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Changing My Perspective on Intelligence

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CHANGING MY PERSPECTIVE ON INTELLIGENCE

A Synthesis Project Presented

by

KRISTIN E. CAPEZIO

Submitted to the Office of Graduate Studies, University of Massachusetts Boston,
in partial fulfillment of the requirements for the degree of

MASTER OF ARTS

May 2010

Critical and Creative Thinking Program

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A Synthesis Project Presented

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ABSTRACT

CHANGING MY PERSPECTIVE ON INTELLIGENCE

May 2010

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Directed by Professor Carol Smith

This paper originates from a deep desire to understand how historic values of intelligence have led to our modern-day conceptions of intelligence. After only five years of teaching, I was drawn to this topic as I felt it was connected to the service I provide my students and the community in a position as a lead teacher, program coordinator and teacher's aide. The question of the nature of intelligence and aptitude greatly impacts the feedback we offer students, intended for their intellectual growth and academic development. I attempt to distinguish myths from realities about how intelligence evolves and is measured, by exploring the works ranging from those of Alfred Binet and Lewis Terman, who founded intelligence testing, to the Instrumental Enrichment Program of Reuven Feuerstein (FIE), among other, more contemporary analysts and scholars such as Howard Gardner, Daniel Goleman, and Robert Sternberg. I address directly variations in our conceptions of intelligence and their influence on curriculum and teacher practice in the American classroom.

My exposure to this topic began in the early part of my graduate career. Through the Critical and Creative Thinking program I have been faced with many challenges, including uprooting old assumptions about what intelligence really is. Inculcated by my family and in

school, I believed the IQ test was the absolute measure of whether an individual was smart or not. None of my ideas acknowledged what the true plasticity of the mind was. I had not yet gained an understanding of the necessity for both critical thinking and a creative outlet. My goal in this Synthesis is to speak to fellow teachers, in elementary school and secondary education, to help them consider how outdated conceptions of intelligence still shape our impressions of what processes and knowledge are valuable in our classrooms. In the paper I incorporate alternatives to the mainstream teacher tools through FIE, so teachers can develop professionally and holistically and therein greatly enhance the success of their students. I propose that teachers must first acquire the skills necessary to be able to recognize potential in student work and encourage in them the habits of mind which will develop thoughtful, motivated students.

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There are many influential minds behind this paper. First and foremost are the familial figures that have helped to shape my conceptions of intelligence and encouraged a growing desire to know thoroughly and pursue justly all that I came to question. Secondly, are the professors of the CCT program, specifically and as it relates to this paper, Carol Smith and David Martin. Professor Smith's time and unwavering dedication to the follow through and direction of this Synthesis has been an educational experience unmatched by any other. Professor Martin's consistency and expertise in the area of Instrumental Enrichment and Mediated Learning played a pivotal role in the coming-together of ideas presented in the body of the work. Lastly, the steady (and often stubborn) insistency and support from my significant other, Petre Rontea, helped me to meet the goals I had set forth which might have otherwise overwhelmed and hindered the successful completion of the project. So to many I am indebted.

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CHAPTER 1

A GLIMPSE INTO THE REALM OF INTELLIGENCE

Deciding on what to do for this paper is a little like opening Pandora's Box, if only to take a peek. I can say with certainty that I had at a young age the knowledge that I wanted to teach. I was probably about 8 years old when it became clear that teaching, and to some extent writing, were going to be cornerstones in my life. I think my path to teaching emerged out of that ego-gratifying authority which comes from being the figurehead at the front of the class. I see this in my work; children's earliest forms of role play deal with holding adult positions, be it a doctor, teacher, or police officer. To be the arbiter, the filter of knowledge, the rule-assigner is an influential role for a young person to hold, specifically when taking place within a group of elementary age students. Although it may be unbecoming of a teacher to admit the egotism associated with teaching, I still continue to see threads of truth to that observation.

Teaching is a powerful profession, which begins with the idealism and enthusiasm of individuals who seek to make a positive difference in society. It can be incredibly self-fulfilling. It is also a profession that engenders the most sincere forms of altruism and social responsibility. Teachers build lives through educating. If I peeled back the layers of what I do now, looking closely at how intricately my educational experiences have shaped who I am today, the depth of my role as a teacher, and the roles of teachers in my past, I am still deeply impacted by these interactions as they have shaped the development of my self-perception. As a teacher, I perceive that I am both filter and projector for my students, digesting and making sense of life through my own skill set and knowledge and bestowing upon them a

greater sense of purpose and self-awareness, regardless of the discipline or domain. As instructors, our very entry into teaching gives us the reins to cultivate the character of our students, in addition to the various other services we offer in the grander scheme of their personal growth and development.

As both teacher and pupil myself, an ongoing cycle for any teacher, my most recent academic encounters took place in the Critical and Creative Thinking Program at the University of Massachusetts in Boston. The time I have spent in the program, roughly two years, has given me a great deal to think about, including my own educational practices in both of those roles. As I embarked on the latter half of the program and subsequent Synthesis project, I saw something new evolve within me. I was looking at the world around me differently; specifically, and more importantly, as it relates to the synthesis, I looked at the nature and value of intelligence differently than I had in the past. After my initial Creative Thinking course, I took a course titled “Structural Cognitive Modifiability.” Both courses exposed me to the new realities of comprehensive teaching, and holistic intelligence development and assessment. I began to see how my current views on intelligence had been shaped in part by what teachers thought of as either consequential or insignificant in the classroom. To some degree, I believe now that many of my earlier teachers were wrong, or just sadly ill-informed. Intelligent responses can emerge in the most unlikely of situations, and contain characteristics, such as self-reflection and introspection, which cannot be measured by any psychometric testing.

My interest, and the existence of a substantial amount of literature, led me to pursue understanding how to promote and develop intelligence in the classroom as the focus for my synthesis, as currently I am a teacher of young children in an After School program. I saw

acutely from my own life how the influence of others (such as family, teachers, and even the larger culture) has shaped my views and values regarding intelligence. These views often (unconsciously) determine what we pay attention to and notice; the work of some goes under acknowledged while others are classified as brilliant. These views can be limiting and potentially harmful if they lead us to overlook opportunities to nurture the development of others; but they can be liberating and empowering if they give us new ways to help, appreciate, and respond to others. For example, the emphasis 100 years ago was not being placed enough on what is ingenious, innovative, creative, socially beneficial, emotionally and intrinsically uplifting and transcendental, but more on intelligence as a fixed sheer cognitive ability, a focus which undermined the search for ways to nurture and develop intelligence in our students. It seems more evident today, especially after the pioneering work of Reuven Feuerstein among others, that environment has as much to do with the intelligence we develop as do our in-born, innate “smart.” Throughout the paper I look at multiple theories that have influenced our conceptions of intelligence from nearly 100 years ago to the present day. I also examine what the current tools for intellectual assessment are, in addition to offering possible changes in teacher practices which will enhance the way we can perceive potential, offer constructive feedback, and enrich our students’ academic careers.

In chapter two I highlight some of my personal experiences, both at home and at school, that had an influence over my conceptions of intelligence, prior to attending college. My experiences at home were sometimes similar to and sometimes different from my experiences at school as it relates to the shaping of my conceptions of intelligence. They were similar in two respects: (a) both assumed intelligence was fixed and involved exclusively cognitive abilities; and (b) both illustrated the influence that others, particularly persons in a

position of authority, can have on the development of young children's views. The act of describing and analyzing these influences helped me understand and tell the story of the progress in my thinking and the ways some assumptions about intelligence were challenged and others left unchallenged in both environments. At home, my family assumed (and told me) that I was of high intelligence because I had a strong curiosity about life from a young age and was able to remember a lot, which made it easy for me to associate new knowledge with old knowledge. At school, I was regarded as "above average" based on the results of explicit intelligence testing; further skills in math and command of certain writing skills were emphasized more as important aspects of intelligence, which were ideas I had not yet come across at home. In neither environment, however, was I encouraged to more fully develop my thinking and reasoning skills.

When I first had the idea to embark on a project on the changing conceptions of intelligence, I felt I did not fully understand all of the influences on my ideas, beyond family and educational experiences. For this reason, it was important for me to start from a point of origin which was relevant to the points I wanted to convey about intelligence testing and its influence on our culture. The more I learned about the origins of intelligence testing, from the practice of craniometry to the first cognitive assessment scale of Binet, the more I was able to draw connections from my personal experiences with intelligence to an overall cultural movement which influenced the thinking of important figures in my life.

Therefore in Chapter 3, I explore issues about the origins of intelligence testing along with ideas about the fixed vs. plastic nature of intelligence. I use Steven Gould's book, *The Mismeasure of Man*, to discuss the origins of intelligence testing based on theorists such as Alfred Binet and Lewis Terman. French theorist Alfred Binet defined intelligence as an age-

related achievement; from this assumption the Binet-Simon intelligence test was created with a series of tasks ordered by the age at which the typical child should be able to solve them. In the paper, I discuss the initial test as it relates to later modes of assessment, which surface after WWI. The American psychologist, Lewis Terman, generated work after Binet on the Intelligence Quotient test, which stressed heritability and the idea that intelligence is fixed. In keeping with this changed conception of intelligence, Terman also altered how intelligence tests were scored and presented—focusing on I.Q. as a single number that reflects the child's (assumed to be invariant) standing with respect to a group across time.

In Chapter 4, I introduce the next set of theorists, whose work has also greatly impacted and expanded our culture's more modern conceptions of intelligence, including aspects of brain plasticity. To counter the emphasis placed on intelligence as based solely on the nature of one's cognitive abilities related to school success (assumptions shared by Binet and Terman), I explore the work of Howard Gardner (1997, 2002), Daniel Goleman (1998), and Robert Sternberg (1988), Gardner's work in the realm of Multiple Intelligences paved the way for Goleman's work on Emotional Intelligence by developing theories which support that emotion is as central to one's propensity to learn as is one's cognitive ability. Goleman expanded on the ideas Gardner developed to incorporate an entire model of how personality make-up influences learning and expressions of intelligence. Goleman devised a 360- degree personality assessment to determine a person's Emotional Quotient, a mirror in emotional capabilities and understanding to cognitive abilities and mental functions found through IQ testing. Sternberg's contribution is in his Triarchic Theory, which, like Gardner's Multiple Intelligences theory, assumes that having a balance among certain types of intelligences is the ideal.

Following Chapter 4, I consider the basic question of the ways that we as teachers can develop the many intelligences of our students by exploring the various “tools” that have been proposed to develop intelligence, broadly construed. The first set of tools is part of an enrichment program that I encountered during my second course in CCT, Cognitive Structural Modifiability. The course not only exposed me to the Multiple Intelligences theory and the Emotional Quotient theory, but also made me aware of new, strategic, and holistic cognitive enhancement programs. The purpose of these programs is the betterment of student learning and assessment in the classroom for today’s teachers. The work that I have found most inspiring in this regard belongs to Reuven Feuerstein (2006) and his proposed Instrumental Enrichment tools. Feuerstein is an Israeli, born in Romania, who leads in educational reform in Israel, although now all over the globe. After escaping the Nazi invasion, Feuerstein left Romania and settled in Israel to take part in the major educational transformation that he felt families needed after experiencing the Holocaust.

His work stems from a deeply rooted belief in the modifiability of cognition, much like the belief of Alfred Binet. Cognitive modifiability is an integral piece to this paper as it is an integral piece to the CCT program. Fixed intelligence is a concept which holds educators and students back from attempting to learn more—about themselves and about the world. Classes in CCT, in contrast, stress use of multiple cognitive abilities whose functions are equally balanced with creative and divergent learning opportunities. For these reasons, FIE stood out to me as an important program, espousing the same values I was learning about through my CCT coursework.

Unlike Binet, however, Feuerstein’s goal was to *develop* the cognitive and social/emotional abilities of students who struggled with behavioral issues that were believed

to result from cognitive deficiencies. These were students who would hit themselves, produce violence against others, shout without provocation, and who could not be made to focus on task completion, in addition to a litany of other behavioral problems. He believed these students could have their habits and patterns of thinking rewired to learn more through mediation and thus assimilate in normal educational settings. He also believed that skills in meta-cognition could build a student's autonomy and auto-correction in learning, which would ultimately lead to good decision making in the future, specifically as it relates to making a conscious effort to be a life-long learner.

Chapter 5 provides an overview of these tools, exploring mediated learning and brain plasticity in greater depth. They connect with CCT's idea of "general thinking skills" and the role of meta-cognition, or "thinking about one's own thinking" in the process of learning. Chapter 5 also considers the tools of "emotional navigation" by Roger Fisher and Daniel Shapiro (2005). Using emotional intelligence to navigate classroom negotiations is a tool teachers can use to better handle despondence and apathy in student behavior and, subsequently, student work. The application of emotional navigation also requires teachers to have gained skills in active listening and body language perception. Those are essential for clear and effective communication.

I conclude my synthesis by discussing in Chapter 6 how changes in my own thinking about intelligence have transformed the way I consider more carefully my interactions with students. I discuss which of my teacher practices have changed specifically as a result of the literature for this project as well as my interactions with colleagues and professors in CCT. I lay out the possibilities for change and the personal steps I will take, and have already taken,

to understanding my students better, and providing them optimal service as a source of information and influence in their early lives.

The evolving conceptions of intelligence I review (in chapters 3, 4, 5) have led me to believe that America is constantly looking for a better way to assess its students and guide their academic careers. At the turn of the century, experts thought the guide might be based on the results of standardized tests. America is now coming to realize that character cultivation is as necessary as intelligence to building intellectually sound, supportive, critical and creative thinkers. Such results are already developed through education systems in other countries. As a society we are requiring schools to educate students such that they become socially responsible and self-aware. This is an area that other cultures have already addressed.

What I believe today is that the shaping of an individual takes place throughout one's lifetime, but pupils in public education need better instruction if we, as teachers, are to build a resilient, educated workforce. Since curriculum and performance expectations are produced for public education based on national standards, an entire reallocation of time, money and energy is mandatory if we are to change the schools of thought governing our teacher skills and classroom practices. This paper is my contribution to that change.

CHAPTER 2

KNOWING WHERE I CAME FROM

Intelligence, depending on the theorist, can have varying definitions. One thing that is conclusive, though, is that intelligence, although manifested in many different ways, is a property of the mind, and the development of the mind is a product of many factors, some of which can and others of which cannot be determined by means of measurement. Prior to the Critical and Creative Thinking Program, to me, intelligence related directly to one's cognitive abilities. This included a strong memory, the ability to reason in an appropriate, logical sequence involved in task-completion/problem-solving, and the ability to compare, articulate, and generate cohesive ideas relevant to the topic or discipline at hand. As a young person, I was not encouraged by my family or teachers to acknowledge non-cognitive aspects of intelligence. I also believed intelligence to be a fixed, inborn ability--something that existed naturally within the individual, a lifelong potential determined by heredity and accurately measured by the IQ test. These ideas were not ones I maintained after my first few years of teaching and undergoing the graduate program at UMass Boston.

Early Home and School Experiences

As a young person, I did not socialize easily with persons of the same age because I had a preoccupation with topics that were not really of interest to others, or at least, that I could not convey to them in ways that were of interest to them. Moreover, all throughout my life, I seemed to rebel against conformity; in high school especially and even into college,

socialization and friendship building were areas where I was weakest. Growing up, instead of being outside with a group of similar-aged peers, I much preferred to spend time with family, around the dinner table, absorbing what they said and did. As a child, I did so intentionally in an effort to separate myself from what appeared to be the normal expectations for children. I saw reflected in the behaviors of adults toward young people that a certain standard of behavior, a maturity, was needed if adults allowed a child to stay in their presence. For this reason, I enjoyed being in the company of adults more than peers.

I now believe I had a harder time exercising habits of self-reflection in part because I spent less time with my own age group. The less time I spent with my own age group, the less I knew about my idiosyncratic, eccentric nature. Self-reflection to me now is a complex and central aspect of critical and creative thinking, which I did not practice until much later in my academic and professional careers.

From about the third grade, when I started to learn more about the treatment of other individuals by authority, I began to believe that intelligence meant what type of attention certain individuals received from different teachers, including instances of prolonged favoritism. What positive attention a student received based on what he/she said or did in school was a major determinant in how I viewed that person's intellectual capabilities—showing me the influence which a teacher can have on a student's development. For instance, when students were given multiplication tests, the person who got all of them right in the shortest amount of time was awarded more free time, or time on the computer, or was eligible to select the story which the class read aloud. These privileges were granted because the student was not only fast but completely correct. The same person kept winning and kept receiving the free time. No one else ever had a chance, and we, as a class, viewed that person

as innately more skilled in that domain because they were unendingly rewarded for what they produced.

At home, though, intelligence was judged more by the degree to which a person exhibited an interest in reading, how well one's memory worked, how often a task could be completed on one's own for my parent's benefit, and how often a child stayed out of trouble. It seemed that the less one requested of another, the more he or she must have learned already. For my father, learning took on a certain form of attaining skills in practicality, particularly skills that reduced parental intervention. To him, learning from one's mistakes, or better yet, learning from another person's mistakes—in a sense, being able to auto-correct or break the patterns of behavior which disadvantaged an individual—was central to really intelligent capabilities.

What I understand now about the need for instructional modeling and mediation, I did not know then. In teaching, modeling behavior is central to a student's ability to see, experience, and replicate an action. My mother did not talk about intelligence much, though she was crafty due to her reduced income and resources. It was in the care of my father, my aunt, and other familial mentors living in Massachusetts, that obvious inattention to the details of follow-through and consistency was most evident. They did not take into account whether all of their preaching about intelligent habits was rendered ineffective by the lack of modeling necessary to uphold and support the various intellectual values expounded upon at home. If he was not able to instruct his daughters on how to correctly process mistakes, or to avoid the trap of repeatedly exercising erroneous judgment, how could we manifest a feasible solution to avoid future blunders? The perpetuation was unavoidable. He needed to openly take

responsibility for the errors which he made and show explicitly in the future his change of thinking and action, in order for us to be capable of doing the same.

The practice of thinking aloud and talking an individual through a problem is something that is encouraged in classrooms so that students can be aware of the process of thinking and the energy required for making positive changes in regards to the habits of mind we all develop—a form of meta-cognition, in fact. To talk through problem-solving, even when the solution is unsuccessful, teaches children to be comfortable with confusion, to look for alternate solutions when the obvious one is not entirely compatible with the complexities of the problem, and to know the language of the thinking process which will continue to develop as the learner faces new challenges which require adaptation to the old, base knowledge. As central figures in my life, it was unfortunate that my father and aunt preached the value of intelligence but did not explicitly model complex problem-solving in their daily interactions.

My most rudimentary conceptualizations of intelligence came from the experiences I had with family, and continued because of the deeply-rooted comfort and acceptance which I found in a family-oriented environment. Before I moved to Massachusetts to live with my father, I spent weekends with his sister, my aunt, who perceived my insatiable curiosity for all things inhabiting the earth at one time or another as a sign of innate intelligence. This process, in addition to the equally shaping experiences of elementary school, initiated the journey which I would take to understanding my own conceptions of intelligence and the ideas that have rightly and wrongly influenced my thinking. My family encouraged my cognitive abilities more than they did my sister's and I think now that this was because I seem to express so much curiosity about the world around me when she did not. My aunt believed that

my older sister, Jackie, had artistic and social talents, which I did not possess, and which made us unique and vastly different as people. At the time I chose to over-emphasize my “innate” cognitive abilities and diminish my sister’s artistic and social aptitudes as they did not seem as important as what I was capable of for my age.

After taking various versions of the standardized intelligence tests in third and fifth grade, I was surprised to discover which percentile I was a part of, compared to my peers. Comparing my abilities to that of students the same age was the first realization I had that no matter how encouraged I was with my comparisons to my older sister (who in many ways struggled in school), a more appropriate gauge would be among persons of the same age, with varying personal experiences, and educational backgrounds. Never too high, never too low, I was right around the 77 percentile, yet my reading comprehension level in third grade was at a fifth-grade level. Since I believed that intelligence was inborn, I was not receptive to the meaning of the calculations when my teacher revealed that such a spread can change every year. It did not make much sense: How could I substantially excel one year and the next, possibly be struggling to keep up?

Still, however, the contrasting qualities of my sister’s and my own intelligence stuck with me most because we were more than three years apart. She struggled with new knowledge, and I did not try especially hard to learn new information; rather, I possessed a drive to know more, to know truth, to sort out worldly injustices and devise novel solutions based on the limited knowledge I had. I did not read fervently on the topics of interest; I simply seemed to retain more than she did and utilized intelligence differently, and still today do not think that it was of my own volition but of an inborn nature to satisfy curiosity.

The schools we attended blamed the trauma of our childhood for any academic setbacks we had, more so with Jackie as she was old enough to witness and understand the difficulty of living with a mother who was terminally ill. My sister expressed to me once that she never really attended Kindergarten, and thus was held back a year because our mother always kept her at home where she could not develop the building blocks for later learning. I did not think that was fair. We both experienced strife, and I still did not waiver in my academic pursuits. Frankly, just as it was attested to at home, in school, I wanted to be the naturally smart one—not the one who, because she was younger and perceived less or was more naïve, was therefore unscathed by a tumultuous past. When Jackie was tested for intelligence, she fell into the normal bracket, as did I. The schools, however, concluded she came out unable to function because of my mother's illness and poor quality of life, whereas I was too unknowing at the young age to experience the full ramifications of my mother's illness.

As I understood from my experiences at home, two contradicting realities existed in my intellectual world. Despite excessive encouragement of my supposed intellectualism at home, I did not enjoy reading. It was simply not what I preferred to do. I could read and comprehend what I read well, but I never learned how to skim, or fast-read, and so reading became increasingly a more daunting and exhausting practice, unless I was reading material which I *really* liked. Again, this situation may be a reflection of selectivity or of a lethargic approach to my own learning. It was difficult for me to understand or reconcile why, if I were inherently intelligent as so many family members seemed to think, an avid interest in reading did not automatically develop as it had in my sister. Instead, much in the same way that I selectively spent time with family more so than friends, I quickly took a liking to videogames

because family was not always available to entertain and engage. Year after year, my social intelligence was squandered while my hand-eye coordination improved. There was something solitary, invulnerable, and gratifying about videogames which made me a perfect candidate. I enjoyed the mental challenge of puzzle-solving and level-acquisition, but I also enjoyed that it was not an activity in which my eccentricities would be explored publicly, critically, and in great detail by peers.

What happened was that I went on to college, and my sister did not; she worked instead on numerous jobs. She still reads more than I do, and I still do not know whether we can both articulate and comprehend complex ideas at the same rate and level.

Initial Experiences as a Classroom Teacher and in CCT

It was during my undergraduate studies at Central Connecticut University that I first learned of Howard Gardner's theories of multiple intelligences, as his books were widely read and discussed in my courses and on campus. It was stated over and over in my teacher education classes how valuable it is to look at an individual's intellectual, social, and emotional well-being. Still, I did not believe even then that the cultivation of one's mind and subsequent actions were a result of many factors outside cognitive ability.

I did, however, know very early on that one's academic performance appeared to be tied to a family's economic status. In fact, this concept later became a preoccupation of mine as I experienced and witnessed injustices at school that seemed to be tied inextricably to money. From my own personal experience of being monetarily poor and moving around a lot during my preschool years when I lived with my mother, I understood that a large part of the cultivation process depended on one factor—one's opportunity; in obvious but unfortunate

ways, one's cognitive abilities in addition to other more creative expressions of intelligence could readily emerge when there was expendable cash and the luxury of time—both of which are found in the upper and middle classes. For all the potential I was pronounced to have had, rarely was extracurricular learning funded by my family. And when it was at whatever cost, it was perceived and expressed as a burden and a reason for resentment by others. Undoubtedly, it dissuaded me from looking for funding from family for enrichment and learning outside of public education.

My initial experiences of teaching were in an urban high school in New Britain, CT. I had not yet adopted the new conceptions of intelligence and was on many occasions reminded by veteran staff of the cultural sensitivity movement which should be permeating our lesson plans and units. It was not until I began the graduate program at UMass and started working at Underwood Elementary After School Program that I experienced a real transformation as an educator. At the high school where I was student-teaching, I found that my (deeply held) childhood assumptions about intelligence came across as rigid and uninformed to students and even my supervisors. At Underwood, I embarked on a new thinking career—one which would benefit my learning and my students' learning in the long term.

As a student teacher, I had a low tolerance for slow-paced students. Unless mandated by another teacher, I rarely offered extra time for students who needed it in order to complete a task. I was skeptical when all other students could complete it in a set amount of time and an individual did not have an IEP but still requested exceptions to the standard. It came back to a point of fairness for me, which I could not get past. I found myself judging students as being undisciplined, unfocused, or disinterested in finishing, which I could not honor.

Today, I spend a good amount of time paying attention to different modalities of learning, and when appropriate, recording my observations, comparing insights with other teachers, and attempting to know each student as comprehensively as possible—even when our resources at After Care are generally limited to crafts made of paper, glue, and glitter. I believe as a teacher I cannot see my students developing unless I do as well. Unlike the inefficient models I had growing up, I now know clearly the limited effects of preaching ideals about life and learning if I do not make every attempt to show these values and ideals through exemplary behaviors myself. I will be called on as a teacher to critically think about the new ideas and theories which will develop in education through our country's attempt to make progress in our academic systems. As a teacher, I can expect I will need to make revisions to my own thinking and decide how best to alter my classroom practices in light of the constant changes in education policy.

In teaching kindergarten and first grade students now, I am much more aware of the impact of my actions and words. In high school, students had the skills to mask what they knew or did not know. In kindergarten, students are just starting to form their ideas about the world, and I have to be responsible with what type of influence I have on them. Through my coursework at CCT, I have had countless lessons in managing authority, practicing discretion, and taking responsibility and initiative in relationships. These processes were not easy at first, as I was unsure outside of the realm of authority figure; I could still learn about the children and get them to learn as I needed them to. Respecting students' rights to have choices and being careful with the knowledge I imparted, were two important aspects of teaching which did not come easily to me at first because they involved giving up some control of the class (at least in the beginning, that was how I perceived it).

The difficulty that I have leads me to the belief that intelligence is a complex aspect of our lives, and a process of diversifying activities and increasing teacher range needs to happen in order to best engage students if they are to eventually become self-governing, intrinsically motivated, moral individuals. For these values in education and my increasing ability to respond flexibly to them, I owe gratitude to the professors and students who invested time and energy in my learning throughout the Critical and Creative Thinking Program. My experiences over the past two years have forced me to look at my past critically, have shown me the issues of maintaining assumptions that are wrong and damaging to my professional and personal development, and caused me to question whether I superficially believed I was a lifelong learner or if I needed to really practice the skills of lifelong learning to be an effective practitioner in the field of education. The benefit of this ongoing quest to know and better myself professionally and personally through CCT is that it has bestowed a warehouse full of tools to maintain critical and creative thinking habits in my own life, which permanently influence my conceptions of intelligence and continue to transform my classroom interactions.

In short, I had many experiences throughout my childhood that influenced my conceptions of intelligence in ways that I was not always fully aware of. I adopted values that were expressed often in my company about the importance of cognitive ability and what those abilities looked like in action. I adopted such views based on the perceptions which my family and teachers shared with me on my own cognitive aptitudes. Their ideas also reflected, I would later learn, the then predominant American cultural conceptions of intelligence at the time—a topic to which I now turn in the next chapter. It was not until I went through most of my undergraduate and graduate studies that my conceptions of intelligence actually began to evolve. In a strange way, my early ideas mirrored those of a theorist (Terman) whom I will

discuss in the upcoming chapter--a theorist I had never heard about or read, but whose work had enormous impact on American education. However, my ideas began to evolve and change as I had new educational experiences and as I began to read the work of other theorists. I was encouraged all along to modify my views in order to reconcile the proof of intelligence plasticity (discussed in Chapter 5), but it took me time and experience in the field to be able to do so in a plausible way, as well as the significant body of evidence of the multiplicity and heterogeneity of the skills and abilities involved (discussed in Chapter 4).

CHAPTER 3

EXPLORING EARLY CONCEPTIONS OF INTELLIGENCE AND ITS PLASTICITY

In order to understand our modern conceptions of intelligence, I had to look at the origins of intelligence testing and the evolution of early theorists' work which led us to the present. I discovered my own conceptions of intelligence were highly influenced by these early theorists as their ideas permeated through our culture year after year, informing and reforming education, teacher practices, and attitudes toward students. As I did my research for this synthesis, I discovered something alarming about the progression of theorists' ideas—it is possible through popular opinion and public support to reverse the positive effects of a person's work.

Just before coming to the CCT Program after I had completed my undergraduate work in Connecticut, I assumed that there must have been a natural progression of ideas, dating back from the late 1800's, which continued to be transformed positively until we arrived more recently at goals of Multiple Intelligence, Social and Emotional Intelligences, and Comprehensive testing. When I began research on intelligence testing, Binet was highlighted as a primary contributor, which is why I focused on him for this chapter, but I had not heard of Lewis Terman, who was central in bringing Binet's test to the US. Terman's work comes after Binet's, but his theories and use of intelligence-testing seemed a step back and counterproductive to the work Binet was doing. This activity did not follow the natural progression of ideas I expected to find. While Terman's work with intelligence and intelligence-testing had a significant influence on our culture in the early 1900's, it was his

agenda behind intelligence-testing which really surprised me. In learning about Terman and the difference between what was happening in France and US, I became more aware of and interested in the role of larger cultural influences on intelligence. Terman's work on IQ testing resulted from a massive change in approach to work in the US at the time. The US, during and after WWI had developed a growing concern with industrial efficiency, especially as the immigrant population grew drastically. There was also a preoccupation with eugenics--an attempt to improve the human race by advocating the "sterilization" of those deemed to be genetically inferior. America was also influenced by the idea that the optimal population could be cultivated by manipulating and segregating the masses. The tool to succeeding in this endeavor was the intelligence test which Yerkes introduced to the United States Army, and which spread throughout the entire American culture after the war, based on the work of Terman and others.

Alfred Binet and the Origins of Testing for Intelligence

In the late 1800's, when psychological studies were being performed in Europe on perception, Alfred Binet entered what I consider the 'intelligence measures' radar. In Stephen Gould's book, *The Mismeasure of Man*, Gould affirms that at first Binet worked with the idea that craniometry, which sought the evaluation of intelligence as measured by the sheer size and shape of one's head, was a valid approach to measuring intelligence. Later, Binet stepped away from that theory which assumed "that intellectual superiority is tied to the superiority of cerebral volume" (Gould, 1996, p.177) as it was disproved by the findings of studies and the fact that this approach did not seem that useful. Without knowing it, Binet's interest in intelligence changed the way the world perceived and judged cognitive ability.

Binet's original profession was in the field of Law, but finding that it did not suit him well, he gravitated toward the study of hypnosis and hysteria at the Laboratory of Physiological Psychology in Sorbonne, France. It was not until after four years there, when he became the director, that he veered away from the work of his neurologist mentor, Jean Charcot, and actually began the study of subconscious thought, personality, and higher reasoning. Placing his family at the forefront of his work, Binet used his two daughters in early experiments which involved studying higher-order mental functions. These studies of higher-order thinking processes came before he was asked by the French commission of schools to create a test which would aid in the development of suitable instructional facilities for persons with mental disabilities. The development of assessments which would differentiate normal learners from those with major complications became the apex of his professional career.

The goal was to identify students in the public education setting who would benefit more from special education rather than being placed in regular education classes. He wanted to classify children in ways that were not culturally biased (e.g., judging intelligence by whether students were poorly clothed, smelled, or were dirty). He included such attributes in his methodology of testing as emotion, memory, attention span, and problem-solving. The rudimentary shape of the standardized intelligence tests was being formed, and its original purpose was to quantify adequately a child's intelligence to assist and identify persons with intellectual disabilities or individuals with lesser cognitive capacity. With the backing of the French government, Binet could utilize these tests as a means to aid students academically throughout primary education. Binet then set his sights on devising the first diagnostic tool which would offer that very quantification.

Practical questions come to mind such as, how could he presume to measure intelligence if he did not know what it is? What assumptions must he have been making to continue to devise the test in the way he had? The approach Binet took was ingenious. He assumed that one way to sequence tasks was by the level of mental function necessary to solve it as was determined by the age at which one could typically arrive at the correct solution. Another strategy he used was to give the series of tasks to students of different abilities and use those tasks which best helped to discriminate those two groups. The tests revealed that developmentally delayed or retarded children showed stark contrast to children with normal or gifted cognition in the way they perceived the problem, categorized, and created sub-goals in the tasks they were completing. This process gave intelligence a meter through comparative results and an ability to encourage with certainty the separation and use of specialized classes which would best educate students according to their degree of cognitive ability (Gould, 1996).

According to Gould, Binet's purpose was to help children that needed it by determining which students were significantly behind their peers so they were not "ready" to profit from typical classroom experiences, which I believe today is an aspect of educating to which teachers and parents need to pay close attention. Although he identified these individuals by giving tests to determine their mental age, he regarded the idea of mental age as a convenient "mental fiction" useful for this purpose. Intelligence was too multi-faceted and complex to be reducible to a number. "He greatly feared that his practical device, if reified as an entity, could be perverted and used as an indelible label, rather than as a guide for identifying children who needed help"(Gould, 1996, p.181). As he feared, the premise of his work would be ignored and undermined by people interested in labeling intelligence as a

fixed, determinate quantity the way one would mark a student's height or weight. Gould himself espouses that same argument about the dangers of assigning a number to something as complex as intelligence, which is the foundation for the *Mismeasure of Man*. Gould also supported the idea of the plasticity of intelligence—a concept that I explore later in this paper through the work of Reuven Feuerstein—who empirically demonstrated the capacity of low IQ students to learn much more than was thought possible based on the intelligence test scores (Feuerstein, 2006). He believed that in no way should intelligence be considered fixed, and that in doing so, educators do a disservice to their students and underestimate their ability to acquire knowledge, ideas with which I fully agree as a result of my studies in the CCT program.

Binet worked with Theodore Simon on perfecting this diagnostic tool. A complete version was released in 1905. What emerged was the Binet-Simon scale. The scale included 30 “everyday” problem-solving tasks that used, among other mental operations, abstract reasoning. The series of tasks, which increased in difficulty, were contingent upon what was considered achievable challenges for students of a particular age, roughly between 3 and 13 years; when children's mental age was similar to their chronological age, they were considered to be within normal ranges. Giftedness in children was indicated through a mental age much higher than their chronological age. The reverse is true for students with cognitive handicaps. The test helped parents, teachers, and administrators determine the school-readiness of the child, his/her ability to interact in age appropriate social behaviors, and to be able to self-care. Yet, Binet still had concerns “that school masters with exaggerated zeal might use IQ as a convenient excuse for getting rid of the students that troubled them” (Gould, 1996, p. 181). If unmonitored, the use of the IQ test could have drastically negative effects on

a student's access to knowledge and classroom experiences. Binet's concerns foreshadow a movement that took place in the United States years after his death.

When Binet passed away, his mark on intelligence-testing in the field of psychology was significant. He emphasized skills of reasoning, utilizing basic materials such as pens, pencils, paper and selected images, and asked children to follow directions, sort objects and copy patterns. He and Simon incorporated these in a test which would indicate a child's need for remedial assistance, and it would reveal the mental age of that child, who could now, in turn, be given specialized teaching to develop his/her, individual cognitive abilities better. Binet used a 2-year disparity between mental and chronological age to determine if the learning disabilities were severe enough to warrant special education (Gould, 1996). His purpose was in getting aid to children where it was necessary; therefore, segregating children into groups was for their own benefit, not for increasing the efficiency in society. Binet was not classifying children as productive or unproductive, moral or immoral, likely to be corrupt or unlikely to fall into corruption. The Binet test utilized a series of tasks which would illuminate current cognitive capacities in a number of cognitive operations. The function of a child's brain at the time in which the test was administered was in no way an indicator of the future potential of the child. Unfortunately, plasticity of the mind, which was a component of Binet's theory of intelligence, became distorted through gross misuse of the Binet-Simon scale after Binet's death through the work of Lewis Terman in the United States.

Lewis Terman and Psychometric Testing in America

Another powerful figure in psychology, one who was American and thus perhaps more marketable in the United States, was Lewis Terman. Born during the third-quarter of the

1800's, Terman was an American farm boy, the 12th of 14 siblings, whose ambitions and zest for reading led him as an adult to head of the field of cognitive psychology. His interests were centered on the differences between children of high and low intelligences, and his goals were more aggressive than that of Alfred Binet. Terman went to school at Clark University and later found prominent work at Stanford University (Gladwell, 2008). His intentions became clear when he took on the project of Simon-Binet Scale revision. In an attempt to make applicable the Simon-Binet scale in the United States, he adapted the language of the Simon-Binet to English, reworked the tasks and scoring to fit his intelligence measures agenda, and renamed the test Stanford-Binet.

Terman, like other American thinkers of the time such as Goddard, believed that low intelligence was the explanation for criminal behavior and substandard moral practices,

Not all criminals are feeble-minded, but all feeble-minded persons are at least potential criminals. That every feeble-minded woman is a potential prostitute cannot be disputed by anyone. Moral judgment, like business judgment, social judgment or any other kind of higher thought process is a function of intelligence. Morality cannot flower if intelligence remains infantile (Terman, 1916, p. 11, cited by Gould, 1996, p. 181).

He also thought that low intelligence contributed to industrial inefficiency, when people were in jobs that did not well suit them given their abilities:

Industrial concerns doubtless suffer enormous losses from the employment of persons whose mental ability is not equal to the tasks they are expected to performAny business employing as many as 500 or 1000 workers, as for example, a large department store, could save in this way several times the salary of a well-trained psychologist (Terman, 1916, p. 17, cited by Gould, 1996, p. 173).

For Terman, the purpose of intelligence testing was to separate children based on disparities in potential achievement. His philosophy was that people were born with a fixed intelligence. This was a belief that Binet did not share, nor did he employ it while developing

the Binet-Simon scale. For Terman, in contrast, a person with a fixed intelligence was born with a set of cognitive abilities that would remain static throughout his/her life, determining whether the individual would be adequate to live in society or needed early sequestering.

In creating the Stanford-Binet, Terman did more than “translate” the Binet-Simon scale. He made a number of innovations that reflected his differing conception of intelligence from Binet. For example, instead of assigning students a “mental age” (which by its nature was changeable and increased for any given child over time), Terman used the idea of IQ quotient (mental age divided by chronological age)--something that might remain more “invariant” across age. Terman calculated the test results by building on Binet’s idea of mental age but utilizing the calculations of mental age divided by chronological age, and multiplying the quotient by 10 to establish a range of normal between upper 90’s and 110. The average human intelligence was set to be 100. Terman proposed that a score of 70 and below indicated significant cognitive deficiencies and a score over 140 indicated supreme cognitive function and innate higher-order thinking abilities. This concept became the basis for the mental measurement found in what we understand today as the Intelligence Quotient.

Terman’s initial idea on intelligence was that intelligence was a fixed, inborn, entirely hereditary capability. A cultural movement to promote “educational efficiency” began to flourish in the US; IQ testing was used to support the educational practice of tracking students. It was assumed that education would be more effective and efficient if students were put in more homogeneous groups, with the curriculum and instruction targeted to their level intelligence. It was also assumed that there were different occupations that people with different IQ could achieve. This concept seemed to parallel his assertions that IQ was innate and fixed, and that different academic paths, whether one for the gifted, one for mainstream,

and one for delayed student, should be followed, based on that number. In this sense, some students were ushered in specific directions based on their IQ.

A major problem with tracking is that it became a kind of self-fulfilling prophecy. Those students in lower track not exposed to material that promotes intellectual development, started to lag further behind. Access to quality education became a kind of elitism, which was available only to those who qualified via the IQ test results. This result was not Binet's intention, to predetermine the academic life-track of all students, though in the end, that is one way the IQ test was manipulated in the education systems of America.

Another problem with the classification of individuals based on their IQ scores is that it also herded people by class and race. Since parental education and money affected a child's at-home learning and exposure prior to entering public education as well as performance on IQ test, minorities were not nearly as often placed in educationally supportive environments. Because of this tracking, they were also not eligible for high-paying, white-collar positions. The generational effect is that higher education was available only to a select few in those groups.

Because of his interest of IQ and life success, Terman conducted a longitudinal study of an identified a group of very high IQ children (all with IQ's over 140 [100 being average and over 132 qualifying individuals for the Mensa Society]). He followed them through to adulthood, and the results were somewhat disappointing. While a few of them actually did something quite prominent with their gifted intelligence, most were considered an average success. They held professional jobs, obtained a few more degrees than most people, but were overall unremarkable given their distinctive advantages.

Some of his child geniuses had grown up to publish books and scholarly articles and thrive in business. Several ran for public office, and there were two superior court

justices, one municipal court judge ...but few of his geniuses were nationally known figures. They tended to earn good incomes—but not that good. The majority had careers that could only be considered ordinary and a surprising number ended up with careers that even Terman considered failures” (Gladwell, 2008, p. 77).

By the 1930’s, Gould argued, Terman could not deny the work that was being produced on the environmental influence on intelligence. His views shifted, and he was no longer trying to rank occupations in accordance to one’s IQ level. His earlier positions on fixed intelligence were recanted as evidence of brain plasticity prevailed in society:

It is hardly necessary to stress the fact that these figures refer to mean values only, and that in view of the variability of the IQ within each group the respective distributions greatly overlap one another. Nor should it be necessary to point out that such data do not, in themselves, offer any conclusive evidence of the relative contributions of genetic and environmental factors in determining the mean differences observed” (Terman, 1916, p. 17, cited by Gould, 1996, p. 222).

Near the end of his career Terman finally states that psychologists do not actually know how to partition the average differences between genetic and environmental influences, which makes determining intelligence and learning potential a complex concept which has yet to be fully understood.

As I read about Binet’s and Simon’s original work as well as Terman’s, Goddard’s, and other Americans concerned with intelligence testing in Gould, I began to think about two issues: (a) assumptions about the plasticity of intelligence; and (b) how larger cultural factors influence one’s thinking. I realized that my own initial assumptions, like Terman, were that intelligence was fixed, but as I read Gould’s book, I realized how some of that might have been influenced by giving intelligence a “number.” If I think about the component skills and abilities that go into thinking and reasoning (something Binet was concerned with), then many aspects of thinking obviously undergo development. While there may be certain inborn abilities that contribute to that development, what becomes important for me as a teacher is to

understand those developing skills and abilities themselves. Neither Binet nor Terman focused on giving a detailed analysis of those abilities—they just sampled broadly and summarized with a number. I realize in my own upbringing, I did not focus on those either—just focused on summary numbers. In the next chapter, I turn my attention to other theorists who were more concerned with giving an analysis of some of those component abilities. As they tried to do this, they also “expanded” our views of the heterogeneity of those component abilities, including some aspects that were not purely cognitive.

CHAPTER 4

EXPANDING MY VIEWS OF INTELLIGENCE: CONSIDERING ITS TRIARCHIC, MULTIPLE, AND EMOTIONAL ASPECTS

More than a few important figures changed my current views on intelligence for the better and have altered what I “see” in classroom interactions with students, but in this chapter, I will be exploring the theories of three prominent individuals in the field of psychology and intelligence. Their work, in addition to the educational program introduced by Reuven Fuerstein, makes up the very fabric of ideas interwoven throughout the latter half of this paper. Those figures are Howard Gardner, Robert Sternberg and Daniel Goleman. The fundamental premise of my synthesis is that it is important to recognize diverse forms of intelligence so as to support divergent learning and intelligence recognition in the classroom. These theorists have led me to recognize and observe things in new ways in my classroom. My initial interpretations of intelligence were such that it was all about a person’s mental function and cognitive ability. Binet and Terman thought of intelligence primarily in cognitive terms, and were concerned with its relation to school success.

As a teacher with a few more years experience today, I can see the relationship between Binet and Terman’s theories and my own initial approaches to student work and ability. As a teacher, I emphasized computation and a student’s ability to input and output data and correct responses within a given time frame, regardless of the individual challenges the student faced in comprehending instructions, or misinterpretation of data and expectation. Although test batteries included diverse cognitive abilities such as abstract reasoning,

determining likeness or sameness, memory, and so on, they focused primarily on verbal and mathematical abilities, overlooking many other areas of measurable intelligence. Terman stressed convention, not creativity, while creativity is a large part of innovation, ingenuity, and resourcefulness that is discussed in theories by Gardner, Goleman, and Sternberg, as well as by Reuven Feuerstein. These theorists have helped me to broaden my perspective of intelligence, and to challenge the assumptions I made as a teacher about innate ability and brain plasticity, which has extended my teacher practice to incorporate more empathy, cultural sensitivity, compassion and emotional reasoning.

I start with Robert Sternberg because he opens the door for balance among types of intelligence. His Triarchic Theory represents the need to have a more integrated sense of what intelligence entails and how it can be interpreted in more than one equally valid way. I then segue into Gardner's work with multiple intelligences, which further develops the notion that intelligence is multifaceted and replete with many forms which manifest in different ways, and has different meanings in society. I end the chapter focusing on work of Daniel Goleman, who takes an aspect of Gardner's work and develops an entire system for measuring one's emotional and personality-based features that influence learning potentialities. The three theorists' works are a precursor to my presentation of the Instrumental Enrichment program developed by Feuerstein (in Chapter 5), which I see as incorporating aspects of each of these theorists' conceptions of intelligence, in addition to Feuerstein's own theories on mediation, meta-cognition, and holistic development.

Sternberg and his Triarchic Theory of Intelligence

Robert Sternberg, currently a psychologist and administrator at Tufts University,

studied at Yale and Stanford, but developed an interest in intelligence as early as the sixth grade. When Sternberg was a student in middle school, he suffered from test anxiety, which impaired his ability to think clearly, concretely or abstractly when faced with a problem. He realized his test-taking skills improved when his confidence was raised, as was proven by the higher grades he received when undergoing an exam in a room with students a year younger (Mitterer, 2006). When asked in a 2004 interview how intelligence could be defined, he replied: "Your skill in achieving whatever it is you want to attain in your life within your socio-cultural context by capitalizing on your strengths and compensating for, or correcting, your weaknesses" (Mitterer, 2006, p. 286). He developed his Triarchic Theory of Intelligence which incorporates three essential types of intelligences and their uses. The three intelligences are analytic, creative and practical embedded in a theoretical framework that identifies different cognitive components, and the roles of experiential and contextual factors.

The underpinning of his theory is that intelligence cannot be accurately defined by just one area of ability. "To understand intelligence completely, it seems that one needs to understand the relationship of intelligence to three things: the internal world of the individual, the external world of the individual, and the experience with the world that mediates between the internal and the external worlds" (Sternberg, 1988, p. 58). This point also relates to the three essential components to his theory: Practical, Analytic and Creative intelligence. He believed in the interplay of all three, and the probability that with correct intervention, intelligence could be developed in each of the areas. Each of the three aspects is fundamental to success in life, at work, and in relationships. The consistent features of each aspect, which hold together his theory of intelligence, are that each must be useful in our everyday applications to have any substantial, transformative value.

By design and definition, the first is analytic intelligence and refers to the mental functions which produce expressions of intelligent thought, and which is almost purely cognitive. Sternberg believes that this area relates specifically to manipulations within the internal world, within the individual's mind; his opinion is that the internal world is most often what is being assessed in intelligence tests. Sternberg's theory surpasses traditional psychometric accounts by offering an analysis of the cognitive processes involved. He distinguishes metacomponents, performance components, and knowledge-acquisition components. All three are important. Metacomponents are the central executive components that can organize and act on other components.) These include solving a mathematical equation, comparing two works of literature, learning a language, or operating an experiment in physics or chemistry. Analytic intelligence involves being able to produce answers to formulas that are familiar, that have been previously taught and understood. Analytic intelligence also deals with knowledge retention as it relates to performance on a test or project. Sternberg cautions in the same way Binet had that to scale intelligence and ascribe a number to it, treads on dangerous ground.

The second aspect, creative intelligence, deals with the ability of individuals to create novel solutions and optimize resources. Someone with a creative intelligence may not be the best test-taker (applying pre-existing knowledge) or the fastest performer, but may be able to invent alternate solutions to problems based on creative ability. The indicators would be to have knowledge of how versatile one's resources are and to see solutions in a variety of contexts. In contrast, early forms of intelligence testing assumed that creativity was too subjective to quantify with intelligence measures. For Binet and Terman, focusing on creativity was not such a central aspect of their tests and assessment. Sternberg assumed that

the various forms would be inter-related, although it is possible to have higher levels of practical intelligence than creative or higher levels of analytic than creative; that is, it would be an exception if an individual were capable of highly analytical thinking but had no creative or practical insights. Still, he argued, one needs to assess and consider one's capacity to deal with novelty and to automatize based on recurrent experiences (both experiential factors) as well as one's ability to manipulate mental symbols (analytical intelligence) to having a full account of human intelligence.

The last part of the Triarchic Theory of Intelligence is Practical intelligence. Practical intelligence evolves from socio-cultural roots. Practical intelligence manifests as an ability to adapt to one's environment, to make wise selections, and to understand the shaping of one's self by his environment in order to best conceptualize context. An example of practical intelligence would be "street smarts", and would be based on first-hand experience, which informs the person of the right or wrong decision to make, based on the circumstances. This aspect may include which direction to take while driving, to whom to go for information on a specific topic, or what to say and not to say given a specific scenario. Although Terman did not test specifically for the practical applications of knowledge, his earlier theories assumed that individual's with lower IQ's make poorer decisions, landing them in the outskirts of society, such as the "morally corrupt" which filled the country's prison and detention centers. Sternberg in no way addresses persons of low practical intelligence as destined to end up as criminals, though Terman espoused that idea when the IQ test was first being proliferated throughout the US. Sternberg does contend that practical knowledge or "street smarts" are necessary for any one to survive, regardless of culture, as it depends on one's use of their environment and accurate contextual discernment. He also argues that one needs to devise

separate measures of these abilities, as some who are good with analytic intelligence (and the internal manipulation of symbols) are remarkably poor at adapting to their environment. Sternberg suggests that success in real-world settings relies a great deal on tacit knowledge. It is knowledge an individual has which is not openly expressed or stated but which aids in decision-making and judgment. “Tacit knowledge is considered to be practical rather than academic, informal rather than formal and usually not directly taught. Knowing how best to get along with your colleagues or your boss is an example of tacit knowledge” (Sternberg, 1988, p. 213). Additionally, tacit knowledge is not necessarily knowledge that is good for instruction. It deals a lot with common sense, and knowing how to navigate—socially, intellectually, and emotionally—one’s environment.

Meta-components, performance components, and knowledge-acquisition processes play a significant role in all three types of intelligence. “Meta-components are higher-order, executive processes used to plan, monitor, and evaluate one’s task performance” (Sternberg, 1988, p. 23). Many times they will relate directly to the thinking strategies used to complete a task. Performance components, in contrast, are the ability to execute plans, based on prior experience. Meta-components can influence the selection of specific performance components, such as when one asks oneself questions such as: How do I solve this? What is required? How long will it take? Knowledge-Acquisition is another component which is used for learning new information through selective encoding, selective combination and selective comparison. Meta-components include determining what one needs to know in order to proceed, what information is missing that might delay arriving at a solution or how and when one set of data is applicable to another. Meta-components mobilize the thinking processes which lead to the principles of what is being learned, performed, etcetera.

The operations of the meta-components call for *meta-cognition*. Meta-components are used to plan, monitor and evaluate problem-solving (Sternberg, 1988). Meta-cognition utilizes self-correction, understanding and identifying one's mental process during problem-solving, and reflecting on the experience with the aim of improvement. Meta-components comprise one's knowledge about, and the meta-cognition is one's ability to reflect on the cognitive processes involved in problem-solving. This aspect of Sternberg's intelligence was not explicitly a part of Binet's or Terman's but has emerged as a key component to the evolution of bettering thinking patterns, and is found throughout the Instrumental Enrichment Program devised by Feuerstein. Sternberg and others argue that those with general mental retardation would have some deficits in the meta-components. The Triarchic Theory emphasized also that persons suffering from specific learning disabilities would have a harder time with the component of knowledge-acquisition and/or some aspects of automatization. If a disabled student could not acquire the knowledge necessary, in an efficacious manner, "deficits will serve to compound the existing learning disabilities...the tendency to automatize componential functioning may hinder specific learning processes" (Kolligan & Sternberg, 1987, p. 5). Feuerstein's and Binet's original vested interests in intelligence were to identify persons who may be mentally challenged in some cognitive way, identify what process is not taking place, what disability is at the root of that faulty process, and work hard in that domain to raise (if possible) the person's specific capabilities. The triarchic theory is a critical breakdown of how the three major aspects of intelligence affect learning and behavior.

As I reflect on what I have learned about Binet, Terman and Sternberg I begin to think about the importance of "balance" among these three aspects, something that does not occur when one thinks of intelligence monolithically. According to Sternberg,

Predictors of success in school, such as conventional psychometric intelligence tests, are less predictive of success out of school...the relation between intelligence test scores and real-world criteria such as job performance indicate that approximately three-fourths of the variance in real-world performance is not accounted for by intelligence test performance alone. (Sternberg, Wagner, Williams, Horvath, 1995, p. 35).

It seems to add to that conceptualization, but to further that intelligence, supreme or average, is not relevant if it cannot be made useful throughout the duration of a person's life. In that way, the Triarchic Theory is a contribution to the already widening conceptions of general intelligence, except for the incorporation of certain divisions adds comprehensive values to understanding intelligence as a whole. Successful uses of intelligence, including common sense, can be found when the three are balanced and each relate to the individual's choice-making regarding adapting to and shaping of one's environment.

Gardner and his Multiple Intelligences Theory

Another person who has greatly expanded my conceptions of intelligence is Howard Gardner. Gardner was born in the early 1940's and works at present at Harvard University in Massachusetts. Gardner was an individual whose work reflected an interest in ethics and intelligence. He seemed intrigued by the various intelligences which he saw in the doctors, lawyers, teachers and artists around him (Mitterer, 2006). What made all of those individuals exceptional in different ways? What linked them, and in what ways were their unique abilities differentiated by the specific domains in which they worked? Gardner developed the Multiple Intelligences theory in which the intelligences were divided into seven different categories: linguistic intelligence, logical-mathematical intelligence, musical intelligence, bodily-

kinesthetic intelligence, spatial intelligence, intrapersonal intelligence, and interpersonal intelligence.

According to my theory, it is misleading to think of humans as possessing but a single intellectual capacity, which almost always amounts to an amalgam of linguistic and logical-mathematical skills. Rather, examined from an evolutionary perspective, it makes more sense to conceptualize human beings as having several relatively autonomous mental faculties, including musical intelligence, spatial intelligence, bodily kinesthetic intelligence, and naturalist intelligence. I also propose two forms of personal intelligence, interpersonal and intrapersonal: these latter are close to what Goleman means by emotional intelligence (Gardner, 2002, p. 32).

The first intelligence, linguistic, involves exactly what one would think regarding one's ability to use language to express one's ideas. Gardner describes it as sensitivity to spoken and written language(s) in addition to the ability to learn more, as well as a capacity for increasing vocabulary, especially for the purpose of completing goals (Mitterer, 2006). An individual with linguistic intelligence may have learned another language in addition to his or her native tongue; he or she may have fluidity in expressing him or herself and speaking in forms that are rhetorical or poetic. A strong diction and a pattern of increasing one's lexicon are also important to linguistic ability, which are components of Feuerstein's Instrumental Enrichment Program (FIE), discussed later in the paper. That component of FIE teaches the reliance on an expanding vocabulary accurately to describe and assess what needs describing and assessing at a given time. Professionally, motivational speakers, lawyers, and writers typically have high linguistic abilities and so chose professions that draw on those capabilities. Linguistic and Mathematical abilities are aspects of intelligence which were supported by Binet and Terman and used throughout the IQ tests to illuminate the mental age of a child or teenager. Language and Math seem to run at the core of measuring what one knows. Math deals with concrete and abstract reasoning and presents problems at a variety of levels through multiple representations. Language is also very important in communication

(written and verbal) as well as the interpretation, inference, and articulating the process of the mind as well as the solution to the problem (Gardner, 1997).

The next intelligence, which is perhaps the one most highly regarded in our education system is the logical-mathematic intelligence. It deals with an individual's ability to analyze problems through the use of logic and the application of correct sequences. Skills of inference, deduction, induction, and analytic reasoning are sophisticated in persons of high "logical-mathematical" intelligence. In schools, it is classified often by students who excel in math and science, fields that are more concrete, and are less interpretive and more data-driven.

The other five intelligences highlighted by Gardner, however, are not ones as highly valued by schools or even recognized as key "intelligences." The consequence of lack of academic value being placed on such aspects as music and kinesthetic intelligence is that funding for these programs are reduced and the programs are shut down, limiting a diverse range of learning opportunities for students. As a component of multiple intelligences, musical ability is significant. Gardner classifies it as a skill in the composition, appreciation and performance of musical patterns. Recognition and composition of musical tones, pitches, rhythms, and notes, both audibly and pictorially, require a basic exposure to music, as well as a concentration on musical components. The learning of the musical structure of a song can be compared to learning a language, which makes musical intelligence equal to linguistic intelligence, except that they are in different domains. This type of intelligence contradicts Sternberg's beliefs. He takes issue with this area and calls them talents because he does not think they have general impact, like his meta-components, performance components, and knowledge acquisition components. He is looking for a general theory of the processes of intelligence.

The next Gardner intelligence is a little harder for scientists to classify. A bodily-kinesthetic intelligence involves a person using his or her body to complete a task and to solve a problem. It requires the use of mental operations to organize and coordinate bodily movement. A strong correlation exists between the activity in the mind and activity in the body. Bodily-kinesthetic intelligence is highly related to spatial intelligence—a fifth form of intelligence. This type of intelligence deals with an individual's ability to see space, recognize its capacity, shape and dimensions and be able to best use or optimize what is available. In terms of Sternberg's practical, creative and analytic intelligence, this intelligence is valuable because it appears to utilize all three.

The last two are personal intelligences. These intelligences are intrapersonal and interpersonal. Intrapersonal is the capacity to cohesively and coherently comprehend oneself, even if others cannot. It means to have the capacity to appreciate one's motivations, feelings or trepidations. For Gardner, this intelligence entails working on an effective model for living that best suits us, based on the knowledge we have of our strengths and weakness, personality profiles and the cardinal aspects of our character, which would enhance the way we regulate our own lives. Interpersonal intelligence is concerned with understanding intentions, motivations and what drives other people. People with high levels of interpersonal intelligence can work effectively with others because they have a relatively easy time inferring the needs of and reading the body language of others. Counselors are a great example of people who possess strong interpersonal intelligence. Teachers also must have this capacity in order to be effective in the classroom.

At first the idea of teaching and recognizing multiple intelligences among students seemed staggering to me when I was introduced to this idea as an undergraduate. Among

other obstacles, I was overwhelmed with the challenge of identifying seven categories of intellectual capability. It also challenged my initial view of intelligence as primarily cognitive. After learning more about the premise of Gardner's work and the influences of IQ testing on our society, I came to see his theories as liberating and empowering. The source for change in teachers' conceptualizations of intelligence surfaced as the theory of multiple intelligences seemed to be a highly applicable facet of learning and therefore of teaching in their classrooms. The ability for teachers to recognize potential in student work through the process and development of classroom projects and activities was vital to encouraging divergent thinking and providing outlets for differentiated learning experiences. As with the Triarchic theory, the hope is to have a steady blend of all the intelligences, and to one extent or another, be able to compensate for a lack in one by a proficiency in the other.

Daniel Goleman and Emotional Intelligence

Daniel Goleman is the creator of a theory of Emotional Intelligence. His work is based in trying to identify what emotional components aid in or impede a person's ability to learn and how learning is affected by one's personality, emotional intelligence, self-esteem and confidence, among other elements. Goleman was born around the same time as Howard Gardner, only a few years after in the late 1940s. He is also a Harvard graduate and has worked at Harvard just as Gardner has, which is why the influence of Gardner's work is so apparent in Goleman's approach to understanding the complex nature of intelligence.

Unlike Binet or Terman, but like Gardner, Goleman (1998) notes that an important aspect of one's intelligence concerns one's abilities to understand one's emotions and social situations. Like, Terman, Goleman does attempt to measure (and quantify) one's intelligence,

although unlike Terman his focus is on an aspect of intelligence that Terman ignored, one's emotional intelligence. His work has been mostly in developing measures of one's emotional intelligence—one's Emotional Quotient, a measure which parallels the existence of the IQ. "EI" is a relatively new measure which includes the knowledge one has of the emotional status of the self, another person, or group. It requires an individual to know best-effort management strategies for fluctuations in emotion.

For Daniel Goleman, the EI model is one which looks at a person's emotional competencies. It builds on and expands Gardner's ideas about interpersonal and intra personal intelligences in that it encompasses the social and emotional dynamic of intelligence, which is to know oneself well in the effort of understanding others. The model includes an "Emotional and Social Competencies Inventory" and an "Emotional Intelligence Appraisal," which can also be deemed a 360-degree assessment since it covers the conditions of well-rounded emotional and social intelligences. The four aspects which Goleman assesses are self-awareness, self-management, social awareness and relationship management.

Self-awareness requires an individual is able to read and correctly perceive his/her emotions to accurately perceive the emotions of others. Self-awareness aspects can include the use of intuition and contextual reasoning, as well as the use of introspection and reflection. Over time, self-awareness can be developed through intentional practice in addition to teaching how to read others and be aware of implicit messages bodily and facial gestures make. "People with strong self-awareness are neither overly critical nor unrealistically hopeful. Rather, they are honest - with themselves and with others" (Goleman, 1998, p. 273). This directly impacts a person's decision making and the ability to manage reactions and outcomes.

Self-management deals with control over one's own thoughts and body, a reduction of impulsivity—or exaggerated thinking, i.e., going to extremes, gross mismanagement of ideas which lead to erroneous action, and so forth, in addition to being able to adapt to one's changing environment, again without swinging too far one way or the other in a compensatory manner. To a great extent, meta-components are used in self-management. For example, “meta-components are used to decide on a paper, plan the paper, monitor the writing, and to evaluate how well the finished product succeeds in accomplishing its goal” (Sternberg, 1988, p. 59). As it relates to self- management, one would need to carefully select a feasible topic-- one that was manageable for them, and which made sense for the assignment. Then, that topic would have to be carefully researched and divided into subparts, wherein a thesis statement might help to guide the focus, or direction, or the paper throughout. Or, the individual would need to determine whether the topic fit within the structure of the paper and if help with writing were necessary, for both content and grammar. The two aspects interact.

Social awareness also deals with self-management, as the individual is responsible for reactions, responses, and the emotional impact he has in a group dynamic. It also involves paying attention to patterns of behavior, patterns of response and reaction based on his involvement in the social network. “Social skill is the culmination of the other dimensions of emotional intelligence. People tend to be very effective at managing relationships when they can understand and control their own emotions and empathize with the feelings of others” (Goleman, 1998, p. 271). Socially aware people do not have to socialize continually to create social networks; they simply learn how to find common ground among the people they are working with and have that network to fall back on when the time for action comes.

This skill in social awareness also works into relationship management, which engenders thinking about methods of conflict resolution. The individual understands the influence of one person on another or on a group and generates effective coping mechanisms for those changes. The goal is to be constructive and to reduce misinterpretation and misinformation with oneself and with others in a social context.

My personal view of intelligence has been enriched by reading Goleman's work. It challenged my view that intelligence was primarily cognitive and made me aware of the importance of an aspect of thinking in which I was not so strong, especially in my ability to read body language, decipher emotion through intonation and experience with empathy—as well as my being attuned to my own emotional experiences and how my education was affected by them. If I did not attend to what I experienced on an emotional level, how could I possibly process it and distinguish fact from judgment, in order to avoid making future errors of a similar nature? As an educator I had to learn to validate emotion in the learning experience.

I also came to the conclusion that I must help students grow socially and emotionally as well as intellectually. Emotional growth can be hard to quantify, but Goleman suggests there is a way to generate an Emotional Competencies Inventory. The ECI can also be used to determine whether certain character and personality traits are reflective of higher intelligence. A character which is invested in active learning throughout one's life can be cultivated. The nuances of character can be shaped, and shaping influences ability to learn and retain new information. As an example, confidence, self-reliance, enthusiasm, determination, are all qualities of a person's character which can be conditioned over time, and which aid in the ability of the person to pursue new avenues of learning. If those aspects exist early on in life,

if they are cultivated, a person's general intelligence will be more likely to develop well. The aspect of social development may appear too complex, given the number of exchanges we have daily with different students, at different times, and after different social encounters. Still, our obligation to aid in learning goes beyond curriculum content. As a mandate of the occupation, and whether teachers like it or not, we are bound to our positions as a secondary filter for what students conceptualize and retain about their time in school and out of school. I mention that we are a secondary filter because we are in no way intended to replace the role of care-giver, although we often do fulfill such roles within the constraints of the school.

I now believe that by acknowledging the simultaneous importance of multiple intelligences and emotional intelligence, we will carve out a balance of critical thinkers, creative thinkers, reflective and introspective thinkers in the classroom. They will be more aware of themselves as well as of their impact on others, and essentially the impact of others on them, which is crucial to comprehensive development. And much of that type of comprehensive, holistic learning can take place in the type of education program—Instrumental Enrichment—described more thoroughly in the following chapter.

CHAPTER 5

TOOLS FOR INSTRUMENTAL ENRICHMENT AND EMOTIONAL NAVIGATION

How can teachers help promote and develop the intelligence of their students?

Frankly, this was a question I would not have asked some years ago; it would have seemed a contradiction in terms. But as my own views on intelligence began to expand and change, the question became meaningful and important. I began to consider that intelligence could not actually be a fixed ability if students were to be helped, advanced and enhanced in their thinking. I needed to adopt a new philosophy about intelligence and learning potential. My expanded view of what is involved in intelligence now incorporates that there may be many aspects to develop, including social and emotional.

In this chapter, I consider the work of two individuals, each of whom have given me new insights about how I might answer the question. The first is Dr. Reuven Feuerstein. He developed multiple programs which address building skills at an advanced level in meta-cognition as well as building skills in restraining impulsivity, working backwards, thinking aloud, following logic, and so on. The primary basis of his work was to challenge the notion that intelligence was genetically fixed by generating programs which caused enhancement and development in multiple skill areas—including cognitive, emotional and social growth (Feuerstein, 2006).

More explicitly, Feuerstein developed some exercises to promote basic cognitive abilities that he thinks underlie self-regulated and higher order learning. In this chapter, I will consider (a) the tools he proposes for enhancing intelligence; (b) what aspects of intelligence

these tools target; and (c) how I might incorporate them in my classroom. As excited as I grew about his work, I knew I also faced a dilemma; specifically, how I was going to integrate his program in my own classroom setting. His work stressed teacher mediation, but did not fully address how to become a successful mediator. I worried about how I would be able to address recurring problems with students' learning if I wasn't able to effectively communicate. I began thinking about how to develop skills in successful negotiations with students, and how I was going to articulate expectations, boundaries, initiative-taking, and follow-through in relationships. This is where Roger Fisher's and Daniel Shapiro's (2005) work is introduced as a means to evaluate effective communication and emotional navigation.

Reuven Feuerstein and his Instrumental Tools of Enrichment

Born in Romania in 1921, Feuerstein proposed that the mind was a malleable facet of the human existence. Though the process is complex and intricate, requiring time, exposure and retraining, he argued intelligence can be taught, and cognition is modifiable. After World War II, Feuerstein fled to Israel where he led in education and psychological repair of holocaust families. His work soon spread to education of the general public, wherein, he developed the International Center for the Enhancement of Learning Potential. The program I chose to elaborate on in more detail was Feuerstein's Instrumental Enrichment Program (henceforth FIE) designed to enhance a number of thinking skills that influence cognitive, social and emotional capacities. The FIE program is comprised of 14 tools (see Figure 1), 9 of which are described more thoroughly throughout this chapter.

Figure 1. The Instrumental Tools of Enrichment (Feuerstein, 2006). The first 7 instruments are represented in the first diagram, and the second set of instruments is listed in the second diagram. They follow a clock-wise order in relation to their sequence in the FIE program. The tools (*italicized and in black font*) are the tools discussed in this paper.



The tools of FIE are used to enhance student learning on a variety of levels and can be implemented in the classroom to have maximum effect for students as young as 5 years of age. According to Feuerstein, teachers would need to be trained in FIE to be able to implement correctly the exercises in cognitive development and mental function recognition. Materials and training information for FIE can be obtained by the International Renewal Institute and sent to schools as a part of a Professional Development program.

The 14 tools have tool-specific goals and levels; the program itself has sub-goals that increase in difficulty and complexity, ranging from operations such as categorization to inferential analysis, to the underlying purposes of healthy habit-forming and intellectual enhancement. The program is designed to aid in student learning through mediation which helps young learners grasp larger concepts in an organized and sequential fashion. Teacher mediation occurs when the teacher comes between the learner and the academic task and helps the learner to interpret, develop strategies, and gain insight into the task without the teacher doing actual telling. The mediator also encourages and supports the learner, an important part of social and emotional learning. This fact was also a part of the motive I had for finding information on navigating emotion and classroom negotiations.

The overall intention of the original FIE program is early intervention for at-risk students; prevention and intervention is a means to give students the help that they need. As it developed over time, the program came to be seen as the means of promoting children's cognitive modifiability and social adaptability. In general, it is used to aid at-risk students in making long-term good decisions, based on skills that help with judgment, ascribing correct interpretive values, consequence-weighting, and widespread problem-solving abilities. Although an educational setting is a primary environment for retention and mediation, the

skills built in the program have applicability to real-life settings. Parents, teachers, mentors and friends could utilize the tools, adapt them to various environments and languages, and use them at home in game-like contexts, instead of in strictly academic contexts, which may appear intimidating to a learner. The purpose of FIE was to generate content-independent skills that could be generalized across content areas.

The practical application in the classroom can be done in one-hour lessons, 3 to 5 days a week, for 2-3 years. Although Feuerstein began with pre-K studies, the program has been adapted for a wide variety of ages—younger children and elementary age, as well as early teen and even adults, specifically adults, and early teens, with deficiencies in each of the domains for each tool.

Although it does not relate to special-needs learners per se, a convincing study about the effects of IE occurred in Israel. Two groups of high school students, some of whom came originally from countries where they had had very little previous formal education and very little family interaction, were identified for the research study. One group received the general high school curriculum and then proceeded into the Israeli army; the other group received the general high school curriculum and IE, and then proceeded into the Israeli army. By the end of high school, the group who had had IE training had already outpaced the control group on the Primary Mental Abilities scale as well as on 3 standardized nonverbal tests of intelligence. But the results of the follow-up study are still more encouraging—two years after their training in high school, now in the Israeli army, both groups were tested again, this time on an intelligence test showing verbal and nonverbal aspects of intelligence. The researchers found that students who had had two years of IE were now outperforming the control group even further, concluding that IE had successfully increased the IE students' abilities to learn how to learn (Chance, 1981, p.2, cited by David Martin, 2010).

Each tool has a structure, a set of objectives, and a specific goal. Overall, the tools have an order which mandates why one must precede the other in order to reach maximum understanding and fulfillment in learning. The nonverbal instruments are: Organization of Dots and Analytic Perception. The instruments with limited vocabulary are Orientation in

Space 1 and 2, Comparisons, Family Relations, Numerical Progressions, and Syllogisms [logic statements]. The tools which would require independent or intermediately assisted reading and comprehension are the tools: Categorization, Instructions, Temporal Relations [time], Transitive Relations and Representational Stencil Design. Each of these tools works to develop an individual's cognitive functions on incremental levels.

The purpose of this program, specifically for instructors and mediators, is to move away from the psychometric approach to understanding intelligence by simply measuring or assessing it and to holistic teaching practices by trying to promote and develop it. This begins with differentiating the function of the mind, i.e., the production of thought and emotions as they interplay with learning, and the need for mediation and guidance in all academic arenas. FIE is a means to influence the scope of our intelligence to incorporate social factors, occupational factors, emotion and environment, behavior, and of course, cognition. Social factors include interaction, labeling social relationships, identification of emotions, and developing empathy; the latter two are especially important in the early-childhood version of the FIE program. The conception of intellectual abilities on which the tools are based support a comprehensive view of development; Binet believed in brain plasticity and worked as well with low-performing students, whereas Terman determined early in his career that intelligence was fixed and worked to eliminate low-performing students from mainstream education. The success of Feuerstein's program proves that cognitive development can be nurtured in the right environment and with the right tools.

Six Sub-Goals of Instrumental Enrichment

There are six sub-goals of the 14 tools in FIE program; by the end of the program, all of the underlying goals should be fulfilled, but some of the goals do not develop until the tools offer that specific type of learning (Feuerstein, 2006). Sub-goals must also be incrementally achieved, as they are reflective of the mastery of one or more series of instruments.

The first goal is to correct cognitive deficiencies and to detect them early on in a child's learning. This includes reducing high levels of impulsivity in students, teaching systematic and precise data collection measures, defining problems by their relevant clues, looking for logical evidence, forming a hypothesis and practicing reflection [at varying levels of high-order thinking] before responding.

The second goal of FIE is to build vocabulary and the versatility of word use—considering context and using inferences and deductive/inductive reasoning to define words based on syntax and semantics. This includes developing appropriate labels that represent different relationships, stretching one's linguistic processing to be able to recognize sentence structure and logical sequencing of words, and expanding one's lexicon to encompass diverse, but precise words for speaking and writing.

The third goal is considered the most indispensable, and it has to do with developing intrinsic motivation within the learner. Feuerstein's Instrumental Tools for Enrichment is a program which consists of learning activities that help teachers mediate the development of a learner's basic concepts and thinking skills developed from the theories of cognitive modifiability and mediated learning. FIE discourages the use of external motivators such as that found in classrooms that espouse "token economies." In token economies, and similar set-ups, students are enticed, through external rewards to explore a learning opportunity in the

hopes that the result of the process encourages more investment in the learning itself, without the external reward.

The development of intrinsic motivation is also tied to the development of good habits of mind that are manifested in expectations and behavior. To cultivate one's habits of mind early is to help develop the aspired outcome of a learner--that he/she is self-motivated to learn and to do better. This is also true for the developing adult and teenage minds, especially where social values exist and connect through peer-mediation in task accomplishment. This process elicits accountability of the self as the 'self' is involved in completing a task; it is about role-recognition and the ability to see oneself in the problem, as a vital component to the solution. A person intrinsically motivated to complete tasks feels the personal, long-standing satisfactory results of his/her success, forming within him or herself the habit and understanding of true gratification—a feeling tied directly to owning one's work.

The fourth and fifth goals of FIE relate to intellectually shaping a person who is capable of generating insightful and reflective thinking. In goal four a reflective and insightful learner develops, and in goal five, an autonomous, self-regulating learner has emerged. An insightful and reflective thinker is a person able to produce and contribute to his or her own cognitive development and influence the success and efficiency of his or her environment. The learner is taught not to yield to blaming tactics, such as attributing failure to all factors but his/her own self. He/she is taught to reason about the consequences of behavior, to be active in decision-making so as to prompt consistent meta-cognitive practices, such as thinking about one's mental process at the time of problem-solving, and to have awareness at full capacity of the development of an action or plan. The learner is encouraged to mark the

social responses around him/her to understand the appropriateness or adequacy of actions and words and to reflect on that process to better enable future success in personal awareness.

The last of the FIE sub-goals connects each of them together. This sub-goal is to bring a learner from a state of passive data-processing to active reasoning and interpretation. The learner is intended to have developed the skills necessary to generate data on his/her own without heavy mediation and should be able to register and process those data without immediate external incentives. The interplay of crafting one's self-image relates directly to the full development of a learner and the effectiveness of accurate self-perception in learner practices. A learner with enhanced self-image sees him or herself as the primary motivator of his/her own learning and seeks out challenges that are adequate to building skill level. Such learners are, for the most part, autonomously driven to succeed and have self-directed and self-correcting abilities learned through the program.

The Tools of Instrumental Enrichment

The **kinds of thinking processes** targeted by the 14 tools involved in Instrumental Enrichment are analysis, inference, deductive reasoning, inductive reasoning, restraining impulse, working backwards, making comparisons, drawing conclusions, meta-cognition, characteristic recognition, labeling, numeric sequencing, and genealogical comprehension (Feuerstein, 2006). The different kinds of thinking processes relate to the relevant work I have done in critical and creative thinking. Restraining impulse for the purpose of planning, experiential learning, logically sequencing operations, using different methods of research have all been a staple in each of the CCT classes, regardless of whether they emphasized creative or critical aspects of thinking. Additionally, socialization, interdependence and

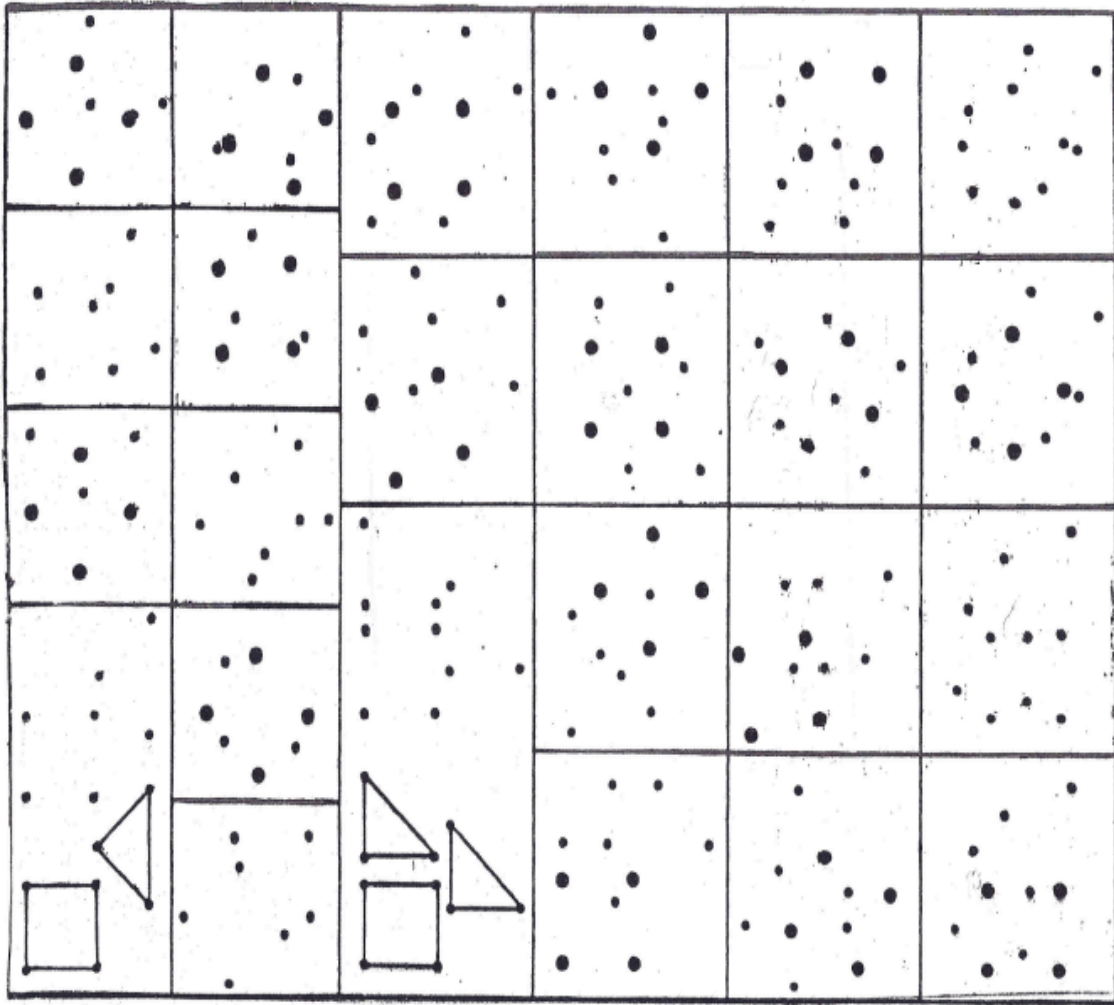
collaboration have remained staples in how I approach task completion today as a result of undergoing CCT, having been influenced throughout the coursework by the theories of Howard Gardner and Daniel Goleman taught in our classes. Meta-cognition, for example, is not only a large component to Feurestein's work, but also espoused in Sternberg's Triarchic Theory, which was introduced to me during my studies at UMass, long after I had completed my undergraduate work. Meta-cognition involves the practice of reflection as a tool to developing an understanding about one's own patterns of thinking. The development of thinking patterns and habits correlates highly with one's ability to retain and organize information, as well as pursue further knowledge (Reisberg, 2006).

I have chosen to focus on 9 of the 14 tools in this paper. The 9 I have chosen cover the broad range of diverse learning activities and possibilities for implementation. I plan to illustrate both the verbal and nonverbal aspects of FIE, specifically to show how they build on each other. Although each of the tools is important, some are rich in content and versatility, which I thought could incorporate some of the creative thinking training I underwent in the graduate program at UMass Boston. Many of the tools show to an extent how my conceptions of intelligence have grown and changed as a result of CCT education and program exposure.

Organization of Dots

The first instrument is the Organization of Dots which targets projecting imagined geometric relationships onto a set of dots. The reason I choose to describe this instrument was to show its non-verbal learning qualities. It is the introductory exercise in the FIE tools. The student must conform to producing simple geometric shapes in an amorphous cloud of dots. In the example below, a student would work individually to complete the exercise in organizing the lines between the dots to fit set geometric shapes.

Figure 2. Organization of Dots (Feuerstein, 2006). A student would work from left to right up each column using the darker dots as cues as to how to solve the geometric placement.



One aspect of this task is to identify or outline within an amorphous cloud of dots, a series of overlapping geometric figures. The figures can be triangles, rectangles, trapezoids, squares, diamonds or stars. In the beginning, darker dots and angles act as cues, but as it continues, the darker cues fade into regular size and color dots and the angles are difficult to navigate, making it even harder for the eye to discriminate. The individual must be able to

project relationships in order to continue in the series of increasingly difficult and less discrete placement of dots and proposed figures.

The goal for the tool is to be able to utilize relevant information, maintain constancy of form and size, but also be able to discriminate size and form. This goal is also relevant for social development, “To be able to disentangle various components from a given complex social situation, one must be able to identify patterns that characterize different groups and relate the individuals to a specific pattern” (Feuerstein, 2006, p. 220). The task also requires systematic search, planning and personal restraints to not act on impulse while visually transporting the geometric object in multiple directions to complete the task. The learner needs to rely on precision and accuracy as a function of the problem in order to have success. This tool is the first introduction to the program system and the interrelated structure of goals. I believe this is because a) it is a non-verbal exercise, which requires explanation, but not an acquisition of new vocabulary and b) it deals with representation, conservation and precision in a rudimentary form.

In a classroom setting, the Organization exercise can be used with different geometric shapes in mind, varying the levels of complexity by deciding how many shapes and dots there will be in each box. As seen in Figure 2, the Organization of Dots exercise can consist of as many dots per box as will fulfill the number of geometric shapes within, and they may be repositioned and angled to challenge the learner. In my class, with a young student, I could utilize the example box to design a legend with color-coordinated cues, such as purple to denote the starting point of a triangle, and yellow to orient the learner to the start of a square, or rhombus. I could also keep the shapes, which remain the same size, at relatively

uncomplicated new angles, such as all resting right side up, or upside down, or to the left or right, as opposed to one tilted at 60 degrees, the other at 90 and another at 45.

This brings me to another point that the number of geometric shapes per box can also be decided based on the age of the learner. In this way, the student can be guided through the exercise using the example and a legend to complete a task of four increasingly difficult Organization of Dots boxes. As the boxes progress in difficulty, I could start to eliminate one color coding or both, and only use the larger dots, of all the same colors as cues. And, eventually, no selected dots highlighted by color will be used as cues, and the learner will then have to use his or her familiarity with the shapes and distance of dots to fulfill the task. If the learner is able to build on prior knowledge within a single set of tasks in order to complete it, he is already achieving one important goal of FIE. In the classroom setting, activities which promote conservation, teach precision and practice multiple representations, expose students to skills which can be applied to alternate and supplemental study—a student learns to reduce impulsivity, to think through a problem before engaging in the determining an actual solution, and to set the expectation that precision is important for accuracy, effect and better understanding.

Orientation in Personal Space

Another tool deals with Orientation in Personal Space. Orientation in Personal Space, also referred to as Orientation in Space I, is a concept that is malleable and subjective, but ultimately, relies on good self-awareness and articulation of actual location in relation to what is around, both near and far. (A later instrument, called Orientation in Universal Space or Orientation in Space II, deals with geographic orientation, while the present instrument deals

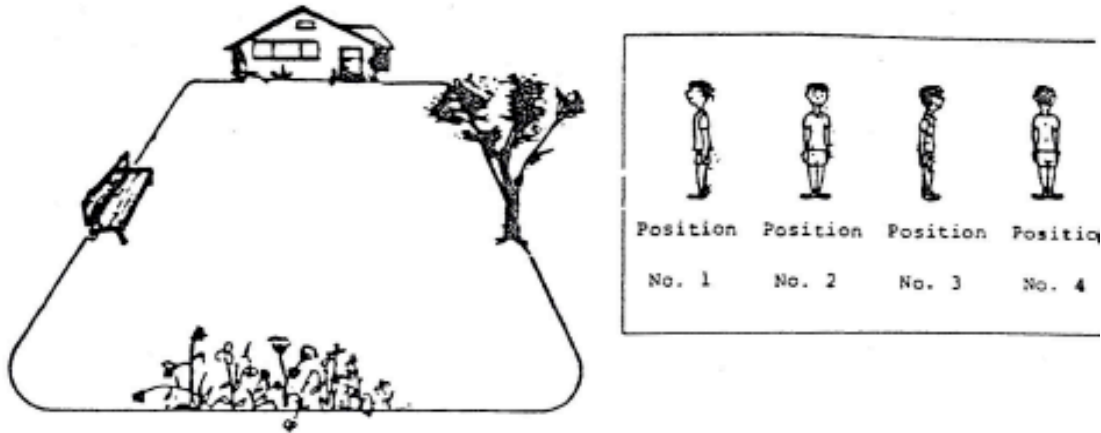
with personal orientation, point-of-view, and the use of front, back, right, and left). Feuerstein describes this instrument in this way:

Spatial orientation is linked to the correct perception of objects over a wide range of situations. Good articulation of representational space can be used as an efficient carrier for the development of rational abstract thinking and the correction of a host of deficient cognitive functions. Taking two elements and relating them to each other, while coordinating one's view to that of another, in addition to utilizing the basic comparative behavior involved in each of these processes, are two of the many functions that can be activated through the acquisition of representational space. The perception and understanding of transformation as deriving from certain operations can also be acquired through representational space perception, (Feuerstein, 2006, p. 228).

In the classroom, there is potential for this tool to be used in reducing discipline problems. I had not thought of discipline in these terms, but I thought that teachers would need to exercise creative authority in order to derive the optimal possibilities for successful, albeit innovative, use of the tools in the classroom. By giving students the tools to articulate with accuracy where they are in proximity to others, what they were doing, and how it all transpired, the teacher is better able to assess students' comprehension of spatial awareness, as well as their perspectives on the classroom layout and students' interaction in this setting. Students that are able to better articulate their role in an altercation may refrain in the future from getting involved in such circumstances which they will be expected to articulate and reason about to a teacher or fellow classmate. They start here with good decision-making.

Orientation in Space I is about the learner understanding spatial orientation as it relates to his or her own body in which the frame of reference is the individual's own movements. An individual is asked to role-play, placing his or herself in the position of the character on the page (see Figure 3), and asked to identify using "spatial orientation" vocabulary, where he/she is in relation to another object in the vicinity. In the classroom this picture can be used in real-

Figure 3. Orientation in Space (Feuerstein 2006). A student would use the cues in each line to fill in what direction the boy should be standing, or what object he would see, and what direction it would be in, in relation to the boy.



IV. Fill in what is missing:

Position	Object	Direction in Relation to the Boy
1	The tree	
4		right
2		back
	The house	front
3	The bench	
2	The house	
	The tree	left
4		back
	The bench	
		left
3		back
4	The tree	
		right

life contexts. That is, the drawing can be modified to include actual elements of the classroom the students' occupy. Students can use proximity in relation to objects they are familiar with in the actual classroom, such as the windows (if there are any), the front and rear exits, the teacher's desk, the fire extinguisher, and so on. It can also be an exercise that incorporates physical movement, keeps the students moving and orients them to the important aspects of the class and the less important elements of the class, that they will regularly use in the future. This tool is also good for learning spatial-orientation language in daily routines, or in circumstances of an emergency. Students will know how and where to organize their bodies and belongings in relation to what is around them when they regularly participate in these exercises.

Comparisons

The third instrument I am going to discuss is Comparisons. Comparisons is used in cultivating the sharpness and acuity of perception and developing shrewd analysis of relationships among sizes, shapes, colors, gradation, scale, and so on. This tool attempts to move beyond the recognition or identification of a particular event/object and deconstruct it to ascertain its multiple features which make for a salient case in the distinguishing characteristics of one versus another. As Feuerstein puts it,

Comparative behavior is the abbreviation of a motor manipulation by which the two elements are superimposed, one on the other. In the process of seeking correspondence between two elements, each of the dimensions is scrutinized thoroughly. Through this activity, there is a determination whether the items are identical. If not, there is a search for the locus and direction of the differences, (Feuerstein, 2006, p. 251).

The onset of a more sophisticated lexicon is required for the learner to progress accordingly. The words related to comparative processes range in complexity for example: same, equal, similar, and dissimilar, they also demand precision and succinctness in diction, and











expectation for acute judgment, therein engendering the learner with finer tools for discrimination. The distinction in complexity between simply recognizing differences and commonalities to comparing based on multiple dimensions is divided between units 1 and 2 of Comparisons.

The example of Comparisons found on the next page in Figure 4 shows a few ways in which images can be used to highlight obvious and less obvious differences. The pictures can be designed to progress in difficulty and detail, utilizing more sophisticated concepts and vocabulary. At a simple level, two circles, of different colors and sizes can be placed for comparison. Obvious traits of difference would be their distinctively different size and color, expressed in a comparative context. For example, the red ball is bigger than the blue ball. Or, the ball on the left is larger than the ball on the right. It can also be decided what their different uses are based on their sizes and colors. I would also consider comparisons for common classroom items to help with word precision such as looking and discussing, the distinguishing characteristics of a pen versus a marker versus a pencil—or a journal versus a book versus a magazine. It is important to use everyday objects that students actually come in contact with to make sure the lessons are practiced often in explicit and implicit ways.

In a more sophisticated comparison, two objects may have more detail and more similarities. For instance, comparing two balls of similar size and shape, with more intricate designs, and with more complex use of comparisons would suggest that students were expected to ask questions of critical analysis before expressing what such comparative results might be. The ball may be smaller, and of different color, but now a mediator can expect that a student should ask what is it made of, how far away is from the other, is this the cause of perceived differences in size, is it hollow, where can it be found, what purpose does it serve,

Figure 4. Comparisons (Feuerstein 2006). A student would look at both pictures and discuss in writing what aspects of the pictures are similar or different based on size, color, and shape, etc.

Indicate what is common to each pair of pictures and the differences between them.

 <p>Common: _____</p> <p>Different: _____</p>	 <p>Common: _____</p> <p>Different: _____</p>
 <p>Common: _____</p> <p>Different: _____</p>	 <p>Common: _____</p> <p>Different: _____</p>
 <p>Common: _____</p> <p>Different: _____</p>	 <p>Common: _____</p> <p>Different: _____</p>
 <p>Common: _____</p> <p>Different: _____</p>	 <p>Common: _____</p> <p>Different: _____</p>
 <p>Common: _____</p> <p>Different: _____</p>	 <p>Common: _____</p> <p>Different: _____</p>

and so on, to extract more complex comparisons out of two relatively similar objects. What generally provokes the students to think deeper about these concepts is the teacher's probing as well as responses by peers which illicit asking further questions.

Categorization

After the Comparisons instrument comes Categorization. In Categorization, associations are necessary to build composites that require differentiation.

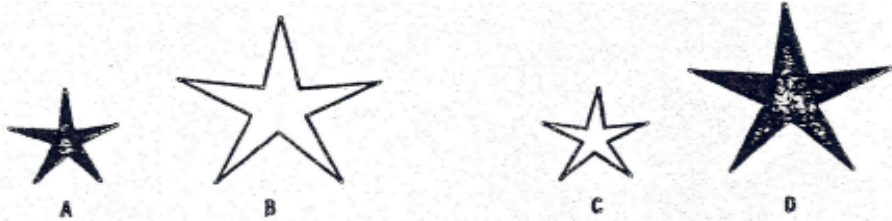
Categorization is designed to deal with the lack of, or impairment of, the ability to use hierarchically higher mental processes to organize the data into super-ordinate categories. Categorization relies on processes of classification based on successful comparison, differentiation, and discrimination. With analytical perception and the projection of relationships, the process is not merely one of sorting but one of grouping objects or events according to underlying principles, and subsuming them into appropriate sets, (Feuerstein, 2006, p. 265).

Like the Comparison and Organization of Dots instruments, Categorization is divided into units and graded in complexity. The modalities of Categorization are pictorial, schematic, figural and verbal. The instrument builds off of a mastery of Comparisons and sets up for the later instrument, Syllogisms. According to Feuerstein, mastery of Categorization gives students an ability to make immediate application of operations learned such as reorganization, classification and criteria discrimination. Using a systematic strategy, learners can make selections, defend selections, and propose new categorizations with proper reasoning. Categorization exercises hypothetical thinking and open-mindedness. This is required because the data presented by the exercises are unorganized, and the learners have to develop ways of organizing the data so that they remain mutually exclusive. This also means the students are required to engage in verbal exchanges and test hypotheses to figure out which categories best-fit given the data in the exercise. Over time, students would need to,

recognize levels within a hierarchy in order to correctly categorize the task at hand, be it form, size, color, age, gender, type of activity, or relationship between two or more of those components. Categorization also teaches students about representations of figures and multiple strategies for diagramming, which require the recognition of principles within each categorization task. A sophisticated use of categorization demands fine discrimination.

Figure 5 provides an example of what Categorization task from Feuerstein would look like for a student determining the correct label for an object based on its known, or stated, characteristics. The student is also asked to provide the correct description given the picture. In the classroom, Categorization is very important for routine and organization. Teachers label where items go and where they can be found from a very young age. In my kindergarten class everything is labeled and everything has a specific place. Toys are broken down into categories, and those categories have sub-categories that help with the classification of material objects around us. For example, the “toys” section may have five separate categorizations. There are building blocks, which contain Legos, Lincoln Logs, and wooden blocks of various shapes and sizes. Then there are dolls, puppets, small plastic animals, and cars and automotives. And that’s just toys. Then there are games. Board games, with or without dice, word games, math games, card games, etc. And there is a drawing area, crayons and oil pastels and markers—thin and thick—and colored pencils. And there is more. The list goes on and on for students who need to know exactly where something is to be placed and why. The principles of categorization help students to see the significance of order, and this builds on the knowledge they gained of how to make comparisons. In this sense, students know why something is categorized together with another object because they see in what ways both objects are similar to each other and different from everything else.

Figure 5. Categorization (Feuerstein 2006). In this example students are asked to identify based on the characteristics listed where each star should be placed. In a more sophisticated example, a student may be asked why, and need to justify his principles of organization.



Here are four stars marked A, B, C, D. Classify them according to size and color and write the correct letter on the appropriate line.

Subject of classification: STARS

Principles of classification: size: (1) large (2) small
color: (1) black (2) white

```

graph LR
    STARS[STARS] --- large[large]
    STARS --- small[small]
    large --- black_large[black: _____]
    large --- white_large[white: _____]
    small --- black_small[black: _____]
    small --- white_small[white: _____]
  
```

Put a circle around the words that describe the color and size of each star:

	<u>color</u>	<u>size</u>
Star A	black/white	large/small
Star B	black/white	large/small
Star C	black/white	large/small
Star D	black/white	large/small

Students also need to know how two things can appear different but under a certain level of classification, can be considered the same. For example, a dog is a mammal, has four legs and a tail. A horse is a mammal, has four legs and a tail. One is an omnivore, and the other is a herbivore. Based on the specifications for categorization these animals can either be placed together or apart. It all depends on the criterion set forth by the instructions which the student needs to follow, unless that student has the privilege to decide, and justify, his own system for categorization.

The example shows a few ways in which categorization exercises can be used in the classroom. The arrangement of animals in accordance to specific requirements, such as the design of a new zoo, gets students to utilize skills of organization and classification as they construct their own zoo diagram with the animals placed within each area. The critical thinking part of “Classification of Animals” is that the students must substantiate their purpose for separation by generating principles. The fact that students are asked to generate their own principles highlights two important aspects of learning. One is that students need to be able to uphold the statements they make with substantiating evidence and two: students need to understand there must be rules by which we govern our decision-making, now and in the future, which do not easily fluctuate based on the different components presented to us. In FIE, this is important because the derivations of classification systems that originate out of Categorization (through the use of similarities and dissimilarities) become the basis for the later instrument, Syllogisms, which strengthens the mental capacity for transitive thinking.

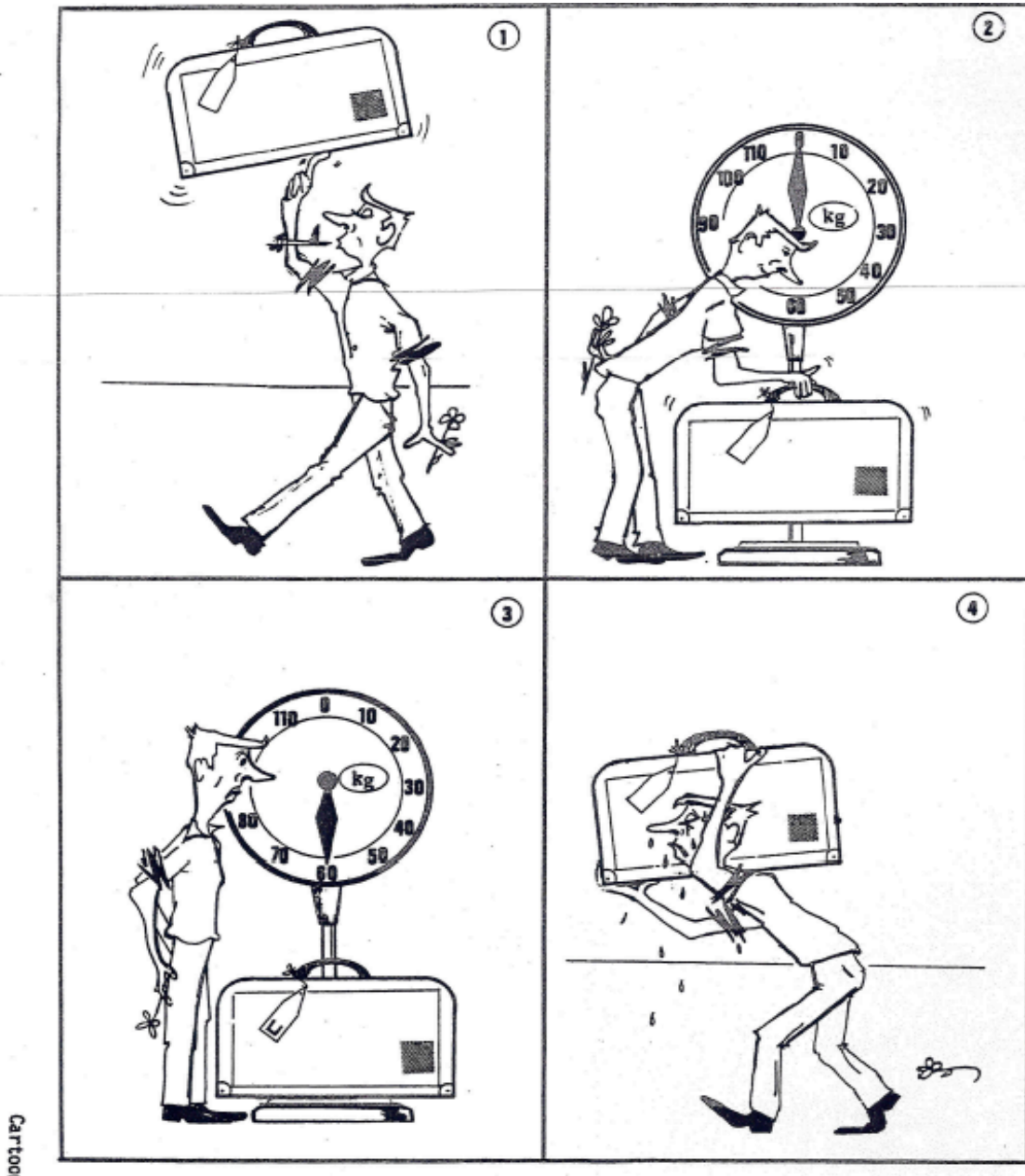
Illustrations

The next instrument deals with Illustrations. An illustration teaches learners how to draw on data found in images to come up with logical conclusions and sequences for what they

see. For example, students are shown a series of somewhat incongruous pictures and then must interpret this sequence by telling a plausible story. As a prerequisite to task-solving in Illustrations, the learner must use inference and evidence culling skills. The learner implements the acquired skills from previous instruments that support input, elaboration, and output. The interrelated aspects of the Illustrations instrument occur when learners are using newly developed cognitive functions such as perceiving reality, recognizing erroneous thinking and faulty conclusions based on the pictorial representation, and being aware of similarities and dissimilarities in representations. The existence of a problem should cause a disruption in the equilibrium in the learner and thus, prompt the learner to search out possible solutions. This requires sensitivity to detail, awareness of body language and the emotional correlate of countenance as it appears in the image, an eye for irregularities in pictorial repetitions, and the ability to reconstruct a visual problem into a verbal or written problem and solution.

Figure 6 shows an example of an exercise using this instrument from Feuerstein. In this example a man is seen in a series of pictures and the student is asked to come to his or her own logical conclusion about the sequence of the pictures and determine a plausible explanation for the obvious changes depicted in the image. For example, the child might say: "When the man pulled the suitcase from his closet it was empty. After packing for his trip the new weight of suitcase made him unhappy." Another student, unable to draw more of solid conclusion from the example, may rely on fantasy "The suitcase has a monster in it. At first the monster is tiny, but after 6 hours it has grown into something much larger and much heavier. This worries the man." This conclusion would be based on a series of pictures wherein skills of inference and inductive reasoning help the learner to determine a realistic series of events.

Figure 6. A Sample of an Illustrations Exercise (Feuerstein 2006). In this instrument, students are asked to tell a story that makes sense of the sequence of pictures. This calls for the use of inductive reasoning and accurate use of inference.



I really appreciate this instrument more now than I had even when I was first learning about it. I use illustrations constantly, especially in demonstrating certain examples of my expectations for a task. In school, we are all very visually oriented, teachers and students alike.

I often ask students to follow a series of tasks that have been laid out for them visually in order to complete a project. I will say constantly, “If you don’t understand, please study the example.” This is because I cannot be one-on-one with each student during whole class instruction. It is also to encourage them to learn autonomously and to rely on what is in front of them to solve a simple, but seemingly complex problem. For instance, if something is made of different-sized parts, and is to stand vertically without support, then it would make sense, even at different stages, that objects with a larger base area would be at the bottom while smaller items would balance at the top. The Illustrations instrument infuses pictorial depictions to cultivate the thematic categorization of pictures. The mode of imagery presentations comes through a collection of illustrated circumstances and scenarios.

Illustrations can be used in many ways in the classroom: for example, to decipher the logical sequence of the passing of time, or can be used in conjunction with deductive reasoning skills to identify what is missing or added to a picture which alters it from the original version. This exercise is good in leading students to make logical conclusions about what is to come next, implicit in the image, as well as in diversifying perspectives on how such an image can logically be interpreted. Again, a component of FIE which was found in Categorizations, the students must practice substantiating their claims of the logical sequence based on the inferences they make on what is in front of them. Another example might show a picture of a girl with a leash in her hand, then walking a dog, then chasing the dog with the leash at the park, then walking in the reverse direction with the dog back on the leash, and the next picture with the two of them entering the home. Again, a student must use logic to decipher and interpret the sequence of the illustrations.

A much simpler pictorial story can be conveyed by a snowstorm, snow man, sunny day and pool of water on the front lawn. Much like the Instructions tool, which I describe next, students can also generate pictures in a particular sequence on their own, or generate a story, which can be interpreted and completed by other students in the class. Again, an emphasis on clarity, precision and direct approach will enable students to express themselves clearly through image and color. They can also pick up on non-verbal communication detection by identifying the mood or expression of emotion depicted in the images that are not explicitly written

Instructions

The emphasis of critical and creative thinking is based on the accuracy of interpretation and the generation of questions that support self-regulatory processes in task completion. Throughout previous instruments, the completion and mastery lies in the mediation of instruction. Eventually, through FIE, the learner has to gain skills in the comprehension of instructions. This requires concrete and abstract thinking. “Instructions” is an instrument that relies heavily on verbal factors.

Language is emphasized in this instrument as a system for both encoding and decoding processes on a variety of levels. These range from simple labeling following recognition (1), or enacting following decoding (2), to the use of inferred instructions derived from the interaction of instructional codes and the stimuli (3) (Feuerstein, 2006, p. 256).

Data-gathering and the practice of correct labeling of objects/assigning of relationships best forms when inference, deductive reasoning, and inductive reasoning are used to clarify the specificity of instructions so that task completion can be chunked into stages.

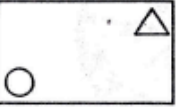
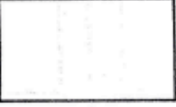
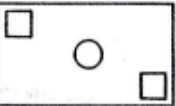
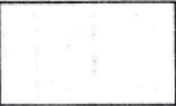
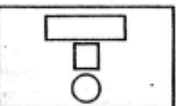
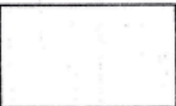
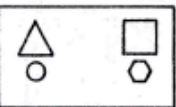
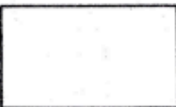
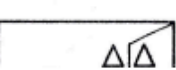
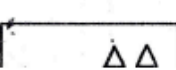
Each instrument in FIE engages the learner in adapting new vocabulary and new patterns of thinking. In the first unit of Instructions (following the written instructions of how

to recreate an image), Orientation in Space I and II are characterized through geometric shapes within a given frame. A reiteration of word use learned in said instruments aid in familiarizing students with the interplay of instrument, goal and skill set. It is important that students do not see the instruments of FIE as individual but cross-referential and interdependent. Sequence is highly effective in the mastery of a task, and it requires consistency in the comprehension of instructions.

Figure 7 provides an example of what an exercise in “Instructions” would look like that builds on prior units on spatial relations. Two people work together, one describes what is present in the picture on the left and the other recreates the image based on the written description found in Figure 7. This calls for students’ ability to encode spatial information accurately in words, and communicate it effectively to another person who does not share knowledge of the situation. The “decoder” in turn, must convert words into an accurate spatial representation.

The application of Instructions in the school setting is used on a daily basis. Instructions are given verbally, through writing, and by step-by-step physical examples. A teacher must be able to use multiple modes of representation to depict the same series of expectations. Students, though, are also instruction givers. Students ask each other for help, they watch each other’s nonverbal actions to understand class expectations and derive meaning in a multitude of ways that is not transferred directly by the teacher. To give the students an exercise in instruction is to ask of them to represent the multiple ways they interpret information.

Figure 7. Sample Instructions Exercise (Feuerstein, 2006). The learner's objective here is to write instructions based on the pictures on the left so that the drawer can recreate them on the right. The left side examples are folded back to hide the picture.

LOOK 1.	DESCRIBE (What You See)	DRAW (According to the Verbal Description)
	<hr/> <hr/> <hr/>	
	<hr/> <hr/> <hr/>	
	<hr/> <hr/> <hr/>	
	<hr/> <hr/> <hr/>	
	<hr/>	

Instructions can be given orally at first with students practicing their word choice for specific actions they expect from another student. Then, based on their writing abilities, written instruction, in short simple sentences at first, and then in greater detail later, can be incorporated into the classroom “Instruction” lesson plans. Students will begin to adapt to different instructional modes and have more diverse instructional language skills as a result of repeat exercises of the Instruction tool. Like Sternberg, I am trying to encourage practical reasoning within students, without needing to organize the materials, or do the thinking, for the

students. An illustration helps students to come to logical conclusions on their own, without a lot of verbal interpretation or teacher intervention. The data are right there for them to interpret.

As a teacher, I too can benefit from the application of the skills involved in instructions. For example, the time I have spent working with parents on student behavior and issues has taught me the value of suspending judgment and over-attributing clarity in my writing. As it relates to observations I make in class, or instructions I give on how to proceed in the future, writing as accurately and precisely as possible eliminates room for misinterpretation. I found it stifling at first to not be able to expound upon a particular issue I was having with a child, expressing how my experience and interpretation of the matter influenced my assessment of the problem's root, and subsequent solution. In writing, supplementing my perspective with copious modifiers and adjectives only marred people's comprehension. I have learned to give and take direction at face value and because of this, I have reduced the number of mistakes I have made in my relationships with students and parents. Exercises in Instructions have also made me more conscious of my language and what interpretive value I think I am adding that is ultimately portrayed as unfounded assumption.

Numerical Progressions

Both Numerical Progressions and Temporal Relations instruments require the learner to invent patterns on presented data. In one case, a series of numbers which appear to be random but which are not, and in another case, a series of events which appear to be random at first, but are not, must be logically sorted and strung together by a salient cause by the learner. This perception includes that of objects, numbers, figures and events using that which is probabilistic and based on a specific rule, principle or determinant such as proximity. Cultivating perception of numerical progressions helps eliminate the inclination to

conceptualize events as random or by accidental juxtaposition. That assumption about the randomness of events evolves from the impulsivity of task-solving in this content area without proper training.

Figure 8 gives an example of Numeric Progressions exercise from Feuerstein. The example shows a few different tasks in Numeric Progressions, which asks the student to identify different numeric sequencing patterns and be able to further specify the numbers that come next through that identification process. Patterns can be developed by repetition, such as deciding what comes next in a sequence that repeats 4, 7, 6, 4, 7, 6 or a more complicated repetition such as 5, 4, 5, 5, 6, 7, 5, 5, 5, 4, 5, 5, 6, 7, 5, and 5. When a pattern is established, or when a student can identify a pattern early on through acquired skill, then the missing pieces can be placed in the middle of the sequence rather than at the end, to reduce the effect of rote solution. For example: 0, 8, 9, 1, 1, 4, ____, ____, 9, ____, ____, ____. The 9 signifies where the pattern begins and ends in the missing pieces, so that the student can be certain the pattern does not continue beyond what is known on the page.

In class, students could start from a relatively easy pattern, such as identifying what numbers have been skipped, and why they have been skipped, in a sequence of 1-20. For instance, 1, ____, 3, ____, 5, ____, 7, ____, 9 and so on. The patterns could become increasingly complicated as the sequence stretched into higher numbers and fewer prompts were provided. The numbers can take on different representations, including fractions, and decimals. The correct answers to the missing links are only half as important as the student's ability to identify the relationship of the parts to the whole, and derive a sequence that works in continuation to provide accurate results.

Figure 8. Numeric Progressions (Feuerstein, 2006). Here is an exercise in which the learner would identify a pattern in the numbers and complete the sequence. The expectations are established in the first few givens, and sometimes prompted by the numbers provided halfway through the progression.

Complete the following progressions:

(A) 45 47 47 49 49 51 _____

(B) 20 20 18 18 16 _____

(C) 11 12 15 16 19 _____

(D) 11 22 20 31 _____ 40 _____

(E) 7 2 7 3 7 4 _____ 6 _____

(F) 18 0 16 0 14 _____ 0 _____

(G) 2 7 5 10 8 13 _____

(H) 20 17 _____ 15 16 13 14

Developing skill at detecting numerical and temporal progressions will be important in science. Children are not readily equipped to search for distant stable relationships such as, the moon's gravitational pull on the Earth which creates tides that they experience while visiting the beach at different times throughout the summer because of the Earth's rotation on its axis,

and must be trained to do so; in addition, this skill is useful in recognizing second-order relations, specifically involving cause and effect “...the major purpose for the Numeric Progressions instrument is to develop the orientation to perceive disparate objects and events as being linked by some kind of relationship that can be deduced. In certain cases, these links can be reduced to a common relationship that determines the changes and transformations, as well as the directions of such changes, according to certain rules,” (Feuerstein, 2006, p. 301).

Familial Relations

Family Relations can be taught through algorithms, family trees, chronology lines, lineage charts, and Venn diagrams, among others. According to Feuerstein,

Family Relations provides learners with the relational abstract elaboration of relationships they experience in their daily lives. That such relationships are used and experienced by performers does not necessarily mean that they are aware of their conceptual nature so that they are able to detach the labels they use in specific context of their own experience and apply them more generally, (Feuerstein, 2006, p. 297).

A Family Relations task encourages learners to go beyond defining familial relationships via labels and emphasizes deriving relationships across specific and general situations. In many cases, this means introducing keywords to lay brick and mortar for constructing relativism in relationships. The role an individual plays in a given kinship pattern leads to the question of how each is related to each other. In addition, individuals fulfill multiple roles simultaneously, and clarity in role defining is necessary for learners.

Figure 9 provides an example of a Familial Relations exercise from Feuerstein. In order to eradicate erroneous patterns of thinking, Familial Relations uses symbolic, graphic and verbal modalities to represent information. Learners are able through Familial Relations to orient themselves and the identity of others via gender and role through vertical and horizontal relationships that occur within families. Task completion relies on the systematic

synthesis of two or more sources of information, which utilizes male/female coding to illustrate the functional definition of the relationship under terms which are acceptable for the conceptualized kinship. This particular exercise works best with students ages 9 and upward, which requires the learner to label the relationships. Feuerstein's example uses a simple family tree revealing a few lateral and vertical relationships among family members. The students are given sentences including information represented in the diagram. Students are then asked to determine based on the diagram and short set of sentences who is in relation to whom and why.

An adapted version, with an even simpler set of expectations utilizing the same concept could be designed for younger aged learners. For instance, John and Janice are married. John is Janice's _____; Janice is John's _____. They have one child, Bob. John and Janice are Bob's _____. Bob is John and Janice's _____.

Another kind of adaptation of familial relations would be to include examples of diverse family relationships. For example, John and Janice are married. Fred is John's brother. Hannah is Janice's mother. Janice is an only child. Fred is married to Carl; they have two sons, Chip and Chester. Here you have a created a (diverse) network of relations which upon careful reading and questioning can be organized in a hierarchical way to show lineage. This is a great lesson to bring children's family life into the classroom and to show how each family contributes in some way to the classroom community. Our community in particular accepts many same-sex marriages and mixed families, including interracial and interfaith—which are aspects of the Familial Relations tool that can bring about the celebration of diversity in the class. Examples of questioning about one's family based on this set of facts are as follows: Chip is Chester's _____. Carl and Fred are Chip's _____. Carl is

Figure 9. Familial Relations. (Feuerstein, 2006) Here is student is asked to determine what the nature of the relationships in the examples are based on the information provided above. They are to fill in different questions for each representation of the problem on the page.

Richard and Ann are brother and sister.

Richard has a son whose name is Joseph.

Ann has a daughter whose name is Joan.

Richard is Joan's _____.

Joan is Richard's _____.

Ann is Joseph's _____.

Joseph is Ann's _____.

Here is what the diagram looks like:

```

graph TD
    Ann((Ann)) --- Box1[ ]
    Ann --- Joan((Joan))
    Richard[Richard] --- Box2[ ]
    Richard --- Joseph[Joseph]
    Ann --- Richard
    
```

Joseph and Joan are _____.

Joseph is Joan's _____.

Joan is Joseph's _____.

We say "cousin" instead of saying "the son of my uncle" or "_____".

We also say "cousin" instead of saying "the daughter of my aunt" or "_____".

John's _____. In the future progressions of this exercise, hypothetical situations can be created to further the extent of familial development such that Chip and Chester gain respective partners, have children, and they have children, who marry, divorce, and have more children. The aspect of family is central to classroom dynamic, and this tool in particular

brings out many opportunities for parents and teachers to engage students in learning about their personal history as well as gaining conceptual understanding of who they are in relation to their relatives.

Syllogisms

Categorical Syllogisms are logic statements about classes and their relations; as such they normally work on a formula: a major premise, a minor premise, and a valid conclusion. The premises and conclusions can involve a universal affirmative (All men are mortal), a universal negative (No dogs can fly), a particular affirmative (Some planes are jets) or a particular negative (Some people are not friendly). Two examples would be: All men are mortal, All mortals die, therefore, All men die. The next is: No dogs can fly. A Boxer is a breed of dog. Based on the aforementioned, we know a Boxer cannot fly. Trickier would be to challenge the students to understand the principle syllogistic phrases hinge on despite their absurdity in the real world. For instance: All types of clothing are made of stone; A shirt is a type of clothing; Therefore, a shirt must be made of stone.

The example in the FIE text sets forth the following premises: (1) No plant is a liquid; (2) A cactus is a plant; and (3) Oil is a liquid. The learner is then required to fill in the blanks provided by the example, which should result in a logical conclusion based on the information and the individual's reasoning. For instance, the second line is: A cactus is a plant. Therefore, a _____ is not a _____. The third sentence, "Oil is a liquid," warrants the fill-in-the-blank: therefore, _____ is not a _____. The student should be able to follow the line of reasoning and offer a valid conclusion (Feuerstein, 2006). This is the basis for the instrument's logico-verbal reasoning. Students must be able to categorize based on hierarchy as the information is presented to them. Students are required to use inference and project

relationships based on the skills they've mastered through previous tasks, in previous instruments.

Fun ways to represent logic statements in the class are to have the students create the groups and provide defining characteristics for each, which may reveal an overlap or distinctive features which call for their separation. Syllogisms also utilize the principle that a statement or argument must be grounded in logic, must make sense, and must have a consistent standard or formula, which can be applied universally, despite obvious, superficial differences.

Syllogisms support logic and reasoning in aspects of mathematical problem solving and also in areas of argument, debate, and recognition of erroneous judgment/assumptions made during our exchanges with other human beings. A person capable of reasoning why something cannot exist or coexist based on the information given is likely not to be confused by his/her own thinking and thusly, will make clear and concise statements about the self or the task, or others, understanding that exercising logic is at the root of enhancing our day-to-day interactions.

Summary

In summary, FIE is a systematic approach to skill-acquisition and identifies specific cognitive operations necessary to master each Instrument. The instruments vary in design and complexity, but each requires the individual to achieve, in stages, higher mental processes. The most important aspects of FIE, though, are the emphases which are put on autonomy, intrinsic motivation, mediation, and confidence. A person's overall well-being is as important to the completion of the program as is their mastery of each Instrument, and the philosophy behind this movement is that the two concepts are not mutually exclusive. FIE focuses on developing

general intellectual skills. The program is adaptable to every age group and ability level (not just developmentally delayed), and the value in that is that FIE is not content-dependent though it can be content-modifiable. The program can be worked into lesson plans of all disciplines, from botany, to home economics, to photography. Not every instrument is used every time a task needs completing, as our brains use different processes for different operations.

Nonetheless, each of the skills a student is expected to possess after completing the program, are applicable in all areas of existence, including, and more importantly, the aspect of developing a life-long learner with healthy habits of the mind.

In all of the instruments, divergent thinking and flexibility are mandatory. Divergent thinking and flexibility must be fostered first, through the use of reflection and through systematic search of a set solutions and alternatives, especially where relationships and the rules of such govern transitions in succession. The focus of all the instruments is to encourage learners to contemplate the variety of possibilities and use evidence to justify the use of the chosen alternative. This thinking leads students to believe in numerous causes for any given event. It is a mode of thinking that requires guidance and is consistently reinforced throughout the CCT program.

I think Feuerstein does a great job of identifying areas often overlooked by teachers and administrators, and he puts them into well-adaptable lessons and units which can be executed in multiple settings, with a broad range of students. Sadly, he does not incorporate musical aspects of learning to this program. Music, a core part of Gardner's Multiple Intelligences Theory, would fit in well with labeling, characteristic recognition, and categorization, depth perception, as well as having sensory implications. While not all teachers have access to musical instruments, instruments can be made, and their features, as well as the values of the

FIE program, can be upheld through impulsivity restraint, patience, repetitious practice, exposure and the freedom to test ingenuity in an auditory context. In the next section auditory and oratory skills are of high importance, but the basis for the inclusion of Fisher's and Shapiro's work is to identify how central communication is to successful learning, and how effective communication, specifically in the context of classroom negotiations, must be learned before it can be practiced well.

The Final Negotiation

A large portion of the FIE program is through teacher and symbolic mediation. Throughout the learning process, students rely heavily on the guidance and instruction of the mediator. This is true not only for clarification and direction, but also for encouragement, to build esteem, to influence autonomy and to filter the experience. Since mediation is at the core of learning, teachers would be able to see the practical use of FIE in the classroom, though it poses a challenge of feasibility given the growing number of students in American classrooms. Class sizes are increasing little by little each year. The demand for space, resources and one-on-one instruction is therefore higher. This raises the question: how can a teacher be an effective mediator with a large classroom of students?

In my school, I also work in class as an aide to one Kindergarten teacher, in addition to the Program Coordinating I do for the Aftercare facility later in the day. In the mainstream classroom there are 24 students. Most elementary school classrooms do not have more than one main teacher, one secondary aide, and one paraprofessional per class. In a group of 25, whether they are 10 years old or 5 years old, it is still a lot. The paraprofessional cannot be

asked to fulfill roles that may take her attention away from the cognitively disabled child, though it happens often that the particular paraprofessional is stretched to meet many needs at one time.

As an aide, who merely assists in planning and follow-through, I think 25 students is a lot to manage; in Aftercare, I must remain within the ratio of 13 students to one teacher. Sometimes though, I have 15 or 14, or even 18, when a teacher needs to be excused for half the day, or other circumstances arise and our current ratios cannot be kept “clean.” I imagine for most teachers, an attitude of doing what one has to in order to get by, must be adopted. I know that I have adopted that attitude at times.

This reality makes FIE a challenge to integrate because it hinges on the successful mediation of each tool. Mastery for each student cannot be expected if the level of mediation necessary is not met. This does not mean an aide for each student or even an aide for every two students. It does mean that students will master the tools over longer periods of time because the concentration level of students to mediators will be significantly reduced, and this is just a mark of one of the current dilemmas in American classrooms.

In the book, *Beyond reason: Using your emotions as you negotiate*, Roger Fisher and Daniel Shapiro (2005) discuss just how vital understanding the process of negotiation is to teaching and to generating smooth communication throughout all endeavors. When I read Feuerstein’s work, it focused on the exercises themselves, but not fully on the process of being a successful mediator. I was excited by Fisher’s and Shapiro’s work, because in part, it helped me see “how to fill in the missing links”—to think about the steps I would have to take to be a successful mediator and hence promoter of intelligence in the classroom. Shapiro argues that emotions come through in nearly every exchange we have and that nearly every

exchange we have is some type of negotiation. Simple day-to-day questions such as in what ways should the materials be sequenced, how much time should the students be given, what types of review will be necessary, will there be opportunities for extra credit and what grade to give students who try very hard but have failed to meet the requirements of the assignment, without undermining the work of other students, are all internal and external negotiations teachers face. Who deserves an extension on a project and why is a common predicament, and the why part is for obvious reasons, difficult terrain to navigate. Validating another person's personal setbacks or hardships, whether related to the difficulty of the material or not, is a situation which occurs often in a teacher's life.

Most of these negotiations occur within the teacher's brain at first, and then will lead to actual dialogue with other teachers, faculty, parents or the actual students themselves. In our negotiating, we have a rise and fall of various emotions, which can influence our language, our demeanor and thinking—ultimately—the success of the negotiation which is impacting for both the student and the teacher, as well as the class community. According to Fisher, there are five core concerns that must be addressed for successful negotiation through dialogue. The concerns are: (1) appreciation, (2) affiliation, (3) autonomy, (4) status, and (5) role. Recognizing these concerns in oneself, as well as in another individual, helps keep the emotions positive between the two [or more] participants. It also should support successful mediation.

Negotiating in the classroom is about building a trusting and working relationship, where authority and rule is present, but less important than other factors such as honoring fairness and honesty between individuals. The balance and intertwining of all these things is central to maintaining harmony in our exchanges. When the core concern of 'appreciation' is

being fulfilled, the thoughts, feelings and actions are perceived as valued, acknowledged or given merit. In the classroom, teachers often face complaints of being ignored from students, or not having their needs met. To be able to meet the needs of all the students all the time is impossible, and should not be attempted. Instead, showing students I appreciate their inquiries, respect their language use or the “seriousness” of the problem allows them to feel less defensive about the problem and more flexible in coming to a solution. I may say, “I think that is problem worth investigating; can we work on this together?” the student is no longer alone in attempting to problem-solve, and I have validated their concern without rewarding them or coercing them into believing that I agree or disagree with what has transpired.

When the core concern of *affiliation* is addressed, the individual feels as though they are a colleague (or person of common status) with person he is negotiating with. This is very important to students who will continue to seek praise and arbitration from teachers, and yet still challenge their authority and rebel against the effort and hard work it takes to learn and retain something well. In this circumstance, I may preface my response with, “Well, in knowing that we are all equals in this class, I do not have more rights than you do and you do not have more rights than I do.” I believe in substantiating claims that may seem inaccurate or false, so I may add, “I make decisions because I am prepared to handle the responsibility of classroom: safety, organization, curriculum content,” and so forth.

If the teacher or student recognizes the core concern *autonomy*, each is responding both to the right to decide on what matters and the freedom and respect that should be given to one who has an opinion which matters (although this may be an illusion of choice, as it often happens between teachers and students in decision-making). Alternately, if this is not

being met, each may feel that his “freedom to make a decision is impinged upon.” In this circumstance, students may back out of negotiations and become hostile or withdrawn where the mediator is concerned. This reduces the trust that fairness is exercised in that relationship. A student interaction may develop where I feel exercising one’s right to have an opinion about what he or she does is interfering with his or her concentration on the task at-hand. In this circumstance I have to remember that all people, big and small, want to have the right to choose what they are involved in. I may develop a series of choices, all applicable, all relevant, or devise a compromise among the choices, to honor what I would like to occur and what the student would like to happen at that time.

When *status* is considered, a teacher’s or student’s standing is regarded, and both feel and react as though deserved recognition exists. The teacher recognizes the student, shows appreciation for previous work and efforts, and makes decisions based on that rapport, as well as interprets future opportunity for change through added chances for success. The opposite of the recognition of one’s status is to be treated as inferior. A lot of times for students this is experienced as condescension, rigidity and indifference. This core concern also has a lot to do with affiliation, although status involves looking at, if possible, the history of student performance and the student/teacher relationship.

Lastly, is the core concern of one’s *role*; one’s role must be considered in a negotiation such that he perceives his activities and involvement in the negotiations, or in the conclusion of said negotiation, to be fulfilling. It is important the individual feels as though something positive came from the negotiation, even if it is not something concrete, such as an emotional understanding or clarification on some idea or point of difference. The person must also feel as though the role he or she had in the negotiation is a fulfilling one, or that person

may come away with other core aspects not feeling met. The absence of a defined role, in that context, could be personal detachment from the other person or the exchange. If no common ground can be met between the two individuals or two groups of individuals, contention continues to breed in their exchanges, as compromise appears as less of possibility during the stagnation. If a person invested in a negotiation perceives the stake is lost, the negotiations no longer have appeal and the individuals do not respect or sustain the outcome. For students, as well as for parents, this is very important. Teachers must not over-sacrifice to yield to the oncoming demands of individualizing the curriculum for each family. This dilutes the standard of quality and it distorts future negotiations, which are bound to occur.

According to the core concern of role, teachers must view themselves as the proprietors of the class, the students must be aware that their role is equally necessary but of another dimension, and parents must be made to feel a part of decision-making, though not at the center of it. With teachers as the primary mediators through the education system in America, having skills in negotiating as well as in comprehending emotional intelligence, will help create a community of belonging which is fundamental to the learning process. Teachers are the car salesmen of their trade; they choose the features that best sell the material, and they must remain honest to avoid losing their integrity among students. They choose the make and model of their teaching and the administration decides if it is effective. Teachers also have the privilege of honoring that which is thoughtful, thought-provoking, useful and intelligent about their own work and the work of their pupils. In my opinion, teachers are most obligated to being socially and intellectually responsible in their classrooms, and that means, for the child, being capable of fostering and honoring divergent thinking as well as the

ability to recognize and develop the vast modes of learning and potential an individual brings to the school.

Diversifying teacher strategy is a good way to reach students with various abilities. One problem in America's education is that teachers face numerous obstacles, including being under-trained to fulfill vastly changing roles within the school. For instance, some school districts face budgeting crises; teacher resources are depleted and they rely more heavily on the use of less engaging, more cost-effective lessons. Teachers have other pressures, such as planning for entire days, weeks, and months without enough time in their work schedule to complete all of it. For a teacher, there is nothing more challenging than keeping up with the tasks and obstacles and emotional roller coasters involved in creating an effective, successful learning environment. Feuerstein's program of Instrumental Enrichment and Fisher and Shapiro's guide to Navigating emotion in negotiations can help to positively influence the experiences both teachers and students endure in the classroom.

CHAPTER 6

MY CHANGING PERSPECTIVE AND PRACTICE IN THE CLASSROOM

I learned a great deal about my own approaches to teaching through the CCT program and my experiences as a Teacher's Assistant in the general education kindergarten classroom and as a program coordinator for the Underwood After School. I still struggle to validate the emotions I am confronted with, specifically during instances where I have trouble sympathizing with my students' situations, which makes teaching empathy that much more difficult. I believe in educating for autonomy, but I have come to terms with the need for consistent and positive social interaction, and with the fact that I am the primary facilitator of those interactions, so I work hard to maintain a comfortable and safe place for students to express themselves, to hear others and be heard in constructive ways.

Throughout Chapter 6 I explore various aspects of my teaching which have developed and need to develop more. I incorporate vignettes from my classroom experiences, to illustrate typical situations, contrasting how I might have responded before, and how I might respond now. The next steps in my own continued growth are as follows: I plan to pursue professional development opportunities as often as I can, especially when sponsored by the school or academic institution I am a part of. Currently, I am enrolled to take part in a workshop on bullying and social interaction. In addition, I am taking on weekly sessions with my director wherein we discuss my current goals, plans for implementation, objective development and assessment strategies. I am trying to become the best teacher I can. I have setbacks which are a part of my personal experience, environmental shaping, formal and informal education which have been divulged openly throughout this paper, but I believe it is my responsibility as an

individual who influences the learning of others to provide the utmost service to my students, and to myself.

Seeing the Value of My Current Setting

The aftercare facility where I work at Underwood Elementary in Newton, Massachusetts is a teaching environment rich in opportunities for developing children's intelligence but one that was strange to me as an instructor early in my career because I didn't see the richness of its opportunities. Through this occupation I have learned a great deal about the dynamics of school age child-care and the responsibility to learn and use one's resources to maximum capacity, an important aspect of Practical Intelligence that was emphasized by Sternberg. Underwood After School contains all of the elements of a normal primary school; we have teachers of diverse backgrounds, though their qualifications for the position are less than that of the formal education setting. We have a snack period, outdoor recreation, indoor free play, organized sports, crafts activities, time for homework, and a variety of diverse learning opportunities for the students.

When I began working at the program, prior to undergoing CCT, I was not happy about the reality I faced in this new, non-academic environment. I wanted to be able to grade students, to provide feedback in critical ways to their work, and to be seen as a serious influence on the student's academic career, as I felt was present with their formal teachers upstairs. The teachers upstairs had their own space in which to work, and they structured their day in accordance with what worked best for them. They had authority to provide feedback in an academic context to the parents, and the parents were far more receptive to it. Yet, we still

had many unique advantages, which, prior to undergoing the CCT program, I was not able to recognize because I did not value what it was we did for the entire school community.

In many ways, I now see that the students at Underwood After School Program (UASP) are luckier than students in the general education setting because they have an opportunity to experience mixed-age groups, they have exposure to a range of different teachers who have different interests and areas of expertise, and they have the chance to participate in additional clubs and fieldtrips that the public education students do not have. All of the aforementioned make UASP and its students the benefactors of some wonderfully collaborative projects and activities. As a non-profit organization, we are not directly responsible to the school's administration, but we reap the benefits of the school's amenities.

The fact that we also have great external resources, such as an affluent, safe and involved community, raises the expectation for staff to know how to use what is at their immediate disposal in addition to what requires a little research and planning. Our staff includes musicians, ministers, recent foreign language college graduates, and a balance of senior and junior educational leaders. The structure of the program itself is as follows. We work on a three-tier model: kindergarten and first graders belong to one team; second and third graders belong to team two; and the last team is solely for fourth, fifth, and the occasional sixth grader that travels down from Bigelow Middle School, a quarter mile away. To provide even more diversity, we also utilize a staff-alternating model where teachers from different Teams pair up to offer activities for a group they do not normally work with. During staff-alternating days staff members from different teams pair up to provide new and enriching activities for students they do not normally work with during the rest of the week. Our model values team autonomy yet incorporates and promotes interdependence. On days when the

models are collapsed or integrated, the two staff members designated to a team, in tandem with our part-time ‘floater,’ have the opportunity to work with any or all of the students in aftercare in any given time, and they introduce clubs as well, such as the Asian-American Program, running Tuesday afternoons. We will often rotate the students through for 1.5hr during what we call “Station Rotation” in which 3 or 4 separate activities are arranged within our space and students carousel through them in established mixed-age groups.

In order to add depth of quality and skill building in the exercises offered to the students, the program devised clubs, groups and organizations in a particular subject or domain. The clubs are a preview of what the students may want to be involved with in later years, such as sewing, chess, cooking, creative writing, and self-defense. The clubs are extra features of the programming which expose students to practical situations where the importance of good decision making, keeping commitments, goal setting, and diversifying one’s skills and interests is expressed explicitly and implicitly throughout the lessons. I now see this is also an aspect of social development which enhances student’s ability to work with one another on a set task, to cultivate their shared interests, and to build standards of responsibility which translate fairly to those who choose enrollment in such a club.

Whereas before I thought of the clubs as ways to keep ratios clean and buff up the program’s appeal to parents, I now see how mediation (something stressed especially by Feuerstein) is also an important component of what we do in Aftercare, especially in and throughout the clubs we offer. I also am more aware of the challenges in being an effective mediator, and more reflective about the social dynamics in mediation. The clubs are designed to highlight a staff members’ strength as it relates to enriching student experiences in the program. In a designated group setting, one or more staff members work on a consistent basis

to mediate all concepts and strategies incorporated in the club to the individual and the group in that particular domain.

In the aftercare environment, I choose to offer the following clubs: writing, sewing, cooking, and bake sale. My daily programming consists of reading, writing, and two art activities or the incorporation of one art and one physical activity. Through my efforts in the clubs I offer and my specific programming selection, students gain exposure to new facets of the world outside the program through my individual filter, and that filter involves making explicit connections to what we do daily that relates to what we do in the classroom.

Classroom Vignettes

Vignette 1: Changes in My Approach to Reading Stories

Reading is an important piece of my students' day. It exposes them to different literary techniques, use of language, and the basic sound patterns of language. An aspect of my teaching approach which has changed since I began work at Underwood deals with reading to the students. I now focus on using strategies of scaffolding, fading, and emotional navigation rather than high-demand expectations, rote repetition and out-put focused lessons. I make sure that reading is active. I chunk material and review what is chunked before moving on, especially during reading. I do this by reading to students a little at a time and asking content and comprehension questions throughout. It's not easy to remember to do this as a teacher, and it takes away from the time you have to work on related exercises, but as the class is shaped by the teacher, the teacher and the students will know what to expect. Thus, we will not spend as much time reviewing what was just read by rereading each word and defining it, but by being able to pull out consistent themes, literary techniques and complex ideas.

As a habit in my class, I supplement most exercises with preparatory reading. Because the students are five and six years old, most cannot read on their own yet. I pick literature which in some way relates to what we will be working on individually or as a group so that the students are familiarized with the concepts. I do this so that students can begin to formulate ideas about what they are producing, so that they can generate associative values to the reading and their own experiences and so that they can see real world applicability to what they understand from books. This works especially well with expectations for behavior and teaching morals. Books provide detailed stories interwoven with examples of perceived good and bad behavior. In class, we discuss what these behaviors mean, why they are important, and the students draw on their own experiences and examples to find a relationship between what they hear when read to and what they do daily in school and at home. Most of what we do in UASP is bridge building. Sometimes the reading itself is the primary activity, but mostly, reading is preamble for active practice. I've experienced that students exercise less impulsivity and express less confusion in a later activity when they have working knowledge they can incorporate into the task at hand.

Finally, I can now see relevance here of relating stories to specific FIE tools, as perhaps an additional way of fostering their development. For instance, a story riddled with complex family relations, such as the incorporation of sisters and brothers and mothers and uncles and marriages, would be great for Familial Relations. Stories about neighborhood travel and community interaction could work in conjunction with Spatial Orientation, stories about trips to the zoo or aquarium, or different geographic locations would work supplementary with the tool Categorization. Prior to the CCT program I had not thought much about pairing learning with literature and approaching learning with an interdisciplinary attitude. When I

first encountered FIE, constantly thinking about bridge-building and applicability was a new concept for me, which required much more forethought and planning to the lessons I produced. Now, it is a part of what I do regularly, and I see students are better able to make connections in and throughout the day, which has a drastic effect on behavior, and their ability, over time, to make associations independent of teacher guidance.

Vignette 2: Changes in My Approach in the Writing Club

In the beginning of the writing club I was using tactics and resources which I was comfortable with and which I had much experience. I devised writing prompts which I could appropriately manage the outcomes. I thought if I didn't know thoroughly what I expected of the students, I would not be able to manage the class, and thus the students' opinion of my course would be fairly low. I worried I would not be able to convey enough of what I knew if I tried writing exercises with which I was not very familiar. I found myself setting up half of the writing exercise for the students, instead of allowing them to use the tools they'd gained and create their own. An example of this would be to teach the students what an acrostic poem is, and then dictate which words the students could use in an acrostic design which would create a solid, comprehensible poem, rather than allowing them to make mistakes, attempt a few trials and errors and cultivate a poem using their own words, and their own ideas.

Through my increasing sensitivity to issues of emotional negation (as discussed by Roger Fisher and Daniel Shapiro), I am now starting to see how much my students value the experience of learning something new at the same time as the teacher. And, it does not mean that I lose control of the class. Originally, I preplanned exercises which would have set results. For example, there are many styles of writing and many forms of writing which can best fulfill

specific tasks. By providing students with different styled writing prompts, they are able to exercise their creativity in ways that are not confining. For instance, if I am teaching them what an acrostic poem is, and I know about acrostic poems and their uses, but am not an expert at them, and have decided to tweak the instructions to fulfill a more creative or relevant task, I will attempt my own acrostic poem with the students, undergoing the exercise at the same time, with similar constraints and sets of tools, and be open to infusing, other, more effective uses of the poem style if generated by the students, rather than myself.

Being able to connect to my students in a way that equalizes our learning and the importance of our contributions also happens to work best in a creative context because I express the expectations I have for student involvement and commitment to the club, but their work is not graded and they are not assessed academically for what they produce. It is a judgment-free zone but the students understand that the purpose of writing is to explore what we know, learn more, and cultivate the craft, which requires the giving and receiving of constructive feedback. So, now, we have a critique session at the end of the session where we discuss what the highlights of the club were and what we each need to work on, including myself, for next week. And, we hold each other accountable. The writer's now have buddies to support their writing, encourage risk-taking, and keep them on task. Before, I was not apt to develop a system for writing which depended on the support of others. Now, I see how vital that is to the writing process, especially as I finish my graduate work.

I have noticed that students feel less inclined to compete and more inclined to learn what each other knows. The feeling of embarrassment about wrong answers or entitlement when more answers are known by some as opposed to others seems to fade. The playing field is equalized. Students listen to each other and watch what the other is doing. I am needed only

for incremental guidance; I am not the voice of absolute correctness. I am an observer, offering leads when necessary. The students have been able to carry on conversations about the assignment, which spread into different areas of discussion by the association of ideas, with persons they may not normally initiate face time with, or have had reservations about in the past. It is a way to sew gaps and create explicit commonalities throughout the learning experience.

Vignette 3: Increasing Awareness of Informal Social Structure

Another aspect of the clubs which I now see enhances their qualities is that they are formed by the students themselves (with permission of their parents) who believe the group may be of some use, or have an impact on their learning capacity in aftercare. They *choose* to be involved, and they are expected by all staff to uphold that commitment. The club enrollment often is initially based on specific social connections the students have to each other and to the staff. I have found as a host of three clubs (sewing, writing, and cooking) that students will branch away from the safety net of friendship if they feel they can trust the mediator and they are interested in what they are learning.

The students cannot begin to learn on their own unless they are comfortable within their learning environment. I realize that as facilitator and mediator, the responsibility is on me to generate an atmosphere conducive to learning that goes beyond motivational mottos paired with colorful photos posted on the walls. I had to move beyond creating the look of a class and actually develop the feel of a classroom, a place where people come to share ideas, learn new concepts, gain confidence, and develop skills in emotional navigation and positive social interaction. Although the mediator is central to this process, effective mediation also involves

the mediator fading into the background to supervise as students begin to work together or autonomously to complete the task. I remind students to use their words instead of actions to demonstrate a point, or convey a reaction, so that they are exercising restrained impulsivity and then I back away, allowing the student to think of their own words, rather than supply what is to be said.

I have found that when I stop paying attention to what is done or said; the students realize this and resort back to using their actions first. They are testing to see if I really care about the values I enforce. If I do not care, they do not care, but they are always watching to see if I do something about a problem which they know is wrong, even while they continue to do it. They want to know if I know what is happening in my classroom, how much I witness, when I feel compelled to intervene—on what grounds—and whether my advice is consistent, my punishment enforced and my protocol in line with the policies expressed in other classrooms through the school. Even when I back out of a situation, allowing two students to organize a solution on their own, they want to be sure that I am aware of whether there is follow-through. There really is no space for the teacher to be absent mentally or emotionally from the room, even when the physical presence is obvious to the students.

In my two clubs, learning happens through many avenues, but what I see most now that I could not identify before is the effort students make to relate to me, to relate to each other, and to relate to what they are learning. I also see how what they say and do at school reflects what they see and hear at home. I have learned this over time but was not able to draw connections from home life to school behaviors because I was not validating that key element in their life; I was simply insisting they adjust to the rules and regulations I had in place. I did not pay attention to the skills they had in emotional navigation or tools they had already

acquired in regards to social development, such as recognizing what another person is skilled or good at, because I did not recognize it as essential to the learning process.

From a social standpoint, being able to witness this in students meant they were exercising a measure of self-regulation; students asking each other for help shifts the focus from the teacher to the valuing the peers' opinion and evaluation. At first, this was uncomfortable for me as I perceived I would lose control of the class if I allowed students to make bonds wherein they were relying on each other for information on how to succeed on a given task. Today, peer mediation is a tool I use steadily, which actually aids in regulation, and provokes much more tendency in my students to self-govern. When students want to go outside and are waiting in line because of two individuals engaged in inappropriate behavior, I do not have to interject and impose authority. I wait, or I cue with my hands my expectations, such as producing the "quiet coyote" with my thumb and ring finger, or clapping a particular rhythm that should be mimicked and the students use their actions and behaviors in an appropriate way to reform the actions and behaviors around them such as clapping back, or placing a "quiet coyote" in the air, in front of noisy peers. This works best with the steady and consistent use of key phrases, hand signals or conditioned responses which elicit the response the teacher is waiting for, and which prompts students to be self-aware, as well as recognize the behaviors of others.

Relying on students for help can also allow a student to easily modify answers, that is to say they don't have to admit to being wholly right or wrong because they are not depending on the peer for that type of instruction and redirection. When I have provided my students with a challenging maze and at first ask them to work alone, and then allow early finishers to help those that may be struggling, I encourage not the speed of accomplishment, or even

correctness, but more so the opportunity finishing presents to aid in others doing the same. I also make clear that helping a struggling student by feeding them the answers is not a healthy habit and causes the learner to struggle more in the future. In that way, the peer guide is an aid, who cannot be pressured into doing what is not expected of them, and in my hopes, alleviates the anxiety students have when most have finished before them. I emphasize that students are not the arbiter of all that is done well, or incorrectly, and truthfully, that's not a great attitude for the teacher to have about his or herself, either. I've found now that I am better able to pay attention to student social interaction; most students actually do implement scaffolding strategies to support their learning, such as building off what was previously known and applying it to new situations in a way they can best understand and they can do this with language that is more fluent to them when they are exercising a verbal exchange with peers. Students will not struggle with precise language and they will express themselves more comfortably, when they are not pressed to do so in front of the entire class and under perceived scrutiny. A student may say "the thing" or use unconventional grammar. For now, it is the way they relate and describe to one another features which may be out of their vocabulary range. Today, I perceive myself as a mediator as opposed to an authority at the head of the class; further, rather than viewing the students as fully formed, I consider them in constant stages of development.

I am not saying that exercising correct grammar is unimportant, and I do want them to understand the need for precision, especially in what they understand as the "definition" of a term or action. I also allow them to go as far as they can with an answer, especially as it relates to the ways in which they teach each other, until it needs instruction, also known as "leading." This same strategy parlays into the aspect of leading a student, through his or her own choice

words, to the correct answer by hinting and creating partial sentences whereby the student verbally fills in the answer (usually identifying the subject, or direct object in the sentence). It is also significant in language development that the student hears how he/she sounds to the teacher and to his/her peers, which means allowing ample time for students to instruct one another. As with the Instructions instrument used in FIE, assessing how well one's words communicate with others is a vital part of that self-critique.

The flexibility of adapting materials to form whole lesson plans for teaching was something I found in the Feuerstein Instrumental Enrichment Program. It best works in my occupational setting because we are primarily activity based not academic based. We do not have to adhere to a curriculum and are not responsible for assessing students on the answers they produce during or after a lesson—though we still may share our observations with parents as Aftercare highlights different aspects of the child's learning that may never surface in the general education setting. It is up to the staff how they choose to set up the students' time—there is no established criterion for developing activities and lesson plans day after day. In my opinion, the students need enrichment and engagement within the frame of the program, which provides a well-structured, activity based day for the student that is feasible given the skills of the staff, which should also develop each year professionally. My personal attempt with each activity is no longer to make sure the activity gets accomplished by each student. Now, it is to acknowledge students' individual needs and learning styles while meeting the standards and expectations of our Aftercare Program. I also often infuse my own interpretations of those expectations in to my programming because I need to be able to do what works best for me also.

Vignette 4: Changes in My Working with Parents

As an activity-based learning environment, After Care tends to provide a broad spectrum of projects and events for the students to participate in. It behooves the parents as well as staff members to work in a collective effort, given their diverse backgrounds to create solid programming comprised of mixed opportunity for learning and positive growth from a multitude of experiences offered within the constraints of the program. This feature also helps to define the program by highlighting its assets, however much they may change during the course of year. Although I cannot provide substantive feedback to parents about my perceptions of the child's current academic strengths and weaknesses, I can talk to them about what I see within our program in a social, emotional and cognitive framework, and I do often.

One primary example of how this has happened is through the coaching of my employer. She suggested to me that I learn to be more receptive not to the words my students' parents used but to their body language when speaking to me. There was a recurring pattern of crossed-arms and frowning which occurred when I approached a parent on more than one occasion. A pattern of response had developed wherein parents would automatically become concerned with what I might say about their child. I did not realize that parents did not want to know every time their child did something wrong. I thought to myself, if this was my child, I would want to know, to correct the behavior. Alas, it is mere speculation. I do not have children, so I really do not know how much I want to know, and how much I expect that schools should be able to manage and correct on their own, through their own resources. She suggested that I try to incorporate a balanced perspective, that I do not bombard them with long, heavily detailed passages about what their child was engaged in unless it was very serious, and even then, I needed to pare down the language and incorporate more questions as

to what the parents observed to offset the notion that my opinion was the final word. And, it worked. Parents started to smile more when they walked away from me. I paid attention to how I made them feel, and despite what they would say, their body language almost always indicated far more than their words. I contend though, that teachers NEED training in understanding body language. It is a form of communication which requires study if a person is to accurately and comprehensively assess what is said and what is meant at the time both are happening.

I find it necessary to maintain consistency of expectations at home and in school, and I call on parents to step up and make sure that what we advocate for in school, as long as it does not conflict with value systems and personal beliefs at home. This can only happen if I take the time to reflect on what I see and experience with my students, journal as a reflective practice about the changes in my classroom and the specific things I can do better to enhance my students' experience, regardless of whether they work, and to optimize resources, including the work of others, and my work from previous years, to keep students engaged in their own learning. If I can use something with my students, such as an activity that I know well, and have done many times before, I can focus better on their interactions, their zones of proximal development, and their personal social, emotional and cognitive landscapes because I do not need to worry as much about the management of student behavior, time, planning and what always occurs in the classroom, which is, the environment-altering component of the unplanned.

Conclusion

In this chapter, I have discussed the practices that I have most changed in terms of what I do differently in the classroom, especially regarding feedback. Not everything that I have discussed throughout the paper I have been able to implement. I have not given my students a 360 Personality Inventory, or even had access to their IQ scores. It does not entirely matter all that much to me anymore if the student is 95 or 125. I care that they are developing all around, and that I am helping to ensure that happens. I do believe in the zones of proximal development—that each student’s success should be marked by their different points of origin, academically speaking. IQ tests won’t reveal data which is as relevant as what I can find in a student’s detailed Individualized Education Plan. I take the intelligence theories which I have been exposed to throughout my own academic career, and, as they are consistent with the direction of the school I teach in, I make every attempt to infuse emotional, social, and academic learning into every day.

What I have also learned as a key element in Gardner, Sternberg, Binet and Goleman’s work is that to produce a comprehensive opinion on intelligence, one must be willing to incorporate multiple, and to the best of one’s ability non-conflicting, viewpoints on the development of the mind. One thing I appreciated about Sternberg, Gardner, and the Feuerstein Program, is that it is best to state, and really believe, there is no one absolute point of view which is the most beneficial to students. I have synthesized many perspectives on intelligence shared with me throughout the CCT program, balanced them with my own and exercised, over time, what I have learned about developing as an instructor and an individual. Utilizing what works best for me, is cardinal to my success as a teacher because I am aware of

the limits of my environment, which in many ways supports the Practical Intelligence Theory. At the same time, through studying the Multiple and Social Intelligence theories, I was better able to address my students through divergent methods, which aided in my ability to see the students as individuals, unique and deserving of diverse learning experiences.

My time in school and my work on this final paper has provoked a motivation in me to continue my path of self-improvement. CCT has taught me how central personal development is to professional development; how the two overlap, and none is likely to withstand time without true dedication and authenticity in the pursuit of positive change. Through learning about Terman and Binet I have discovered a basis for my early notions of intelligence, and why my home life encouraged certain aspects of cognitive intelligence, but did not honor as much other aspects of my abilities. Throughout undergraduate and graduate work, my sense of leadership and obligation in the classroom has emerged as I granted myself the same right to learn and be understood as I did eventually my students. The work I did with Feuerstein in particular has transformed the way I look at learning, the development of the brain, the necessity of correcting habits of thought, and the significance of diverse learning opportunities that appeal to the different potentials taking place under the surface of my student's work. I now see my role as crucial in my students' steps to understanding themselves in this world, and to making better decisions in their lives, short and long term. I am open with my students, I talk to them about what I know and how life can appear disjointed and isolated if you do not make a conscious effort to find the threads that bind us all together, as humans. I only believe now that the issues I faced in the past resulted from a lack of knowledge about the true meaning of teaching, and assumptions I let stay for too long, which hindered my own growth

and my ability to see the real value in what my students were doing in my classroom every day.

REFERENCES

- Feuerstein, Reuven (2006). *Creating and enhancing cognitive modifiability: The Feuerstein Instrumental Enrichment program*. Jerusalem, Israel: ICELP publications.
- Fisher, Roger & Shapiro, Daniel L. (2005). *Beyond reason: Using your emotions as you negotiate*. New York, New York: Viking Penguin Group.
- Gardner, Howard (1997). Multiple intelligences as a partner in school improvement. *Educational Leadership* 55 (1), 20-26.
- Gardner, Howard (2002). On the three faces of intelligence. *Daedalus*, 131 (1), 139-144.
- Gladwell, Malcolm (2008). *Outliers: The story of success*. New York: Hachette Book Group, Inc.
- Goleman, Daniel (1998). What makes a leader? *Harvard Business Review*. 93.
- Gould, Steven Jay (1996). *The mismeasure of man*. New York, New York: W. W. Norton & Company.
- Kolligian, John Jr. & Sternberg, Robert (1987). Intelligence, information processing and specific learning disabilities: A triarchic synthesis, *Journal of Learning Disabilities*, 20 (1), 8-17.
- Martin, David (2010). *Instrumental Enrichment effects on special-needs learners*. Unpublished manuscript, University of Massachusetts, Boston.
- Mitterer, John O. (2006). *Psychology: Modules for active learning*. Belmont, California: Thomson Learning, Inc.
- Reisberg, Daniel (2006). *Cognition: Exploring the science of the mind*. 3rd edition. New York: W.W. Norton & Company.
- Sternberg, Robert (1995). Testing common sense. *American Psychologist*, November, 50 (11), 902-927.
- Sternberg, Robert (1988). *The triarchic mind*. New York, New York: Viking Penguin Group.