theory of Systems 1 and 2 to study how thinking operates across several academic and life contexts. This particular discussion and project could be conducted in collaboration with a social studies or psychology class, particularly an AP Psychology class, to reinforce the cross-contextual transfer of learning about interpretation which I promote in several stages of the curriculum model.

Stage Two: Literary Interpretation with Reflection on the Elements of Mind

Closely examining the students' interpretations and reconstructions of passages from fiction showed me that perceptions intriguingly vary in students' reading. Some students vividly see a text; others hear it; still others perceive and represent movement, whereas others present schematic stillness. From this finding, I draw inspiration for an experiment and for an enhancement of my teaching in future literary interpretation exercises.

First: to the experiment. My close examination of perceptual differences in the Stage Two artifacts prompted me to think about differences in the students who created each interpretation--and I subsequently saw patterns in the students' interests and commitments that appear to correlate with the types of perceptions they emphasized most heavily in their writing--e.g., a dancer more often described movement and auditory perceptions in her reading of literature; a musician reported almost all auditory perceptions. In my proposed experiment, I would collect a large sample of students' writings about a wide range and large number of texts over the course of a year, and I would test the sets for perceptual variances and tendencies. I would then see if these tendencies, if they appear, may relate to students' broader attunement to certain kinds of perception (e.g., images, movements, sounds) as revealed by their immersion in additional activities outside of the language arts context, such as music, dance, art, math, or sports.

I would also like to test to see if these perceptual tendencies vary in relation to big five personality traits. The perceptual variances that appeared in the Stage Two data set may in fact represent another form of self-priming. In order to complete a test of this relationship, I would need to collect significantly larger sets of passage analyses which may bear out distinct perceptual patterns. I would conduct this experiment in a mixed methods design, placing the

numbers of occurrences of types of perception (e.g., visual, auditory, kinesthetic) in categories and checking for correlations between those numbers and scores on the five personality categories. If differences do appear consistently among students, and if these differences correlate with different personality types, then this experiment could help us understand how deeper patterns in personality may prime our reading and frame our perceptions.

I could also take an active approach to changing students' perceptual tendencies by creating exercises to cue students to notice, observe, and describe a wider variety of perceptions. This is the pedagogical inspiration I draw from my reading of the Stage Two data. Students enjoy changing their minds or at least adding to their perspectives in the social interpretation phase of Stage One; likewise, they may be surprised to notice perceptual variance in their peers' writings (and, by comparison, in their own work) and be thus inspired to awaken their more latent senses in their future reading experiences. The data set throughout chapter five shows that changing one's mode of perception appears to change the larger way one thinks, overall. I thus feel strongly encouraged to invite students to playfully alter their modes of perception while reading (and while working in other disciplines, too).

I could support students' awakening of perceptions by creating a frame--or having them create a frame--which they could superimpose on a text they are reading. The frame would be empty at the center to let a page show through to the reader; and on the frame's edge the reader would see questions and prompts that the reader may relate to the text, cueing the reader to consciously activate and reason with a particular sense. In a digital form, this frame could appear on the rims of a reader's screen and could be activated, deliberately by the reader or at random by the software program, to give a voice prompt or a textbox prompt to the reader to engage with the text in a particular way, through a particular perceptual or conceptual lens.

Eventually, the frame would be superfluous as the reader adopts habits of mind which the frame suggests; and new elements could be added to the frame as a reader grows more sophisticated.

I would be interested in conducting an experiment designed to help researchers learn about students' experiences of reading with the support of such frames. Would students report changing how they read literature (and to see what, if any, impacts derive from this potential outcome)? Perhaps certain frame designs would be more effective than others; and perhaps there would be much to learn from studying what kinds of frames students create for themselves.

Each of these extensions and augmentations of Stage Two could provide students with a richer platform for learning about the elements of mind as they relate to literary interpretation.

Stage Three: The Elements of Mind Cognitive Self-Profile

When I was a novice teacher in 2000, I assumed that my students formed multi-elemental ideas in response to every poem and novel we read. This assumption was invisible to me. I had no idea about students' wide variety of reading experiences, nor would I have known how to explore ways that latent, inactive elements of mind might be awakened to help students improve upon fragmented comprehension or lift out of boredom. The information revealed in students' mind self-profiles would have surprised me; and, twenty years later, I still find surprising detail and new learning in studying the students' verbal self-portraits and making connections between the portraits and work students complete in other stages of the model. These realizations bring me to my primary finding about Stage Three. In the mini self-profiles, veils drop; minds show through in clear detail--we teachers have much to learn about our students, and this instrument can help us know more about the students we would like to reach.

The first veils that drop begin to fall in the opening phase: the initial sensory imagination self-assessment table. Students show surprise at their own self-evaluations; and they see their peers in a new light when students share their self-ratings on the vividness and speed of sensory imagination they form in response to different kinds of signs. I began to think differently about the nature of my work when I learned that my students perceive at different speeds and levels of vividness when they read. I began to think much more thoroughly in my lesson planning about how to spark and elicit sensory imagination in response to concepts. My assumptions gave way; an almost alarmed urgency to help, to do something, took its place.

Stage Two--continuous focus on Stage Two literary interpretation, with time for sharing and comparing interpretations--became one of my main answers to this discovery: continuous individual and socially supported training in assembling multi-elemental readings of texts. This mainstay of our classroom culture is only one of the techniques I have developed over the past 20 years to support synthesis of perception and concepts. Only in the last five years did I see and directly explore the benefit of weaving into the curriculum a year-long conversation about the elements of mind, with stages of increasing challenge, cycles of private and shared reflections, and layers of student- and teacher-accountability to advancing through the process of developing a practical philosophy of mind.

These years of experience come into focus as I reflect on Stage Three, bringing to mind a second finding for this stage: teams of teachers could benefit from learning how their students combine (or, importantly do not combine) the elements of mind across disciplines. Realizing how much I have changed in response to what I learned about students in the self-profiles, I hypothesize that groups of teachers could likewise help each other understand the self-profiles and create curriculum materials that respond more precisely to students' needs. Tracking

teachers' responses to students' elements of mind self-profiles would make a fascinating subject for a case study, with the case being bound at the level of the group.

The initial self-ratings instrument may also help to predict which kinds of perceptions students will notice and highlight in their reading and analysis of passages. In my data analysis, I looked for broader patterns in students' ratings of sensory imagination: in the opening miniature assessment, in the eight subject-focused profiles, and in reflection-questions five and six concerning sensory imagination. Strong correlations appear between these broad Stage Three patterns and the types of perceptions that students describe in their Stage Two literary analysis writings.

This discovery brings me to a third finding: the outcomes of Stage Two and Stage Three provide teachers with a platform for talking with students in much more detail about how their perceptions uniquely point their attention and thus guide their interpretation. My hypothesis is that this conversation can be eye-opening for students, especially if the teacher can then follow-up with students to explore how to broaden, diversify and brighten perception-and, with it, experience and comprehension. My proposal to use a reading frame may provide a means for actualizing a follow-up how-to discussion about reading and perception. Frames designed for other subject areas (e.g., math; biology; chemistry) conceivably could perform the same function, which may help students find more of their classes to be "multi-elemental" in nature.

The latter consideration--making each class "multi-elemental"--is important in light of another finding supported by Stage Three data: students tend to dislike and underperform in classes where they struggle to integrate the elements of mind. A downward spiral of negative emotion develops, adversely affecting students' interpretation. Teachers may be able to break this cycle by explicitly thinking about how to activate elements and integrate them into lesson

plans. If a teacher believes that activating each element is important to understand a given subject, then activation of the elements must not be assumed; it must be planned. Proving to students that a subject engages reality in compelling ways, revealed through concepts and perceptions both, can change how students think about a topic.

I support my latter claim by referring to another key finding from Stage Three: students respond positively to subjects they find beautiful; and in subjects they find beautiful, they activate and combine multiple elements of mind more fluidly. By contrast, students respond negatively and tend to do poorly in classes they find "rarely" or "never" beautiful--and in these classes, the struggling students report that they cannot activate sensory imagination. This outcome calls for more research into the apparent chain of connection that links active perception, recognition of beauty in concepts, and engagement in learning.

My last finding prompts a question. First, the finding: students can accurately assess how their cognition functions across several contexts, and they can go on at length and in detail about how the elements of mind come into play (or remain inactive) in a given activity. That is, they can use the elements of mind method to become aware of intricate detail in their thinking. This finding leads to a question: is the mind self-profile in each class a fixed pattern, or can a learner shift one or more profiles in ways s/he would favor, i.e., toward mastery and enjoyment?

One major purpose of the later stages of the model is to *train for* and *test* this very possibility. However, I conclude that the training and testing need not wait until later stages. I can design Stage Three to play an important role in this subsequent training and testing stage by adding a periodic reflection on, addition to, or revision to the profile to see if students become adaptable. The students would keep a concise journal record attached to each class in order to chart, encourage, and measure change across elements in each class.

In a longitudinal case study, a student or group of students could complete a new profile in each year of the study. The patterns in each profile from year to year could be analyzed in a mixed methods format. The quantitative dimension of the profile would gain sharpness if I were to modify the instrument by prompting students to give numeric ratings for each element of mind in the eight profiles, just as they do in the initial Stage-Three instrument on speed and vividness in sensory imagination. Making these changes to the instrument can help it to become more sensitive, capture more detail, and support deeper and more varied inferences in a future study.

Stage Four: Creating a New Word

In its relative brevity, Stage Four resembles Stage One: all of the work centers on defining one form, one structure, which frees creators to devote more attention to sub-symbolic perceptual and intrapersonal conceptual elements of mind that give ideas volume and texture. Stage Four thus offers creators a laboratory for rethinking the nature of symbols, overall, prompting people to explore how symbols are artifacts of creative processes. The poet Wallace Stevens (1996) writes, “A new meaning is the equivalent of a new word” (p. 902). We humans notice new meanings and become fountains of new concepts in every symbolic medium.

I see a high return on the relatively small amount of time creators invest in this process. In pondering the stirrings of perceptual and intrapersonal conceptual elements of mind, students acquaint themselves with “raw” content, and they learn to draw their attention away from the known and toward sensory experience and proto-conceptual structure: gardens for potential concepts.

This creative process presents a microcosm of larger forms of invention, such as developing a novel hypothesis to explain a pattern one can perceive in nature, or to represent an

experience in an original work of art. Imagine a scientific, literary, technological, or musical project of invention that requires several such inventive steps looped together like links in a mail--a process requiring more endurance and a larger vision, yes; but a process springing from the principles of transformation and synthesis of the elements of mind. We see the vital importance of these principles in the advancement of music, science, and technology, particularly in novel theory development and in paradigm shifts (Doidge, 2007; Einstein, 1970; Isacoff, 2003; Keller, 1984; Kuhn, 1990). Stage Four gives students an opportunity to master these creative principles, starting from pre-symbolic elements.

Given the value of Stage Four as a microcosm of invention, I plan to add more phases to this stage in future iterations of the curriculum model. Specifically, I will have students invent a number; form a new word for a natural phenomenon; form a new word for an internal psychological or emotional phenomenon; and invent a musical note or note-cluster. That is, I will make this stage multi-disciplinary; students will create a variety of forms from starting places in perception and intrapersonal imagination, building a wider variety of signs from quiet starts in imagination till the points when the forms mature into spoken, played, and written forms. I mean for the curriculum model to promote "multi-elemental" thinking across disciplines; I now see Stage Four as an ideal context for bringing about a transformation in students' aesthetic, emotional, and cognitive relationships to many kinds of signs.

I see an opportunity to combine Stages One and Four in a stand-alone online curriculum that fosters creativity among people of many ages, nationalities, and professional interests. This curriculum would also exist for a creative purpose: not only to create new symbols, but to teach a wider population about the principles and how-to processes of sign synthesis, building from the elements of mind. I call this online platform by the name of Living Lexicon. I intend to use

Living Lexicon as a basis for teaching the elements of mind in classrooms wherever teachers and students wish to play the games of Stages One and Four and make a laboratory for working with the elements of mind. I see Living Lexicon as an invitation to each person to consciously claim their creative ownership of language, and to take opportunities to help language, number, form, and note to leaf out in ways that are wholly original to each person's imagination.

I see Living Lexicon as a catalyst for a global, multilingual movement of language creation and metacognition training, promoting wider understanding of what language is, how the elements mind interact in it, and how we create meaning multi-elementally. Living Lexicon will support a perpetual project--i.e., it will remain alive and lively--in symbol synthesis across signs mediums. In order to engage people and to highlight human creativity in symbol creation across sign mediums, I would like to publish an annual print text of some of the most witty, mesmerizing, inspiring symbol creations. These novel signs would be highlights selected from a much wider--potentially oceanic and radically democratic--online dictionary, which would represent a permanent Wild West frontier region of sign creation.

Stage Five: Creating a Philosophy of Reading

I conceive of Stage Five as a process of instrument creation; the instrument is the philosophy of mind students apply in later stages of the course. Students produced some of their strongest work in this transitional stage. The artifacts from this stage, more than any other, proved to me that students can conceive of an original philosophy of mind and describe how to apply it. There are higher outcomes I can imagine, however, that follow from Stage Five, all of which involve application of the method in harder projects--such as in the lesson design exercise

in Stage Six. My primary reflection concerning the future of Stage Five thus centers on the timing of the stage to arrange for additional application challenges.

Students need adequate time to complete the prior stages in order to practice and to do a complete job in eventually developing a first iteration of their practical philosophy of mind. However, I would also like to maximize the amount of time available to students for the purpose of working with the instrument on a variety of harder projects. In a future course, I would aim to have students complete a first version of their respective instruments by late January or early February. I would ask for further refinements and additions to the instrument, but these changes would come by persisting through higher degrees of difficulty.

To aid and encourage students in this refinement process, I would expand opportunities for students to compare their philosophies, teaching each other their interpretive techniques across disciplines. I have never tried this activity with any of the 450 students I have guided through the model over a four-year period. Upon the (hopefully earlier) completion of Stage Five, I would project an image of Raphael's *School of Athens* and announce a second and open-ended phase of Stage Five: a social interpretation stage in which students tune their philosophies in continuous rounds of formal and informal collaboration.

Case studies of individuals who work through the stages could teach me a lot about the entire process: the stages leading up to Stage Five, when they formalize their ideas about philosophy of mind; the features of their philosophy and how they apply it at the start; and the phases and stages that follow in the final months of an academic year. I would eventually like to conduct ten-year longitudinal case studies from high school through the later years on subjects' twenties, preferably for at least one student each for several different fields of endeavor. I would highlight, in a case study of any duration, a close examination of Stage Six: case studies on how

students learn to change their thinking about a daunting, perplexing topic could provide valuable information for teachers seeking to help students appreciate and master subtle concepts.

Stage Six: Applying a Practical Philosophy of Mind to (Re)Design Thinking

Students understandably struggle to evaluate, plan, and design their thinking in a subject they find intractable. Though the study participants did well in their evaluations of their past learning experiences and in their designs for alternate paths to mastery, I would like for them to have had more time to deeply test and try their methods. Their plans to redesign their learning remained just that: plans--albeit plans that excited me and fired my imagination.

I became aware of my own steep learning curve in the process of guiding students through this cross-disciplinary application of the elements of mind. I perceived the uniqueness of each student's sense of lostness or longing; I perceived the mismatch between the speed at which they were expected to learn, compared to the time they would realistically need to organize their perceptions and intrapersonal concepts into new processes that could, as Griffin stated in his essay, help "the whole comprehension process to run much more efficiently." To compensate for these difficulties, I would, in a future run at Stage Six, begin the process earlier, create many more checkpoints, involve more people in the process who are equipped with necessary expertise, and take time for more reflections and class discussions along the path throughout Stage Six.

Taking a cue from the wide range of learning designs the ten study participants created, I would also offer maps and models of short- and long-term learning processes for students to ponder. Curie chose to design a long-term plan, and she has in fact followed up on it in depth and detail over several years. However, students choosing a path similar to Curie's would have

to wait for years to their plans tested and their visions realized, whereas their peers could conceivably experience a complete cycle of transformation in their understanding of a skill or concept in a matter of weeks.

The students proved to me that both the short- and long-term design exercises are valuable and viable. I am excited to see what future groups of students could accomplish. To emphasize again my strongest takeaway from teaching in and reflecting on Stage Six: I would aim to give the students more time; design more concrete steps and structure to help give form to each student's innovative, intrapersonal learning process; and secure more involvement of outside experts who can steadily provide energy, insight, and accountability to spur students to maintain high discipline and standards in what is--by design--an obscure, lengthy, and complicated process. The potential pay-off of this process for students is very significant: they can earn concrete proof, working from their own elements of mind and interpretive strategy, that they can design and work their own way out of confusion. Such experiences can transform their self-perception and sense of efficacy as learners and creators.

Stage Seven: Reflecting on the Elements of Mind as a System

To complete Stage Seven, students needed to juxtapose all of their artifacts of work from previous stages. Through juxtaposition, they could take in the sprawl of their work over the course of a year and take it in from an aerial view, seeing it as a whole. I asked them to pass their thinking through the lenses of three questions and to give three paragraph-length replies, one paragraph per question. The primary finding I draw from the artifacts of this stage is that students are able to see how the stages connect: how skills in previous stages translate into stages that follow later in the process. Ezra writes, "[T]hese stages required me to think in ways I don't

typically think. ...They asked me to look at myself; to find within myself what true understanding of something is, and that's not easy." The stages form a bridge from simpler perceptions and intrapersonal concepts to complicated concept arrays, linked together through meticulous self-observation, reflection, and creation. Students like Ezra can learn, "...most importantly, why [they're] not good at something" while also seeing what makes one an effective learner "in all of [their] strong subjects and everything [they're] good at and enjoy"--and they can explain their patterns in detail through social interpretation.

The students' closing reflections help me see that the students can articulate the links between the stages. The reflections also convince me that the students can gauge the impact of working through the model's stages on their self-understanding and on their analysis and creativity. These findings also bring into view the outline of a missed opportunity. I began the year with the assumption that much of my students' knowledge and imagination would exist in forms I could not directly see: sensory data, sensory imagination, and intrapersonal concepts, along with shared concepts they would choose to conceal. I also began with the belief that students can express their knowledge in more sign-mediums than words alone; and so I wish that I had coupled to the final reflection an invitation, if not a requirement, to each student to complement their short written reflection by representing their experience through some form of artwork or alternate sign medium: music, painting, a mathematical proof--something that I could not invent or foresee but could potentially understand.

The students' final words created for me a platform from which to look more deeply into their thinking. They helped me to gain more understanding. I sense that I might have been thrilled to see and hear, and not just infer, more of the detail and life of their intrapersonal thought, as given by an artistic reflection: a final creation that would let their understanding

come through to their audience in as many kinds of signs as they would choose to include in their concluding artifacts.

As the students and I discussed before beginning Stage Four, language is a subset of mind, while mind is a smaller subset of reality. I am not only interested in the students' language, however. I will make an opportunity for future groups of students to draw my thinking not only towards their language, but toward perceptions that can guide my thinking out, away from anticipated outcomes, and toward the harder-to-notice regions of their minds, helping me know more about the reality of their ways of thinking.

Proposal: Stage Eight—Exploring Consilience

I hypothesize that an ambitious project in cross-disciplinary imagination might require that students first form a practical philosophy of mind--or, at least, such a cross-disciplinary project might come to fruition more easily, if not also more satisfactorily, after students learn how to analyze and create from a foundation of fine-grained reflection on the elements of mind. In a future study, I propose to test if and how a student's command of a practical philosophy of mind can help them to solve difficult cross-disciplinary problems.

Solving problems often first requires that one frames them accurately. One's frame, in this case, may need to be flexible as well as sturdy in order to help one to securely hold and receptively comprehend volatile subject matter--a complex challenge; a vexing problem. For the purpose of creating such a frame, I turn to the biologist and philosopher E. O. Wilson, who in his book *Consilience: The Unity of Knowledge* (1999) wrote these words about the importance of cross-disciplinary imagination: **"**…[D]raw a series of concentric circles around the point of intersection [among disciplines]. As we cross the circles inward toward the point at which the

quadrants meet, we find ourselves in an increasingly unstable and disorienting region. The ring closest to the intersection, where most real-world problems exist, is the one in which fundamental analysis is most needed." Wilson's frame of concentric circles helps us to approach an "increasingly unstable and disorienting region" through a gradual process, wherein the outer layers hold us more securely and gather us to a locus of meaning and challenge. At this locus, Wilson calls us to connect the findings and insights we bring out of our many fields of intellectual endeavor to improve our ability to carry out "fundamental analysis."

Yet answers to these "real-world problems," Wilson elaborates, often elude us: "Yet virtually no maps exist. Few concepts and words serve to guide us. Only in imagination can we travel. The time has come to achieve the tour in reality" (Wilson, 1999). Wilson's last two sentences describe primary goals I hold for students as they work through the stages of the model: to learn how to travel in imagination; and to make a tour through a wider reality. By the time students reached Stage Seven, I had been explicit in naming this goal, but I believe I could and should ask future groups of students to take an additional step in reaching this goal: designing and completing a project in which they try their hands at consilience, using the elements of mind as fundamental building blocks in an original cross-disciplinary project.

Renowned engineer and historian Stephen L. Sass reinforces the thesis that skillful cross-disciplinary imagination helps civilizations to endure and advance. In his study of human history from "the stone age to the age of silicon," Sass characterizes cross-disciplinary imagination as an essential "substance of civilization" and describes some of its core features: "[T]hose driven purely by curiosity and by a willingness to ask seemingly irrelevant questions," Sass declares, "will discover the substances that shape the course of history…." Sass's succeeding remarks align with Wilson's vision of developing consilience by making a

tour through reality. He writes, "[P]erhaps new visions will emerge from a union of art, engineering, and science, all of which…share common goals. W[e]…must have the ability to combine, as Adam Smith put it, 'the powers of the most distant and dissimilar objects.' Upon that ability human civilization has always depended" (Sass, 1998). Sass's call to action reinforces Wilson's: we must learn to create a world picture from the findings we bring from several fields of inquiry.

Wilson and Sass argue that cross-disciplinary imagination may be necessary to our endurance as a species. We billions of humans speak more than 7,000 languages while living in nearly two-hundred countries, working in hundreds of different fields of specialization, consuming more space and more resources, and increasingly feeling the pressures of social, cultural, economic, and ecological limits. We billions must somehow overcome our language barriers and expand our ways of seeing and understanding our world in order to learn how to share one fragile planet.

The project of remaining a diverse people while becoming unified in our thriving as a species presents inherently cross-disciplinary challenges. It requires our spirited imagination; and it provides a rallying cry for how and why we educate. It is an especially complex project because it is overwhelming in its detail and possibly ill-defined, or perhaps plurally and irreconcilably defined by the many, sometimes-estranged parties who claim a stake in how we organize ourselves as a species. Thinking across economic and political philosophies, and taking into view ecological realities, social and cultural traditions, and technological possibilities, we must conceive of a method for preserving the best of our diversity, our plurality, while growing our capacity for agile and graceful action as a community, discovering and rediscovering new forms of harmony.

My work as a teacher over the past 20 years has in part reflected my effort to grasp the baton that Wilson and Sass have passed along to us, and then, in a practical manner, to carry it to students to see where they run with it. How can teachers help students "achieve the tour of reality" and "combine 'the powers of the most distant and dissimilar objects'"? Part of the answer to this question depends upon our ability to help students see how ideas are built--to see the sub-elements of ideas and their origins in interpretation--until they can analyze, re-create, debate, and synthesize ideas (Koek, 2019; Semetsky, 2014) for themselves in original forms.

With Wilson's and Sass's visions in view, I propose adding an eighth stage to the model to make the sequence conclude with a consilience project. This project would require that students convert longer sequences of intrapersonal thoughts into chains of inferences, logical connections, and communicable concepts, knitting together disparate ideas from distinct disciplines. To give the project coherence, students would be required to conceptually frame their project from a hierarchical perspective gradually afforded to them by their moment-to-moment recognition of intersections among two or more disciplines in relation to a central question.

Students would conclude this project with a culminating social interpretation phase, wherein students listen to and read one another's consilience projects, and from the set of projects make a diagram of and reflection on connections that link the projects into a field (see the introductory prompt for the Consilience Project in Appendix H).

This stage, too, appeals to me as a candidate for qualitative case study research, focusing on a single class of students as they endeavor to complete each phase of "Stage Eight."

The Elements of Mind

Future steps in my research on teaching a practical philosophy of mind include purposeful and ever-deepening study about the elements of mind. Each element contributes fascinating and essential features to thinking, to communication, to creation, and to life. Throughout my work on this study, I grew more interested in identifying finer classifications of concepts and perceptions, in particular. This interest grew stronger in my review of Stage Two artifacts during data analysis, when I noticed that students lean toward certain types of perceptual sensory imagination when they interpret literature. I do not think I need to go deeper than to teach two types of perception, concepts, and interpretation in working with students throughout the stages of the model, but I might be surprised to find advantages in doing so. I expect to benefit from exploring finer classifications, in any case, for the purposes of preparing my lessons Tand interpreting student work still more sensitively. Contemplation of the elements has brought joy to my research throughout this process. It seems right, almost obligatory, to comment briefly on each remarkable one of them.

Sensory Data

In chapter three of this study, I discussed early inspirations for my research on the elements of mind. Foremost among these early influences are the creators whose innovative research changed and improved their respective fields of study. An important point to notice about their lives and work is the vital importance of sensory data in inspiring, teaching, and tuning their work. Keen observation of sensory data--paying attention, and letting thought rise from the ever-renewed sensory encounter--is a primary source for discovery and inspiration.

Nobel laureate Barbara McClintock spent decades directly observing the plants she studied (Keller, 1984); globally-celebrated perfume developer Sophia Grosjman spent her childhood dwelling in fields of wild grasses and flowers (Klein et al., 1995); famed American culinary artist Jeremiah Tower made most of the earliest memories in his life exploring the kitchens of five-star hotels he walked alone as a child; and athletes Michael Jordan (Hameroff, 1997) and Tom Brady (Brady, 2018) stay riveted to sensory data in their training and in their competitions--the list, I believe, is endless, and endlessly rich in illustrations of the value of sensory data.

How often do teachers plan to integrate sensory data into their classes? This is an important question to explore, seeing as how interpretation of sensory data plays such a central role in the life and work of paradigm-shifting creators. A very recent illustration of the importance of sensory data as a source for learning came to my attention, fortunately, when I lucked into hearing the March 23rd *Invisibilia* podcast, “An Unlikely Superpower” (Spiegel, 2020).

This particular episode of *Invisibilia* features the story of Joy Milne, a woman who, after living with her husband during his long battle with Parkinson’s disease, developed the ability to smell the presence of Parkinson’s disease in other people--before existing methods of diagnosis could register it. Spiegel reports, “Joy's nose is so good, she's been working with researchers all over the world. She can now identify all kinds of illnesses--tuberculosis, Alzheimer's, cancer, diabetes. And her nose has been used to create a test that confirms the presence of Parkinson's through its molecular signature.” Milne’s particularly remarkable gift with olfactory sensory data has improved medical research, diagnosis, and treatment. Consider the value of this talent--

a sensory talent. With stories like this one in mind, I am thrilled by the prospect of continuing to explore how we teachers can bring sensory data into the heart of education.

Sensory Imagination

Through the seven stages of the curriculum model, the ten study participants spoke compellingly to the importance of sensory imagination in their learning. Research in neuroscience and medicine shows that, in learning how to activate and strengthen sensory imagination, students are developing a capacity that can aid them not only in learning, but in healing. Norman Doidge's research on neuroplasticity, learning, and healing (2007; 2016), enabled by activation and training of sensory imagination, brings compelling examples of the vital role sensory imagination plays in many areas of our lives, from training for high-level performance, to gaining physical strength (yes: through imagination alone), to changing the brain's motor and somatosensory cortices through imagined, pain-free movement to heal from chronic pain (Moseley, 2004). I am excited to help students work creatively with sensory imagination as a source of beauty in concepts, as a motivator for learning and emotional resilience in the face of challenges, as an essential resource in developing high-level expertise, and as a helpful life skill that can support a rich inner life and even improve physical health.

Intrapersonal Concepts

Intrapersonal concepts come from a person's interior life. Even to the thinker, they are almost a secret. The journey to bring them into communicable form can require years, even decades of effort, as evidenced by the testimonies of Barbara McClintock (Keller, 1984) and Albert Einstein (Einstein, 1970). My students' journeys through stages of the model, which

involved several phases of struggling to bring intrapersonal concepts into a satisfying and shared form, taught me that tending to this intangible element of mind is one of the most delicate and important parts of the teaching process.

An intrapersonal concept is invisible to everyone before the thinker has expressed it; and it is often obscure to the thinker herself. I am fascinated by the art of helping a person to catch sight of an interior symbol or symbol array that functions as an idea, to believe in it willingly without forcing its identity, remaining flexible and receptive, and helping it to emerge in time and in a process--idiosyncratic, emotional, and eventually social--that helps a new idea emerge. Without elaboration or commentary, let us hold this process in contrast to the common mandate to teach pre-formed interpersonal concepts on a pacing guide for the primary purpose of completing an end-of-grade test, potentially with teachers' and administrators' jobs on the line.

Nevertheless, a key disposition a teacher must embrace in order to make room for the intrapersonal transformation process to occur is to look confidently and supportively into a seeming void, giving warm welcome to awkwardness and novelty. In the presence of a teacher's warmth and sensitivity to a student's emergent ideas, just beginning to take shape, students may feel confident enough to acknowledge a subtle inner event and to follow through on that initial moment by holding a meditative gaze on the elusive, potential idea till it becomes clearer, more intimately known, to the originator, as students did in Stage Four.

As I complete this study, I realize that this is the type of teacher I aspire to be: one who creates an atmosphere and designs exercises that afford students quality opportunities to recognize, believe in, and develop a rich world of intrapersonal thoughts in which to take delight, in which to experience freedom of imagination and spirit, and from which to draw insights, form deep understanding, and create new concepts.

Stage Four, especially, presents an invitation to develop this kind of thinking. It requires the creator to dive into the sensory, the imaginative, and the intrapersonal. The longer exercises of Stage Six and the proposed Stage Eight likewise present invitations to explore how the intrapersonal world serves as a world for creativity. Helping a student develop a practical philosophy of mind through the connected stages means, in part, to help a student to resourcefully plumb the world of intrapersonal concepts with increasing independence in bringing inchoate ideas into new, communicable forms.

Interpersonal Concepts

> The poet comes to words as nature comes to dry sticks.
> --Wallace Stevens (1996), *Adagia*

Concepts bridge mind to mind, create structure within individual imagination, and constitute fundamental connective tissue in social interpretation. Concepts are instruments, William James (1977) writes, which enable interpreters to navigate the stream of thought and the field of perception; concepts, according to Albert Einstein (1970), make thinking "communicable" and grant interpreters a "measure of survey over the experience of the senses which we are able to achieve with [their] aid" (p.7); and concepts represent the ideas teachers mean to share with students and which test-creators analyze to measure qualities of individual minds. Yet all of our concepts are artifacts of both practical and imaginative experience: words were first worlds. Words might serve us best when we restore to them such fullness. Even the airiest abstractions have assumed a body, a written form and a group of sounds imbued with rhythm; and these abstract forms both derive from and reflect a tangible world from which they

distantly originate and toward which their meaning moves, much as a raindrop materializes from a vaporous grain, holds a reflection of earth and sky, and re-enters a wider body of its element.

Concepts, in a sense, sit perhaps or perhaps not deservedly, at a peak among the elements of mind, a totem-pole position granted to concepts by prominent writers since the ancient pre-Socratic philosophy of Xenophanes (Wilcox, 1993), with only rare exceptions, such as in the case of Heraclitus (Wilcox, 1993); and concepts have overshadowed perception in Western philosophy for over two thousand years since the emergence of Platonism. Not till the nineteenth century did perception emerge as an element of mind equivalent in importance to concepts. In the transcendental philosophy of Emerson (1982) and Thoreau (1962), in the phenomenology of 20th century philosophers such as Maurice Merleau-Ponty, Jean-Paul Sartre, and Martin Heidegger (1993), and in the 19th- and 20th century pragmatism of John Dewey (1933), William James (1977), Charles Sanders Peirce (2011), and Josiah Royce (1969), perception plays essential roles, partnering with concepts in idea synthesis. Contemporary philosophers continue to debate the nature and status of concepts (Davidson, 1973; 2001; Quine, 1992; Putnam and Putnam, 2017; Rorty, 2009).

In the philosophy of Louise Rosenblatt (1978), a single concept itself constitutes a kind of poem, in her figurative application of that term. A word becomes part of a triad of reader, meaning, and sign in the reader's stream of thought, pregnant with possible significance, and also bound by convention and agreement to signify certain forms. Philosophers debate the status of the word as marginal to the reader's epistemically privileged consciousness or, alternately, as constitutive and corrective of the reader's inherently partial and fallible consciousness.

I find that this debate lends appealing mystery to concepts. The poet John Balaban (1997) conveys a sense of this mystery and illustrates the idea of a single concept as a poem in

"Crossing West Nebraska, Looking for Blue Mountain." Balaban's opening lines elicit the form of the debate among literary theorists about the location of meaning: does it reside in the word, in the mind of the reader, or in the moment of the encounter between reader and word? Balaban begins, "Where can one find the real Blue Mountain?.../Will anyone ever live there but me?" The reader could be a solipsist or, by contrast, a social participant joined through language to a vision, in dialogue with a writer's created world, brought past limits by the unpredictable signs originating outside of one's private imagination.

Balaban's next images present the seeker with surprising answers to his questions. The answers hold alternate possibilities that Blue Mountain may appear only in light of disciplined scrutiny, or that it may appear in abundance all around us: "Some say that Blue Mountain is very small/ and is rocking in zion of a waterbead," he begins--and then pivots: "They claim to find it everywhere, even in clouds/of atmospheric dust snapping with strontium/ and settling on the grasslands this evening." The seeker in the poem then finds and takes us to a singular zion in a waterbead, which appears mountainous: "Although Blue Mountain is only as large as a thought,/ its sides drop off into dark crags; its steep slopes/ are smooth as glass. Its aspect is discouraging. But from its peak, one can see everything clearly…/...Am I there?"

Let Balaban's Blue Mountain, this zion in a waterbead, stand as a figure for Rosenblatt's word-as-poem in the mind of the imaginative reader. It is a useful symbol for interpersonal concepts because of its embodiment of concept-perception synthesis. Balaban's imagistic language represents the perceptual and intrapersonal dimensions of an idea, which a thinker can only discover and appreciate by making an interpretive journey. Such a journey holds out the prospect of glimpsing memorable landscapes and peaks from which one may "see clearly." We

can feel called to go on this journey of interpretation, even if we are not sure: “Will anyone live there but me?”

In the process of inviting and supporting students on a journey to develop a practical philosophy of mind, I want to invite students to find in the subtlest concepts and even the barest of stimulation a zion of meaning and a Blue Mountain of perception to ponder. Such imagination transforms boredom from within and buoys creative effort. My hope is that, at several moments throughout the model stages, a work of literature or an original inner thought brings into view an outer layer of beauty that invites a student to embark toward sensed inner layers that may be known on an interpretive journey. One so inspired may feel courageous to think as a truly individual interpreter, and to find resilience in case of fear that s/he is the only one, at least for a while, who will find meaning there on a novel path of interpretation, reveling in perception, in intrapersonal thought, and in fragments of language, till such time as the creative reader wishes, chooses, and works to make an inner vision communicable.

I argue, almost as an aside, but speaking directly to proponents of standardized testing, high-stakes and otherwise, that wandering toward Blue Mountain may be the best way to guide students to become more successful on standardized tests. In a future study, I will test this question directly in a mixed methods format. Does teaching students to analyze and create with the sub-dimensions of interpersonal concepts equip the students to reason more effectively with concepts on standardized tests? I conjecture--based on data, experience, observation, and theory--that yes, it does. If teachers can help students to understand concepts in such a new light, guiding them, and having them guide themselves, through readings, writings, projects, and debates that progressively reveal to them how to interpret and create with concepts--finding the

legs to scale the crags and slopes of a Blue Mountain--then students can very plausibly gain a leg up in the sloping z- and t-scales of standardized scoring matrices.

Future journeys into the nature of concepts with new classes of students may benefit from my effort to define more clearly a wider range of types and functions of concepts. In the current iteration of the curriculum model, students learn to distinguish among two primary classes of concepts: intrapersonal and interpersonal; among the former, we discuss types of internal meanings stemming from or bound up with specific kinds of perception; among the latter, we explore identities and functions of concepts in rhetoric, composition, debate, poetry, fiction, nonfiction, logic, and a range of related disciplines such as psychology, art, and history.

However, I note that differentiating carefully among types of perception in analysis of Stage Two artifacts yielded insights about differences in how students interpret literature. I might not have acquainted myself with similarly differentiable classes of concepts explored and explained by linguists, philosophers, and psychologists. My future research includes my commitment to seek information about various crags, slopes, sides, and peaks of Blue Mountain.

Individual Interpretation (Radical Constructivism)

The predominant way in which American students are academically evaluated as individual interpreters is through standardized tests. Let's note, however, that individual interpretation involves synthesis of four elements of mind: sensory data, sensory imagination, intrapersonal concepts, and interpersonal concepts. Interpersonal concepts represent only one fifth of this overall combination, and yet standardized testing (which I conditionally and sometimes strongly support) and the often obsessive culture and politics which develop in support of it (which I oppose) narrowly points teachers' and students' attention at multiple-

choice format assessments of interpersonal concepts as the primary year-end learning objective. Lessons which do not eventually cycle around to test-focused measurement of learning quickly come under suspicion. In light of these facts, we need to ask (minimally): what exactly are concepts, and how do students come to understand them?

Throughout this study, and with reference to compelling authorities, I have argued that a concept--a fully-formed concept--reflects a synthesis of perceptions, intrapersonal thoughts, and interpretive actions, which bond together the elements together in meaningful memory. On the basis of this study's literature review and artifact outcomes, I argue that our education system is due for a formal review of how we do (and importantly *do not*) incorporate each element of mind into standard curricula. Perhaps many people would laugh at the idea of assessing the place of sensory data in a test-focused curriculum--and yet consider the immeasurable value of this element in the advancement of every field of human endeavor. How often do we teach sensory imagination in math, science, and social studies courses? We need clear answers to such questions, and we need a plan for how to increase our knowledge of what each perceptual and proto-conceptual element does to fill interpersonal concepts with meaning, volume, and texture.

This is all to say: we need to create a culture of appreciation for the processes and contents of individual interpretation. We need to learn how exploration of the elements of mind that cohere in a compelling concept can engage students and propel them to eagerly develop interpretation. Aesthetic, emotional, sub-symbolic perceptual, social, and intrapersonal dimensions fold into individual interpretation, energizing it and shaping it.

I see this project--defining the dimensions of individual interpretation--as a way to honor students who, at every level of the education system, are called upon to be individual interpreters: individuals who take tests and stand by their test scores; individuals who earn grades

on a permanent record; individuals we teachers (myself included) expect to find meaning and value in interpersonal concepts. If the students will be ultimately counted alone on their test scores, in their college applications, and in their actual striving to win opportunities to work in the ways they most deeply value, then we must help to imbue their individual pursuits with an interior richness that is its own reward, that breeds resilience, and that holds within it an implicit personal invitation to persevere and discover. We can serve students in this manner by teaching from an informed understanding of individual interpretation.

Social Interpretation (Social Constructionism)

Throughout every stage of the model over the course of an academic year, social interpretation consistently helped to drive forward our shared project. Students learned from one another; they concentrated consistently in the classroom; they gave evidence that they had worked energetically outside of the classroom; and they willingly learned from their teachers. The school environment--particularly the lively, joyful, disciplined culture of the classrooms, and the administration's belief in teaching as an art form--facilitated our class's striving toward the goal of creating an applicable philosophy of mind.

This important fact--the vital importance of the social milieu in which the students pursued this project--commands my attention at a visceral level. I know that students and teachers in many schools wrestle with complex problems of classroom climate: difficulty in winning attention and focus; low buy-in from students and teachers alike; and overwhelming conflicts concerning student behavior. I have worked in such classrooms. I know how profoundly limiting such conditions can be for everyone involved.

I am earnestly interested in making the model fully functional wherever people would choose to adopt it. In future projects, I will explore how teachers can adapt the model to many social, academic, cultural, and economic contexts. I see this model as a flexible curriculum built to serve everyone--and which will grow through everyone's creative involvement. Social interpretation will play a driving role in my future research on teaching a practical philosophy of mind. Years from now, I hope I will have created, in collaboration with teachers in many different kinds of schools and districts, several iterations of the elements of mind curriculum model which teachers and students claim for their own.

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APPENDICES

APPENDIX A: Definitions of Critical Thinking

The eighty-page *Delphi Report* features a paragraph-length consensus definition of critical thinking (see Table A.1), an elaboration of two critical-thinking dimensions--*skills* and *dispositions*--and a set of fifteen recommendations for critical-thinking instruction and assessment. Similar definitions of critical thinking appear in research (Scriven & Paul, 1987) that precedes *The Delphi Report*. Later definitions such as those published by The Critical Thinking Foundation (Paul, et al., 2019; Elder, 2007) also closely echo the Delphi consensus (see Tables 2 and 3), which scholars around the world have translated into 20 languages and applied in research in 60 countries (P. Facione, personal communication, July 18, 2019).

Table A.1. *Definition of Critical Thinking from The Dephi Report.*

We understand critical thinking to be purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based. CT is essential as a tool of inquiry. As such, CT is a liberating force in education and a powerful resource in one's personal and civic life. While not synonymous with good thinking, CT is a pervasive and self-rectifying human phenomenon. The ideal critical thinker is habitually inquisitive, well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit. Thus, educating good critical thinkers means working toward this ideal. It combines developing CT skills with nurturing those dispositions which consistently yield useful insights and which are the basis of a rational and democratic society (Facione et al., 1990, 3).

Table A.2. *Definition of Critical Thinking from The Foundation for Critical Thinking.*

Critical thinking is self-guided, self-disciplined thinking which attempts to reason at the highest level of quality in a fairminded way. People who think critically attempt, with consistent and conscious effort, to live rationally, reasonably, and empathically. They are keenly aware of the inherently flawed nature of human thinking when left unchecked. They strive to diminish the power of their egocentric and sociocentric tendencies. They use the intellectual tools that critical thinking offers – concepts and principles that enable them to analyze, assess, and improve thinking. They work diligently to develop the intellectual virtues of intellectual integrity, intellectual humility, intellectual civility, intellectual empathy, intellectual sense of justice and confidence in reason. They realize that no matter how skilled they are as thinkers, they can always improve their reasoning abilities and they will at times fall prey to mistakes in reasoning, human irrationality, prejudices, biases, distortions, uncritically accepted social rules and taboos, self-interest, and vested interest. They strive to improve the world in whatever ways they can and contribute to a more rational, civilized society. At the same time, they recognize the complexities often inherent in doing so. They strive never to think simplistically about complicated issues and always to consider the rights and needs of relevant others. They recognize the complexities in developing as thinkers, and commit themselves to life-long practice toward self-improvement. They embody the Socratic principle: *The unexamined life is not worth living*, because they realize that many unexamined lives together result in an uncritical, unjust, dangerous world (Elder, 2007).

Table A.3. *Definition of Critical Thinking from The Center for Critical Thinking.*

The Problem: Everyone thinks; it is our nature to do so. But much of our thinking, left to itself, is biased, distorted, partial, uninformed, or down-right prejudiced. Yet the quality of our lives and that of what we produce, make, or build depends precisely on the quality of our thought. Shoddy thinking is costly, both in money and in quality of life. Excellence in thought, however, must be systematically cultivated.

A Brief Definition: Critical thinking is the art of analyzing and evaluating thinking with a view to improving it.

The Result: A well-cultivated critical thinker:

- raises vital questions and problems, formulating them clearly and precisely;
- gathers and assesses relevant information, using abstract ideas to interpret it effectively;
- comes to well-reasoned conclusions and solutions, testing them against relevant criteria and standards;
- thinks open-mindedly within alternative systems of thought, recognizing and assessing, as need be, their assumptions, implications, and practical consequences; and
- communicates effectively with others in figuring out solutions to complex problems.

Critical thinking is, in short, self-directed, self-disciplined, self-monitored, and self-corrective thinking. It requires rigorous standards of excellence and mindful command of their use. It entails effective communication and problem-solving abilities, and a commitment to overcoming our native egocentrism and sociocentrism (Paul et al., 2019).

One might conclude that these definitions of critical thinking have helped educators and education researchers to hold a clearer discussion about what skills and dispositions constitute critical thinking. One might further infer that these definitions provide a rich starting place for teachers to think about how to teach students to acquire and sharpen those skills and dispositions. However, in 2014, the *Educational Psychology Review* dedicated a special issue to the topic of how to define critical thinking, taking on the same task that the Delphi team had completed. Surprisingly, not one of the articles makes reference to *Delphi*, and only one later article by Facione, published in 2000, appears as a reference in the special issue, and then in but two of the

nine papers. The special issue gives evidence of American scholars' continuing interest in returning to foundational questions about the nature of critical thinking.

Publication of the *Educational Psychology Review* special issue came on the heels of an interdisciplinary conference, "Seeking Common Ground," where scholars worked to "form... shared claims about critical-analytic thinking that crossed philosophical, psychological, and methodological lines and that could guide future research and instructional practice in the years to come" (Anderson, 2014, p.472). Conference attendees arrived at a "Shared claims" statement (see Table A.4), which bears many similarities to the critical thinking consensus statement in *The Delphi Report*. Despite the strong similarity in the two outcomes, education scholars nonetheless continue to debate definitions and functions of critical thinking (Hayes, 2015; Mulnix, 2012), and in recent decades, studies of critical thinking skills have weighed new epistemologies (Anderson, 2014) and new theoretical problems that have emerged since the publication of *The Delphi Report*, especially concerning apparent differences in critical evaluation of online and print texts (Carr, 2011; Davidson, 2011; Mod, 2017).

Table A.4. Definition of Critical Thinking from the *Seeking Common Ground Conference.*

Common ground on the nature, development, assessment, and teaching of critical-analytic thinking. Shared claims:

Critical-analytic thinking is based on credible evidence.

What constitutes credible evidence in critical-analytic thinking varies by task, context, and normative constraints.

Critical-analytic thinking is effortful.

Critical-analytic thinking can be potentially costly or beneficial.

Young children can engage in critical-analytic thinking under the right conditions.

Critical-analytic thinking is fundamental to expertise development in cognitive domains.

Critical-analytic thinking is important to support the social good.

Critical-analytic thinking is fostered by the interplay of cognitive, social, motivational, neurophysiological, or experiential conditions.

It is possible to construct learning environments that nurture critical-analytic thinking.

Critical-analytic thinking can be individual and collective.

The process of critical-analytic thinking should be systematically incorporated into the school experience for all learners.

APPENDIX B: Kahneman's Definitions of System 1 and System 2 Thinking

Table B.1. *Characteristics of System 1 and System 2 Thinking*.

Features of System 1 Thinking (p.20, p.105)	**Features of System 2 Thinking** (p. 19-30, 89, 103-104)
• generates impressions, feelings, and inclinations; when endorsed by System 2 these become beliefs, attitudes, and intentions • operates automatically and quickly, with little or no effort, and no sense of voluntary control • can be programmed by System 2 to mobilize attention when a particular pattern is detected (search) • executes skilled responses and generates skilled intuitions, after adequate training • creates a coherent pattern of activated ideas in associative memory • links a sense of cognitive ease to illusions of truth, pleasant feelings, and reduced vigilance • distinguishes the surprising from the normal • infers and invents causes and intentions • neglects ambiguity and suppressed doubt • is biased to believe and confirm • exaggerates emotional consistency • focuses on existing/ignores absent evidence (WYSIATI: what you see is all there is) • generates a limited set of basic assessments • represents sets by norms and prototypes • matches intensities across scales • computes more than intended (mental shotgun) • sometimes substitutes an easier question for a difficult one (heuristics) • is more sensitive to changes than to states • overweights low probabilities • shows diminishing sensitivity to quantity • responds more strongly to losses than to gains • frames decision problems narrowly, in isolation from one another • can generate complex patterns of ideas (p. 20) • can drive a car on an empty road (p.21) • can detect hostility in a voice (p.21) • understand simple sentences (p.21) • find a strong move in chess (if you are a chess master) (p.21)	• an often acquiescent monitor that allows considerable leeway to System 1 • active in deliberate memory search, complex computations, comparisons, planning, and choice • able to resist the suggestions of System 1 • able to slow down thinking and impose logical analysis • enables and supports self-criticism • when lazy, it uncritically accepts suggestions of System 1 • allocates attention to the effortful mental activities that demand it • often associated with the subjective experience of agency, choice, and concentration • identified with the conscious, reasoning self • derives its beliefs and deliberate choices largely from the suggestions of the effortlessly originating impressions and feelings generated by System 1 • can construct thoughts in orderly series/steps • can take over cognition, overruling free-wheeling impulses and associations of System 1 • capable of diverse operations that share one feature in common: they require attention and are disrupted when attention is drawn away • can monitor the appropriateness of one's own behavior in a social situation • can check the validity of a complex argument • focus on the voice of a particular person in a crowded and noisy room (selective attention). • has some ability to change the way System 1 works programming the normally automatic functions of attention and memory • normally in a comfortable low-effort mode • mobilized to increase effort when it detects an error or an imminent error • Searches for answers to complex questions which activate System 1 processes within the frames of the System 2-directed searches (p.89)

Kahneman (2011) summarizes and expands upon extensive research in psychology (e.g., Stanovich and West, 2000) that describes interacting systems within cognition: System 1 and System 2. Following Kahneman, I utilize these two categories to describe thinking patterns that appear in student artifacts in each stage of the curriculum model**.** These systems describe "automatic" (System 1) and "effortful, conscious, intentional" (System 2) thinking, both of which become active and involved in interpretation (the synthesis of concepts and perception).

APPENDIX C: A Practical Philosophy of Mind among Pioneering Innovators

Skillful interpretation has remade and continues to remake the worlds of the sciences, arts, and humanities. Writings by leading thinkers boldly illustrate this point. Whenever a leading thinker makes advances in a field of research or in a creative pursuit, that thinker will usually demonstrate a clear command of how she or he combines concepts and perceptions to form ideas, to develop techniques, and to explore or explain beliefs. That is, leading thinkers show that they can call upon an explicit practical philosophy of mind that informs their work; and this is true across cultures, disciplines, and centuries. This compelling fact calls for a systematic investigation of common patterns in these thinkers' conceptions of mind, because these thinkers exemplify the advantages of connecting one's ideas about thinking to one's creative pursuits.

Albert Einstein's conception of knowledge serves as a prime example of interpretation as an essential basis for analysis and creativity. In his "Autobiographical Notes," Einstein (1977) develops his definition of thinking, which he composes in terms that a pragmatist philosopher might have chosen. Note Einstein's direct reference to perceptions and concepts and his description of how he proposes to combine them to form knowledge. He writes:

> What precisely is 'thinking?' When, at the reception of sense-impressions, memory pictures emerge, this is not yet 'thinking.' And when such pictures form series, each member of which calls forth another, this too is not yet 'thinking.' When, however, a certain picture turns up in many such series, then—precisely through such return—it becomes an ordering element for such series, in that it connects series which in themselves are unconnected. Such an

> element becomes an instrument, a concept. I think that the transition from free association or 'dreaming' to thinking is characterized by the more or less dominating role that the 'concept' plays in it. It is by no means necessary that a concept must be connected with a sensorily cognizable and reproducible sign (word); but when this is the case thinking becomes by means of that fact communicable….all our thinking is of this nature of a free play with concepts; the justification for this play lies in the measure of survey over the experience of the senses which we are able to achieve with its aid.

Consider the direct overlap of Einstein's terms and the three elements of mind that interested his pragmatist contemporaries. Einstein notes how complexly these elements combine and mutually shape each other: he observes, for example, that an inner, intrapersonal concept does not have to become a "word." His comment suggests that knowledge and understanding may exist in a form outside of language, which implicitly presents a challenge to teachers and students alike. The only way that teachers and students can share what they know is if they can put their thoughts into a communicable form; and transforming one's ideas from thoughts grounded in intrapersonal perception and inchoate concepts to thoughts distilled into communicable form is a process of considerable interpretive complexity. Such complexity, and the importance of this cognitive process, illustrates the importance of teachers' and education researchers' efforts to develop effective teaching methods deliberately aimed at promoting awareness of the elements of mind and how they may interact to form knowledge.

Einstein confirms this assertion in his definition of thinking. He notes that a thinker must bring his or her inner thought-world into a "sensorily cognizable and reproducible sign (word)"

in order for that thought-world to become "communicable," for our perceptions are always our own, private experiences. The American poet (1997) Wallace Stevens (1879 – 1955) made a similar remark about the relationship between thoughts and words in his collection of adages about poetry and philosophy: "A new meaning is the equivalent of a new word" (902), and for students, a central challenge of learning is to develop a vocabulary and a skillset to speak about "new meaning" that emerges non-verbally in their thinking. Einstein and Stevens understand that new meanings constantly form in the mind, reorder our existing ideas, and give rise to new elements in our lexicon. Part of a teacher's project with students is to help students discover how to create and organize language in order to convey meaning.

Consider a second illustration that confirms the importance of learning this process of metamorphic operations—this time from a slightly different, but complementary angle. The physicist Richard Feynman (1918 – 1988) expresses a lively interest in the distinctions of the elements of mind, and he emphasizes the importance of teachers' and students' grasp of these elements, their distinctions, and their interactions. Feynman (1997) elaborates on this topic in a story from his own classroom:

> I had a very interesting experience. I was teaching a group of students who would ultimately become teachers….I discovered a very strange phenomenon: I could ask a question, which the students would answer immediately. But the next time I would ask the question—the same subject, and the same question, as far as I could tell—they couldn't answer it at all! ...After a lot of investigation, I finally figured out that the students had memorized everything, but they didn't know what anything meant. When they heard "light that is reflected from a medium with an index," they didn't know that it meant a material such as water. They didn't know that the

> "direction of the light" is the direction in which you see something when you're looking at it, and so on. Everything was entirely memorized, yet nothing had been translated into meaningful words. So if I asked, "What is Brewster's Angle?" I'm going into the computer with the right keywords. But if I say, "Look at the water," nothing happens—they don't have anything under "Look at the water!"

Feynman here presents the importance of the distinction between concepts and perceptions in teaching and learning. He explains that his students were very good at playing a kind of matching game with concepts—numbers, symbols, formulas, and words—but that they were not prepared to link these concepts to perceptions, to non-linguistic phenomena. That is, they were not prepared to do interpretation.

Feynman's comments echo Einstein's. "Thinking," Einstein wrote, "is of this nature of a free play with concepts; the justification for this play lies in the measure of survey over the experience of the senses." Feynman asked his students to use principles of physics to explain the world they perceive with their senses. This effort to synthesize symbolic forms and perceptual phenomena is the difficult, interesting, important work that teachers and students must take on together.

The biologist and Nobel laureate Barbara McClintock represents the significance of mastering the skill set that Feynman sought to help his students develop. In *A Feeling for the Organism*, science writer Evelyn Fox Keller (1984) examines how McClintock synthesized intrapersonal perceptions and concepts to gradually formulate a model of genetics that revolutionized the field of biology. Describing and quoting McClintock, Keller tells about the "kind of seeing" that propelled McClintock to find and share her discoveries:

> What is it in an individual scientist's relation to nature that facilitates the kind of seeing that eventually leads to productive discourse? What enabled McClintock to see further and deeper into the mysteries of genetics than her colleagues? Her answer is simple. Over and over again, she tells us one must have the time to look, the patience to "hear what the material has to say to you," the openness to "let it come to you." Above all, one must have "a feeling for the organism." Our [Western scientific] method could tell us about some things, but not about others —for instance, she reflects, not about "the kinds of things that made it possible for me to be creative in an unknown way. Why do you know? Why were you so sure of something when you couldn't tell anyone else? You weren't sure in a boastful way; you were sure in what I call a completely internal way….What you had to do was put it in their frame. Wherever it came in your frame, you had to work to put it into their frame. So you work with so-called scientific methods to put it into their frame after you know. Well, [the question is], how you know it.

McClintock's surprising comments reveal how her groundbreaking work began and continually developed in pre-linguistic and extra-linguistic modes of cognition—namely: in sense data, in sense-imagination, and in intrapersonal conceptual thought, what Taylor calls "the internal conversation." McClintock's description of her own creative process brings to mind the philosopher Martin Heidegger's (1889 – 1976) characterization of language as "the house of Being." The mind lives inside of language, Heidegger claimed; however, he asserts that the mind is also "not-at-home:" so thinking moves outside of language, like a wind blowing around the conceptual "house." This metaphor describes McClintock's depiction of how she developed

her theory of genetics. She held an understanding of scientific phenomena that did not align with prevailing conceptions of truth, but that she considered plausible. She worked back and forth between perceptions (observations) and intuition ("a feeling for the organism") and established concepts—a "communicable form," to quote Einstein; words that fit into "their frame," to quote McClintock—in order to gradually develop a new set of ideas about the interactions of genes and the environment.

Knowledge often originates in this hybrid form: part word, part intrapersonal perception and concept. Knowledge also progresses from nascent form to a linguistic form that can subsequently influence the imaginations of other individuals. Interpretation guides this process of idea-synthesis. McClintock, Feynman, and Einstein embrace a condition of intellectual life that Stevens describes in another of his adages: "To live in the world but outside existing conceptions of it." And then to go on listening, naming, and creating. This adage also describes a mode of thinking that teachers can and arguably should help their students to acquire. A chief aim of this study is to present a model that may support this endeavor.

The cross-disciplinary relevance of this pursuit is further established in the two, brief following illustrations, one from the field of literature, and one from the field of math. Linguist and philosopher George Lakoff and psychologist Rafael E. Núňez identify interpretation as a determining force in the development of mathematics. They write in their book *Where Mathematics Comes From* (2000) that "everyday non-mathematical thought can create mathematical understanding and structure mathematical ideas. …Image schemas have a special cognitive function: They are both perceptual and conceptual in nature. As such, they provide a bridge between language and reasoning on the one hand and vision on the other" (29). Arguing against neo-Platonic conceptions of mathematics, Lakoff and Núňez assert: "…the only access

that human beings have to any mathematics at all…is through concepts in our minds that are shaped by our bodies and brains and realized physically in our nervous systems. For human beings…mathematics is embodied mathematics" (346) that arises through human beings' interactions with the world. Lakoff and Núňez devote their entire book to explore the link between concepts and perceptions in mathematics. Scientists such as the late Stephen Hawking attest to the richness and essential importance of this sensory-conceptual synthesis in mathematics (Overbye, 2018), reinforcing the role of perceptual (especially visual) thought in concert with concepts in mathematics (Boaler, et al.; Sazdanović, 2012, 2018).

Linguist, philosopher, and semiotician Marcel Danesi, a professor at the University of Toronto, conducts research that parallels and reinforces Lakoff and Núňezs' emphasis on the role of perception in developing concepts. Danesi (2001) asserts that abstract concept-formation is often grounded in enriched perceptual learning: "There is overwhelming evidence in the semiotic and language sciences that abstract concepts are not knowable directly—for example, as words-standing-for-single-ideas—but rather as 'metaphorized ideas.' …This is the reason why the focus is being put increasingly within these sciences on understanding how the brain carries out its work of transforming sense-based, concrete forms of knowing into mind-based, abstract modes" (133). The curriculum model aims to augment this very process and make students conscious of how to activate it.

Lakoff and Núňezs' theory holds important implications for teaching mathematics. Regardless of whether one accepts their critique of mathematicians' common inference that math exists independently of imagination, Lakoff and Núňezs' theory strongly implies that math educators would do well to ask students, like Richard Feynman asked his students, to use numbers to describe their actual interactions with the world, linking concepts and perceptions to

examine present experiences and to imagine (perceptually and conceptually) a range of mathematical subjects and experiences." That is, Lakoff and Núňez imply that mathematics courses could be informed by laboratory- and field-based courses that require synthesis of concrete and symbolic schemas.

The above-cited passages from physics, genetics, literature, linguistics, and math (and additional passages on culinary arts, chemistry, painting, and field biology in Appendix C) show that interpretation is a central, shaping influence among the disciplines. Collectively, these illustrations represent only a fraction of testimonies that converge in a common conversation about mind, meaning, and creativity. Above all, these illustrations underscore the importance of thinking deliberately and persistently on the topic of how teachers and students can work together to understand how the elements of mind combine to form knowledge.

Goal for Students: Understand and Apply Interpretation

Interpretation drives creativity and analysis in ELA classes.

Students master writing and reading—the heart of ELA—to the degree that they master interpretation by strategically combining the elements of mind when they read literature and produce texts of their own creation. A vivid illustration of this claim appears in Morton D. Zabel's (1947) biography on the novelist Joseph Conrad, in which Zabel quotes Henry Adams to describe the language-artist's creative process:

> Of the work of the artist in words Henry Adams once said that it "may be a stimulant more exhausting than alcohol, and as morbid as morphine. The

> fascination of the silent midnight, the veiled lamp, the smoldering fire, the white paper asking to be covered with elusive words, the thoughts grouping themselves into architectural forms, and slowly rising into dreamy structures, constantly changing, shifting, beautifying their outlines—this is the subtlest of solitary temptations, and the loftiest of the intoxications of genius" (p. 48).

Adams' description creates a picture, like an aerial map, of the paths of the creative writer's thinking. The writer moves back and forth between internal "architectural forms" and "dreamy structures" that the writer represents on the paper by tracking down "elusive words"—concepts— that convey impressions of the writer's dream to imaginative readers. Adams presents the creative writer as a synthesizer of words and internal images, emotions, and concepts. Creative reading inverts this process: the reader begins with concepts and develops sensory worlds and infers meaning. Deliberate, skillful interpretation is a thought-pattern that appears at the heart of a creator's—and each reader's—body of work.

An English Language Arts course makes an ideal setting in which to ground a discussion of the elements of mind: the "elements" provide a unifying framework for examining the widest range of literature. English Language Arts courses thus provide the sturdiest and widest stages to allow all of the voices of many disciplines to come together. ELA's primary focus—the development of language and thinking skills—also helps to give such a broad, varied curriculum a clear focus and a larger energizing purpose: to personally connect, through literature and writing, to Life in its many textures and forms.

APPENDIX D: Prompt for Stage Four—Creating a New Word

STAGE FOUR

Create a Word

Developing New Concepts from Multiple Elements of Mind

PROCESS

(1) Begin by observing a non-symbolic, perceptual pattern, object, or process.
(2) Your new word need not be onomatopoeic. Consider moving your pattern from a perceptual impression into a proto-conceptual form.
(3) Experiment with ways to link the perceptual pattern with concepts or with parts of concepts.
(4) Feel your way through intrapersonal concepts, tuning perceptions and concepts.
(5) If you find yourself pulling together a word from parts of existing words, consider studying those words' etymological roots, and use the roots, or antiquated forms, or parts of old forms, as raw material for your new concept.
(6) Hold in attention the emotional, attentional, tonal, perceptual, and conceptual dimensions of your word...till it becomes a communicable concept.

See three examples on this page and on the next one.

FORMAT

Follow the format for "squethumpabucket." Give the word's spelling, pronunciation, part of speech (and related forms), definition (and any sub-definitions), and the story of how your word evolved through your gradual synthesis of elements of mind, told in your illustration of the word and in your review of its origin. See your peer's neologism, "eirondshe," for inspiration.

sque•thump•a•buc•ket (sqwuh-THUMP-uh-BUH-kit)
noun – a basketball sequence consisting of a series of moves that creates an arrangement of interrelated onomatopoeic sounds.
verb – to engage (esp. to engage effectively) in said physical basketball sequence.

Variations and related terms:

squethumpabucketized squethumpabucketization squethumpabucketeers

Illustration of the Word:

The sound of sneakers squeaking-squealing on a basketball court signals to radio listeners the state of the basketball game at that moment: a scramble for position and possession in the paint. Even without seeing the players, a listener sees them in the sounds they make. Add to this euphonious cacophony the thumping of the ball on hardwood, the thumping of bounce passes, and the thumping of athletes going shoulder-to-shoulder to shield the ball and shove off for rebounds, all of which creates a percussive dimension to this basketball music (and this thump had better mark the sound of bounce passes, not the sound of over-dribbling *one-on-one*rs whose butts will thump the bench in *this* coach's line-up). Now, a second of silence, a spell of "ah" in this melee, this ballers' soiree, suggests a shot is arcing toward the hoop, marking a moment of

anticipation: and the players' jaws, slightly open as they watch its parabolic path, mouth the "ah" shape, mirroring the face of awe of the fans close-up on the spectacle—and, pronounced with the schwa's "uh," one might say this ah, this *uh*, catches defenders in the first syllable of the "uh-oh" as the shooter's rainbow zeroes in on the O of the hoop. The shot that hits the front of the rim first comes down with a "buh," a bounce bending metal downward; and when the rim-spring snaps the ring back in place, the rim flicks its "kit!" sound, so that in the case of such shots that rim-and-bank, the word *bucket* becomes onomatopoeic, underscoring the name and nature of this game of "buckets." To master this game of buckets is to become a squethumpabucketeer, whose opponents will surely cry bucket's o' tears in the wake of each contest. Altogether, these squethumpabucketous phenomena—the squeak-and-squeal, the *thump-thump-thump*, the *ah*, and the *buh*-kit!—naturally constitute and collectively define a phenomenon that till now has lacked a name: the squethumpabucket, a pyramidal shape of sound rising from a bass of thumps and diminishing to a silent point at the shot's apex. Students of the game, take note. The *sque-* of "squeak" and "squeal" makes half of *sesqui-*, that Latin prefix for *one-and-a-half*; and the squethumpabucket is the soul of full-court defense and half-court O. A brief scuffle under the hoop creates a brief squethumpabucket; a possession featuring four offensive rebounds, a long, complex one. Squethumpabucketization is essentially the process of winning on the strength of a team's full-court press and half-court game. O, teams of the nation: if you burn with championship dreams, you'd better learn the art of the squethumpabucket. Teams of the nation! If you want to clutch the golden ring, do not, DO NOT, *do not* let! yourselves get! *squethumpabucketized*.

Origin of the Word:

In my parked car, late at night in June, I sat listening to the Celtics and Lakers play for an NBA championship. I hadn't been home yet from work; high in my windshield, I could see the moon shining through oak branches. The game's radio announcers paused, and faint sounds of sneakers squealing on the floor came through the speakers; I could see the scene. Having jostled opposing players for rebounds in pick-up games, I knew that the sounds I was hearing meant the players were wrangling in the mosh-pit of the lane, watching a shot and then fighting for a rebound. The sounds instantly became images—and these sounds and images formed the first contours in my mind of what would eventually become a word: squethumpabucket, which began as a collection of sense-impressions, blended with memory through sensory imagination, emerged in embryonic form as an intrapersonal concept, and slowly accrued externally recognizable structure as an interpersonal concept.

EXAMPLE #2:
pla•ti•na {pluh-TEEN-uh}

(*noun*)—a layer of platinum-colored light over any landscape

Illustration and Origin of the Word: One morning last winter, I had occasion to sleep in a little and come to school late; so I got to see the sunrise. I walked from my car to the oak-yard lawn of Weaver Street Market in Carrboro. On my way to the cafe, I stopped several yards from the door, despite frigid air, to watch the light—to note its unusual color, a coating of it spread on the face of the long brick wall of the converted mill building, laced bright on the black of curvilinear

branches, and settled on fallen leaves curled like hands cupping rain. Stevens' observation came back to me in this moment—to paraphrase: a new pattern, a new observation, a new idea equals a new word. But several willing labels bounced off of this light. No, it was not precisely golden—*gilded* would not do. Not exactly argentine. Not *only* copper-hued. Metallic in color, however, and a watery amalgam of these, and subtly bathed in a hide-and-seek seeming of pale gray, pale blue auras—and most like platinum: white-on-gray, lit within to silver; all blended and brightened. And *not* metallic, after all. Malleable, yes. More so than gold. Though clear as glass; clear as shellac, a fine-grained varnish, a luminous patina. This crystal layer lining shapes' sharpest features, shining color, and allowing colors-shining-through to show, became to my mind, in a thought, *platina*: a patina-like coating of light all at once converging on, touching, flying off of platinum. Perhaps the spread of such light on objects is a process called *platination*. The quality of such light is *platinar* (PLAT-en-ur), not to be confused with the Spanish "platinar" (PLAH-tee-NAR), which, nevertheless, means "to coat with platinum." In some moments the mill's glowing wall seemed surfaced with electric blue.

EXAMPLE #3:
eir•ond•she (err-OND-she)

Noun The movement of air out from underneath a sheet as you press it down towards your bed.

Example The eirondshe made such a soothing sound that Bill had forgotten he was in the middle of making his bed.

Origin of the Word
At first I was very stressed about having to create a word because I had no idea what I was going to make the word about. I figured I would go about my day and see if anything came to mind or if anything happened. So my mom had just washed my sheets and brought them up for me to put them on the bed. I hate making my bed, yet I love a made-up bed, so I started the process. I put the fitted sheet on and then went to put the top sheet on. With the top sheet, my mom held one side while I held the other, and we carefully laid it on my bed – I like my made-up beds to be perfect. Obviously there is a lot of air underneath the sheet because it is so light so that it kind of floats above the bed for a little bit. Sometimes I let it float down to the bed on its own, but on other occasions I press it down and smooth it out on my own. This time I decided to smooth it out. So, while I was doing that, I noticed the amount of air that actually comes out from under the sheet. It made a sort of "swoosh" noise and the sheet went down against the bed kind of dramatically. I then realized there was no word for that pleasing, noticeable moment when the air comes out from under the sheet, so I decided to make one for it.

Illustration of the Word
There are many different sounds that air makes in all different types of scenarios and the one that I can compare this one to the most goes along with a parachute in the gym in elementary school. The problem with that is the noises that go along with it are very loud and exciting, whereas this sheet noise is more gentle and smooth. I decided to come up with a word that went back to the origins of words in the phrase, "air under sheet." I found that one of the origins of air was "eir,"

under was “onder,” and sheet was “shete.” I didn’t want to use all of the parts because that would create a word called “eirondershete,” and that, honestly, sounds like a not-so-nice word at the end. I was stuck for a little bit because I couldn’t figure out how to make them all fit together and seem semi-normal. I played around with moving the words out of order but then I felt it would not be as true to the meaning. So, I decided to use the first three letters of each origin to come up with “eirondshe.” Along the lines of it being my own word, I knew that I didn’t have to follow the rules with how things were supposed to sound, so instead of making “eir” sound like the word *air*, I decided to have it sound like “err.”

APPENDIX E: Prompt for Stage Five--Creating a Philosophy of Reading

STAGE FIVE

What Is Reading?

Describing Advanced Reading

Create a Reading Philosophy: What Is Real Reading? How Does One Do It? What Is Its Value?

Readers create meaning through analysis of structures and effects, sensory modeling of physical detail, and mental modeling of characters and audiences—a complex process requiring effort, emotion, strategy, and reflection. Discuss texts you have carefully considered to help you describe in detail how this creative-analytical reading process works.

In your introduction, win your reader's interest by telling a story, presenting a puzzle and its curious solution, considering a counter-intuitive idea, or discussing ideas that hook your intended audience's interest. After developing a rich introduction to your central idea, arrive at a thesis: define real reading, and tell us how to do it.

In the body of your essay, use eight to ten full paragraphs—more if you prefer, always focusing on clarity and quality—to expand on your thesis about real reading. Connect your paragraphs to your thesis by placing echo-phrasing in the transitional and clinching sentences. In the total set of your claim-data-justification cycles and mini-quotes, refer to many of the texts in the "Consilience: Core Sources" set. Feel free and invited to discuss other sources you would like to include in your essay.

In the penultimate paragraph, tell how reading with awareness of the elements of mind (concepts, perceptions, interpretation, and their respective subcategories such as sense-imagination) can help one to face complexity, find meaning amid confusion, and even seek to experience the Huh Effect—the experience of confusion and wonder without finding immediate structures or techniques that could bring about a state of clarity and understanding. Describe how a strategy for activating and combining elements—i.e., how the metamorphic operations of interpretation—supports one's ability to develop consilience.

Conclude by considering the value of interpretation and consilience on a personal level and/or on a societal level. Please be reminded: do not merely summarize your essay. Instead, use your preceding paragraphs as a platform to make a statement about how real reading (interpretation) occurs across disciplines, supports consilience, and shapes our world.

Bring this essay in typed, printed form. Use 11- or 12-point font; set margins at 1" all around; and single-space the lines of your essay. Give your essay a thoughtful title.
Include and LABEL in your essay at least one example of each of the following:

Dyadic sentence Triadic sentence Anadiplosis Zeugma Train sentence
A sentence using a colon for illustration A sentence using a dash to add emphasis
You may use handwritten margin notes and arrows to identify these forms.

APPENDIX F: Prompt for Lesson Design in Stage Six of the Curriculum Model

STAGE SIX

(Re)Design Your Thinking to Tackle a Hard Problem

Use Your Reading Method and the Elements of Mind to Design a Lesson to Teach Someone Else How to Do Something You Struggle to Understand

The problem or task I'm asking you to rethink and teach in a design of your own need not be a completely intractable problem, though I invite you here to take on a challenge. Choose to analyze and teach a concept from another class. At a minimum, the problem or task you study must be one that makes you work hard in order to understand, apply, and create with the concept or skill in question.

Please have your teacher verify that this concept or skill is in fact one that poses a challenge to you. A signature and a brief comment on the matter, in written or email form, will be suitable, and I'll follow up with your teacher in case I need to follow up with her or him in more detail.

In your lesson design, complete the following steps:

(1) Name the concept, problem, task, technique, or process in question. Tell how your chosen topic presents a challenge to you. Importantly, notice and comment on which elements of mind you presently can and cannot apply when thinking about your topic.

(2) Discuss how you have previously studied the topic, and assess what you do and do not understand about your topic.

(3) Identify a mastery target for your learning: define what qualities would define "mastery" of your chosen topic.

(4) Consider your answer to question (3), and then design a lesson you could use to teach yourself and someone else how to reach mastery.

Tell how you would use each element of mind in your lesson:
How would you elicit sensory imagination?
How would you guide a student to understand new concepts?
How would you design engaging rehearsals of the task(s) to help strengthen understanding?

(5) Honestly assess whether your lesson design has changed your understanding of how to think about your topic.

OPTIONAL and ENCOURAGED:
(6) Show your lesson design to your teacher; hold a discussion about it; see if your conversation confirms your sense that you have understood your topic. Have your teacher write to me—on paper or in email—a short description of your conversation about your lesson design.

APPENDIX G: Prompt for Stage Seven: Reflections on the Form of a System

STAGE SEVEN

Reflections on the Form of a System

Consider How Elements One through Six Form the Outline of a Method to Evolve over Time

This concluding reflection will consist of three detailed paragraphs.

In the first paragraph, describe your process of thinking and insight-formation as you worked on Stages One through Six. Did you go through confusion? Did you experience moments of breakthroughs? Did you remain the same or did you change in any way?

In the second paragraph, consider how these six stages fit together in a system that breaks reading and writing into related steps, working from the simple to the complex.

In the third and final paragraph, speculate on how these steps could form part of a method, a practical philosophy of mind, which you could continue to evolve. How could you use and improve this reading method in the future? Consider some practical steps you can take to get stronger, and tell how you might apply that strength.

Creativity and Consilience

Project Outline of Core Ideas and Relevant Subject Areas

...[D]raw a series of concentric circles around the point of intersection.
As we cross the circles inward toward the point at which the quadrants meet,
we find ourselves in an increasingly unstable and disorienting region. The ring
closest to the intersection, where most real-world problems exist, is the one
in which fundamental analysis is most needed. Yet virtually no maps exist.
Few concepts and words serve to guide us. Only in imagination can we travel...
...The time has come to achieve the tour in reality.

—E. O. Wilson, *Consilience* (1999)

Identify a passion, an unsolved problem, or a project goal that requires you to connect ideas from several disciplines. At the very least, the combination of ideas you formulate will present an entirely new arrangement in your mind; it might also represent a new arrangement of ideas for anyone. The main ideas that inspire this project are these: to identify a very meaningful pursuit and invest valuable class-time and personal time chasing a big goal; to share our ideas with each other, using our class as a resource; and to use creative and analytical research skills to draw on disparate resources and form one coherent project.

The outline on the next page will help you to begin. Identify your goal, and locate it within the boundaries of a profession, pursuit, or anchoring academic discipline. State your goal in clear language so that your peers can understand what you aim to achieve. In the boxes below the space reserved for your main question and statement of purpose, contemplate connections to other disciplines in order to focus your project on creating a synthesis of ideas you can find from many fields of endeavor that can help you to make your work beautiful and complete. This is a space for you to play with ideas, explore possibilities, and bring into view a design for your project and a path to finishing it. In doing this work, you will apply every skill you are developing this year: creative and analytical reading; strategic, imaginative writing; research and composition from multiple sources; and resourceful thinking across many disciplines. Connect to at least two additional disciplines, activities, or research areas in addition to English.

Consilience involves linking resources from several disciplines into a coherent form, especially in efforts to describe and solve a large-scale problem or far-reaching project. Your challenge involves creating a question as well as its potential solution. *Question creation* poses, in itself, one of the most important forms of innovation.

Section from *Metamorphosis II* (1939-1940), by M. C. Escher.

Figure H.1. *Consilience Project: Introductory Page of Prompt for Stage Eight.*

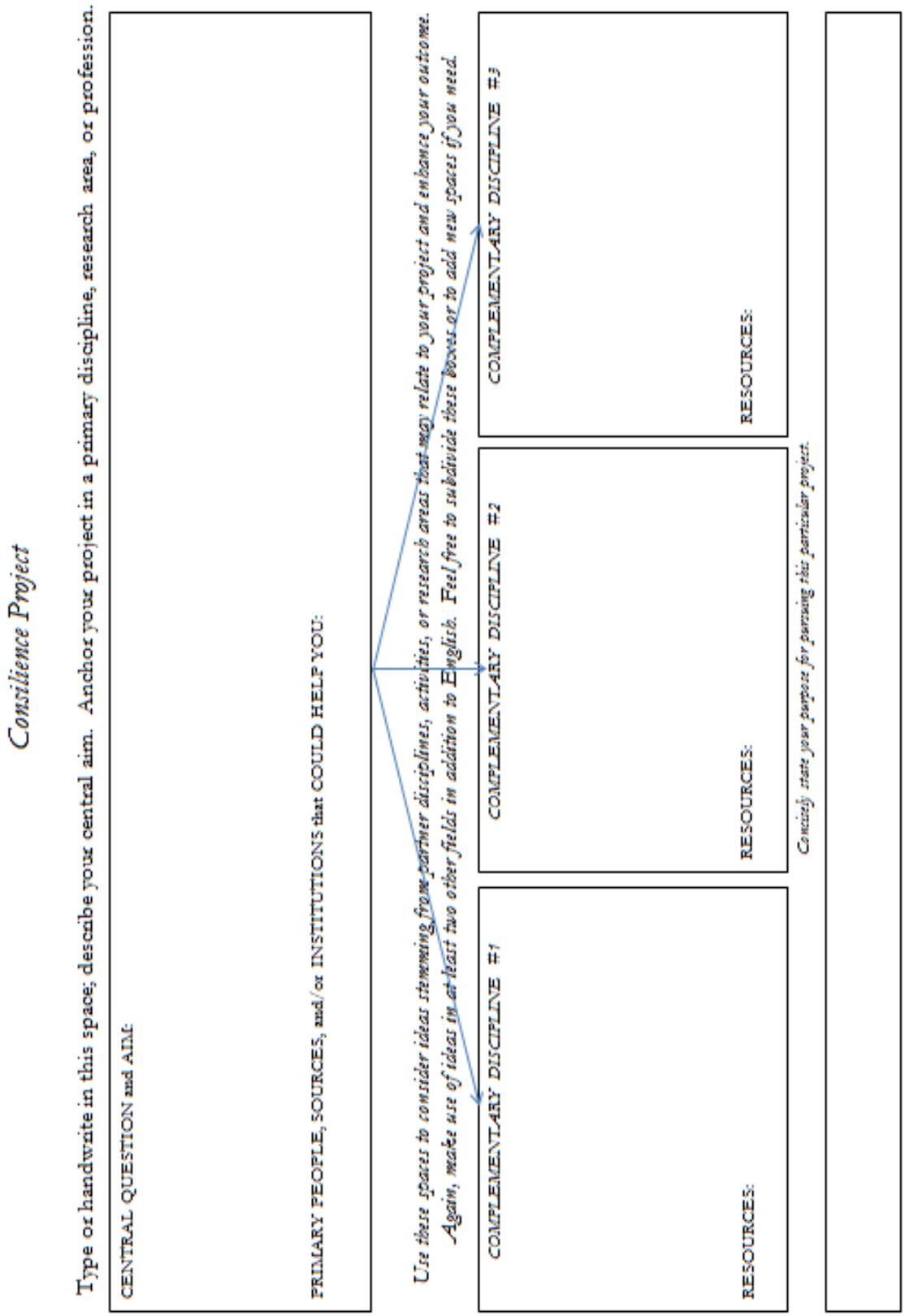

Figure H.2. *Consilience Project: Initial Outline Guide for Stage Eight.*

APPENDIX I: Beauty, Goals, and Flow

Abstract

Teachers aim to help their students establish achievement flow in subject-related activities. Through a literature review and via interviews with teachers and administrators, I explore the function of proximal goal setting in helping individuals to establish flow and the importance of perceived beauty of distal goals in driving a learner's motivation. My goal is to establish the grounds for questions to test in formal research: What role does an individual's perception of beauty play in shaping his or her domain identification, goal-setting strategies, and flow experiences? Can students' flow experiences—their frequency, duration, and quality—provide a useful criterion for defining the quality of a class? Can teachers and students benefit by making flow experiences an explicit goal? Do teachers and students who use proximal goal setting strategies establish flow more frequently and successfully than teachers and students who do not? I create a conceptual framework for seeing how beauty, goals, and flow together form a motivation system that functions in many contexts and influences how people learn.

Introduction and Purpose

My conjecture is that *beauty*, *goals*, and *flow* are connected elements of a motivation system that functions across many life contexts. Consider F. Scott Fitzgerald's Jay Gatsby looking across the sound to Daisy's green light, building his life around winning her affection; think of Paris and Menelaus warring to win the hand of Helen; study the emotions, language, and strategies of modern political parties as they devote themselves to a particular vision of society; imagine a scholar getting her first glimpses of a compelling, original idea, and spending years to pursue a deeper understanding of it in order to share it with others through a painting, a novel, a book of poems, a scientific argument, or a mathematical proof.[1] These varied instances present vivid illustrations of the close, powerful interrelationship of an individual's—or, for that matter, a group's—perception of beauty, on one hand; and on the other hand, the individual's goal-setting strategies and efforts to experience flow as s/he works toward a cherished goal.

The elements of this motivation system involve every aspect of a person's humanity. They engage the emotions, the body, and the intellect, especially when they work in a seamless combination. In light of the apparent power of this system of motivation to activate learning and, for better or for worse, to drive action, I propose to use this literature review, conceptual paper, and research proposal as a platform for exploring reasons why teachers should consider whether and how they incorporate the three elements of this motivation system into the classes they design and lead. I will begin by establishing clear definitions of each of the three main elements of this motivation system. I will gradually illustrate how the elements connect to one another, focusing especially on illuminating individuals' pursuit of flow in life projects large and small.

My aims are these: to promote consciousness of how perception of beauty profoundly shapes motivation across several life contexts; to consider the importance of flow in learning, and to discuss how goal-setting strategies may help students to experience it; and to establish a clear conceptual framework and a convincing rationale for pursuing an in-depth study of the interrelated roles that beauty, goals, and flow may play in how people learn. I will begin by discussing each element in reverse order, i.e., starting with flow, proceeding to a discussion of goals, and turning last to questions concerning beauty. This discussion frames the research proposal that I describe in the concluding pages of this study.

Literature Review

Flow

What is *flow*? Several common metaphors illustrate this concept. These metaphors include phrases that most people have either heard or spoken when discussing a person who is in flow: we will say that someone in flow is "in the zone," "unconscious," "on fire," or as a friend recently put it, "hitting all the green lights on a busy street." From these phrases, one can glean a basic sense of the meaning of this idea, *flow*. Flow is the experience of finding a productive, if not perfect match between one's intentions and abilities, on one hand, and the context and demands of performing a task, on the other. Flow is a term that describes what happens when one engages in a challenging activity, enters a state of total immersion in it, and reaches a level of mastery in it. In this state of complete immersion, one's effort and concentration facilitate fluid performance and support a high level of success and progress in the activity, a condition often accompanied by feelings of happiness, confidence, and enthusiasm.

The psychologist Mihhaly Csikszentmihalyi (1990) coined the term flow to describe such experiences. Csikszentmihalyi contends that a person's "best moments usually occur when a person's body or mind is stretched to its limits in a voluntary effort to accomplish something difficult and worthwhile" (3). Csikszentmihalyi calls these moments "optimal experiences," and "flow" is the term he uses to describe the state of joyful, total immersion one feels when successfully engaged in a personally meaningful, voluntary task. Layers of motivation theory are thus implicitly folded into the *flow* construct. Flow states involve feelings of *self-efficacy* that arise in the midst of an individual's *self-regulated* pursuit of goals s/he *values* and in which s/he *expects* to find challenge, reward, and positive outcomes, all of which can in turn affect an individual's sense of connection to the flow activity and the larger domain (e.g., arts, math, science, dance) to which the activity belongs.

Flow is highly individual. The conditions that promote one person's flow may create suffering or induce boredom in another, a fact which complicates teachers' efforts to design classes to help each member of a diverse classroom population to enter flow states. Classrooms are characterized by diversity and ill-structuredness: Lev Vygotsky's well-known and widely accepted idea of the zone of proximal development means that different people, even people who are similar in many ways, may require different circumstances to achieve flow in performing a task. However, according to Csikszentmihalyi, all people thrive in flow and can learn to cultivate flow experiences. Thus, flow may also be regarded as an important goal that teachers and students should strive to reach.

Csikszentmihalyi's thesis about the universality of flow, coupled with the uniqueness of how each individual enters it, holds important implications for teacher and students. One might use the frequency of flow states students achieve in class activities as a primary criterion for

evaluating the quality of a given course. A teacher's challenge in a diverse classroom is to design lessons and activities that place each student in his or her own zone of proximal development, much the way that an athletic trainer helps athletes adjust weights on gym machines to meet each athlete's appropriate degree of challenge. Another way of describing this challenge is that teachers and students must master the art of goal-formation in order to set the stage for learning and, eventually, for flow experiences.

Goals and Flow

Csikszentmihalyi explicitly links flow states to Vygotskyan goal-setting strategies. Flow happens "when psychic energy—or attention—is invested in realistic goals, and when skills match the opportunities for action" (6). A variety of research on goal-setting and flow in school-related tasks confirms Csikszentmihalyi's assertion about the intimate link between goal-setting strategies and flow states. Stephan Dutke and Joachim Stöber found that for individuals who suffer high test anxiety, high sequential demands (or frequent prompts to support self-evaluation and development of micro-goals) increase both "speed and accuracy of the test-anxious participants" (Dutke & Stöber, 381). Alayne C. Armstrong found that a group of eighth-grade math students that was "sufficiently decentralized" and capable of establishing "a working collaborative zone of proximal development" appeared to "demonstrate episodes of experiencing group flow" (Armstrong, 101). Nicola Baumann and David Scheffer conducted a series of three studies that "offer converging evidence that flow experiences arise from dynamic changes in positive affect," whereby study participants move from initial states of "low positive affect ('seeing difficulty') to high positive affect ('mastering difficulty')" (Baumann & Scheffer, 1304) by meeting and overcoming an experimentally-induced challenge. Each of these researchers' conceptual frameworks, especially Baumann and Scheffers' "affective change hypothesis," and

their respective experimental outcomes aligns with Csikszentmihalyi's conception of the connections between goal-setting, flow, and goal achievement.

These studies also illustrate an important distinction between two types of goals that prompt a learner's interest and facilitate a learner's focused effort. These two types are *proximal* and *distal* goals. Proximal goals are goals that are nearly within an individual's current state of preparation or ability. They are the goals that Vygotsky identifies as optimal targets to guide a student's learning process. Distal goals are larger, more complex goals that are remotely possible or presently unreachable within an individual's current state of preparation or ability. They are the long-term, overarching goals that inspire learners to take interest in acquiring knowledge and skills that will help them to make progress through several successive stages of mastery and toward realization of a higher-end, or even a transcendent, accomplishment.

Defining challenging, attractive distal goals plays a central role in a teacher's effort to direct students into purposeful activity that leads toward learning and, potentially, into flow experiences. A key to the success of each student's overall learning endeavor is to keep the distal goals in view as they focus on smaller, proximal goals, while also helping students acknowledge the distance they must travel to meet their distal goals. Distilling essential principles in their review of flow literature, Baumann and Scheffer write that "in order to maintain a state of flow, people have to continuously adjust the balance of challenges and skills. One the one hand, they have to actively seek difficulty in order to keep perceived challenges high. On the other hand, they have to convince themselves that they will be able to master these challenges in order to keep perceived skills high" (1305). Teachers play an important role in this continuous goal- and skill-balancing process. A teacher's frequent monitoring of students' perspectives on their relationship to their distal goals can assist the learners in resisting the

feeling of being overwhelmed by the larger task, and meanwhile to remain engaged, realistic, and inspired to strive.

This goal-setting and action-monitoring process entails risk. Students often lose confidence and motivation if they perceive a likely risk of failure to meet their distal goal, much less the proximal goals connected to it. However, students may feel listless and uninspired without meaningful distal goals to awaken their interests and move them to take constructive action. Csikszentmihalyi writes, "[g]oals can lead into all sorts of trouble, at which point one gets tempted to give them up and find some less demanding script by which to order one's actions. The price one pays for changing goals whenever opposition threatens is that while one may achieve a more pleasant and comfortable life, it is likely that it will end up empty and void of meaning" (223).

Assiduous goal-management thus emerges as an important skill for teachers and students to develop together. The flow literature I have cited here suggests that teachers can use proximal goal-setting strategies to help students navigate the emotional complexity and the cognitive strategy adjustments that accompany both their threat assessments and their commitments of belief and energy. Effective teachers want their students to work toward meaningful, ambitious goals and to find flow in activities the teacher designs. Baumann and Scheffers' affective change hypothesis can sensitize teachers to a pattern that indicates whether students are progressing toward flow. This pattern describes the direction in which a student's emotion evolves when the student and teacher skillfully handle the goal-management process: emotion moves from degrees of trepidation—again, "seeing difficulty"—to degrees of confidence—"mastering difficulty" (1304).

Proximal goals play an essential role in bringing this pattern into the light for teachers and students alike. Proximal goals create a greater number of opportunities for teachers and students to process results, communicate about progress, and engage in the goal management process that helps students to adjust, focus, and organize their learning efforts.

Testing the Relationship between Goals and Flow

Experimental researchers have begun to elaborate and clarify the relationship between flow and proximal goal-setting strategies. Once I reached a point of clarity in my understanding of this relationship and in my perception of support for this idea in flow literature, I decided to conduct a qualitative pilot test to learn whether and how students, teachers, and administrators have explored this relationship between goals and flow. I chose to conduct my test by doing a literature review about two related experimental schools in Canada, and then by conducting interviews with teachers and administrators at each of these locations to test the inferences I drew from my readings.

Both institutions are "Arrowsmith Program" schools, and both of them are subjects of very recent research that connects neuroscience and education. One of them is the original laboratory school founded in Toronto by Barbara Arrowsmith Young. Arrowsmith Young is profiled in chapter two of Norman Doidge's book, *The Brain That Changes Itself* (2007), a study of leaders in the emerging field of neuroplasticity. Arrowsmith Young grew up with severe learning disabilities that left her incapable of holding a drink in her left hand without spilling it, unable to comprehend basic conversations, and barely capable of making sense of what she read (Doidge, 2007). She developed cognitive exercises that helped her to overcome her own

disabilities and launch the Arrowsmith School in 1982. Thirty schools in Canada and the United States are now certified Arrowsmith Programs.

Arrowsmith Programs are built on the principle of lifelong neuroplasticity: the idea that the brain is flexible and changeable over the lifespan. Arrowsmith Young contends that sustained immersion in custom-designed cognitive exercises, in a supportive and nurturing environment, leads to physical changes in the brain, changes that form the basis of higher functioning across several domains of learning and performance. Each Arrowsmith Program employs instructional methods designed to promote deep, lasting neuroplastic change in learners who, due to any of a range of learning disabilities, have struggled to succeed in basic learning tasks. In reading about Arrowsmith Programs and in contacting people who teach and lead in these schools, I wanted to discover: what role might proximal goal-setting strategies might play in each Arrowsmith Program's approach to helping students work toward the ambitious distal goal of physically changing their brains through steady, years-long immersion in custom-designed cognitive exercises?

In a recent phone interview, I posed this question to Sandra Heusel, a co-founder and the head cognitive classroom instructor at the Eaton Arrowsmith School (EAS) in Vancouver, British Columbia. Based on my readings about EAS, I expected Heusel to confirm my inference that proximal goal-setting is an important part of the EAS culture. In *Brain School* (2012) by EAS founder Howard Eaton, a book that describes the history, function, and principles of EAS, I learned that students spend six out of the daily eight academic periods at EAS engaged in individualized learning activities that make up the Arrowsmith cognitive training curriculum. This arrangement suggested to me the likelihood that each day at EAS is measured out by students' efforts to meet a series of proximal goals.

Heusel's affirmative answer still surprised me. EAS students and "cognitive classroom" teachers collaborate in setting a new proximal goal at least every 35 minutes. Each hour of the school day is divided into focused, cyclical phases: time to define a goal; time to work toward the goal without interruption; time to process instant performance feedback; time to rest; and time to move to the next of six learning stations to begin the goal-setting and goal-management process anew. Proximal goal-setting is woven into the fabric of each hour, even each minute, of the EAS curriculum.

Heusel emphasized the importance of this cycle of goal-setting, instant feedback and adjustment, and focused effort. "They get to start toward a new goal at least every hour. There is always a new chance to succeed. Students take part in defining each new goal with the help of the cognitive teacher, who is also like a coach, a motivator." Heusel also mentioned at several points in the interview the importance of *hard work*: "Changing one's brain is not an easy feat. There are no shortcuts. The program does not go around students' weaknesses. It goes straight at those weaknesses again and again in targeted, precisely-defined exercises." I explained my hypothesis that proximal goal-setting sets the stage for learners to achieve flow experiences, and I asked Heusel if she thinks this thesis describes core design principles of the EAS curriculum: "Do the students eventually enter flow experiences after working consistently to meet a series of proximal goals?" Heusel responded, "Yes. That's exactly what they're doing. After a lot of hard work, students will start to say, 'this is getting easier. I can write and learn. I can understand a joke. I can read faces. I'm not as anxious." Such moments represent new peaks, "optimal experiences" (Csikszentmihalyi, 3) for EAS students.

The importance and power of distal goals at EAS also came through in Heusel's responses. Heusel explained that the typical EAS student, prior to starting the Arrowsmith

Program, had "often settled for lower life goals. But this program offers them an opportunity to revise their goals upward, to be more ambitious. Their parents, too, believe that their child could become capable of leading a more successful, if not fully independent future." While EAS students usually start to show noticeable progress at about the three-to-four month mark of their first year, Heusel stated that the first changes may start when the child visits. "They see other kids like themselves making changes. They can meet graduates who tell about their experiences. Through all this they can start to get a sense of what is possible. We tell them, 'If we can create the tightly-woven basket, it will be easier to fill it.' The students see, 'there are people here who understand me. I'll be in control of changing my life'" (S. Heusel, phone interview, April 12, 2012). *Changing my life*. *Working hard to change my brain*. *Overcoming my weaknesses. Becoming independent*. These are ambitious distal goals that Arrowsmith students consciously work to achieve—35 minutes at a time—every school day.

One week after my interview with Sandra Heusel, administrators at the Arrowsmith School in Toronto sent their written responses to my 18 interview questions via email (see the Appendix for the full transcript). My primary contact at Arrowsmith Toronto was Tara Anchel, the school's Assistant Director. Anchel spoke with teachers and administrators at Arrowsmith Toronto, including the school's founder, and sent written responses to the questions I had previously discussed with Sandra Heusel. Anchel's responses align with Heusel's, though Achel added interesting details about the program in Toronto, and Barbara Arrowsmith Young (via Anchel) commented more directly on the topic of flow.

In my first question, I asked, "If you were to remove the hourly and daily goal-setting strategy at Arrowsmith and work strictly with weekly goals, monthly goals, and/or annual and long-term goals, how would your students' cognitive development be affected?" Anchel's reply

underscores the central importance of proximal goal-setting strategies at the Toronto school. She writes, "…Arrowsmith has created benchmark goals for each cognitive exercise. These are communicated to the student as a macro goal…and are factored down to as small as a 2 minute goal. These benchmark goals are displayed throughout a cognitive classroom, kept on students' desks, and frequently referred to within a single class session. Students are very aware of these goals" (Anchel's full response is reprinted in Appendix).

EAS's goal-setting system is modeled on Arrowsmith Toronto's. The collaborative, individually-differentiated proximal goal-setting strategy EAS teachers employ is a centerpiece of the Toronto school's curriculum design. Arrowsmith Toronto's focus on a series of "2 minute" goals is the most striking example of Arrowsmith's application of proximal goal-setting strategy. Both schools' goal-setting practices, moreover, align with Baumann and Scheffers' affective change hypothesis: students consistently, consciously move from "low positive affect ('seeing difficulty') to high positive affect ('mastering difficulty')" (Baumann & Scheffer, 1304) to work toward progressively higher levels of performance, striving to reach flow.

Barbara Arrowsmith Young confirms that the design of the Arrowsmith curriculum helps students to scale up to flow experiences. I asked her to comment on my inference that the Arrowsmith curriculum is implicitly designed to induce flow states through steady work toward connected proximal goals. Via Anchel, Arrowsmith Young wrote that she "does have Csikszentmihalyi's book and is familiar with his work. The short answer to your question is yes." She elaborates that "the feedback/mastery/reward component built into each Arrowsmith exercise motivates a student (likely releasing dopamine) which will promote active engagement which will promote cognitive change." I went a step further and asked Ms. Arrowsmith Young if the proximal goal-setting/flow model of development characterizes her own effort to develop

her initial version of the cognitive training exercises before she founded Arrowsmith Toronto. Anchel wrote in response:

> the methodology and format of each exercise intends to produce within the student the optimal 'zen' state of engagement, but as you suggest, Barbara herself endeavoured to reach this state when she first developed these programs over 30 years ago. This is actually described in her book (Chapter 5)[2]—that in order to create the work she needed to 'become one' with the functioning of a cognitive area and feel her way to find a task that would stimulate it. This would certainly be a 'flow' state of embodying the nature of the area and becoming it (T. Anchel, email interview, April 18, 2012).

When I reflect on this response, I bear in mind that Barbara Arrowsmith Young had once been labeled "retarded." She spent many years of her life designing learning exercises to train herself how to "build herself a better brain," as writer and physician Norman Doidge phrases it in *The Brain That Changes Itself*. The Arrowsmith School that Ms. Arrowsmith Young founded has become to learning-disabled children what a superb athletic training facility is to athletes: Arrowsmith's curriculum design, function, and culture promote proximal goal-setting and the daily striving toward flow states in order to transform learning-disabled students' minds and

emotions, and ultimately to improve their self-concept, self-efficacy, and their prospects for happiness and fulfillment.

I have sent this paper to Sandra Heusel and to Tara Anchel to ask them to verify or adapt my report of their responses to my questions. Through this first round of interviews, I find that their responses support the idea that proximal goal-setting strategies and flow states are connected elements in the Arrowsmith curriculum.

Now, what of distal goals? And what of beauty?

As I have reflected on the Arrowsmith administrators' responses to my questions, I have come back several times to something that Sandra Heusel said about the proximal goals that Arrowsmith students and teachers create and work toward together: meeting their goals requires years of hard work. The studying process is highly repetitive. I infer that it may even risk becoming a grinding, boring process. What could inspire the students to go through this process? This latter question prompts me to think much more deeply about the role of the distal goal in establishing proximal goals that are sufficiently meaningful and relevant to incite a struggling student's interest and inspire him or her to work toward flow.

My thesis is that a distal goal that exerts this kind of enduring and defining influence must possess certain traits to the teacher and above all to the student. It must be compelling. It must engage the emotions, the imagination, and even the body of the learner. It must prompt and retain the learner's interest in spite of the difficulty and suffering s/he may experience in pursuit of it. It must hold resilient, even transcendent appeal. I infer that the goals that the young Barbara Arrowsmith Young created for herself and the goals her students now set for themselves

are goals that they might find, or even describe, in terms such as these, though I will need to explore this question further.

For the record, I did pose a question to both Arrowsmith administrators about the connection between goals and beauty. I wrote: "I'm interested to explore the idea that a person's sense of beauty shapes a person's self-identification with certain activities (e.g., someone who finds number beautiful will be more likely to enjoy math; someone who "sees and feels" stories will be more likely to find pleasure in reading). I'd like to know if teachers at Arrowsmith attempt to sensitize students to the beauty of the subjects they study. What role does beauty play in students' proximal and distal goal-setting and goal-definition strategies?" My question elicited interest, but not confirmation. Ms. Anchel wrote: "This isn't something we have explicitly explored within the Arrowsmith Program. Sounds interesting!"

I do find details in Heusel and Anchels' responses that encourage me to connect the elements of flow and proximal goal-setting to a third element, beauty: the latter element seems implicitly present in how Arrowsmith administrators and cognitive classroom teachers frame the distal goals the program aims to help students achieve. However, a deeper look into literature—research literature and "*literature* literature"—will be necessary in order to further test and refine this dimension of my motivation hypothesis.

Beauty, Goals, and Flow

Perception of beauty is unique to each individual, but the effects of beauty on a wide range of individuals are more universal in nature. Beauty focuses *attention*. It brings together the perceiver's physical, mental, and emotional alertness. It inspires *affective change*, preparing the way for the perceiver's skill development and mobilization of internal and external resources.

Beauty suggests a *purpose* for defining and pursuing goals. Its appeal is not exhausted by one encounter. It remains ingrained in one's memory, inspiring renewed encounters and encouraging progressively deeper inquiry and understanding. It has a reciprocal effect, too: the perceiver's self-concept rises in the repeated act of positive engagement with the beautiful subject.

I believe that the patterns I have just described conform closely, if not perfectly, to the relationship that a typical Arrowsmith student develops with the distal goal s/he forms and refines over several years: the goal is attractive and deep; it organizes the learner's whole being; in inspires and sustains positive affective change; it gives purpose and influences the learner's daily goals and routines; and it improves the learner's self-concept as s/he works toward meeting it. It is, in fact, a truly beautiful goal. My thesis concerning the role of beauty in motivation is that the beauty of the distal goal infuses each proximal goal with meaning and gives the individual a deep reason to press on through a wide range of difficulties. A goal is even more beautiful, I would argue, if one's pursuit of it leads not only to individual fulfillment, but also contributes to the wellness of others. In the case of students' personal growth and transformation at the Arrowsmith School, we see this kind of larger and deeper beauty.

Negative examples abound, too, and they are important to consider. I opened this paper with illustrations of ideals of beauty gone wrong: Gatsby's obsession with the hollow and reckless Daisy Buchanan, for example. Constructive and destructive examples alike illustrate the system of motivation I describe: an experience or ideal of beauty takes hold of one's attention. It moves the individual to organize a whole series of actions in response to this encounter, a process that grows more elaborate and complex through repeated encounters. The individual desires to enter flow and works toward this goal.

This system operates across many life contexts. This latter fact underscores the importance of students' and teachers' thoughtful consideration of the issue of beauty and goal-setting in our lives. Critical consciousness of ideas of beauty enlarges the emotional freedom through which individuals can engage and modify their relationships to their goals. To be in thrall to whatever ideals of beauty one happens upon in one's media zeitgeist is to be a plaything of whim and chance, perhaps of shame and guilt, or—worse: of marketing strategists. Uncritical allegiance to an ideal of beauty may also entail the seemingly-hypnotized perceiver's gradual development of cognitive and emotional *blind spots*—the perceiver's inability to see beyond the beauty ideal and think critically about the implicit demands the perceiver interprets as his or her responsibility, if not duty, to the beautiful ideal. For example, the absence of irony in a high-minded enforcer of a murderous colonial enterprise in the name of "beautiful" intentions, as dramatized in *Heart of Darkness*, provides a vivid illustration of this blind spot phenomenon. Such blind spots can and very often do afflict otherwise intelligent, well-meaning people.

Recent Research on Aesthetics and Flow

Authors of four recent articles explore these issues and address connections between beauty, flow, and goals. Each of Is' assertions either dovetails with or directly cites Csikszentmihalyi's claims about music and flow. Csikszentmihalyi writes, "[m]usic, which is organized auditory information, helps organize the mind that attends to it, and therefore reduces psychic entropy, or the disorder we experience when random information interferes with goals. Listening to music wards off boredom and anxiety, and when seriously attended to, it can induce flow experiences" (Csikszentmihalyi, 109). Csikszentmihalyi describes three layers of musical experience: sensory, analogic, and analytic, which involve the listener's body, emotions and sense-imagination, and intellect (110-111). Each article parallels Csikszentmihalyi in

conceptualizing learning as a broader physical-emotional-intellectual phenomenon, and each article converges thematically and philosophically with my motivation hypothesis.

In her theoretical article, “The Shiver-Shimmer Factor” (2010), Deanna Bogdan incorporates Csikszentmihalyi’s conception of musical flow experiences into a proposal for a music education curriculum driven by students’ critical contemplation and appreciation of beauty in music. Bradley Baurain compares group flow experiences in soccer matches to artful classroom communication in his conceptual paper, “The Aesthetic Classroom and the Beautiful Game” (2010) in which he considers the merits of teaching students to think about flow and guiding them to experience it. In a separate study, “Aesthetic Flow Experience in the Teaching of Preservice Language Arts Teachers” (2006), Sharon Murphy Augustine and Michelle Zoss carry out a plan like the one Baurain outlines. Augustine and Zoss see the subject of beauty and flow as “integral to understanding what makes school experiences meaningful” (Augustine & Zoss, 78).

Augustine and Zoss’ stance resonates with the thesis of Judith B. Alter’s article, “Aesthetics in Action” (2004), in which Alter explores the importance of “calling attention to the aesthetic features of movement” to enhance physical education classes—for example, to notice how “the rhythm of a movement, along with meter and tempo, affects its outcome because rhythm organizes movement” (Alter, 32). Alter’s (2004) proposals for physical education aim at helping students to activate and coordinate each of the three dimensions of musical experience Csikszentmihalyi describes: sensory experience, emotion and sense-imagination, and intellect.

The subject of how to activate and coordinate fundamental elements of the learning process—sensory perception, emotion, intellect, and volition—goes to the heart of the

present study. It also guides my thinking about how to expand this project as part of my dissertation. This marks an important new development in my dissertation proposal. The hypothesis I explore here is the motivational system that drives learning in the cognitive training program I have designed and which I have proposed to study. My proposal is significantly enriched by the addition (or the recovery) of this motivational dimension into the heart of my research topic: it maintains the holistic integrity of the program I mean to evaluate in language arts classrooms.

An Early Inspiration: Chuck Close

As I have worked on this study, I have realized that I have been working intuitively with this tri-elemental system of motivation since I started my first teaching job in the fall of 2000. I had recently learned about a painter, Chuck Close, whose early life-history reads much like an Arrowsmith student's profile: Close struggled through school, earning D's and F's in many of his classes except for art, where he routinely earned A-level grades. He barely graduated high school. However, he developed his own strategies of learning, and he mastered a complex form of composition that he continues to use and adapt to this day. Close's paintings are usually very large in scale: one black-and-white painting measures 21' by 12', and the details are photorealistic. His later paintings bear the same photorealistic detail—from a distance. However, as one approaches the canvas, the large-scale image begins to dissolve into progressively smaller forms that reveal Close's artistic method. In his portrait paintings, he divides a wide, ceiling-to-floor sized canvas into minute grids. Tens or even hundreds of thousands of these grids comprise the larger image, while each individual grid is also its own painting, its own world.

In response to viewing Close's large portraits, an interviewer once asked him, 'How do you paint a face?" Close's illuminating answer yields clues as to how teachers might guide their students toward the larger objectives and higher-order tasks they want their students to master. Close said, "I don't know how I do it. The task is too big, too hard to master. But I can make this task into much smaller tasks that I know how to do. The face just slowly appears after I work…it always surprises me" (Greenburg & Jordan, 1998). I took cues from Close's answer when I designed my first English classes. How would I help my students to become self-regulating creative thinkers? An answer could only come slowly, and it could only come by working together, day at a time, spiraling closer toward a larger goal. Each reading and writing activity, like each of Close's grids, served as a microcosm of the larger thinking strategy students could learn and apply to reading literature, to writing stories, and to how they reflect and act in the world. And always at the back of my mind, if not also at the forefront of class discussions, was the presence of the beauty in the work, the multi-layered beauty. This presence, too, is a fountain of motivation for Close: he devotes himself to bringing out the beauty of his subject in the image he creates. It urges him on. It is the criterion by which he evaluates his progress and charts his creative course.

***Lucas (1986-1987)*. Chuck Close. Note the grids (right) that comprise the portrait-subject's left eye.**

Conclusion

Perhaps this theory of motivation is quite old. Bogdan refers to Plato's critical-minded embrace of music as "central to children's preparation for the love of truth and beauty required in attaining philosophical knowledge," noting too that Plato was concerned about what ideals of beauty children would adopt: "…Plato censored the Lydian and Phrygian musical modes for the education of his guardians in his Republic as antithetical to character building," much as teachers, policy makers, and cultural commentators today debate the place of certain kinds of art and music in the lives of impressionable students.

Consciously or incidentally, Bogdan also touches on the potential danger that may arise from how one conceives of beauty. She writes that Plato saw music education as a means of

"predisposing the young mind to love the beautiful and hate the ugly" (Bogdan, 113). Such emphasis on aesthetic polarities has frequently translated into political violence. It has even contributed to the worst catastrophes, such as World War II, insofar as it was fought over competing *aesthetic* visions of race, religion, and culture that grounded the political programs of the Axis powers and the Western Allied nations.

Indeed, talk of beauty is quite common. Merely mentioning the word beauty is necessary, but entirely insufficient to affect how students think, feel, and act. That is, the term *beauty*, and for that matter the terms *flow* and *goals*, do not comprise a spell that teachers can recite in a kind of magic-words curriculum. And it is entirely plausible that these three elements, beauty, goals, and flow, are present and functioning together in classrooms, dance halls, science labs, and athletic fields where none of these terms is explicitly mentioned, or even directly conceived as such. However, teachers and students, and people more generally, may benefit significantly by a critical-minded, democratic discussion of beauty and a cooperative pursuit of beautiful goals and experiences of flow.

The latter claim begs many questions and demands further clarification and research to be substantiated. How can teachers teach about beauty and flow when each idea refers to something so personal and abstract? What difference can beauty make and what room could it find in a test-driven curriculum? What benefits can students and teachers gain from thinking explicitly about these topics in a language arts classroom, a science classroom, or a math classroom? The arrival of these questions marks a fitting conclusion for my present task, even as it signals the start of a harder endeavor, as well. This harder endeavor must include a practical test of whether and how a teacher's deliberate implementation of the motivation system I describe can make a positive difference in students' learning experiences.

Study Proposal

My primary research question is: Is there a relationship between an individual's perception of beauty in a distal goal and the individual's subject-related achievement flow?

My sub-question is: What is the role of proximal and distal goal-setting in establishing achievement flow?

I will combine quantitative and qualitative methods in a QUANT + qual = Explain Results Design (Creswell & Clark, 2011) to get at a comprehensive answer to these questions. I will begin by using 7-point Likert-scale surveys to assess the associations that high school students, high school teachers, pre-service teachers, and university professors make between their perceptions of beauty and their primary academic domain identification.

I will then conduct a hypothesis test to see if mean G.P.A. and test scores are higher for students in subjects that students find more "beautiful" in comparison to other subjects. I will also conduct ANOVA measures of mean scores in several subject areas compared to students' perception of beauty in each of several subject areas (e.g., math, chemistry, biology, English, and foreign language study).

Follow-up questionnaires soliciting written explanations of subjects' responses to the Likert-scale surveys will help me to gain a general understanding of how a wide variety of subjects conceives of beauty and identifies it in one subject or another.

In the final stage of this study, I will use semi-structured in-depth interviews with two individuals from each of eight subclasses: in the first four subclasses: high school students, high school teachers, pre-service teachers, and university professors who find a subject beautiful; and

in the second four subclasses, members of the same four groups who find the identical subject (the one admired by members the first four subclasses) to be bland, uninteresting, or unattractive.

I could go a further step with the members of these subclasses: I could try an intervention to see if an overt effort to introduce the subjects to "beauty" in a discipline they dislike could change their estimation of a given domain's aesthetic value. In my dissertation, this "further step" could take the form of my current dissertation proposal, "Teaching Pragmatic Interpretation." The experimental phase of the latter project involves an elaborate intervention aimed at helping students discern beauty in what they read by working through multi-leveled processes called aesthetic encoding and creative reading, which both involve proximal goal-setting strategies to support interpretation of texts.

My implicit emphasis on beauty in that proposal and my explicit discussion of its importance in this present essay deeply connects these two projects. I have started to consider them complementary branches of one project. The present study describes the *motivation system* I have employed in guiding students through the *cognitive training program* I have designed for my English classes, a program I have long planned to test in formal research.

Beauty, Goals, and Flow: References for Appendix C

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Beauty, Goals, and Flow Appendix: Interview with Tara Anchel of Arrowsmith Toronto

From: Mark Spring

Sent: Wednesday, April 18, 2012 10:52 PM

To: Tara Anchel

Subject: 18 Interview Questions

GOAL-SETTING STRATEGIES and STUDENT PROGRESS

[1] If you were to remove the hourly and daily goal-setting strategy at Arrowsmith and work strictly with weekly goals, monthly goals, and/or annual and long-term goals, how would your students' cognitive development be affected?

Active engagement is a crucial component of neuroplastic change, and frequent feedback perpetuates this engagement. Per session goals (eg. a quality/quantity goal set for each 40 minute period) enables a student to experience far more frequent opportunities which sustain their engagement, and even, ideally, drive at the goal with greater awareness/focus. Further to this, from a staff perspective, a per session goal allows a more acute measure of monitoring that engagement and identifying any patterns of not meeting a goal (in order to investigate and address). It's very likely that without these more discriminating goals, it would be difficult for students to achieve the ideal state of effort and engagement required to effect change. Also, given our student population (many with difficulties in attention, comprehension, reasoning, calculations), longer-term goals would be too abstract, making internal drive/intrinsic motivation more difficult to reach.

[2] What role(s) do the students play in setting and defining their goals at Arrowsmith?

With over 30 years of research and development, Arrowsmith has created benchmark goals for each cognitive exercise. These are communicated to the student as a macro goal (eg. to have an 'Average' level of functioning at the end of the school year), and are factored down to as small as a 2 minute goal. Eg. "To reach your goal, you need to earn a mastery checkmark every 2 minutes of the class. That means at the end of this class, you will have earned 20 mastery checkmarks!" These benchmark goals are displayed throughout a cognitive classroom, kept on student's desks, and frequently referred to within a single class session. Students are very aware of these goals. Occasionally students may, with staff consultation, modify the goals (eg. in hopes to exceed rate of progress by accelerating goal). Ultimately however, every student is meeting the goals as determined by Arrowsmith Program in order to ensure cognitive effect is taking place.

[3] {I understand that the Arrowsmith curriculum is tailored to each student in the cognitive classroom. How do classes work in the English and math classes? Is there a central curriculum? Do the teachers play different roles than they do in the cognitive classroom, and do the English and math teachers have different qualifications?}

Arrowsmith's purpose is to *change one's cognitive capacities to learn*, so Academic teaching and indeed learning occurs outside of an Arrowsmith classroom. The Arrowsmith Program is designed not to teach curriculum, but to rewire specific cognitive areas whose specific functions are related to writing, reading, comprehension, problem solving, memory, calculation, and communication –in time students strengthen these brain areas thereby making their experience learning curriculum material much more effective and efficient. Every school implementing an Arrowsmith classroom determines the ideal schedule of Cognitive and Academic programming for each student, and though crucial within that day is a minimum of 4 cognitive exercises. For

example, a student will spend half a day engaged in Arrowsmith programs, and the rest will be spent in curriculum-based classes as determined by the school.

Here at Arrowsmith School Toronto (the principal site), elementary students spend a daily period of Math and Language Arts, on material and learning objectives drawn from the Ministry of Education Curriculum documents. We recognize these to be the most crucial aspects of the core curriculum, and of fundamental life skills. Students participate in ability-appropriate curriculum material at their present level of function. As their cognitive profiles change, they move through the curriculum more effectively because they are no longer impaired by cognitive deficiencies. Teachers in our Academic classrooms are certified elementary or high school teachers. They also have Arrowsmith cognitive training as a means of informing their professional development to work with our student population. However ,it is not crucial that academic teachers be trained in the Arrowsmith methodology, nor do Arrowsmith Cognitive Teachers (necessarily)need to be certified academic teachers, as the implementation of the cognitive program is highly specialized and available only to those individuals trained by Arrowsmith Program.

[4] I am interested in the relationship between proximal goal setting and achievement of flow states--specifically: I see proximal goal-setting as a strategy that helps individuals and groups to experience what the psychologist Mihaly Csikszentmihalyi termed "flow," a motivational state characterized by feelings of complete task-immersion, loss of self-consciousness, high self-efficacy, and joy; a flow experience is an "optimal experience." In my research on Arrowsmith, I have arrived at the inference that the individualized brain exercise curriculum is designed to help students achieve flow states in areas of life where they have struggled, and that the Arrowsmith program uses proximal goal setting as a strategy to help students enter flow. <u>How do you respond to this interpretation of your curriculum strategy?</u> I certainly anticipated Ms.

Arrowsmith Young would be extraordinarily busy these days; I'm looking forward to reading her book. I'd like to make one request: please see if she would like to respond to this one particular question. I'd be especially interested to learn about some of her early breakthroughs when she was first starting to develop cognitive exercises--I'd like to know if she entered flow states; I'd like to know if she was urged on by goals she found compelling, or even beautiful.

I reviewed this with Ms. Arrowsmith-Young who does have Csikszentmihalyi's book and is familiar with his work. The short answer to your questions is yes. That is, the goals component within each Arrowsmith exercise promote reflection which promotes engagement which promotes cognitive change – so yes, the goals are intended to create as active engagement as possible, and the feedback/mastery/reward component built into each Arrowsmith exercise motivates a student (likely releasing dopamine) which will promote active engagement which will promote cognitive change, and the design of each Arrowsmith exercise involves the isolation of given brain area in order to limits distractions/interference from other areas of deficient - which will better tax the area and lead to cognitive change

Further to the fact that the methodology and format of each exercise intends to produce within the student the optimal 'zen' state of engagement, but as you suggest, Barbara herself endeavoured to reach this state when she first developed these programs over 30 years ago. This is actually described in her book (Chapter 5) – that in order to create the work she needed to 'become one' with the functioning of a cognitive area and feel her way to find a task that would stimulate it. This would certainly be a 'flow' state of embodying the nature of the area and becoming it.

[5] I'm interested to explore the idea that a person's sense of beauty shapes a person's self-identification with certain activities (e.g., someone who finds number beautiful will be more likely to enjoy math; someone who "sees and feels" stories will be more likely to find pleasure in reading). I'd like to know if teachers at Arrowsmith attempt to sensitize students to the beauty of the subjects they study. What role does beauty play in students' proximal and distal goal-setting and goal-definition strategies?

This isn't something we have explicitly explored within the Arrowsmith Program. Sounds interesting!

[6] Do students earn grades at Arrowsmith? How do they assess their own progress? How do teachers report students' progress to colleagues and to students' families?

At Arrowsmith School Toronto specifically, students 'graduate' through the elementary system (grades 1-8) by participation in daily Math and Language Arts programs, and students receive regular feedback towards their progress. Twice a year families receive formal reports which summarize all curriculum learning objectives covered throughout the school term, and to what degree the student is managing these objectives independently.

As Arrowsmith Program is not an academic-based program, it is the School implementing the program that is responsible for the assessment and evaluation of each students' academic progress within their framework.

[7] Do you make an intentional effort to help your students cultivate their emotional intelligence? What is the role of coaching the emotions in the Arrowsmith program?

Yes. Particularly as students who have cognitive deficient in areas related to reasoning/understanding, verbal and non-verbal communication, and aspects of executive functioning, their experience in understanding their own emotions, and that of others, is often weak. The first and crucial objective is to strengthen the cognitive areas related to these features. Then, it is important that students are provided with explicit skill-based learning of developing a strong self concept, a sense of empathy and community service. A seminar within our Teacher Training program discusses the emotional impact of learning disabilities, and how families and school communities can offer further support to their students. However, here again this is an area beyond the specifics of the Arrowsmith program; any emotional/therapeutic programming would be designed and implemented by school staff or parents in other areas of student support.

[8] Is there a discernible pattern or arc in Arrowsmith students' progress over the course of their first year at Arrowsmith? What kinds of changes do students typically experience at each stage of the process (e.g, the first day, the first week, the first month, the first quarter, the first semester...)?

Every student who engages in the exercises makes progress in the program. Depending on their profile when they are initially assessed, some students may address many aspects of their profile within the first 1 or 2 of their program, for others it may take several years to address all the critical functions related to academic and social skill acquisition. Within 3-4 months most students begin to experience change in the ease of their handwriting, gains in their ability to focus, organize, remember information, and understand. Within the first year many students can apply emerging cognitive strengths to accelerate their acquisition of learning skills such as reading, mathematics, and written compositions. Changes are also noted by students, parents and teachers in gains in confidence, communication, independence, task completion, and long

term goal setting. Year end assessments further confirm measurable cognitive change in the specific areas students have been working on throughout the school year. By the end of a 3-4 year program, the majority of students have the ability to re-integrate in a full academic setting without any modification to their curriculum, nor reliance on learning resource support.

INSTRUCTIONAL TECHNOLOGY

[1] Are the computers in the cognitive classroom connected to the Internet?

Arrowsmith software does not require internet connection.

[2] Are some or all of the cognitive training exercises grounded in Internet-based programs, or are they anchored in offline, task-specific software programs?

About a 1/3 of Arrowsmith exercises are computer-based, Arrowsmith-designed software. A 1/3 of the exercises are auditory based (MP3 material), and the rest are paper materials.

[3] What role, if any, does Internet-based (e.g., web 2.0 programs such as Voicethread and Glogster) teaching and research play in the English and math classes at Arrowsmith?

[4] Has the Arrowsmith School developed an explicit philosophy concerning the role(s) that instructional technology will and will not play in Arrowsmith classrooms?

Arrowsmith continues to refine exercises including our computer-based software, however given the unique and propriety nature of the exercises, it's unlikely Arrowsmith will need to rely on internet-based programs.

ELEMENTS of MIND: PERCEPTIONS, CONCEPTS, and INTERPRETATION

[1] Do teachers at Arrowsmith make an explicit effort to train students to deliberately coordinate *perception* (both sensory perception and sense-imagination, i.e, imagined/remembered sensory experiences) and *concepts* (e.g., words, numbers, shapes) to develop clearer ideas and effective thinking strategies? If so, how do they do it? May I see a syllabus for your math and English classes? May I see a copy of an anonymous student's individualized curriculum plan?

Arrowsmith has programs which target specific brain areas related to left and right brain areas, several of which are related to visual perception of symbols (left), and images (right), spatial awareness, memory (auditory, visual, and motor/muscle), and overall problem solving and strategy development. So while teachers are not explicitly teaching students, it's the case that many students are working on exercises which strengthen their ability to better learn and therefore access the strategies which you describe.

Arrowsmith School's Academic Dept does not have a prescribed syllabus as teachers regularly create lessons and unit plans based on individual student need. As the students' needs and indeed strengths are changing throughout the course of a school year, their subsequent Academic expectations are modified frequently. What may be helpful to you are Ministry of Education

Curriculum documents, which can be found online and detail the learning objectives per subject of elementary and high school curriculum. It is these documents and exemplars which Arrowsmith School Academic staff utilize.

ARROWSMITH--GENERAL QUESTIONS

[1] Does the Arrowsmith School incorporate art, music, and physical education into its curriculum?

Arrowsmith School Toronto has a weekly Physical Education classes, and approximately 3-5 art/music sessions each school term.

Here again of course, schools who offer the Arrowsmith Program within their own school will provide art/music/PE curriculum as per their own curriculum and programs offered.

[2] Do you incorporate service learning projects and outdoor/wilderness education into your curriculum?

While not explicitly part of the Arrowsmith cognitive program, many teachers will implement these types of projects within the social skills component of the school year.

[3] Do you offer yoga, dance, and/or meditation classes to your students?

One of our classes here at Arrowsmith School Toronto attends a weekly yoga/meditation class.

[4] Do you offer classes and/or workshops for teachers and teacher educators? If so, how does one apply for admission?

At Arrowsmith School Toronto we hold regular Professional Information Sessions. These ½ day workshops offer educators, physicians, therapists, and those interested in Arrowsmith's application of neuroplasticity. Guests learn about the science and principles of the program and visit with cognitive classrooms.

To become an Arrowsmith Teacher one must complete an intensive 3 week Summer Teacher Training program. This training program is only offered to those teachers from schools who offer the Arrowsmith Program to their student body. Professional development seminars are held throughout the school year and as part of their ongoing training and in order for Arrowsmith teachers to maintain their certification.

[5] What can teachers and administrators in mainstream schools learn from Arrowsmith in order to provide a stronger education to students in mainstream schools?

Teachers and administrators can foremost explore the emerging field of 'neuroeducation'. Conventional measures of altering educational infrastructure (eg. smaller class sizes, different teaching models, technology, new curriculum) is less enduring and less meaningful than 'changing the learner'. Science has informed us that neuroplasticity is possible throughout one's lifetime, and numerous populations once thought to be limited by brain loss or injury have new opportunities for rehabilitation . Most notably, mainstream schools can implement the Arrowsmith Program into their school through a licensing agreement between itself and the Arrowsmith Program. Over 30 schools in Canada and the USA currently offer the program, considered one of the pioneers of neuroplastic application. Certainly Arrowsmith's vision is to

reach as many individuals as possible.

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[1] I invites the reader to search his or her own experiences: do you recall an instance where a beautiful goal motivated you to strive repeatedly to understand it and to connect your life to it in some deeper way?

[2] *The Woman Who Changed Her Brain* by Barbara Arrowsmith Young is scheduled for publication in May of 2012.

APPENDIX J: The Elements of Mind and the Structure of Scientific Revolutions

By and by I despaired of the possibility of discovering the true laws [of radiation physics] by means of constructive efforts based on known facts.
--Albert Einstein (1970), *Autobiographical Notes*

To live in the world but outside existing conceptions of it.
--Wallace Stevens (1996), *Adagia*

In science...novelty emerges only with difficulty, manifested by resistance, against a background provided by expectation….[A]wareness of anomaly opens a period in which conceptual categories are adjusted until the initially anomalous becomes the anticipated….[R]esistance guarantees that...the anomalies that lead to paradigm change will penetrate existing knowledge to core.
--Thomas Kuhn (1996), *The Structure of Scientific Revolutions*

I interpret Thomas Kuhn's classic work in the history of science, *The Structure of Scientific Revolutions* (1996), as an illustration of how a practical philosophy of mind operates at the heart of innovative thinking. Kuhn gives a meticulous account of how an expert researcher's deep acquaintance with a conceptual theory sensitizes him or her to anomaly--perception of a pattern that lies outside of existing verified fact. Kuhn (1996) observes, "...[Novelty ordinarily emerges only for the [person] who, knowing *with precision* what [to] expect, is able to recognize that something has gone wrong" (p. 65) in the theory, and that reality exceeds the symbols we use to describe it. Interpreters then begin to build a bridge from existing symbolic orders to new perception of phenomena. This process is governed by the synthesis of concepts and perceptions: interpretation.

Kuhn's description of this cyclic pattern in science alerts innovators to a useful paradox. "The more precise and far-reaching [a] paradigm is," he argues, "the more sensitive an indicator it provides of anomaly and hence of occasion for paradigm change" (p.65). This means that innovators who look to reify conceptual abstractions about phenomena might at the same time entertain hypotheses about the eventual, even necessary revision of a conceptual order.

A scientist's commitment to revision of conceptual theory need not be interpreted as iconoclasm. The cycle of seeing and re-seeing emerges from a changing relationship of concepts to reality. The innovator tunes concepts by continuously learning and noticing the "precision of the observation-theory match" (p. 65), coupled with the appearance of novelty which emerges to the trained gaze of observers who, paradoxically, learn to think accurately within an existing frame, which sensitizes the observer to wider reality.

The philosopher Ludwig Wittgenstein (2000) presents a picture of this cycle in points 2.063 to 2.224 of his *Tractatus Logico-Philosophicus.* Wittgenstein argues that a logical "picture is linked with reality; it reaches up to it." Here Wittgenstein implies a gap between representations and reality. He continues that the picture "is like a scale applied to reality." The more sensitive the scale, the more accurately the picture describes "atomic facts." Wittgenstein describes a pivotal moment in our relationship to logical pictures: "In order to discover whether the picture is true or false we must compare it with reality," again implying a possible distinction between the two.

Critically, Wittgenstein (2000) notes: "It cannot be discovered from the picture alone whether it is true or false." To evaluate the picture, we must make reference to that which it describes, not only to the description; even in apparently perfect correspondence, we must notice a possible difference between that which we have reified and that which may differ from it. If we replace the word "picture" with Kuhn's term "paradigm," the alignment of Kuhn's (1996) observations and Wittgenstein's (2000) latter argument becomes apparent. The picture and the paradigm play essential roles in describing reality; an exciting and paradoxical point, however, is that these picture-paradigms also serve as platforms from which to catch glimpses of the novel.

From this brief consideration of Kuhn's and Wittgenstein's notes, we can derive an important takeaway for the principles of teaching a practical philosophy of mind. In Kuhn's and Wittgenstein's arguments, we can perceive how innovators will benefit from taking a particular *stance* in their interpretation of concepts. This stance is characterized by the observer's receptivity to detail afforded by the conceptual order, coupled with the observer's keenness to notice novel sub-symbolic perceptual and proto-conceptual forms of order which the "picture-paradigm" may attract to the observer's notice, but not, in known terms, explain.

This understanding of the interpreter depicts human beings as creator-discoverers of meaning. Immersed in an inner conversation that consists of many elements of mind, creator-discoverers may learn to assemble elements of mind into new forms. In teaching students to acquire and apply a practical philosophy of mind, we can present to students this picture of the interpreter, offering it as an invitation to engage in disciplined inquiry and creative discovery. Through the model exercises and stages we design and share with students, we can also cultivate the possibility that the students will have experiences that give them a first-hand feeling for the role of a creator-discoverer, revering, and also refining, the conceptual orders by which we live.

Introducing Students to the Role of Interpretation in Innovative Thinking

To help students to appreciate this abstract discussion topic, and in reply to the students' descriptions of their perceived difficulties in deliberately synthesizing the elements of mind, I created a diagram to support our study of how language, mind, and reality connect (see Figure 7.1).

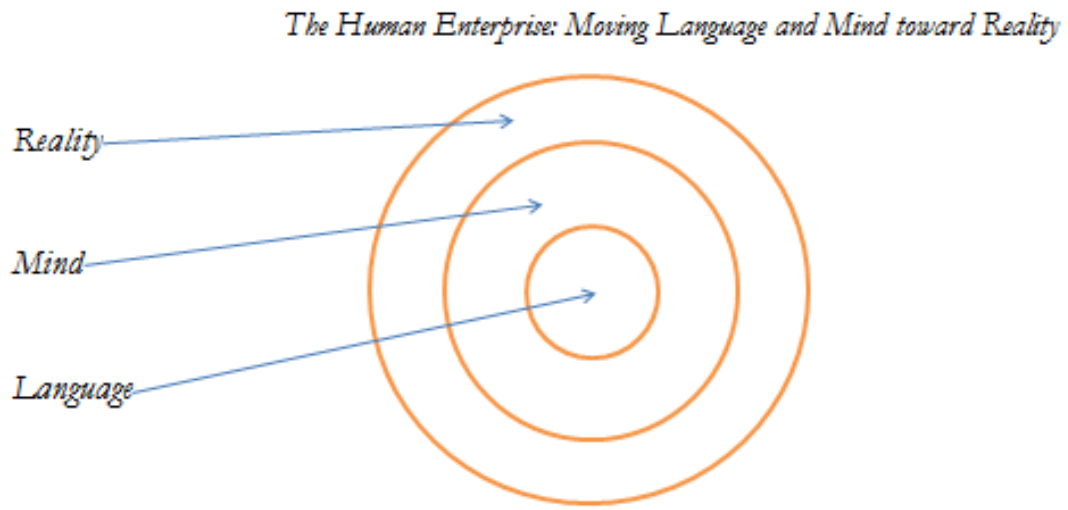

Figure J.1. *A Model for Questioning Interactions of Language, Mind, and Reality*.

Language (interpersonal concepts) is a subset of the much broader domain of mind (all six elements, at a minimum); and the domain of mind is a subset of nature or reality. One can use language, through mind, to describe, touch, and create in the wider field of reality; and when language is imbued with the elements of mind, then language holds potential to make manifest the subtle textures of reality. However, as we observe in the auto-priming phenomenon in Stage One, interpreters often quickly collapse perception into previously-formed concepts that subsequently--almost instantly-- occlude and replace actual perception. We remain in the smaller sphere of language, and this sphere becomes opaque. To grow our conception of reality, we must move perception, mind, and language toward new perception--toward extra- or pre-linguistic phenomenological and intrapersonal textures--rather than merely collapse perception's uniqueness into convenient approximations. The diagram shown in Figure J.1 illustrates a problem and presents an invitation. To prepare students for the next stages of the curriculum model, I shared the diagram along with the following introductory remarks about the "problem" and "invitation," which prepare the way to begin Stage Four of the curriculum model.

Language, Mind, and Reality: Applying the Elements of Mind to Create New Concepts

Language itself is an invention; it reflects the contents of mind; but language does not express all of what minds contain—and so language must be expanded and refined to represent more of the knowledge and experience contained in mind. This language-synthesis project continues in each generation: we are fountains of language—not only users, but creators, too.

Why create language? We need it and want it in order to understand reality—the reality of what causes and cures diseases; the reality of the properties of matter and how to use physics and chemistry to invent medicines, textiles, and materials for industry and architecture; the reality of whether or not life exists throughout the universe, and if so, what created it or led to its development; the reality of our origins and what, in fact, defines true "morality"—all of the "reality" questions that weigh upon us and fascinate us.

Sometimes, the mystery delights us, as in the case of the mysterious origins and behaviors of planets and stars. In such cases, wonder and mystery invite us to engage in serious play with ideas. Sometimes, the mystery burdens us—as in cases in which we suffer from a disease and know not its cause or its cure. In both circumstances—in pleasing and in miserable mystery—we need mind to form understanding, and we need language both to form that understanding and to share knowledge with others.

When we perform the latter operation, i.e., when we use mind to form understanding, and when we represent that understanding in symbolic form (such as in the words of a language), then we make language and mind connect with reality, perhaps changing that reality (curing a disease, for example) for the better. We need to continue to bring language and mind out into the larger field of known and unknown reality. This is a process involving analysis and creativity. We need to learn how to expand the field of the known. How do we do this when answers to our

hardest questions are not already formed for us in books? We must do what questioners-and-answerers do: blend our known language schema (concepts) with raw data—perceptions and intrapersonal concepts—and form new combinations, slowly creating a bridge connecting our worlds of symbols and the worlds-not-yet-symbolized.

The challenge of fashioning language that better facilitates understanding of and contact with a living world requires thinkers to hold their gaze on the unfamiliar--to encounter strangeness and feel "the *Huh?* Effect" as I like to call it--and then let concepts accrue to perception in novel forms. Sensory imagination plays an essential role in modeling novel forms, but, as a sign of the unfamiliar, sensory imagination can become elusive: as an image, it poses; it models and outlines proto-conceptual forms. However, it also becomes the chased rainbow, leaping away from the understander who automatically resorts to pre-existing language that pulls him or her away from the creative edge of language and mind. The new habit I want students to learn is to leap into the field again and cross the gap again toward "the rainbow" of the novel, new concept. In getting closer to a new perception, we can scrutinize it and form a new concept. Even if the form in question leaps away again and again, chasing it nevertheless leads us across and deeper into fields of contemplation.

I shared these thoughts about "language, mind and reality" to prepare students for the word creation exercise in Stage Four. I wanted the students to begin from sensory data, emotion, or sensory imagination, and then to apply individual interpretation to watch and guide their attention as intrapersonal and interpersonal conceptual elements accrue to the novel form, chasing the rainbow into the field, till the form coalesces and becomes a communicable idea. In order to do so, they would need to be patient with sensory imagination and follow it, teaching themselves to individually interpret sensory imagination and intrapersonal concepts in new ways.

APPENDIX K: PsyPEN: Merging Education, Psychology, Philosophy, & Neuroscience

Neuroscience researchers have already documented the power of sensory imagination to make measurable physical changes in the brain and body associated with improved learning (Berns et al., 2013; Doidge, 2007; Miller et al., 1999' Weber et al., 2019), physical strength (Yue and Cole, 1992), and healing (Giraux and Sirigu, 2003; Moseley, 2004; Ramachandran, 1996). The United States military has also turned to teachers of yoga nidra meditation, a practice which induces sustained and detailed sensory-imagination in meditation, to effectively treat soldiers suffering from PTSD (Miller, 2015).

Based on this body of research and on my experiences as a teacher, education researcher, and yoga nidra teacher, I hypothesize that neuroscience research could furnish data that help education researchers and policymakers to gauge the impacts of academic activities that are more difficult to measure than test scores. In turn, this data could create a basis for powerful arguments for tuning, evaluating, and supporting methods of instruction that remain difficult to assess in "hard data" quantitative formats. My conjecture is that compelling hard data would emerge. I am eager to test this conjecture in rigorous double-blind experiments.

Working in mixed methodology formats to draw information from teachers, student-participants, theorists, and neuroscientists, PsYPEN researchers could explore whether and how the training programs teachers and researchers propose for classrooms reliably make measurable, desirable changes in student learning and performance. This data would not obviate or override valuable forms of qualitative and quantitative data that already inform research, teaching, and policy. Rather it would complement and potentially deepen the pool of data from which researchers draw inferences about what, why, and how students learn.