BENEDICTINE PEDAGOGY THROUGH A CONSTRUCTIVIST LENS: CURRICULAR THEORIZING OF A HIGH SCHOOL MATH TEACHER TURNED COLLEGE PROFESSOR

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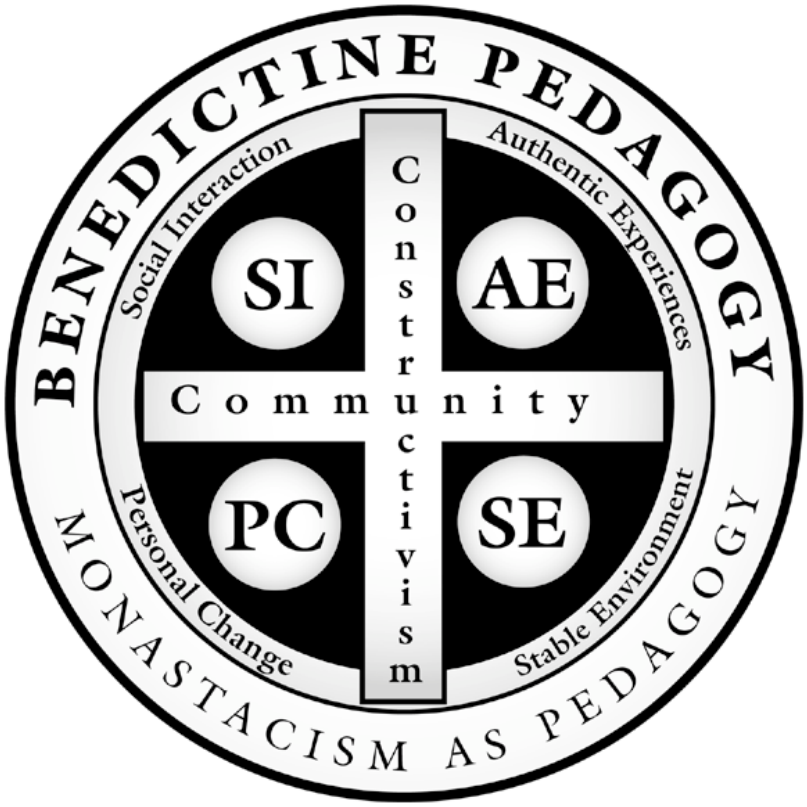

Figure 1. Conceptual Framework of Benedictine Pedagogy

ABSTRACT

BENEDICTINE PEDAGOGY THROUGH A CONSTRUCTIVIST LENS: CURRICULAR THEORIZING OF A HIGH SCHOOL MATH TEACHER TURNED COLLEGE PROFESSOR

This research is the product of blending two pertinent questions. The first question is: “What are the guidelines and behaviors that define a Constructivist classroom?” There have not been a great number of pedagogical tools that discuss and summarize concrete, observable Constructivist behaviors. The second question is: “Is there a unique form of Benedictine pedagogy?” Using curricular theorizing as a methodology, this dissertation analyzes the intersect of Constructivism and Benedictine values. It also attempts to define the Constructivist framework and provide examples of behaviors that describe Constructivist teaching. It then examines Benedictine values through the lens of Constructivist teaching behaviors. While aspects of Benedictine monasticism, as reflected in the Rule of St. Benedict, can be described as Constructivist, the blending of specific Benedictine values results in a framework representing a unique Benedictine pedagogy.

Dr. Norman Weston, Associate Professor, National College of Education, National-Louis University, was the dissertation adviser.

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My professional and personal persona, prior to my doctoral studies, was a collection of scattered jigsaw-puzzle pieces. Fortunately, as the result of interactions with specific people, I have started to put these pieces together to form a unified picture of who I am as a person and educator. There are so many of you out there that I will not be able to recognize individually. To those I do not specifically recognize, you know who you are and that you played a special part in my life. To these people I say, “Thank you.”

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Steve Leach, of Chattanooga, Tennessee, should write a book on how to be a friend. Steve is always there for me, even though he lives in a different state. Steve has

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CHAPTER ONE: INTRODUCTION

Purpose

I have often found myself in conversations with students and with faculty members who make this statement: “There is something different about Benedictine University, but I just cannot put my finger on it.” While Benedictine University (Lisle, Illinois) possesses a unique spirit and identity, that spirit has not been fully articulated in behavioral terms. As a faculty member of the College of Education, I realize that I contribute to this dilemma. I began (and continue) to ask whether I model unique Benedictine values and pedagogy for my students. I have examined my own pedagogy and have reflected on the question whether my classroom practice exemplifies a “Benedictine identity.” The purpose of this study is to examine the Benedictine tradition and the Constructivist philosophy in order to determine whether there is a pedagogy unique to the Benedictine order. This study will answer the question, “Is there a unique Benedictine pedagogy that can be described through the Constructivist lens?” The process of answering this question will contribute to the evolution and development of a Benedictine identity as related to educational goals.

This study will use curricular theorizing to examine Benedictine pedagogy through the Constructivist lens. While there has been material written on Benedictine pedagogy, there is not a great deal that discusses concrete/observable teacher and student behaviors. There have been writings on the relationship between Benedictine

monasticism and Benedictine education, but there has been very little written that translates monasticism's values and ideals into observable classroom behaviors. The literature on Benedictine education that does discuss pedagogy does not do so through any specific lens such as that of the Constructivist philosophy.

Rationale

The rationale for this study is the desire to develop a relationship between Benedictine monastic practice and Benedictine pedagogy.

My individual quest for developing a sense of the uniqueness of a private school education has run parallel with a situation that occurred during a North Central Association Accreditation visit to a Benedictine secondary school (Turner, 1992). Father David Turner relates the phenomenon of one administrator not being able to define and describe the specifics of the Benedictine identity and a Benedictine pedagogy when questioned by a member of the visitation team. He discusses the situation:

> A reflection on an interaction that took place a few years ago during a North Central Association visitation at Benet Academy may bring out what many in Benedictine educational institutions are trying to identify. After reading the "educational mission" statement at the beginning of the academy's self-study, one of the visitation team confronted the assistant principal wanting to know just what this "Benedictine spirit" was all about. "How about some concrete behavioral statements," the visitor demanded. (p. 1)

While the administrator could not answer the question as it was asked, the visitation team member concluded at the end of the weeklong visit that there was something different

about the school. We thus have a basis for examining the quest to articulate a specific Benedictine pedagogy.

The quest to develop a unique Benedictine pedagogy has its roots in the eighteenth century. A Benedictine monk, Magnoald Ziegelbauer (1754), attempted to construct a history of Benedictine education from the time of Benedict at Montecassino (c. C.E. 530) through to his own day in the 18th century. In this famous four-volume work, Ziegelbauer attempted to present a summary of the studies, schools, and libraries found in Benedictine monasteries over the centuries and located throughout Europe. This work presents some insight into the educational practices found in the various schools conducted by various Benedictine monasteries.

In a more contemporary age the desire to create a distinctive Benedictine pedagogy came when the Rev. Patrick Cummins, O.S.B., asked the question, "Is there a distinctive system of Benedictine pedagogy? If so, what is it?" (Cummins, 1920, p. 31). He answers that question by stating that the Rule of Benedict contains the distinctive system of Benedictine pedagogy. This study is the realization of Cummins' vision by blending Constructivist principles and behaviors with the Benedictine values found in the Rule of St. Benedict.

The process of describing a unique Benedictine pedagogy is part of a larger process. That process is the development of a Benedictine identity in various schools conducted by the Benedictine order. In 1927 American Benedictine monks were calling for the formalization of a Benedictine identity (Milde, 1927). Father Milde, in discussing means for improving the teaching of religion, advocates a continuous exchange of ideas

among religion teachers and, in doing so, advocates the need for a Benedictine identity and pedagogy:

> Why can't every branch of our work have its interchange of ideals and experiences, not once a year but every two weeks or at least every month? It would require comparatively little editing to arrange for printing or mimeographing a series of letters answering a certain question on a certain topic. What a wonderful incentive to active study if every member of the Congregation had this opportunity of expressing his views! If there be a unique Benedictine tradition hiding itself somewhere in our activities, such a literature would soon crystallize it. (p. 86)

The phrase "if there be a unique Benedictine tradition" indicates that almost 80 years ago the search for a Benedictine identity and pedagogy was already an issue. Milde continues the call for a Benedictine identity later in the same article when he writes, "We shall soon see the broad currents of a united thought, swelling with distinctive aims, and policies, and courses and methods, truly Benedictine" (p. 89). The use of words such as "unified thought" and "truly Benedictine" indicate that Milde was calling for a Benedictine identity and pedagogy.

While Milde called for a "Benedictine approach" to teaching religion, there evidently was not a lot of movement in this regard. Four years later, the desire to create a "Benedictine approach" again surfaced. Desmond (1931) discusses the possibility of designing a religion course that is distinctively Benedictine. He discusses the pros and cons of such an endeavor:

> In regard to the prospects and possibilities of the project, it should be stated at the outset that it would be rash to attempt to forecast the exact content or methods of instruction in a religion course which intends to take into account the findings in the various fields of knowledge and apply them to the teaching of religion according to the psychological method of St. Benedict which considers the individual with his problems as part of a family perfecting itself for heaven. Such an attempt would be especially rash in view of the fact that work on factual data is not far enough advanced to form the basis for more or less safe conjectures. There are, however, some objectives that can be achieved and can be looked upon as prospects and possibilities. (p. 21)

Here Desmond acknowledges the need for a specifically oriented Benedictine religion course, but he also acknowledges the hurdles that must be cleared. Significant is the fact that he believed certain goals and objectives should be examined. This quote suggests that Milde's call four years earlier had not been accomplished.

Well into the eighties the process of formalizing a Benedictine pedagogy had not been achieved. Abbot Jerome Theisen (1982) discusses the reasons for the need to relate Benedictine monasticism to pedagogy in the Benedictine school:

> But in fact Christian monasticism, while often assuming a formidable and world-denying stance, has actually fostered education and affected the culture in which it thrived. The influence of Christian monasticism today is not extensive but in the Middle Ages the monastic movement developed a form of life that affected many peoples in their language and customs. Benedictine monasticism directs the lives of the monks, and their colleagues who are involved in the liberal arts and

> professional education. Benedictine monasticism stands for certain values that get communicated, at least to some extent, to the monks who live the monastic life and to others who seek learning in a monastic setting. (p. 113)

Later, in the same article, the author goes into specific details on how to make Benedictine pedagogy more concrete:

> Three terms traditionally characterize our Benedictine universities and colleges: liberal arts, Catholic, and Benedictine. I would like to reflect on the term "Benedictine." In this study I am concerned about the way in which values from the Rule of Benedict and from the tradition of Benedictine monasticism get translated into the educational processes of the university or college. (p. 114)

Abbott Theisen's 1982 call for the transformation of monasticism into pedagogy indicates that Milde's call back in 1927 had not been heard to the point of developing such pedagogy. This call also forms the superstructure for this study. This study begins the process of translating aspects of Benedictine monasticism into a Benedictine pedagogy.

Studies done by Benedictine women also indicated that there was a need to identify the elements that make up a unique Benedictine educational experience. Sister Jeremy Hall (1982) discusses the work of Sister Debora Wilson (1969) who studied the essence of Benedictine higher education. Wilson concluded her study of Benedictine higher education over three decades ago with the statement that "there is, in the contemporary Benedictine college, little or nothing at all that marks it as Benedictine (p. 208).

In the spring of 2004 the Academic Quality Improvement Program (AQIP) document for Benedictine University (constructed according to the guidelines of the North Central Association of College and Schools) outlined the primary strategic goals and secondary goals. One primary strategic goal is "Developing an Understanding of What it Means to be a Catholic University Grounded in the Benedictine Tradition." This goal indicates that the Benedictine educators are still searching for a Benedictine identity for their schools.

The movement, in general, for religious orders running schools to connect their religious values to pedagogy is not unique to the twenty-first century. For example, the Society of Jesus (Jesuits) published a small booklet that describes, outlines, and structures pedagogy in the Jesuit classroom (Metts, 1991). This book sets out and explains the relationship between the four hallmarks of Jesuit spirituality and Jesuit education and pedagogy. Those men who belong to the Congregation of the Mission (Vincentian Priests and Brothers) have also articulated the characteristics of a Vincentian education as would be found in a place like De Paul University in Chicago (Sullivan, 2003).

While the Benedictine order has a long and varied history in education, the order has not formalized its pedagogy. Throughout the twentieth century and into this century, the essential elements of Benedictine pedagogy have not yet been fully explained. The Benedictine order has not formalized their pedagogy as such, not because of lack of commitment to do so, but because of the lack of a centralized structure of government within the order. Benedictine monasteries, whether of men or of women, are autonomous units and are not part of a unified system that has a central governmental administration. Thus, there is not an engine to drive the centralization of pedagogy in the Benedictine

order, as is found with the Jesuits who have central offices in Washington, D.C., for both their Jesuit-run high schools and colleges or universities. This study, looking through the Constructivist lens, examines and attempts to formalize Benedictine pedagogy. The result of this study is a collection of characteristics and descriptors that structure and define a unique Benedictine pedagogy. It is important to note that this study, though it will attempt to connect Benedictine monasticism to pedagogy, it is just the beginning of a continual process.

CHAPTER TWO: METHODOLOGY: CURRICULAR THEORIZING

Overview of Curricular Theorizing

As stated in the previous chapter, the purpose of this study is to determine, through the lens of Constructivist philosophy, whether there exists a unique Benedictine pedagogy that can be used to structure classroom practices and curriculum at Benedictine schools, whether secondary or college/university. The purpose is not to verify a theory concerning Constructivist pedagogy, but to examine whether such pedagogy exists and to describe and examine such pedagogy. The methodology of this study is in the spirit of the reconceptualists. William Pinar (1975) states that "the reconceptualists attempt to understand the nature of educational experience" (p. xiii). This study examines and provides a platform for understanding and experiencing a unique Benedictine pedagogy.

The methodology that this study uses is curricular theorizing. Curricular theorizing encompasses both theory and practice. The concepts of theory and practice denote the existence of two separate activities (Marshall, Streedain, and Zavagno, 1992). In discussing the perspectives of theorists and practitioners, Marshall et al. write: "While I *study* new ideas, they're busy trying to make them work" (p. 269). However, this study uses theorizing in which theory and practice are seen not as separate entities but as two processes that flow into each other. William Schubert (1992b) presents a definition of curricular theorizing that does not separate theory and practice but sees a flowing of experience and theory:

> The term, I felt, enlivened the work of curricular theorists, taking away the necessity of producing theory, which carries a more brittle and dusty image of something finished and on the shelf, perhaps ready to plug into a curricular problem to solve it technically. Theorizing was a kind of reflection, an image of the need for continuous reconceptualizing of the flow of experience. (p. 238)

Schubert's phrase "reconceptualizing the flow of experience" can be thought of as creating a new vision of what teaching can become. This is in accordance with the views of Huenecke (1982). In discussing curricular theorizing, Huenecke writes, "Theorizing strives to enlarge vision, to present new possibilities and to bring deeper understanding" (p. 290). Schubert's and Huenecke's perspectives hold that theorizing is the continuous flow of experiencing teacher practice, reflecting on it, and creating a new vision of what could be and new practices.

Schubert (1992a) personalizes teacher theorizing as reflecting on one's actions:

> As a teacher my personal theorizing about teaching is intricately interwoven and embedded within me. As I engage in experiences and reflect on them, I reconstruct my theory, Thus, my theory is in a state of continuous revision. It is revised by all of the ways of knowing, the personal versions of epistemological bases, that are part of my way of dealing with the world: direct experience, intuition, empirical investigation, reflection, revelation, and so on. (pp. 262-263)

Schubert's use of the phrase "is intricately interwoven and embedded within me" bears some comment. He is stating that one's theorizing becomes part of one's existence. In the same article, he writes, "practice had already contributed substantially to the theory I was becoming" (p. 236). For Schubert, the theory and strategies that one practices

contribute to the identity of the educator. I certainly can connect to this. I have often been referred to as “that teacher who makes us write,” or “the teacher who teaches applications.”

Schubert’s and Huenecke’s perspectives on curricular theorizing can be rephrased as follows: Curricular theorizing is the continual process by a practitioner who uses his total knowledge base to reflect on his teacher experiences, actions, and effectiveness in order to modify these actions and create a more effective theory, strategy, and vision that is then applied to new situations.

Curricular theorizing, as I have defined it, is not necessarily a new concept. Tanner and Tanner (1975) call for a curricular process that operates using modes other than just theory. In discussing the views of Joseph J. Schwab (1978) they write:

> Schwab contended that the crisis in the curriculum field was a result of undue reliance on theory. A renascence of the field would come about only if energies are diverted from theoretic pursuits to three other modes of operation: the practical, the quasi-practical, and the eclectic. (p. 92)

Thirty years ago curricularists were calling for a process that used theory and practice in a unified structure. The curricular theorizing model used in this study represents one such attempt. The following paragraphs describe and construct the model of curricular theorizing used in this study.

The Decision to Use Curricular Theorizing

As a young teacher I never really bought into the concept that a separation exists between theory and practice. This was something that I intuitively possessed. I did not get up in the morning and purposely decide to reject the separation between theory and

practice. I suspect that it had something to do with the fact that in addition to classroom teaching I was also coaching basketball. As a coach I had my game plan and theories and strategies that I wanted to employ during the game. During and after the game I would analyze how one could make this happen. During the game I would suggest adjustments to the changing conditions of the game. As coaches we would not throw out our theories and strategies, but we would try to understand why things did and did not happen and then create the situations in which our theories and strategies would be successful. It must be noted that coaches develop their own theories and strategies by discussing ideas with other coaches, reading books written by other coaches, and reading articles written by other coaches. In other words, a coach learns from other coaches (practitioners) and not from basketball "theorists." There were no basketball "theorists," but only practitioners (coaches) who, in a continuous and flowing manner, used their experience to modify their existing strategies and theories and then applied their new strategies in games and practices. A "ripple effect" of this was that of *envisioning* a new playing personality for the team. We, as a coaching staff, created a vision of next year's team as one being ball-control oriented and being a half-court defensive team as opposed to being a full-court defensive team. All coaches assume the role of theorist and practitioner who come to the game with a game plan, strategy, and vision for their team and continuously modify these through the process of reflecting on their experiences.

Unknowingly and unwittingly, I carried this attitude with me into my classroom. I had my Piaget book in my hand, and I attempted daily to apply his theories. A cognitive theory was not a separate entity for me but it was a part of my lived experience. I believed that I must walk into the classroom with some sort of theory that would guide

my actions, and then I would analyze what did and did not work. I would, for example, adjust my examples of the concrete operational level version of the concept that I was presenting. I would not throw out Piaget's concept of concrete operational thought but rather adjust how I would use it. Like my actions as a coach, I would constantly work on adjusting the conditions or theory so I would get the results that I desired. While I did not consciously carry my coaching life into the classroom, the reality is that my coaching life and teaching life were interrelated. As a teacher I was continually adjusting my theories and classroom environment in order to get desired results: student learning. Without realizing it, I was involved in curricular theorizing. Ross, Cornett, and McCutcheon (1992) shed light on this when they write, "Teaching and curriculum making are viewed as complex, context-bound professional tasks. Teachers must select and organize multiple factors in ways that provide educative experiences for particular groups of students in particular settings" (p. 14). Just as a coach constantly organizes different factors in order to produce a winning experience or environment, a teacher who is using curricular theorizing is continuously doing the same thing. Just as a teacher who practices theorizing has that process embedded into his identity, a coach has his theories and strategies embedded into his identity. I was known as the coach "who uses the high-low post offense;" a good friend was known as "the match-up zone coach."

This phenomenon played into my teaching. I rapidly became known as the teacher who used physical examples to explain geometrical concepts, and this developed into my own vision of the ideal teacher. I created a vision in which I *started* each lesson using a physical example of the concept I was about to discuss. As a young teacher and coach I was involved in the process of curricular theorizing, and in this study I use aspects that I

discovered in my doctoral studies to create a model of curricular theorizing that examines the concept of a Benedictine pedagogy through the Constructivist lens.

A Model of Curricular Theorizing

The discussion that follows creates and describes the model of curricular theorizing that will be used in this study. This section uses the paraphrased definition of curricular theorizing from the previous section. I will repeat it here for the sake of clarity: *Curricular theorizing is the continual process, by a practitioner, of using his total knowledge base to reflect on the effectiveness of his actions in order to modify these actions and create a more effective theory and strategy that is then applied in new situations.* This definition implies that curricular theorizing is involved with the teacher's experience as he practices his profession.

Experience

The concept of experience is an important feature in developing the model of curricular theorizing that this study uses. Experience, in terms of curricular theorizing, means more than just recapping what has happened in the past. Dewey (1916) presents a description of experience that is congruent with teacher theorizing. While Dewey in the following quote is discussing the experience of children in school, his ideas can be applied to teacher theorizing as well:

> Experience is no longer a mere summarizing of what has been done in a more or less chance way in the past; it is a deliberate control of what is done with reference to making what happens to us and what we do to things as fertile as possible of suggestions (of suggested meanings) and a means for trying out the validity of the suggestions. (p. 273)

For Dewey the concept of experience includes the activities of reflecting on, controlling, and predicting events. Applying this to curricular theorizing results in the idea that the teacher is involved in a two-way interaction with the class environment. This also reflects on this interaction by modifying his strategy, vision, or plan. Dewey, however, does not stop here. His definition of experience goes one step further. While it is necessary for the teacher to reflect on his two-way interaction in the classroom, Dewey's concept of experience has one more component, that of action:

> The analysis and rearrangement of facts which is indispensable to the growth of knowledge and power of explanation and right classification cannot be attained purely mentally—just inside the head. Men have to *do* something to the things when they wish to find out something; they have to alter conditions. (p. 275)

Integrating Dewey's concept of experience results into the previous definition of curricular theorizing results in this modified version:

> Curricular theorizing is a continual process where the teacher acts on his theories, strategies, and vision in a two-way interaction with the environment, reflects on the outcomes of these interactions, and then modifies his theories, strategies, and vision in order to apply them in the next situation.

The Structure of Curricular Theorizing

The organizing element of curricular theorizing is the structural concept (Grove & Short, 1991). In writing about curricular inquiry Grove and Short say, "The relationships identified among those elements are conceived and defined through structural concepts" (p. 211). For Grove and Short, all teacher action and reflection are based on the structural concept. The structural concept is the intellectual scheme that defines and structures all

the elements in an educator's philosophy, pedagogy, and paradigms. A structural concept is a concept or set of concepts that acts as a framework for the curricular scheme. In explaining Tyler's rationale, Grove and Short comment: "The *objective* is the structural concept of the scheme in that it provides the criteria for selecting and relating all other elements" (p. 212). Tyler (1969) discusses how his concept of "objective" structures his rationale. He writes, "These educational objectives become the criteria by which materials are selected, content is outlined, instructional procedures are developed and tests and examinations are prepared" (p. 3). Tyler's rationale is organized around the structural concept of a learning objective.

Schubert (1994) presents two other examples of a structural concept. The first example is that of Decker Walker's (1971) design: "He argued that curriculum design proceeds through three phases which he calls platform, deliberation, and design" (p. 27). Schubert then describes and discusses how other concepts in Walker's model are derived from the structural concepts of platform, deliberation, and design. Schubert also discusses Schwab's design of curricular inquiry. Schwab frames his model on what he referred to as "four commonplaces:"

> Each of these commonplaces affects the others and their impact on the outlook of students. Thus, if one seeks to understand and monitor the curriculum-in-practice, an appropriate design might be to construct a four by four matrix that depicts the resultant sixteen interactions among the four curricula commonplaces. (p. 28)

Posner (1995), in reviewing Schwab's model, discusses how the commonplaces are organizing elements: "Most curricula are organized on the basis of principles related

to only one of the four commonplaces" (p. 134). Here Posner is stating that any one of the commonplaces can be used to organize a curricular inquiry.

One of the structural components of this study that will be addressed in chapter 4 is five epistemological considerations that I have developed during my studies at National-Louis University. These considerations are:

- The nature of knowledge
- The measurement of knowledge
- The validation of truth
- Relations between meanings
- The role of language

The Benedictine values of hospitality, a search for God, community, the development of each person, balance, stewardship, and academic balance form a second set of structural components that will be addressed in chapter 5. It is not strange that members of the Benedictine Order have been involved with education (Milroy, 1984). Benedict, in organizing the monastery, expresses the conviction that "God not only commands, but also teaches" (p. 2). In fact, the purpose of a monastery is to serve as a school (Fry, 1981). Benedict states that the monastery is to be "a school for the Lord's service" (p. 165).

Father Dominic Milroy (1984) believes that the Benedictine monastery innately possesses an educational mission. A monastic school does not give an education mission to the monastery, but rather it is "the educational instinct already inherent in monasticism which makes the presence of a school something perfectly natural" (p. 1).

These two structural concepts form the foundation of this study. The epistemological considerations are used to derive the tenets of Constructivism. These tenets are broad statements that describe and explain how people construct knowledge and they also describe and explain how a learning environment operates. These tenets are then used to derive specific student and teacher behaviors that describe, explain, and control a Constructivist pedagogy/learning environment. This theorizing study blends these Constructivist behaviors with Benedictine monastic values to create a uniquely Benedictine pedagogy that is viewed through the Constructivist lens.

The Language of Curricular Theorizing

Language is an important component in curricular theorizing. In the setting where the theorist and practitioner have separate roles, they will not necessarily speak the same language. Klein (1992) states that practitioners use a different language than that of those who focus on theory. He writes:

> Theorists use different languages from practitioners . . . and the language of the theorist is not readily understood by the practitioner. . . . Further, because of the reward structure of universities, theorists publish their work in scholarly journals that are not readily accessible to or read by practitioner. . . . Thus, theorists talk primarily to other theorists as their major audience. (p. 193)

With the curricular theorizing model the theorist and the practitioner are the same person and thus will and should speak the same language. The following discussion examines the language of the curricular theorist.

It is the task of the curricular theorist to determine the types of language that he will use. Dwayne Huebner (1975), in discussing how the curricularist uses language,

writes: “It seems to me that one of the tasks of the theorist is to identify the various situations in which we use language, and to find categories that describe the various functions our language serves in those situations” (p. 253). Huebner discusses how the curricularist *describes* curricular phenomena, *explains* how curricular entities occur and how they relate to each other, and *predicts, controls, manipulates.* In predicting curricular phenomena, the theorist ties together descriptive and explanatory language. This study incorporates Huebner’s model of the uses of language.

The Curricular Theorizing Cycle

The model of curricular theorizing that this study uses is a continuous cycle. The teacher comes into the classroom knowing what concepts, pedagogy, and routines he wants to implement. He then acts on these as he interacts with the class environment. The class environment includes students, peers, administrators, and parents. As the teacher interacts, he actually lives his structural concepts, pedagogy, and routines. These define his professional identity. The teacher reflects on the outcomes and grows in understanding of his practice and theory, and he then modifies what is necessary and prepares a new plan of action. The cycle then repeats itself. I have developed the diagram on the next page (Fig. 2) that depicts this model.

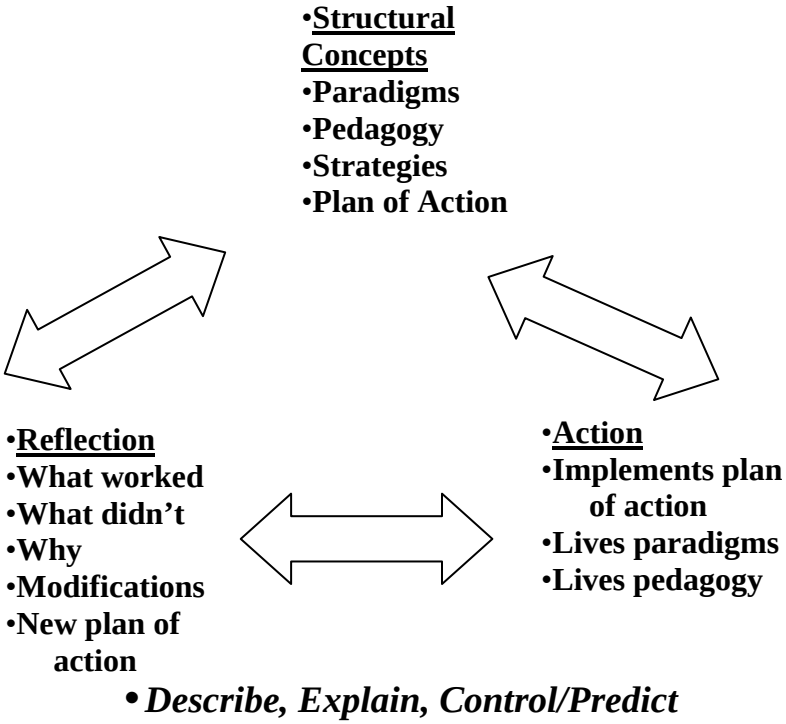

Figure 2. The Curricular Theorizing Cycle

This study is a discourse on the reflection component of the cycle. I reflect on my previous experiences in the classroom and with the Constructivist philosophy, and I then create new strategies, paradigms, and new visions. The next section describes this process in detail.

Outcomes

This curricular theorizing study discusses and explains paradigms and practices that represent Benedictine pedagogy examined through the Constructivist lens. The results are in the form of teacher behaviors, student behaviors, classroom descriptors, and the relationship among all three. Specifically, the outcomes are as follows:

- Tenets of Constructivism
- Behaviors in the Constructivist classroom
- Constructivist behaviors that are unique to Benedictine pedagogy

The last component is behaviors that must be present in a teacher's practice in order for that practice to be called "Benedictine." They will be referred to as "Hallmarks." These outcomes will contribute to the development and understanding of the Benedictine identity.

Definition of Terms

This section defines names and terms in order to clarify their use in this study.

Benedict — Catholic saint and founder of the Benedictine order. He lived from C.E. 480 to 547 in Italy.

Benedictine — When this word is used as a noun, it can be applied to any man or woman who has joined a Benedictine monastery; when used as an adjective, it is used to describe some element of Benedictine life, e.g., Benedictine pedagogy.

Constructivism — A philosophy that stipulates that knowledge is a subjective creation of the learner and that the purpose of knowledge is to find different perspectives from which to express itself and to continuously reorganize itself. It also holds to the precept that no one has the ability to attain the level of absolute truth.

Curricular Theorizing – The methodology that is used in this study. It is a continual cycle of interactions and reflections in which the teacher engages in a two-way interaction with the class environment, reflects on the interactions, and creates or modifies a new strategy, a new vision, or new practices.

Hallmarks — Behaviors that are formed by synthesizing Constructivist principles with Benedictine values.

Problem-Based Learning — (PBL)— Both a curricular and a pedagogical organizer which is centered on an ill-defined, messy problem.

Rule of Benedict. —Guidelines written by Benedict (c. C.E. 530), that direct the lives and practices of the monks who are the members of individual Benedictine monasteries.

Structural Concept — The intellectual scheme(s) that defines and structures all the elements in an educator's philosophy, pedagogy, and paradigms. It is the framework for the curricular scheme. In this study the structural concepts are the five epistemological considerations and the Benedictine values.

Tenets of Constructivism — Principles that structure the translating of Constructivism from a philosophy into pedagogy.

CHAPTER THREE: HISTORY OF SAINT BENEDICT AND THE BENEDICTINE ORDER

Benedict

Though his legacy, through the Benedictine order, has lived on for almost fifteen hundred years, there is not a great deal that we know concerning the personal life of Benedict of Nursia (de Waal 2001; Fry 1981, and McCann, 1958). McCann discusses the challenge of writing the biography of Benedict:

> The task would be no easy one even if we had full and accurate historical record of the details of his life; but it is made infinitely more difficult by the serious defect of such historical information. For what is the situation? There are two documents, and two documents only, which may be used by the biographer, namely the famous Rule for Monks, and the second book of the Dialogues of St. Gregory the Great. (p. 8)

The "famous Rule" that McCann refers to is the Rule for monasteries that Benedict wrote. It is known today as the *Rule of St. Benedict*, and it presents the guidelines that Benedictine communities have followed for these many centuries. In the Western world, it is the oldest extant monastic rule that continues to be used in our contemporary world (Daniels, 1997). McCann claims that although "it may tell us about the mind and practices of St. Benedict, it tells us nothing about the actual course of his life" (p. 8).

The second source, the writings of St. Gregory, also has its limitations (Fry, 1981). In discussing Gregory's writings about Benedict, Father Timothy Fry says, "Clearly this 'Life' is not a biography in any modern sense of the term. The author's purpose is not primarily to tell us what really happened nor to set events in their chronological order" (p. 75). While the information about Benedict as a person is not plentiful, there is enough to paint a partial picture of the man.

Benedict, born in C.E. 480 in the Italian town of Nursia (present-day Norcia), lived in a troubled world. The Roman Empire, seventy years earlier, had fallen, and the invasion of barbarians had rendered the empire a shadow of its former self. The Catholic Church was also experiencing discord. In discussing this de Waal writes that the church was "not only suffering through wars and political disorders, but split theologically, particularly on the question of grace" (p. 15).

McCann and deWaal provide us with some information concerning Benedict's early years. His parents were free landowners, and they also had a daughter, Scholastica, claimed by Gregory to have been his twin. Benedict went to Rome, most probably in his late teen years, to study "liberal arts." In those days it was customary for a Roman boy to be accompanied by a "pedagogue," who was frequently a Greek slave. A "nurse," however, accompanied Benedict. McCann believes that, while his family may have been somewhat "well to do," they could not afford the traditional male tutor.

Benedict left Rome for Enfide (now Affile). There are different perspectives concerning his purpose and activities. One account stipulates that he stayed in some annex of the church and was charitably entertained and taken care of. Another perspective ascertains that Benedict, while at Enfide, commenced his pastoral studies.

Benedict left Enfide and went to Subiaco where, for approximately three years, he lived the life of a hermit in a cave. Though he lived a secret life of prayer and contemplation, his reputation eventually spread. He left Subiaco at the request of a group of monks to head their monastery, though they eventually proved to be "false monks." Benedict's vision of his role as abbot was in direct conflict with the vision held by these monks. Hilpisch writes, "But they had their own idea of an abbot: they saw him as a teacher and spiritual father, but not as their lord and lawgiver" (p. 12). Benedict returned to his cave in Subiaco and began to form his vision of the monastic life. He was joined at Subiaco by disciples, and he eventually established twelve small monasteries that were scattered close by on the hillside. For each of these monasteries, Benedict appointed a dean to be over them.

Around 528 or 529 he took some of his monks to Montecassino. Here, he "left his mark." Esther De Waal (2001) writes, "After destroying a pagan shrine he built his new monastery in its place, and here he remained for the rest of his life" (p. 16). It is at Montecassino that he earned the reputation of being a holy man, and the Rule came into existence. Turner (2000a) states that the Rule "is recognized for its abiding influence in the history of Western civilization mainly as 'wisdom literature' rather than as legislation" (p. 287). Tradition holds that Benedict died on March 21, 547.

The Benedictine Order and Education in the United States

It is not surprising that the Benedictine monks who came to the United States included education as part of their apostolic work. With the immigration of German people to the United States came the opportunity to evangelize them (Turner, 2000b). Father Turner discusses how Boniface Wimmer (1809-1887) left Bavaria and founded St.

Vincent Abbey in Latrobe, Pennsylvania (1846). The idea of being involved in education was readily accepted by the pioneering monks. Father Turner writes, “Any apostolic work that supported the evangelizing mission was permissible: teaching (grade school, high school, college or seminary)” (p. 1132). Rippinger (1990) also points to the notion that education was a central component of the Benedictine mission in America. He discusses how the Benedictine mission to German immigrants naturally gravitated to education:

> An obvious help to the Benedictines in establishing their educational apostolate was the affinity that had always existed between the German people and the school. More than any other single ethnic group in the United States, the German-Americans saw the school as the keystone of their faith community. To build the school first and the church afterward was a common rule of thumb that conveyed their priorities. (p. 117)

For the German immigrants, Catholicism and schooling went hand in hand. Rippinger also sees this idea blending “into a more ancient tradition of monastic education that the Catholic Church over many centuries had come to expect of Benedictines” (p. 117).

Even though the German immigrants reacted favorably to the Benedictine schools, there were some major problems occurring. One major problem was that of language and culture. Rippinger discusses the dichotomy between one train of thought wishing to maintain German culture and language, and another train of thought that wanted children to learn American values. While this controversy eventually died out around 1893, there was another problem arising. While Benedictine schools did foster

moral, spiritual, and religious development, these schools were losing their ethnic parochialism. What was the reason for this? One explanation, according to Rippinger, was that "the school was considered little more than an adjunct to the monastery" (p. 122). Rippinger goes on to claim that the schools did not have enough qualified faculty and did not have a comprehensive curriculum.

In reaction to this reality, several events took place. In August of 1899, all the Benedictine colleges had a meeting at St. John's Abbey, Collegeville, Minnesota. One result was the consensus that classical studies should be offered as the basic component of collegiate education. A year later, nine representatives of Benedictine colleges decided to fix the cycle of commercial courses for four years (roughly equivalent to contemporary high school education), and to fix the cycle for the classical course at eight years (this would be equivalent to contemporary high school and college studies).

These two meetings were just the beginning of the professionalism of Benedictine education. In 1898 Abbot Peter Engel of Minnesota sent his monks to such institutions as Johns Hopkins, Columbia, and the University of Minnesota. St. Procopius Abbey, before World War I, sent some members of its community to the University of Illinois and the University of Chicago. When canon law made this difficult (the 1918 Code of Canon Law frowned on religious men and women attending "secular" universities for advanced study), a summer program for teachers was begun at St. Procopius College, Lisle, Illinois, in 1921 and 1922. Lack of support from many of the monasteries brought this program to a quick end.

Not only did Benedictine schools professionalize their individual members, they tried to professionalize themselves by forming a united group. Members from a variety of

monasteries formed the National Benedictine Educational Association (NBEA). This organization met annually from 1919 to 1942. In addition to the meetings, the proceedings were published. After World II there was a renewal of monastic scholarship, and in 1948 the American Benedictine Academy was organized to replace the NBEA. The Academy continues to meet biennially and they publish a scholarly journal, *The American Benedictine Review*.

As American society changed, so did the demographics of the people that Benedictine schools served. The demand for monastic "colleges" of the nineteenth century, according to Rippinger, was on the decline. Rippinger claims:

> Numerous sociologists of the post-Vatican II Church have charted this change, showing how the sons and daughters of immigrants who had sought admission to the elementary schools and monastic-style "colleges" of the nineteenth century, were, by the second half of the twentieth century, transformed into an upwardly mobile stratum of American society whose socio-economic ranking and educational aspirations were at the highest levels. (pp. 128-129)

Rippinger also states that a new network of Benedictine institutions appeared. Included in this new network were coeducational colleges, coeducational secondary schools, and specialized theological seminaries. Today, in the United States and Canada, there are fourteen colleges and universities and five seminaries that are run by the Benedictine order, in addition to a large number of high schools..

Personal History with Benedictine Education

My history with Benedictine education goes back to the days when I was a high-school student. During my senior year my parents took me to visit different college

campuses. My father "gently" insisted on visiting one campus in particular: St. Procopius College in Lisle, Illinois. This college later developed over the years into Benedictine University, including a wide variety of graduate programs including some at the doctoral level. Since my father had gone there for two years before World War II, it seemed natural for him to want me to go there, and I dutifully went for the visit. Though it was a pleasant visit on that fall day, I wanted to be "my own man," and I decided to go to St. Norbert College in De Pere, Wisconsin. This experience was somewhat similar to going to a Benedictine college because the Norbertine priests who run it live a life that is somewhat similar to that of Benedictine monks. I certainly was cognizant of the potential influences of the monastic (the Norbertine abbey's) life on the student body. Even at this point in my life I realize that those priests influenced me greatly, but I just cannot put my finger on how they did it. I joined the College of Education at Benedictine University as a full-time member in June of 2003. This event signaled a renewal of my involvement with private institutions. As a product of private elementary, secondary, and postsecondary schools, I have given much thought to the difference between private and public school education. As a teacher in both private and public schools, I have reflected on what makes a private school education distinct from a public school education. I have renewed the process of asking that question for over one year now. I have extended my question from how my St. Norbert education influenced me to how the Benedictine order can influence the students at its universities. I am continually asking myself the following questions:

- Why would a student spend the money to attend Benedictine University when he could attend a public institution?

- What makes a Benedictine education different from a public school education?
- What makes a Benedictine education different from an education at other Catholic institutions?
- How do I and other instructors at Benedictine University differ from instructors at public institutions?

CHAPTER FOUR: CONSTRUCTIVISM

Constructivism and the Learning Process

Constructivism is actually a philosophy and not pedagogy (Airasian & Walsh, 1997; Fosnot, 2005,). The Constructivist philosophy is a description of knowledge and not a prescription for learning. Airasian writes, “Although constructivism might provide a model of knowing and learning that could be useful for educational purposes, at present the constructivist model is descriptive, not prescriptive” (p. 444). There are many definitions of Constructivism (Fosnot& Dolk, 2001; Gabler & Schroeder, 2003; Henson, 2004; Schwandt, 2003; Shapiro, 2002; von Glaserfeld, 2005), but they all adhere to the following characteristics:

- People of all ages do not discover knowledge; rather they construct it or make it.
- People create knowledge by relating or connecting it to their previous knowledge.
- Learning involves active cognitive activity and cognitive restructuring.
- People use personal experiences to create knowledge.
- Cognitive growth is stimulated when people are confronted with practical or personal problems that create cognitive disconnects.

Personal History with Constructivism

My personal history with Constructivism runs parallel to the different roles I have held in my adult life. Each one of these roles has contributed to my history with Constructivism.

As a parent I have witnessed the Constructivist philosophy in action with my son. As a two-year old my son knew what a "choo-choo" was, and he also knew what a truck was. One day at O'Hare airport we saw a small tractor pulling the carts filled with luggage. My son spotted this and immediately said, "truck-choo-choo." Despite my sincerest attempts, I could not convince my son that this was not a real train. While in flight another incident occurred that has led me to believe that people construct their own understandings. As we were on final approach, we were going over some highways and we saw many trucks. My son said, "baby cars", and despite my best efforts (over the next two days) I could not convince him that the cars he saw were not "baby cars."

As a teacher I have, for over thirty years, experienced the phenomenon of people creating their own knowledge. I would, very often, check student notes at the end of the class, and I was amazed at how I taught "so many different classes." As a young teacher I would go over the same geometry proof again and again in class and then put the same problem on a test the next day. Not only did many students not come close, many of my better students got it wrong. Since I had "given" them the proof, I could not understand how they got it wrong. I remember saying to another teacher, "I gave them the answer!" Another theme that I have encountered is that of using prior experiences to create knowledge. For years I would tell, demonstrate, and "give the rules" for multiplying out $(a+b)^2$. Over the years I have been very disappointed in the results. I then saw in one of

my books a technique that used a simple geometric design. I started with the following diagram (Fig. 3).

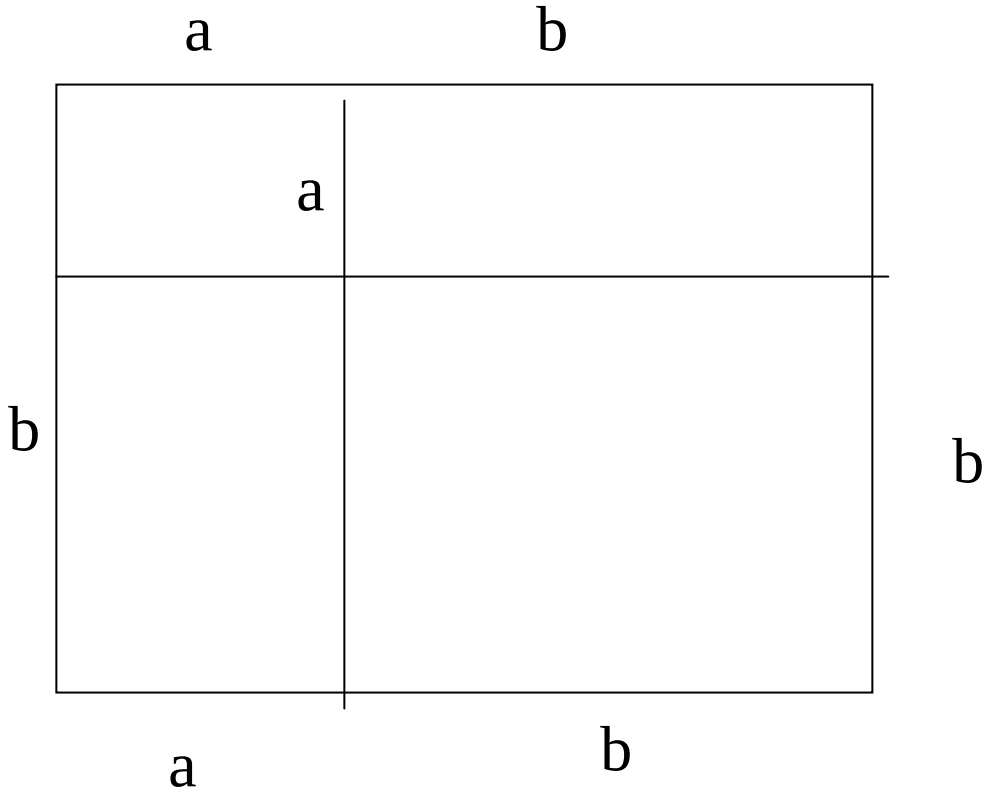

Figure 3 Geometrical Model for Squaring a Binomial

We discussed how one could get the expression for the area of the big rectangle by determining the area for each small rectangle. Since the entire class knew how to determine the area of a rectangle, they quickly transferred this knowledge to $(a+b)^2 = a^2 + 2ab + b^2$. I never told them about this relationship, but since they knew areas of rectangles, this seemed to pose no problem. I then tried to have them generalize this situation to problems such as $(r+p)^2$, or $(3g+7h)^2$. They could not do this until they drew the diagram as I had done when first introducing this procedure. From this I learned that people construct their own knowledge by connecting it to previous knowledge.

I have had similar experiences as a high school and college basketball coach. I cannot begin to count the number of times I have drawn up a play during a timeout and have two players go in the correct direction and the other three go in the wrong direction. This often happened after I would have the players repeat to me what I had just said and point to the spot on the floor where they should go! As a coach I realized, early on, that one cannot "give" people even the simplest knowledge.

As a college instructor, first as an adjunct at three colleges, and now as a full time instructor in the School of Education, I taught many math concepts through the use of analogy (I have extended this to be a part of my bridging question program, which I will examine later). As an example, I would teach the finding of the equation of the translation of a conic by comparing it to taking money out of one account and putting it into another. Students would remark that by relating a new math concept to an ordinary experience, they would understand the new math concept very quickly.

As an Army Reserve officer who was called to active duty in 1996, I experienced the Constructivist philosophy on a daily basis. As a rule I went to many staff meetings with a fellow officer. We would casually compare notes and we would amaze each other. It was as if we had gone to different meetings. We almost always interpreted comments differently, even though we had the exact experience (until our mental structures interpreted these). Here were two college-educated, "mature" men who could not agree upon what they had both seen and heard!

After I returned in October of 1996 from active duty, I continued with my studies for the Certificate of Advanced Studies (CAS) in Mathematics Education. Early on in these studies I became interested in the Constructivist philosophy. The Constructivist

philosophy served as the platform I needed for "quantifying" my life experiences (described above) and my teaching experiences. My final project for my CAS was an extended paper that translated the Constructivist philosophy into pedagogy.

In the years prior to my enrollment at National-Louis University I worked diligently to translate Constructivism into pedagogy. The following paragraph represents the guidelines I implemented for translating Constructivism into pedagogy:

All students will construct their own ideas, definitions, and procedures. They will represent their ideas in multiple modes. They will write out more than one definition for a concept and they will use, concurrently, graphs, diagrams and the written word to describe a concept. The students do this in order to create an authentic product in order to solve a "real-life" dilemma or to create product that is useful in contemporary society. In Trigonometry students will write a flight plan for an airline. In Geometry class students assume the role of an owner of a landscape company and create a bid for laying sod in an irregular-shaped lot. In Advanced Algebra class the students would assume the role of a sports agent and create a proposal that recommends different investment options that a professional athlete may pursue. In other words, students create their own version of knowledge in order to solve a problem that is common in contemporary society.

While the above description is accurate, it does not present a deep, rich and insightful description of Constructivism. My CAS studies empowered me to be somewhat successful in translating the Constructivist philosophy into pedagogy. The key phrase is "somewhat successful." In my opinion, I had only "touched the surface" of translating into pedagogy. My studies at National-Louis University now come into play. A large influence in my development as a Constructivist was Dr. Becky Barr and Dr. Terry Jo

Smith. They were my instructors for my first course at National-Louis University in the summer of 2000. At that time I had kept my Constructivist thoughts to myself, but these two women encouraged me to verbalize my ideas. The course was set up so that each instructor took turns grading the students' reflection (the student would send both instructors a copy of the reflection, but only one instructor would reply). On more than one occasion both instructors would reply because they were so excited about my writing.

I do not know exactly when this occurred, but I do remember that one of Dr. Barr's comments (and later on, Dr. Smith's comments) made me realize that I can learn about Constructivism through my own application of Constructivism as a teacher and as a student. Dr. Barr empowered me to realize that I needed to live what I was trying to learn about. While I do not remember the exact words or time, I know that Dr. Barr got me to live my theory. It was then that I started consciously to monitor how I interpreted class discussions and compared these interpretations with other students. It was then that I tried to refer to previous class notes when studying a new concept. It was Dr. Barr and Dr. Smith who got me to get involved in theorizing (living, experiencing, and reflecting on my ideas).

While I didn't realize that I was doing curricular theorizing at the time, I can say that this dissertation represents a personal construction because I have been formally theorizing for five years. Dr. Smith helped me realize that I was a natural Constructivist, and Dr. Barr guided me to developing different "frames of mind." Dr. Barr was instrumental in guiding me to the realization that I, as a curriculum specialist, needed to develop some guidelines, or "epistemological guidelines," that I could use in my studies.

Through my studies at National-Louis University I have created personal constructs that I use to examine curricular schemes and writings. These personal constructs are five epistemological considerations:

- The nature of knowledge
- The measurement of knowledge
- The nature and validation of truth
- Relations between meanings
- The role of language

I have created these questions as a result of my academic coursework at National-Louis University. These questions represent my growth as a lifelong learner, and I will use them as an instrument for creating the bridge from philosophy to pedagogy.

History of the Word "Constructivism"

Writers such as Dewey, Piaget, von Glaserfeld, and Vygotsky have often been called "Constructivist," but they did not give themselves that classification or use that term. This section investigates the use of the word "constructivism" in literature.

While the words "construct" and "construction" have been used for centuries, the word "Constructivism" does not have such a history (Mahoney, 205). Mahoney has studied the use of "construct-based" terms during the period of 1974-2002. Mahoney writes, "Yet it is appearing with an accelerating frequency in titles of books and articles in psychology" (p. 1). Mahoney's research indicates that, back in 1974, there were fewer than 1,000 instances of the use of "construct" words in titles and abstracts of psychological articles. This same research indicates that, in 2002, these types of words appeared over 4,000 times.

Mahoney's research, while informative, begs the question: What about the use of the word in education? While Mahoney's work is focused on psychology, and there is a link between education and psychology, this study focuses on Constructivism in education. A search of the *Oxford English Dictionary Online* resulted in information concerning the history of the word "Constructivism." This search indicated that the word has been used in several contexts. The first instance occurred in Soviet Russia in 1924 and referred to an artistic movement. There is a reference to the use of the word in mathematics in 1934. There is a 1959 reference in the philosophy of mathematics. Since Constructivism is focused on how one learns or creates knowledge, it would seem logical that the history of the word would be found in educational references, but this is not the case.

A search of descriptors in the ERIC database resulted in finding that the earliest date that "Constructivism" was used as a descriptor was 1977. A. Jon Magoon used Constructivism in an article that he wrote for the *Review of Educational Research.* In this article Magoon examines and outlines a history of the use of the concept in the history and philosophy of social and behavioral sciences. His research includes the field of education and finds "that constructivist applications are clearly discernable within six facets of educational research" (p. 668).

History of Constructivist Thought

Even though the word "Constructivism" possesses a short history in educational writings, there are many writers and philosophers who advocate at least a portion of the Constructivist philosophy. The Constructivist movement can trace its history back to ancient times (Mahoney, 2005). Mahoney, in tracing the history of the movement, writes,

"Among the earliest recorded proponents of some form of constructivism are Lao Tzu (sixth century BC), Buddha (560-477 B.C.), and the philosopher of endless change, Heraclitus (540-475 B.C.)" (p. 2). Philosophers and educational writers, throughout the ages, have discussed the concept that individuals create their own knowledge through reflecting on their own experience and using this to modify preexisting knowledge. While not every writer or philosopher that I cite is a true or pure Constructivist, their writings contain portions of the philosophy. The basic premises of the Constructivist philosophy have been prevalent throughout the ages.

The ancient writer Confucius has elements of the Constructivist philosophy in his writings. While his writings focused on the interrelationship between learning and morality (Cooney, Cross, & Trunk, 1993), Confucius does present some Constructivist views. Cooney et al. quote 2:11 from *Confucian Analects*: "When I have presented one corner of a subject to anyone, and he cannot from it learn the other three, I do not repeat my lesson" (p. 40). With this quote Confucius is making references to using previous knowledge to create new knowledge.

While the Constructivist philosophy believes that people construct their own knowledge, Plato's view of truth/knowledge is somewhat similar (Kraut, 1999; Lee, 1987; Stevenson & Haberman,. (1998) and Strathern, 1996).Plato, in the *Republic,* refers to two types of truth: "At any rate you have before your mind these two orders of things, the visible and the intelligible" (p. 251). For Plato, the "visible" represents the knowledge that man constructs with his senses. Strathern writes: "The physical world we perceive with the senses is in a continual state of change. By contrast, the universal realm of ideas, which is perceived by the mind, is unchanging and eternal" (p. 24). Thus, Plato

acknowledges that people create “human knowledge.” While Plato believes that human knowledge is not equal to the universal realm of ideas, he does acknowledge that people do construct their own knowledge through their senses (Stevenson and Haberman, 1998). Stevenson takes the view that Plato was, to some degree, a Constructivist:

> One thing that we can note immediately is that Plato realizes that human knowledge is not simply a matter of mere passive observation of things and events in the world around us. Our knowledge involves understanding, in that we actively interpret the data we receive through our sense organs, we apply concepts to classify and mentally organize what we perceive, using our rational powers. (p. 92)

In terms of how knowledge is formed, Plato takes on some aspects of Constructivism, but not enough to be called a Constructivist. Constructivists hold to the precept that knowledge is formed when previous knowledge is modified or combined with other knowledge to form a new entity. In terms of “true knowledge (the realm of ideas), Plato believes that prior knowledge plays a role in the attainment of true knowledge (the Forms). The key phrase is “attainment.” This contrasts with the phrase “construct knowledge.” S. E. Frost (1989) writes about this concept:

> The soul, he taught, comes into the world carrying within itself true ideas. These have been planted in it in an existence previous to birth. True knowledge is reached when these ideas are remembered and take the front of consciousness. This is “conceptual knowledge” as distinguished from sense knowledge which is actually not knowledge. (p. 249)

In the Platonic system the realm of ideas (Forms) is in the soul of man when he is born. For Plato and his "true knowledge," there is prior knowledge. Plato, however, does not mean that this prior knowledge is modified or added to in order to create "true knowledge." In the Platonic philosophy "real knowledge" is in the soul at birth and is brought to consciousness through reasoning. In this vein "real knowledge" is reached, not created. In terms of the Constructivist premise of forming new knowledge by modifying previous knowledge, Plato is not a true Constructivist. While he believes that humans construct their own knowledge, he also believed that "true knowledge" is attained through reason, not necessarily created.

Aristotle, like Plato, discusses different types of knowledge or truth (Dancy & Sosa, 1993; Taylor, 1955). Plato discussed the knowledge of the Forms and the knowledge of the senses. Aristotle divided knowledge into "demonstrated truth" and "simpler truths." Taylor interprets Aristotle's demonstrated truth as the truth resulting from deductive reasoning: "Science is demonstrated knowledge—that is, it is the knowledge that certain truths follow from still simpler truths" (p. 36). Aristotle is extending Plato's use of reasoning to find the Realm of Ideas. Aristotle does believe that this system of reasoning depends on given, *a priori* facts. Taylor explains this concept:

> Hence the simplest of all the truths of any science cannot themselves be capable of being known by inference. You cannot infer that the axioms of geometry are true because its conclusions are true, since the truth of the conclusions is itself a consequence of the truth of the axioms. Nor yet must you ask for demonstration of the axioms as consequences of still simpler premises, because if all truths can

be proved, they ought to be proved, and you would therefore require infinity of successive demonstration to prove anything whatever. (p. 36)

Here Aristotle's ideas are congruent with Plato's ideas. In other words, there is a set of truths that is universally accepted and exists on its own. These truths are independent of the human experience. The big difference between them, which is important to our construction of a connection to the Constructivist philosophy, is the use of human experience. While Plato believes that our sensory experiences have nothing to do with the absolute truth, Aristotle believes that our sensory experiences do play a role in finding or discovering the realm of Forms. Taylor presents this viewpoint: "On the other hand, he also says that they are known to *us* as a result of induction from sense-experience" (p. 37).

Taylor quickly points out that the process of using human experience does not *prove* the existence of the universal truths, rather it focuses our mind to their existence: "This exactly illustrates Aristotle's conception of the function of induction, or comparisons of instances, in fixing attention on a universal principle of which one had not been conscious before the comparison was made" (p. 38).

Aristotle's position is that the process of induction does not prove the existence of universal principles; rather, the use of the rational mind through induction empowers man to become more aware of and focused on their existence. Plato believed that human experience was not the absolute truth and that human experience was unable to help man reach that truth. Aristotle, on the other hand, saw human experience as the catalyst for focusing on these experiences. Thus, human experience was a factor in man's quest for the ultimate truth. Whereas Plato envisioned human sensory experience as a non-factor

for the attainment of knowledge and Constructivists see human sensory experience as the focal point of knowledge construction, the position of Aristotle is somewhere in between these two positions.

St. Augustine views the teacher not as one who transmits knowledge, but as a person who manipulates the environment so one can learn (Reed & Johnson, 2000). St. Augustine recasts the role of the teacher from one of mere conveyor of information to one in which the teacher creates an environment in which children are encouraged either to have new experiences or to recall old ones. The philosophy of St. Augustine not only envisions the role of the teacher as one who creates the learning environment but also views the creation of new knowledge as a process of using previous knowledge: "The Augustinian teacher believes that words become meaningful only to the extent that they can be connected with a set of experiences" (p. 31).

Not only does St. Augustine discuss the role of prior knowledge, he discusses the role of the teacher in the Constructivist environment.

It is quite appropriate to discuss the influence of monastic orders on the curriculum during the Middle Ages. Schubert (1997) reminds us the effect that Christianity had on the field of curriculum: "The leaders of the Church, particularly the monastic orders, were responsible for the perpetuation of education in the West during the remainder of the Middle Ages"(p. 60). For many historians and scholars the monastic scholars were the teachers and schoolmasters of Europe (Thimmesh, 1992). Plato and Aristotle believed in a level of existence of truth and reality above and beyond the physical existence of man. Christianity, with its belief of God, also believes in a realm of existence above the existence of man. St. Benedict presents a philosophical outlook

that may be construed to be an extension of the philosophy of Aristotle. St. Benedict outlines his philosophy in his *Rule.* The Rule itself does not set forth Benedict's epistemological philosophy. It is the interpretations of his philosophy by other scholars that provide the structure for this analysis. With a casual reading of some interpretation of Benedictine education (Contreni, 1994; Quinn, 1994; Theisen, 1982) an educator may believe that St. Benedict was a true Constructivist. Contreni addresses this issue with two quotes. In the first quote Contreni is discussing the fact that a Benedictine education must be flexible. He is advocating an education that will prepare people to be flexible. It is in this context that he advocates the Constructivist philosophy:

> It is becoming increasingly clear to me that what matters most is not so much what one knows but how one knows. No matter what curriculum a student pursues, he or she must be taught to think critically because today's knowledge grows obsolete at a faster and faster rate with each graduating class. (pp. 18, 19)

This quote from Contreni features two strands of Constructivism. The first strand is the phrase "but how one knows". This phrase points to the Constructivist concept of knowledge as a strands of different thinking strategies. The second Constructivist strand is that of his version of knowledge. Contreni speaks of knowledge as becoming obsolete and changing. This points to the Constructivist version of knowledge as being subjective and constantly changing.

> That's the point that I want to make—no matter what our students study, they ought to learn also how to learn so that they can effectively master what nobody now yet knows. Four or five years of college and a degree should not be capstone, but, if I may extend the space metaphor, a launching pad. (p. 20)

Patricia Quinn (1994) also points to the fact that Benedictine education has some Constructivist tendencies. Quinn discusses the Benedictine philosophy of knowledge by examining the life of St. Anselm, a well-known Benedictine monk and scholar. Quinn states this in making a reference to the philosophy of St. Anselm:

> St. Anselm reminded teachers that they were like the gardeners of their students ". . . who are planted in the garden of the church, to grow and bring forth God." "If you plant a tree shoot in your garden," Anselm asked a master, "and straightaway shut it in on every side so that it has no space to put out its branches, what kind of tree will you have in after years when you let it out of its confinements? A useless one certainly, with its branches all twisted and knotted." (p. 25)

This analogy of the teacher as a gardener who arranges the garden (environment) so the tree (student) grows on its own is strong evidence supporting the Constructivist philosophy. The analogy of the gardener is certainly congruent with the idea of knowledge as something that grows or is nurtured. Quinn, within the same page, gives more evidence that St. Anselm interpreted the rule of Benedict in such a way that one could understand his view as fitting a contemporary Constructivist interpretation whereby the teacher clearly is the one who creates an environment:

> The effective teacher Anselm was completely student-centered, the way a nursing mother is absorbed in her infant: ". . .the inexperienced one needs milk-gentleness from others, kindness, compassion, cheerful encouragement, loving forbearance, and much else of the same kind . . .adapt yourself to the strength and weakness of those under you." (p. 25)

Saint Anselm, as interpreted by Quinn, is again providing evidence that the Benedictine epistemological foundation is one of creating a nurturing environment for the learner. The key is "creating a nurturing environment." Quinn is painting a picture of the Benedictine philosophy as one in which the teacher must create an environment that nurtures the learning of the learner. This analogy is certainly congruent with the Constructivist environment.

While this previous discussion presents the Constructivist foundations of the Benedictine philosophy, there are some strong indicators that Benedict himself might not have started out as a Constructivist. There are indications that Benedict, like Plato and Aristotle before him, believed in an absolute Truth (Fry, 1981). In the case of Benedict, this was God who manifested himself in the form of Christian Wisdom. Benedict interpreted Christian Wisdom as that of coming from a higher authority (Fry, 1981). This truth is God or Christian Wisdom. St. Benedict starts his Rule by addressing his readers: "Listen carefully, my son, to the master's instructions, and attend to them with the ear of your heart. This is advice from a father who loves you; welcome it, and faithfully put it into practice" (p. 15). Here Benedict uses the images of instructions coming from a "master" to express the idea that Christian Wisdom is at a higher level than human perception. This is certainly consistent with the views of Aristotle and Plato. Previously I used Quinn's interpretation of St. Anselm to explain the Constructivist tendencies of Benedict (the teacher as gardener). In the same page Quinn presents a view of Anselm that is an alternative to the gardener metaphor. Contreni says this about Anselm's second metaphor: "Besides gardeners, he saw educators as goldsmiths whose careful and persistent tapping and smoothing and prodding shaped masterpieces from their students"

(p. 25). The metaphor of the goldsmith polishing up the metal implies that Benedict saw knowledge as a static entity, with the teacher "polishing" up that knowledge. This contradicts the Constructivist philosophy and the other metaphors. There appears to be a "disconnect" within the epistemological interpretations of Benedict's philosophy. Benedict's picture of Christian wisdom coming from a master and the goldsmith metaphor combine to present the premise that the Benedictine tradition is not totally Constructivist.

While Plato and Aristotle believe that man can reach the level of the Forms through reasoning and not through any direct contribution of human experience, St. Benedict takes a different approach. He believes that man can and must use human experience to find the absolute truth (God). Contreni (1994) makes this very clear when he writes:

> Study was a practical activity made necessary by the simple fact that Christian wisdom, the key to holiness and salvation, was embedded in texts, the Bible above all, but also the lives of the fathers and the works of the great Christian authors such as Augustine and Jerome. (p. 6)

In this vein Benedict separates himself from Plato and Aristotle. While Plato does not believe that sensory perceptions were knowledge and Aristotle believed that human experience only brought attention to the absolute truth, Benedict firmly believed that human experience was important for reaching the absolute reality (Christian wisdom). For Benedict, Christian wisdom is embedded in the lives of men and in common everyday work.

Benedict's view of the importance of work also points to the fact that he believed in the value of human experience (Hall, 1982). Hall indicated that Benedict originally viewed his monks not as "pure thinkers," but as people who were continuously busy and this implied doing worthwhile work:

> Correspondingly, Benedict had not intended his monks to be scholars, but in the course of time, "a great tradition of learning and of artistic skills progressively developed." Similarly, as farmers, builders, and scholars, they actively intervened in nature, bringing about "profound transformations of soil, water, fauna and flora," but in such a "wise manner" that their management has largely been very positive in its effects on environmental quality. (p. 204)

Here Hall brings out more of the "Constructivist side" of Benedict. While Benedict advocated the idea that his monks should be contemplative, he also believed that his monks should be involved in worthwhile work and experience. The belief in "worthwhile work" is consistent with the Constructivist philosophy of using hands on experiences to create new knowledge.

Locke, who believed that were two kinds of ideas, advocated the premise that reflection and the senses are the sources of ideas (Bentley, 1958). He believed that "ideas are not innate" (p. 60). One of his categories, complex ideas, is made "by an act of mind" (p. 60). The "act of mind" was broken down into three actions: (a) combining simple ideas; (b) by relating two ideas; (c) by abstracting from them real existence. For Locke, the key to knowledge is summed up in one word, "experience" (Cooney, Cross, & Trunk, 1993). From the concept of combining ideas, relating two ideas, and experience as the key to knowledge, it would seem as if Locke is a true Constructivist. This may not be the

case because Locke was considered an empiricist, and empiricists believed that "the mind as being 'impressed' by experience, just as, in the most often used analogy, a piece of wax is impressed with the characters on a signet ring" (pp. 48-49). The concept of the mind be impressed by experience implies that the construction of knowledge is influenced by action from an outside source.

Immanuel Kant (Shapiro, 2002) also contributed to the Constructivist landscape. Kant's ideas flow with those of Plato and Aristotle. He believes that there is an absolute or universal truth that is distinct from worldly instincts (Bentley, 1958). His thought "agrees with the rationalists that universal and necessary truth cannot be derived from experience" (p. 73). He also believes in "ideal knowledge," which is knowledge that is "knowledge of phenomena, knowledge as it appears to our senses" (p. 72). Kant stipulated that people construct their ways of knowing the physical universe. Kant, while stipulating that there is a universal knowledge that is in physics and mathematics, believed that "we can know only what we experience, that sensation forms the material of our knowledge" (p. 72). Kant believed that universal knowledge cannot be derived from experience. Kant exhibits characteristics of both Plato and Aristotle. He believes in a universal knowledge that experience cannot create, but he also believes in a form of knowledge that is created by the senses, and this represents the Constructivist side of him.

This analysis, so far, indicates that many philosophers throughout the ages have expressed or supported the Constructivist philosophy to some degree. Their philosophy has contained ideas such as the importance of experience, the role of experience in creating knowledge, and the operating on prior knowledge to create new knowledge, and this represents Constructivist concepts. While St. Augustine was a forerunner of John

Dewey, many of the Western philosophers discussed have some ideas that are non-Constructivist. The belief that there is a knowledge base that is perceived by the senses and a knowledge base that is external to man and not perceived or created by the senses represents a philosophy that runs contrary to Constructivism.

Thomas Aquinas, one of the foremost Western thinkers, also presented a thinking process that had Constructivist ideas embedded within it. Aquinas, who as a child studied with the Benedictine monks at Montecassino, believed in the primacy of the senses in the knowing process (Bourke, 1960). Aquinas believed that "there are three levels of knowing powers. One kind of knowing power is the act of a corporeal organ, namely sensation" (p. 9). Aquinas, in speaking about truth and sense knowledge, writes:

> Our knowledge, taking its start from things, proceeds, in this order. First, it begins in sense; second, it is completed in the intellect. As a consequence, sense is found to be in some way an intermediary between the intellect and things." (p. 12)

This thought certainly has Constructivist foundations, but a careful look shows another element and this element is that there is a body of knowledge that is external to man and cannot be comprehended by man. Aquinas believed that this idea applied to "God, angels, and human souls" (p. 5). Aquinas, in applying the concept that the senses are an important part of the knowing process, reasoned, that "such spirits cannot be seen, or heard, or sensed in any way. Nor can there be any direct, natural apprehension of them by man's intellect" (p. 5).

Aquinas, as a Constructivist, put a great deal of emphasis on the senses in the knowing process. The process of using the senses is one of the foundations of my Constructivist philosophy. Aquinas, however, believes that the concepts of God, angels,

and the soul represent a body of knowledge that can be understood not directly but by "indirect and laborious reasoning to judgments about them" (p. 5).

Richard Rorty and William James represent the "pragmatic maxim" (Dancy & Sosa, 1993). Pragmatism and the pragmatic method are trains of thought by which experiential knowledge takes "center stage":

> . . .characterized by the "pragmatic maxim," according to which the meaning of a concept is to be sought in the experiential or practical consequences of its application. The epistemology of pragmatism is typically anti-Cartesian, fallibilistic, naturalistic; in some versions it is also realistic, in others, not. (p. 351)

This definition, which our discussions of James and Rorty will expand upon, presents the main theme of pragmatism. This theme is the overwhelming importance of the experiential knowledge of man. According to this definition, the meaning of a concept is in direct relation its usefulness in the experience of the learner. Thus, pragmatism, by its very nature, emphasizes the individual experiential knowledge of the learner and is closer to Constructivism than our previous philosophers. James makes it very clear that he believes that Pragmatism is more of a method than a static entity or mode of thought (W. James, 1991). James views the pragmatic method as instrument that analyzes experiential phenomena: "The pragmatic method is primarily a method of settling metaphysical disputes that otherwise might be interminable" (p. 23). What is meant by the concept of solving metaphysical disputes? For James this means the verification of the truth of an idea. For James the pragmatic method is the process of verifying or constructing the truth of an idea:

> The truth of an idea is not a stagnant property inherent in it. Truth happens to an idea. It becomes true, is made true by events. Its verity is in fact an event, a process: The process namely of its verifying itself, its verification. Its validity is the process of its validation. (p. 29)

This quote is consistent with the Constructivist philosophy of viewing knowledge as subjectively constructed and as being a process. The question that must now be answered is this: Does the pragmatist measure validity against a predetermined truth (which would be against the Constructivist philosophy), or does he use another standard? The answer is this: Pragmatists measure truth by measuring the gap between the present good and the possible (Rorty, 1991).

> They see the gap between truth and justification not as something to be bridged by isolating a natural and transcultural sort of rationality which can be used to criticize certain cultures and praise others, but simply as the gap between the actual good and the possible better. (p. 23)

Rorty is taking the position that truth is the process of determining whether the present situation is the best possible situation or whether there is the possibility to create a better situation. Rorty continues:

> From a pragmatist point of view, to say that what is rational for us now to believe may not be true, is simply to say that somebody may come up with a better idea. It is to say that there is always room for improved belief, since new evidence, or new hypotheses, or a whole new vocabulary, may come along. (p. 23)

Rorty is advocating the position that truth and knowledge are transitory in nature and that what is considered true for now may change because of the possibility of new and

improved evidence or a new hypothesis. This is certainly congruent with the Constructivist philosophy. When Rorty discusses the concept that there might be a new hypothesis or new evidence, he is envisioning the verification of truth as a continuous process.

Rorty and James lay the foundation for contemporary Constructivist thought. They envision truth as a transitory entity and process that evolves as situations and the environment evolve. Truth for Rorty and James is not a static construct but a state that is determined by the present environment or situation.

The Constructivist movement, as I have absorbed into my own practice, has its roots in the ideas of twentieth century writers Dewey, Vygotsky, Piaget, and von Glaserfeld (Popkewitz, 1998; von Glaserfeld, 2005). The ideas of these writers have influenced the Constructivist movement in the twenty-first century, and they have been large factors in my version of Constructivism.

Both Vygotsky and Dewey developed their theories in the context of their own historical spaces (Popkewitz, 1998). These historical spaces include the political climate, the economic climate, and the ideological climate. According to Popkewitz, Vygotsky and Dewey have much in common. Both of these figures wrote and structured their ideas during a time that involved industrialization, urbanization, and rationalization. Dewey and Vygotsky knew that these new conditions would force a change in the type of person that society produced. Popkewitz writes, “It also was to produce a citizen who would act wisely and autonomously in the new political and social institutions of the times” (p. 537). Thus, the political, demographical, and economic factors of society affected both men.

While Vygotsky and Dewey were fashioning their writings in a world that was being industrialized, and while they both wanted to create an autonomous citizen, they went about reaching their goals in different manners. Their theories recognized the importance of individuality, but Vygotsky examined the importance of language as the instrument to convey social experience, and Dewey focused on the community and its interaction with the individual.

Vygotsky, using a Marxist tradition, argued that thought would arise as the individual absorbed social experience. Popkewitz, in discussing the writings of Vygotsky, states that "Vygotsky rejected the functionalist proposition that thinking involves innate patterns of action that undergo processes of maturation—that thinking is discovered anew by individuals" (p. 538). Popkewitz goes on to say that Vygotsky used a Marxist tradition in arguing for individuality by fixating on the individual's consumption of social experience. In this vein, Vygotsky believed that language was a key to developing one's knowledge and that "thought was viewed as an activity rather than as a passive, idealized process" (p. 538). The concept that thought is an activity is congruent with the Constructivist perspective of the active construction of knowledge.

Dewey focused his ideas on social issues, and he believed that a democratic society should produce a strong feeling of self-worth in people (Cooney, Cross, & Trunk, 1993). Dewey, born in the same year that Darwin's *The Origin of Species* was published, was greatly influenced by Darwin's premise that all people are biological organisms that are challenged by the environment and actively interact with the environment. Dewey, in adapting this naturalistic philosophy, believes that man is involved not only with the environment, but also *in* the environment. Dewey believes that knowledge is an active

relation that, in fact, “makes reality” (p. 135). Dewey, in stipulating that “knowledge makes reality,” is supporting the premise that one creates knowledge.

While Dewey and Vygotsky use different means as a reaction to a changing world that demanded a new kind of citizen, Piaget ‘s “historical space” can be described as combining the rationalist philosophy with the empiricist philosophy (Kamii, 2000). According to Kamii’s interpretation of Piaget, the empiricists believed that knowledge was created external to the individual and that “it is *internalized* through the senses” (p. 4). Rationalists, on the other hand, did acknowledge that sensory experience play an important role in the development of new knowledge, but they believed that reason is a more important factor because “it enables us to know with certainty many truths that sensory observation can never ascertain”(p. 4). Kamii explains that Piaget, who is actually an epistemologist rather than a psychologist, wished to examine how people construct mathematical knowledge by studying its prehistoric beginning. Piaget believed that it was necessary to study the development of an entity rather than its end product. Since the prehistoric and historic evidence was not available to him, Piaget decided that the best way to study the development of reason and empirical knowledge was to study its development in human beings. According to Kamii, Piaget studied children as “a means to answer epistemological questions scientifically” (p. 4).

The “superstructure” of Piaget’s theory is the concept of adaptation. Piaget, as a biologist, uses the biological concept of adaptation in his study of epistemology (von Glaserfeld, 2005). Piaget views knowledge as a “mapping of actions and conceptual operation that had proven viable in the knowing subject’s experience” (p. 4). Piaget’s

theory views knowledge creation as the relationship between the person and the environment rather than a copy or representation of the external environment.

Piaget's theory lays the groundwork for a great deal of modern Constructivism. His theory does not stipulate that a mental cognitive structure acts with external objects as they are but with previously constructed mental structures. Important themes in modern Constructivism are previous knowledge and the reaction of the cognitive structure to its environment. These ideas can be traced back to Piaget's scientific theories.

Von Glaserfeld (2005) discusses the Constructivist version of the word "environment." He believes that this is important because "teaching strategies and procedures seem to spring from the naïve assumption that what we ourselves perceive and infer from our perceptions is there, ready made, for the students to pick up" (p. 5). While the Constructivist philosophy stipulates that people construct knowledge by interacting with the environment, what is taken as the "environment" is a subjective entity. He goes on to stipulate that one's environment, as an element of constructing new knowledge, is itself a construction. Speaking of the environment as an absolute truth "overlooks the basic point that the way we segment the flow of our experience, and the way we relate the pieces we have isolated, is and necessarily remains an essentially subjective matter" (p. 5).

Von Glaserfeld extends his concept of the environment to implications for a teacher's practice. To "create a learning environment," the teacher must understand that the students' version of the environment is "different from those intended by the educators" (p. 7).Teachers can hope to induce students to modify or add to their thinking "only if one has some inkling as to the domains of experience" (p. 7). Von Glaserfeld

extends this idea to the concept of language. He reminds us that language "does not transport meanings or concepts. Language enables the teacher to orient the student's conceptual construction by precluding certain pathways" (p. 7). Thus, the role for the teacher is not to "dispense knowledge" but to provide opportunities for the students to create their own learning environment and their own knowledge.

Why Use Constructivism as a Lens?

This section examines why Constructivism is a fitting choice as a lens for this study. This section examines how the Constructivist philosophy acts as a framework for a wide range of fields.

Constructivism and Brain Research

If a Constructivism as a philosophy professes to study the way in which a person learns, it is logical to expect that philosophy to coincide with the findings from the field of brain research. The question for the Constructivist educator is this: Does current brain research support the Constructivist notion that an individual constructs knowledge by interacting with the environment and reorganizing his mental structures in order to understand new events?

Brain research supports the fact that knowledge is a subjective entity. Our brains may have the same components, but they are wired differently (Caine & Caine, 1991). Not only are our brains wired differently, each learning experience compounds the uniqueness of a brain because "the more we learn, the more unique we become" (p. 87).

Diamond and Hopson's research (1998) presents a model of brain growth in which neurons and their dendrite spines make connections with each other. The concept of neurons connecting with each other is congruent with the Constructivist philosophy

that knowledge is a construction formed by connecting previous knowledge to new experiences. The authors go on to explain how this phenomenon may occur: “And as University of California researchers (including the Diamond group) have found, *these dendrite spines themselves grow, change shape, or shrink as* an animal experiences the world” (p. 27). It is important to determine whether neuron activity actually means that cognitive growth has occurred (Bransford, Brown, & Cocking, 2000). Bransford et al. examine research on rats to determine whether neural activity equates to learning. While rats that exercised did increase the densities of their blood vessels, the group learned new activities was the only group that showed an increase in synapses. This fact and the research of Diamond et al. present a direct relationship between learning and neuron activity.

The question that arises is that of determining what is the cognitive activity that is the result of the connecting of neurons. The brain, through an analytical process and a problem-solving process, creates new knowledge (Caine & Caine, 1997; Sylvester, 1995). Sylvester describes a process in which the neurons “interpret sensory information, compare it with related recalled information, and determine how best to respond to the environmental challenges we confront” (p. 106). Caine and Caine describe the process as one of finding patterns: “In a way, therefore, the brain/mind is both scientist and artist, attempting to discern and understand patterns” (p. 105). Involvement in an analytical, problem-solving process indicates that the brain does not receive knowledge but engages in a process of creating it.

The results of brain research present information that clearly presents knowledge as an active creation of the individuals as they interact with the environment. This is in accord with the Constructivist philosophy.

Constructivism and a Global Economy

The business world, by its very nature, must change in order to survive. The business community, by championing the philosophy of "changing in order to survive" is calling for the development of workers that have skills that are different from the skills of contemporary workers. Willard Daggett (1994) writes: "But the world of work has changed. In the 1950's, about 60 percent of all the jobs in this country were unskilled; today, it's about 35 percent; by the year 2000, it will be about 15 percent" (p. 9). Daggett then discusses what types of thinking are required by the job requirements of the twenty-first century: " In the past, most jobs in the workforce emphasized concrete-sequential skills. . . . Technology will take over the concrete-sequential tasks and leave the others-those that require abstract-random skills—to the people managing the information technology." (p. 10). What kind of classroom environment should be in existence in order to develop these thinking skills? John A. Nidds and James McGerald (1995) sent questionnaires to CEOs of "Fortune 500" corporations. Nidds and McGerald claim: "They said a majority of new workers lack. . . ability to apply their skills to new and unfamiliar problems, and ability to work effectively in groups" (pp. 27-28). The "inability to apply skills to new and unfamiliar situations" is a call for people to make new connections in their thinking. This is a call for the application of the Constructivist philosophy of thinking.

There are people outside the realm of business who also envision a new type of thinking in the business world. Jennifer James (1997) is an urban cultural anthropologist who has created a vision of the type of thinking that will be needed by business people in the twenty-first century. She envisions a type of thinking that is actually a process that operates on experiences and on prior knowledge:

> We need a new vision of intelligence, one that integrates the right brain of images and creativity with the left brain of words and calculations, in the context of the social environment. . . . .It is a fluid thought process that leads us to question our usual assumptions, to rein in our judgments, to take a fresh look (p. 180).

The concept of a knowing being the result of a fluid process that integrates and operates on previous knowledge is a description of the Constructivist view of knowledge.

Robert Reich (1992) takes the ideas of James one step further. Reich views the successful businessperson as one who can create and identify new problems: "The one true competitive advantage in skill is solving, identifying, and brokering new problems" (p. 184). One tool that Reich advocates is that of using, analyzing, and interpreting the tremendous amount of data that the information age has created: "Instead of emphasizing the transmission of information, the focus is on judgment and interpretation…. The student learns to examine reality from many angles, in different lights, and thus to visualize new possibilities and choices" (p. 230). These quotes point out some important thinking characteristics for the successful businessperson:

- Intelligence as a process
- Intelligence as a process of questioning our assumptions and creating new scenarios (a "fresh look")

- Intelligence as a process in a social environment
- Intelligence as the process of interpreting our experiences from different angles.

Reich, in calling for an intelligence that is a process of creating new ideas from existing ones, is calling for the application of the Constructivist philosophy.

Constructivism as a Curricular Organizer

The education community is generally looks toward the Constructivist community as providing a structure for organizing the curriculum. An example comes from the state of Missouri (Schattgen, 1997). The Missouri Department of Elementary and Secondary Education is using Constructivist theory and research to inform and shape educational policy and practice. Project Construct, an early childhood reform initiative that is designed to translate the theory of Piaget into practice, is an extended statewide effort to deliver the Constructivist philosophy to early childhood teachers. Project Construct has conducted an institute that is a 30-hour experience that empowers participants to develop Constructivist practices.

To assess the effects of the Constructivist philosophy on students, the Project Construct National Center commissioned an independent study to examine the effects of different teaching strategies on kindergarten students. The study found that "students whose teachers engaged in practices that are consistent with constructivism attained higher levels of achievement than students whose teachers employed more traditional practices" (p. 37).

Rheta DeVries (2002) reported on several studies that examined the effects of Constructivist methods. She discusses Morse's study on second and third-grade students

in Missouri. Morse reported that Constructivist children scored at or above the national average in total reading, total mathematics, and total basic battery of the Stanford Achievement levels at the end of third grade. DeVries also discusses the study of Constance Kamii (2000) who studied first-grade children from a Constructivist classroom. Kamii interviewed children on word problems and computational problems. Kamii reported that the Constructivist group did better than other groups on all 13-word problems and that their explanations showed better part-whole logic. DeVries also reported on Araujo's study that examined the moral autonomy of school children from three preschool centers. In both 1992 and 1995 students from the Constructivist center expressed higher personal autonomy. It must be noted that in 1999 the Constructivist children scored lower. Araujo speculates that the other groups started to receive "values education" and that the Constructivist children were reaching a ceiling.

A curriculum structured on a social constructivist approach to literacy has been successful in increasing student scores (Au & Carroll, 1997). This approach was developed at the Kamehameha Elementary Education Program (KEEP) and was designed to improve the literacy achievement of Native Hawaiian students:

> After only 1 year in the project. our first group of teachers was able to reverse student achievement for the writing process: 68% of students were now above or at grade level and only 32% were below. The same dramatic pattern held true for our second group of teachers. (p. 217).

P. R. Gordon, A. M. Rogers, and M. Comfort (2001) examined how the Constructivist philosophy can also drive a successful middle school program in an urban area. Stoddart-Fleisher Middle School (SFMS), a middle school in North Philadelphia,

conducted a study in which the effects of Problem-Based Learning (PBL) were examined. PBL is a Constructivist based curricular approach that presents curriculum as a series of realistic situations in which all students "approach the problem without specific prior preparation; they must apply their existing knowledge to analyze the problem and extract the relevant data" (p. 1). This study was one of a few that examined the effects on low-income and minority students. This study supplemented the existing curriculum with PBL 2 percent of the time. The study found that "behavior significantly improved in the cohort that started in the sixth grade, and a trend toward improvement was seen in the 7th-8th cohort" (p. 4). There was a large improvement in science, and one cohort show an improvement in math over a two-year period. This is surprising because the PBL focused on science, personal growth, and health.

Educators from the University of California, Santa Cruz, confirmed the evidence for the effectiveness of Constructivism as an approach for helping students perform on standardized tests. (Henderson & Landesman, 1995) This study looked at the mathematical achievement of middle-school students of Mexican descent. This study examined the effects of the use a thematic approach to mathematics that contextualized mathematics instruction. This approach is in line with Constructivist pedagogy. The study used pretests and posttests that paralleled standardized achievement tests used by the school district. The results indicate that the thematic/Constructivist approach was effective. While both the experimental and control groups made equivalent gains in computational skills, the experimental students (thematic/Constructivist) scored higher in the areas of mathematical concepts and applications.

There is evidence that the Constructivist philosophy can be successful for high-school courses (Moses & Cobb, 2001). Robert Moses, a former civil rights activist, is the founder of the Algebra Project. The Algebra Project is a math literacy program that uses Constructivist principles, and it has been proven to help students raise their math scores on standardized tests. At the King School in Cambridge, Massachusetts students who took part in the Algebra Project scored well on standardized tests: "In 1988, scores in the open program on the citywide algebra exam were the second highest in the system" (p. 106). In Weldon, North Carolina, twenty- two students took part in the Algebra Project. Eighteen of the twenty-two students scored at or above the fiftieth (50^{th}) percentile. The Algebra Project was also successful in a three-year study done in Bessemer, Alabama. In this study two schools represented the control group. Three schools, which participated in the Algebra Project, were the experimental group and they consisted of students who were mostly economically disadvantaged. Within a few years the students who took part in the Algebra Project were outscoring middle class students and students from more prestigious schools: "Here the kids from the lowest socioeconomic group were outperforming our middle-class kids and our upper-echelon kids at our flagship schools." (p. 165)

PBL, as a Constructivist activity and as a curricular organizer, has been successfully used in Teacher Education Programs (Anderson & Piazza, 1996; Kroll & LaBoskey, 1996; Levin, Hibbard, & Rock, 2002; Lowenbraun & Nolen, 1998). Anderson and Piazza's study focused on changes in pedagogy in university mathematics education classrooms. They examined how Constructivist pedagogy in a teacher education program affected prospective teachers. Included in the results of this study was a belief that

students are less anxious about mathematics and gained a deeper understanding of mathematics.

The Constructivist philosophy has been a successful pedagogical tool for helping future teachers learn about working with students who have disabilities. Levin et al. studied forty-four preservice teachers in an undergraduate elementary education program. This study focused on the effects of PBL on the learning of working with children with disabilities. One of the results of the study is that participants in a PBL experience had a more positive attitude toward inclusion. The study also found that many preservice teachers viewed the role of an inclusion teacher as that of a member of a team, rather than that of a teacher working on her own.

The University of Washington education faculty taught courses using a team teaching approach that was based on the Constructivist model (Lowenbraun & Nolen, 1998). Lownebraun and Nolen examine the effects of changing from a position of offering only self-contained special education preparation to "participating more fully in the education of general elementary and secondary education teachers in a new master's level general teacher education program" (p. 34). Students completed an anonymous student ratings scale. The results indicate that students put this course in the 9^{th} decile.

I personally have experienced the success of a teacher education program that is based on Constructivism. I am involved in a teacher preparation program that is based on the Constructivist philosophy. One of my duties at Benedictine University is that of being the Mathematics Curriculum Coordinator for the Alternative Certification Program. This program delivers teacher education through PBL. In 2004 this program received the John

L. Blackburn Award, an award that recognizes examples of creative solutions to issues in higher education.

Constructivism and Museum Education

The Constructivist philosophy is now becoming the structuring instrument for museum exhibits (Cole, 1995; Henriksen, 1998; Olsen, Panetski, & Polka, 2000). Peggy Ruth Cole, director of Programming, Planning & Development for New York Hall of Science, views Constructivism as the framework for applying learning in museum education: "The simultaneous shift—from museums as elite institutions serving a select few to institutions serving broad cross sections of American society—makes the question of how people learn extremely important" (p. 225). Cole sees the Constructivist theme of viewing knowledge as personal meaning making as an acceptable form of the definition of intelligence: "This definition of human intelligence—the process of meaning making-begins at birth and continues throughout life" (p. 226).

Henriksken (1998) discusses how Constructivism guides the development of a museum exhibit on radiation:

> According to constructivist theory, learning must begin from conceptions that the learner already has. Thus we considered it important to introduce each section of the exhibition in a way that would create strong association in the visitor. Each section entrance is designed to give the visitor an immediate idea of the issue to be treated inside. (p. 4)

A partnership between the Lewiston-Porter Central School District and the Castellanti Art Museum has resulted in a project in which high school students create a wall text that interprets artwork for visitors (Olsen, Panetski, & Polda, 2000). This

partnership, the Empire State Partnership (ESP), has resulted in authentic projects for high school students. Olsen et al. believe that this partnership is successful because of its Constructivist foundations:

> We attribute the success of the initial Writing on the Wall curriculum to the constructivist principles employed by teachers and museum personnel in developing their instructional strategies. The ESP team encouraged students to use their experiences to actively construct understandings that made sense to them, rather understandings delivered to them in already-organized form. (p. 2)

Constructivism is also a component that can be used to structure an instrument used to measure the learning of visitors to a museum (Falk, Moussouri, & Coulson, 1998). Falk et al. examined factors that influence the agendas of museum visitors. One method for doing this is Personal Meaning Mapping (PPM), which is "a constructivist approach that measures change in understanding along four semi-independent dimensions" (p. 1).

Constructivism and Psychotherapy

The Constructivist movement has found its way into psychotherapy (Mahoney, 1993; Neimeyer, 1993, 1995). Mahoney writes: "This apparent growth in popularity may also be partially attributed to the fact that some of those writers portrayed as archetypal rationalists —Albert Ellis —have vigorously denied any rationalist leanings and laid strong claim to constructivist views" (p. 4). Robert Niemeyer (1995) provides some rationale for the popularity of Constructivism in the field of psychotherapy: "Thus, psychotherapy can be viewed as a kind of collaboration in the construction and

reconstruction of meaning, an intimate but temporary partnership in a developmental process that will continue long after formal therapy ends" (p. 3).

Constructivism and Other Cognitive Models

This section explores Constructivism in terms of other learning theories or models. This section compares and contrasts Constructivism with behaviorism and the information-processing model.

Constructivism and Behaviorism

Behaviorism views the goal of learning as a change in behavior (Woolfolk, 2004.) Behaviorists believe that the effects of the external environment on the individual are the driving force for learning. Woolfolk discusses the behaviorist theory of J. B. Watson. Watson believed that, since mental activity cannot be seen, there is no reason to discuss internal activity. Behaviorists study the external components of learning because this is what is most apparent.

On the surface it may seem that behaviorism and Constructivism are dichotomous, but this is not necessarily the case. Both Constructivism and behaviorism believe in the importance of reinforcement. Woolfolk discusses cognitive theorists, and views them as those who believe "that humans are active participants in their own acts of cognition" (p. 236). Any Constructivist educator will fall under the umbrella of "cognitive theorist." Woolfolk discusses how the concept of reinforcement is a bridge between behaviorism and cognitive theory: "The strict behaviorist maintains that reinforcement strengthens responses; cognitive theorists see reinforcement as a source of feedback about what is likely to happen if behaviors are repeated or changed—as a source of information"(p. 236). Kamii (2000) views the similarities in terms of what they

both can explain. She discusses the fact that Piaget was a biologist and pointed out that all animals adapt to reward and punishment and that dogs, as higher-level animals, can anticipate the appearance of meat when the bell is rung. Piaget also explained the behaviorist phenomenon of extinction. Piaget, according to Kamii, explained extinction by saying that when the meat did not appear anymore, the dogs stopped anticipating its appearance.

Kamii does not dispute of what behaviorism presents as true, but she believes that "Piaget's theory can thus explain everything behaviorism can explain, behaviorism cannot explain children's acquisition of knowledge in a broader, deeper sense" (p. 16).

There are, however, more discernable differences. The differences are in the basic assumptions, the view of knowledge, the view of learning, and the view of the role of instruction of each theory of learning (Bichelmeyer &Hsu, 1999). While behaviorism assumes that there is a single truth or reality, Constructivists believe there are multiple realities constructed by each individual. While the behaviorist believes that knowledge is the result of finding or discovering truth, the Constructivist believes that knowledge is the result of the process of modifying or adding to previous knowledge. Knowledge, in a behaviorist environment, is acquired, while in a Constructivist environment, knowledge is an active process. In the realm of instruction, there are differences—the behaviorist seeing instruction as providing information or truth, while the Constructivist views instruction as supporting learning or creating the proper environment for learning.

Constructivism and the Information-Processing Model

Robert Siegler (1998) provides an overview of the information-processing model and compares it with the theory of Piaget, one of the foremost Constructivists.

Information processing is based on the assumption that thinking is actually the processing of information. Information processing focuses on the nature of information that children represent, what processes they apply to that information, and the limits imposed on by memory. Also, information processing examines the change mechanisms that lead to development and examines how memory limitations prevent development. The final characteristic of all information processing models is that "change is produced by a process of continuous *self-modification*" (p. 65). The concept of self-modification is important. Siegler views this process as influencing future thinking: "Outcomes generated by the child's own activities change the way the child will think in the future" (p. 64). The aforementioned characteristics imply that that there are commonalities with Constructivism. The phrases, "processing of information," "nature of information," and "process of self-modification" imply Constructivist characteristics. The concept of processing information is congruent with the Constructivist concepts of actively creating knowledge. The phrase "self-modification," which states that outcomes influence the ways in which people will think in the future, is congruent with the concept of operating on previous knowledge to create new knowledge.

Siegler generalizes the similarities between information processing and Piaget's theory:

> Both are aimed at answering the same fundamental questions: "What develops?" and "How does development occur?" Both try to identify children's cognitive capabilities and limits at various points in development. Both try to explain how later, more-advanced understandings grow out of earlier, more-primitive ones. (p. 65)

There are, however, some differences. Information processing models put more emphasis on the role of memory limitations and more emphasis on strategies for overcoming those limitations. In Piagetian theory, the emphasis is on the present cognitive structure and whether it can create a modification in order to integrate any new experience.

CHAPTER FIVE: CREATING TENETS OF CONSTRUCTIVISM

In this chapter I engage, as a curricular theorist, in the process of creating a new vision and new strategies for my Constructivist practices and for the analysis of Benedictine pedagogy. One of the structural concepts for this process is the set of five epistemological considerations. These considerations structure the process of creating Tenets of Constructivism, which in turn will be used to create concrete, observable behaviors in the Constructivist classroom. These considerations are as follows:

- The nature of knowledge
- The measurement of knowledge
- The validation of truth
- Relationships between meanings
- The role of language

The Nature of Knowledge

Tenet One: Knowledge Construction and the Environment.

Tenet One examines the nature of how knowledge is formed. Tenet One states the following: "Knowledge is constructed subjectively by linking previous knowledge with new ideas through interaction with the environment." The following paragraphs examine this idea.

Philosophers, educators, cognitive scientists, and memory experts have all discussed the nature of knowledge. I will look at these differing perspectives and

synthesize them in order to construct a Constructivist view of the nature of knowledge. These perspectives range from the ancient philosopher Plato to twenty-first century educational researcher Rheta DeVries to contemporary cognitive scientist Marian Diamond. All of these perspectives point to the notion that knowledge is subjectively constructed by linking new experiences to previous knowledge.

The philosopher Plato examined the nature of knowledge by inquiring about the essence of knowledge (Frost, 1989; Kraut, 1999). Plato discussed two types of truth. One type of truth is that of "Forms." Forms represent the realm of truth that when perceived by the mind, is "unchanging and eternal" (p. 24). In contrast is a second kind of truth, the physical world, which we perceive with our senses and which is in "a continual state of change" (p. 24).

The philosophers Stevenson and Haberman (1998) take Plato's ideas a bit further. They interpret the knowledge created by the mind to be mere opinion and not knowledge. They write, "Perception of impermanent objects and events in the physical world is only belief or 'opinion,' not knowledge" (p. 94). For Plato, the senses empower man to create a subjective, imperfect knowledge or truth. Plato leaves some room for the Constructivist view of the construction of a subjective truth. Plato also presents the possibility that man can reach the eternal, non-changing world of Forms (Strathern, 1996). Strathern explains:

> With the use of the rational mind we can refine our notions of these universal ideas and begin to apprehend them better. In this way we can approach the ultimate reality of daylight which lies beyond the dim cave of our everyday world. (p. 25)

Even in the middle to late twentieth century there were modern scientists who advocate the position that knowledge is subjective (Polanyi, 1958). Polanyi, a scientist who became a social scientist, strongly advocates the position that knowledge is subjective and is a personal construction:

> Its solution seems to lie in the fact that human knowledge is of two kinds. What is usually described as knowledge, as set out in written words or maps, or mathematical formulae, is only one kind of knowledge; while unformulated, such as we have of something we are in the act of doing, is another form of knowledge. If we call the first kind explicit knowledge, and the second, tacit knowledge, we may say that we always know tacitly that we are holding our explicit knowledge to be true. (p. 12)

This quote suggests that Polanyi's view is congruent with the ideas of Plato. While both of these men believed that there are two types of truth, Plato believed in two separate categories, but Polanyi believed that the two types of truth interact with each other. The continual process of the individual tacitly confirming the explicit knowledge implies that knowledge is not an entity separate from man but a process initiated and controlled by man. This aligns with the Constructivist philosophy that knowledge and meaning making are both the result of a subjective process. Polanyi makes this point formally when he writes:

> This view entails a decisive change in our ideal of knowledge. The participation of the knower in shaping his knowledge, which had hitherto been tolerated only as a flaw— a shortcoming to be eliminated from perfect knowledge—is now recognized as the true guide and master of our cognitive powers. The ideal of a

> knowledge embodied in strictly impersonal statements now appears self-contradictory, meaningless, a fit subject for ridicule. We must learn to accept as our ideal a knowledge that is manifestly personal. (p. 27)

Polanyi, through the use of phrases such as "participation of the knower in shaping his knowledge" and "a knowledge that is manifestly personal," is declaring his support for the proposition that knowledge is the result of a subjective process of construction.

Professionals who work with the applications of knowledge have also expressed their views concerning the nature of knowledge. Lyndon (1995), in presenting the use of the Constructivist philosophy in psychology, discusses the formation of knowledge: "Contemporary constructivist thought has its roots in a philosophical and psychological tradition that draws attention to the active role of the human mind in organizing and creating meaning- in literally inventing rather than discovering reality" (p. 69).

Even young children use their own intelligence to construct their own understandings. Rheta DeVries (2002) cites the findings of Piaget on this matter:

> The evidence (for example, Piaget,1932/1965;1936/1952;1929/1960) shows that children have many ideas that are not taught to them. For example, three-year olds often use their intelligence to reason that their shadows go inside themselves when they cannot see them. Five-year olds believe their shadows are under their bed or covers at night. . . .. Even 9-year-olds do not believe that shadows are transitory. (p. 3)

Andrew Trotter (1995) discusses a situation in which a teacher asked a student what "9 + 9" was. The teacher was surprised by the answer. The student then explained to

the teacher that, since 9 is 1 less than 10 and 10 + 10 is 20, 9 + 9 must be 19. Trotter explains the implications of this episode:

> O'Brien was stunned because he saw in the imperfect reply a thought process that was "enormously robust for a 5-year old." The method was not one the child had been directly taught. . . . rather it was the child's own invention with which refinements could lead toward powerful forms of mathematical reasoning. (p. 25)

While professionals from different disciplines recognize the premise of the subjective construction of knowledge, the work of a psychologist specializing in the nature of memory suggests the mechanics of the process of subjective construction. The above discussions have centered on the examination of knowledge from a purely cognitive standpoint but professionals who work with the applications of knowledge have also expressed their views concerning the nature of knowledge (Lyndon, 1995). Lyndon, in presenting the use of the Constructivist philosophy in psychology, discusses the formation of knowledge: "Contemporary constructivist thought has its roots in a philosophical and psychological tradition that draws attention to the active role of the human mind in organizing and creating meaning- in literally inventing rather than discovering reality" (p. 69).

Research has shown that memory is not the replication of a fixed set of experiences but a process of individual creation. Frederic Bartlett (1997), a specialist in memory, presents a theory for the actual mechanics of knowledge construction. The process of remembering, as studied and described by Bartlett, is a subjective process of construction:

> Remembering is not the re-excitation of innumerable fixed, lifeless and fragmentary traces. It is an imaginative reconstruction, or construction, built out of the relation of our attitude towards a whole active mass of organized past reactions or experience, and to a little outstanding detail which commonly appears in image or in language form. It is thus hardly ever really exact, even in the most rudimentary cases of rote recapitulation, and it is not at all important that it should be so. (p. 213)

When Bartlett uses the phrase "built out of the relation of our attitude towards a whole active mass of organized past reactions or experience," he is touching on the mechanics of knowledge formation. His reference to the construction built of past knowledge and experiences indicates that he believes that the process of constructing new knowledge begins with recognition of previous knowledge.

Bartlett's ideas are supported by the philosopher John Dewey (Dewey, 1991). Dewey not only believes that knowledge is a subjective process, he offers a blueprint for the creation of new knowledge:

> Thinking is specific, in that different things suggest their own appropriate meanings, tell their own unique stories, and in that they do this in very different persons. . .thinking is not like a sausage machine which reduces all materials indifferently to one marketable commodity, but is a power of following up and linking together the specific suggestions that specific things arouse. (p. 39)

Dewey views new knowledge as the result of linking new experiences to previous knowledge and previous experiences.

Bartlett and Dewey formulate the proposition that previous knowledge and experiences are the foundation for the creation of new knowledge, and their belief is supported by studies that investigate the learning of new concepts. The research of Geoffrey Saxe (1985) research concerning non-Western students indicates that knowledge is a subjective construction. He examined the effect of Western schooling on the Oksapmin children of Papua New Guinea. The Oksapmin children used a culturally developed arithmetical system of using body parts to solve problems. Saxe explored how they would use this system to solve new problems presented by Western culture. Saxe found that the Oksapmin children did develop new techniques to solve new problems, but these new techniques were the offspring of their previous knowledge:

> As the Oksapmin child uses what he or she knows— the indigenous body system- to solve the new problems inherent in a Western mathematics curriculum, he or she generates novel arithmetical operations and symbolic forms, developments that are rooted simultaneously in traditional life and in the problems addressed in the novel school setting. (p. 512)

Saxe's research amplifies the importance of previous knowledge. His findings indicated that without the activation of prior knowledge, there is no new knowledge. One must consider that Saxe's study focused on a situation in which students were learning a process that was the product of a culture different from theirs. The question that naturally arises is this: Is prior knowledge as important in a situation in which students are engaged in their indigenous environment? The following discussion addresses this question.

Evidence indicates that pre-reading questions have an effect on the learning of students (Pressley, Tanenbaum, McDaniel & Wood, 1990). The pre-reading questions are

a form of prior knowledge, and Pressley and his colleagues found that students showed significant learning gains when they interacted with pre-reading questions. Their research also showed that when students did not have to answer pre-reading questions there was the absence of significant gains.

While the previous discussion has hypothesized that knowledge is a subjective activity, there is evidence to support the premise that one's experiences have a direct effect on the biological make-up of the brain (Diamond & Hopson, 1998). Diamond and Hopson report on work that examines the nature of knowledge. They discuss the phenomenon that the branching of lower-order dendrites is influenced by their experiences with the external environment. Diamond and Hopson note that researchers admit that "it's not that quite tidy. . .but it's in that direction" (p. 24).

Diamond and Hopson discuss how the dendrites in the cerebral cortex of animals grow protrusions that change as animal experiences different things in its environment. The process of connecting to previously formed dendrites supports the importance of existing knowledge. Diamond and Hopson expand on this theme by arguing that the mind's interaction with the environment presents opportunities for the creation of knowledge. They present the concept that the mind's interaction with the environment presents opportunities for the creation of knowledge.

Cognitive scientists support the idea that the individual subjectively constructs knowledge. They view knowledge creation not only as a psychological construction but also as a biological one in which the mind interacts with the environment. The importance of the environment in the process of knowledge creation is not a new concept. Neuroscientists have previously cited the importance of the environment in the creation

of new knowledge In summarizing the articles that constitute the book which they edited, Jeanne Chall and Allan Mirsky (1978) refer to the importance of the environment in creating new knowledge, “From Teyler’s introductory chapter noting that stimulation and experience change the brain to Epstein’s chapter stressing the importance of education during spurts in brain growth, we are informed about the importance of the in the environment” (p. 371).

This discussion has examined the ideas of professionals in different fields who studied the nature of knowledge from different perspectives. These perspectives converge into some common themes. These themes stipulate that knowledge is subjectively constructed by linking previous experiences with new experiences that are brought on through interaction with the environment.

Tenet Two: Knowledge Construction and Multiple Ways of Knowing

The first tenet of Constructivism partially answers the question concerning the nature of knowledge. The first tenet stipulates that knowledge comes into existence as the result of the individual’s personal construction. Another question is whether knowledge is a collection of isolated concepts or a unified process. Tenet Two examines the nature of knowledge from the perspective of the form it takes on when it is created. Two states: “Knowledge is created through a dynamic process comprised of multiple ways of knowing.”

Plato hinted at the possibility of viewing knowledge as a process. He believed the attainment of the Forms happened only through the reasoning process. When Plato supports the use of reason, he is supporting the premise that the construction of real

knowledge is actually a process. This discussion will now examine other perspectives on whether knowledge is a mere collection of concepts or a unified process.

Educational researchers specializing in mathematics education also point to the concept that knowledge is a *process* of knowing (Dolk, Uittenbogaard, & Fosnot, 1997). Maarten Dolk and his associates view knowledge as both a structure and an arrangement of behaviors: "Rather than a shift in *structure,* a second type of conceptual reorganization involves the refinement of a *scheme,* as an organized pattern of behavior (Piaget, 1997)" (p. 3). Dolk's use of the word "scheme" gives plausibility to the concept that real knowledge construction is actually a process that results in a unified whole.

Cognitive science also views knowledge creation as a process of thinking. The analogy of a web is one way to describe thinking. Fischer and Rose (1998) use the metaphor of a developmental web and Gardner's concept of multiple intelligences to create a model for the dynamic properties of the learning process: "A useful metaphor of the dynamic properties is a developmental web, with thinking and learning changing in parallel along multiple strands or domains, as reflected in such concepts as Gardner's (1993) multiple intelligences" (p. 56). The phrase "with thinking and learning changing in parallel in multiple strands or domains", describes knowledge as an unified network of thinking patterns. A "journey" up or down or sideways along Fischer's model represents different thinking skills. Both Fischer and Rose and Dolk support the belief that knowledge is a process of connecting different ideas and modes in order to construct a new thinking pattern. Fischer and Rose add to the concept of knowledge construction as a process by presenting the premise that it is not only a process, but a process that comprises different ways of knowing.

The hemispheric model of the brain is another theory that advocates the theory that the brain is a unified connection of different ways of knowing. The left brain/right brain" concept of Merlin Wittrock (1978) is congruent with Fischer's model. Wittrock believes that the brain organizes and encodes information by using different modes:

> One of the most dramatic findings of the recent research on the human brain is that, although there is a great deal of overlap and commonality in their functions, its cortical hemispheres characteristically organize and encode information in two different ways. (p. 65)

Wittrock's findings, while not defining the number of distinct modes as Gardner and Fischer and Rose do, does stipulate that there are at least two modes and that there is an overlap of these modes. The overlap of functions of the modes is congruent with the Fischer-Rose model of the intersecting of the strands.

Tenet Three: Knowledge Has Two Functions.

Tenet Three examines the functions of knowledge. Tenet Three states the following: "Knowledge serves two functions. The first function deals with the process of imposing order on new experiences and the creation of new thinking processes. The second function involves self-regulation and how one learns and how one verifies truth."

Tenet One stipulated that a function of knowing is to connect previous experiences to new experiences, and this connection results in new knowledge or learning. This new knowledge or way of knowing can be thought of as a process of imposing order on new experiences. The mind's search for meaning is an innate experience in which the mind searches for patterns in order to impose order on new experiences (Caine & Caine, 1997). In discussing their learning principles they write, "In

a way, therefore, the brain/mind is both scientist and artist, attempting to discern and understand patterns as they occur and giving expression to unique and creative patterns of its own" (p. 105). This quote views new knowledge as the creation of new mental patterns that make meaning out of new experiences.

The engaging in new experiences empowers students to become involved in two cognitive processes Lowery (1998) writes, "Each new challenge does two things: provides a rehearsal of prior knowledge constructions, thus making them more permanent, and provides something new that the brain can assimilate into its prior constructions, thus enriching and extending those constructions" (p. 28). Lowery supports the premise that the purpose of the mind is to modify prior knowledge in order to create new thinking patterns.

Knowledge, however, has more functions than that of creating new thinking patterns. One train of thought views knowledge as being able to analyze itself. Cynthia Tobias (1994), an educator and parent, maintains that there are different learning styles and that an individual has the capability to analyze his knowledge style. She is a proponent for analyzing learning styles and preferences: "Learning how to recognize and appreciate learning styles can help you identify the natural strengths and tendencies each individual posses" (p. 9). Tobias advocates the postulate that one function of knowledge is to monitor itself, that is, to analyze how one learns. This is logically consistent with the concept of knowledge construction as a process of thinking. In this case Tobias points out that the mind forms knowledge that critiques and analyzes how it forms knowledge. Tobias supports the belief that the mind regulates *how* it constructs knowledge.

Another example of "self analysis" supports the position that the mind reorganizes itself by asking epistemological questions. Michael Carr (1997) believes that self-regulation takes on the form of asking questions such as "How do I know? or "Is there a better way to verify this idea?" Carr describes this activity as "reflective judgment." Carr presents reflective judgment as an activity of the mind:

> Reflective knowing is a process of inquiry. The reflective view of knowledge can be contrasted with knowing as "hearing from authority" (pre-reflective) and knowing as "having your own opinion" (quasi-reflective). Reflective judgment is the capacity for constructing one's own picture of reality based on a variety of evidence, including personal/social experience, the critically evaluated ideas and opinions of expert others, experimentation, and so on. (p. 6)

Carr, with this quote, accomplishes two goals. First, he states that knowledge is actually a process ("process of inquiry"). Second, he is advocating the idea of reflecting or judging the connections and ideas that one has constructed. According to Carr, one of the functions of knowledge is to regulate itself by determining how the mind verifies truth.

Vygotsky summarizes the views of Tobias and Carr. Vygotsky also believes that knowledge can monitor itself. Vygotsky advocates adding a self-regulating role to the dynamic nature of knowledge (Vygotsky, 1962). He believes that the dynamic nature of knowledge includes self-regulation: "We use *consciousness* to denote awareness of the activity of the mind-the consciousness of being conscious" (p. 91). While Tobias advocates the position that the mind can monitor its best learning modes, and Carr views

the mind as reflecting on how it knows and verifies truth, Vygotsky views knowledge as the thinking process that analyzes its entire being.

The Measurement of Knowledge

Tenet Four: Knowledge Is Context-Oriented and Arranged in a Hierarchal Arrangement

Since the Constructivist educator believes that knowledge monitors itself, the next epistemological question that arises is, How does a person measure knowledge? Tenet Four looks at how a Constructivist measures knowledge. Tenet Four states: "Knowledge is measured as distinct skills, communicative modes, and problem-solving processes that are unique to a particular cognitive domain or needed to create products that are needed by society. Knowledge is perceived to be arranged in a hierarchal arrangement that is flexible and dynamic."

Fischer and Rose envision knowledge or knowing as a strand of thinking modes. I will logically connect this idea to other perspectives. This concept of a strand is related to Howard Gardner's concept of a domain (Gardner, 1993, 1999).

> In contrast, a domain is an organized set of activities within a culture, one typically characterized by a specific symbol system and its attendant operations Any cultural activity in which individuals participate on more than a casual basis, and in which degrees of expertise can be identified and nurtured, should be considered a domain. (p. 82)

While Fischer and Rose (1998) view thinking as change along strands, or domains and, a close analysis of Gardner's theory puts provides more insight. Gardner distinguishes between intelligence and domain. Gardner (1993) defines intelligence in the following way: "If we accept the way I define intelligence—that is, as the ability to solve

problems, or to fashion products, that are valued in one or more cultural or community settings" (p. 7). This definition of intelligence logically coexists with previous tenets. Gardner, when he uses the phrase, "an organized set of activities," gives credence to the act of viewing knowledge as a process of thinking. Fischer's concept of a strand can be considered a subset of Gardner's concept of intelligence. Whereas a domain or strand of thinking is set of specific skills, questions, and symbolic systems, intelligence can be thought of as a process of using these domains to create an authentic product that solves a dilemma or problem. In contemporary society, algebra, geometry, rap music, and cooking are considered domains, while intelligence is a problem-solving skill to solve a problem that is valued in a societal setting and uses that domain.

As an example, surgeons, lawyers, and sports agents have different types of authentic problems to solve. A surgeon must prepare for surgery, prepare his surgical team, perform the surgery, write up his report on the surgery, and then possibly explain the process to a clerk from an insurance company. A lawyer must write a brief, select a jury, and argue his case before a jury. A sports agent must analyze numbers, make decisions based on these numbers, and confer with parties who possess different perspectives. These activities certainly differ and represent different types of thinking processes. This is the key point—an intelligence uses a domain in order to solve a problem in a particular segment or activity of society. Thus, Gardner's and Fischer and Rose's concepts are logically linked and thus present a partial answer to the question of "How does a Constructivist measure knowledge?" The concept of a strand, mode, or domain can be thought of as "ways of knowing," and for the Constructivist a way of knowing is one unit of measure for measuring knowledge. Another unit of measure that a

Constructivist uses to measure knowledge is the unique products one must create in order to participate in society.

While the previous discussion presents how a Constructivist measures knowledge as it physically manifests itself, it is important to discuss how to measure knowledge from a biological and psychological perspective. Marian Diamond and Janet Hopson (1998) emphasize the biological perspective.

In their model, Diamond and Hopson envision neurons and cells migrating up vertical stems. In this model cells form different layers at different levels of the stem. Diamond and Hopson acknowledge the existence of these different levels when they write, "The cells migrate along the guide cells and at the right point, hop off and form a layer. Then the next group comes up and migrates right through this existing layer and forms a new one above it" (p. 44). The question that naturally arises is this: Do the different levels of neurons represent a different level of thinking? Diamond and Hopson believe that this is the case. Diamond and Hopson discuss the work of Arnold Scheibel, whose research focused on the correlation between brain structure and what we do in life. Diamond and Hopson write:

> The team found that the higher a person's educational level, the more fourth-, fifth-, and sixth-order branching they could observe and document in the dendritic trees. Perhaps, their data suggest, by learning and using more words and complex ideas, the more highly educated person stimulates Wernicke's area dendrites to grow and branch. (p. 34)

The Diamond-Hopson model presents a biological and psychological interpretation of a hierarchy of knowledge. Arthur Lewis and David Smith (1993) studied

the hierarchy of knowledge from the psychological standpoint, and their conclusions are consistent with the philosophy of Diamond and Hopson. They envision a hierarchy of thinking skills formed through a creative process:

> Bartlett (1958), who distinguishes lower from higher order thinking, gave further definition to higher order thinking. He extends the idea of integrating past experience by using the term gap filling. Thinking, he believes, involves one of three gap-filling processes: interpolation (the filling in of information that is missing from a logical sequence), extrapolation (extending an incomplete argument or statement), and reinterpretation (rearrangement of information to effect a new interpretation). Bartlett defines thinking as "the extension of evidence in accord with that evidence so as to fill up gaps. . .(p. 133).

This quote confirms Tenet One by emphasizing the concept of a subjective process that builds onto previous knowledge. It substantiates Tenet Three by referring to "a new interpretation." The findings of Lewis and Smith add a new perspective to our previous tenets, and they also offer a complementary view to Diamond and Hopson's biological viewpoint.

The concept of a biological and psychological hierarchy raises other questions. Fischer and Rose's alignment suggests a rigid hierarchy. In Diamond' and Hopson's model new dendrites grow up through pre-existing levels. The constant growing of the different levels of this model implies the dynamic nature of the biological hierarchy.

Another view of the structure of knowledge of alignment comes from Vygotsky (1962). Vygotsky distinguishes between spontaneous knowledge and scientific knowledge. Spontaneous knowledge is knowledge that the student constructs from his

everyday experience, while scientific knowledge is knowledge that the student constructs through direct, formal instruction. Vygotsky argues that spontaneous knowledge and scientific knowledge are different in their nature, construction, and development but that they tend to influence each other.

> We believe that the two processes—the development of spontaneous and of nonspontaneous concepts-are related and constantly influence each other. They are parts of a single process: the development of concept formation which is affected by varying external and internal conditions but is essentially a unitary process. (p. 85)

Vygotsky presents a view in which the two types of knowledge work toward each other. In Vygotsky's view, once a concept is formed, it works its way toward another concept. This concept of dynamic equilibrium is consistent with Fischer and Rose's model, in which knowledge is aligned as a network of thinking domains that intersect with each other and even cross into each other's domain. Their concept of a complicated network of thinking strands that forms forks and intersections agrees with Vygotsky's view that the two types of knowledge work toward each other. This concept, though not specifically mentioned by Diamond and Hopson, certainly links up with their belief of a hierarchy in the levels are not totally rigid but are formed through the growth of cells.

Tenet Four not only discuses how a Constructivist presents knowledge, it forms a logical connection with the first three tenets. It connects with Tenet One by incorporating the concepts of subjectivity and previous knowledge, and it forms a connection with the second tenet by viewing ways of knowing as processes. Tenet Four connects with the third tenet by viewing knowing as the ability to problem solve or create authentic

products, and this is in alignment with Tent Three's perspective of creating new thinking processes.

Tenet Five: Different Ways of Knowing Are Not Uniform In Their Development

When I was examining Tenet Four as a teacher, I quickly realized that while some students write well, they struggle with creating a visual model of their understanding. In other cases students can orally explain their reasoning but cannot express their understanding through the written word. I then asked this question: "What about the developmental rates of different domains and intelligences?" Tenet Five addresses this issue: "The different ways of knowing (or intelligences) that make up knowledge are uniform in their development. Each way of knowing develops at its own rate."

I was helped in understanding this phenomenon by a thorough analysis of Kurt Fischer and Samuel Rose (1998). They write, "Unlike height, however, cognitive spurts are evident only under optimal support conditions, not across the entire array of children's behaviors" (p. 57). Tenet Five asserts the following: "The different ways of knowing (or intelligences) that make up knowledge are not uniform in their development. Each way of knowing develops at its own rate."

Robbie Case (1991) examines cognitive development in terms of local structural changes. Case believed that intelligence is domain specific and that each domain develops at a different rate:

> The first was that the process of structural change is a local, not a general, one. That is to say, each cognitive structure is assembled independently of each other structure, in a fashion that is sensitive both to the context in which the child

> currently finds him-or herself, and to his or her previous learning history (Pascual-Leone, 1969). (p. 17)

Case not only states that knowledge is domain specific, he also states that the development of each domain depends on the environment in which the person grew up and on the individual's learning history. Case, in the same chapter, expands on these ideas. He discusses the concept that a person's intellectual development comes from a change in control structures that people possess:

> Because children's control structures are specific to particular classes of problems, and because these problems become increasingly culture-bound as they become more abstract, it is to be expected that children will show different patterns of development as a function of a variety of experiential factors, such as (a) the culture or subculture in which they are raised, (b) the specific problems they encounter most frequently within that culture, and (c) the models that the culture provides for successful problem solution. It is also to be expected that children's development will vary as a function of a variety of individual factors of a motivational or socioemotional nature, because such factors will determine the particular goals that children pursue most frequently, and the particular methods for achieving these goals that they find most attractive. (p. 49)

Validation of Truth

Tenet Six: An Individual's Ability to Validate Truth Is a Function of His/Her Ability to Make Meaning from New Experiences.

The next epistemological question that I examine is that of the validation of truth. Earlier, I used a quote from DeVries describing the phenomenon that children believe

that shadows are not transitory. The truth, for such children and, indeed, for all individuals is the level of development that they are operating at. This incident directs one to the premise that what is truth for an individual is directly related to the mode and to the level at which one can connect to new experiences. I can personally relate to that premise. When my son was approximately two years old, he had knowledge of what a train is. When my wife and I took him to the airport where he saw a small tractor hitched to about five or six small wagons filled with the luggage from an incoming flight, my son looked at the tractor and small wagons and immediately said, “choo-choo”. One may want to conclude that what one can validate as true is directly related to the level of sophistication that one uses to connect to new experiences. Most people would conclude that this is a function, to some degree, of the chronological age of the person. There has been research on this idea. For example, Siegler (1998) discusses the reverse effect:

> Parts of the cortex grow to 10 times their size at birth. Not all of the changes are from less to more, though. The density of synapses in many parts of the cortex reaches levels during early childhood greater than those in the adult brain. For example, in the frontal lobe, the density of synapses reaches twice the adult level by age 2, and it does not decline to adult levels until age 7 (Huttenlocher, 1979). The high density may allow superior learning of language and motor skills during this early period. (Bjorklund & Greebm 1992; Fischer, 1987). (p. 336).

With the last sentence, Siegler confirms the Constructivist belief that the process of validating truth is related to the mode and level that the individual is operating at. Constance Kamii (2000) discusses this phenomenon in terms of a situation in which a child is presented with six miniature dogs and two dogs of another size. The child was

asked whether there were more dogs or more animals. Kamii states that most children, with some prompting, will respond that there are more dogs than cats. While this response does sound strange, Kamii explains that while the interviewer asks, “Are there more dogs or more animals?”, the child hears, “Are there more dogs or cats?” Kamii explains:

> Young children hear a question that is different from the one the adult asks because once they mentally cut the whole (animals) into two parts (dogs and cats), the only thing they can think about is the two parts. For them at that moment, the whole does not exist any more. They can think about the whole, but not when they are thinking about the parts. In order to compare the whole with a part, the child has to perform two opposite mental actions *at the same time*—cut the whole into two parts and put the parts back together into a whole. In other words, they must be able to think about the whole and the parts at the same time. This is precisely what 4-year-olds cannot do. (p. 11)

Kamii’s use of the phrase “precisely what 4-year-olds cannot do” connects to the belief that a person validates only what his mental structure can connect to.

Tenet Seven: Biological, Cognitive, and Emotional Development and Learning Are Dynamically Related.

When I enrolled in the doctoral program at National-Louis University, I entered under the assumption that what one learns is equal to the cognitive level that one has developed, and that learning will, in turn, have an effect on what one adds to his own body of knowledge. This, however, may not represent the entire picture. There is evidence that the learning experience is not the only factor that influences what one

learns. Herman Epstein (1978) strongly advocates the position that development of the brain's structure occurs without the aid of formal learning:

> From biology we learn that formation of brain cells ceases early in life; the most recent data indicate its cessation before the end of the second year of life. The cessation contrasts markedly with the increase of about 35 percent in brain weight after that age. (p. 343)

Here Epstein is advocating a two-pronged position. First, brain development occurs independent of learning. Second, this development is not continuous, but rather occurs discontinuously, at different stages of life. Epstein summarizes this perspective:

> This chapter includes a brief account of my finding that human brain growth indeed occurs primarily during the age intervals of three to the months and from two to four, six to eight, ten to twelve or thirteen, and fourteen to sixteen or seventeen years, and that these stages correlate well in timing with stages found in mental growth. (p. 344)

Epstein's findings strongly indicate that development occurs independently of learning and it occurs sporadically. Fischer and Rose's work supports Epstein's position of sporadic growth cycles**:**

> These growth cycles repeat several times between birth and 30 years of age. Each recurrence produces a new capacity for thinking and learning that appears to be grounded in an expanded, reorganized neural network. Humans have a new opportunity for relearning skills and reshaping networks that they missed in earlier cycles." (p. 56)

This quote emphasizes an important concept: learning lags behind development. Since the growth of the brain is independent of learning, individuals have the potential to learn more than they demonstrate in the classroom. Fischer and Rose bring this point up when he uses the phrase “have a new opportunity.” Fischer and Rose support the proposition that the mind may grow independent of learning but that the existence of a new, expanded mental structure does not necessarily mean that new learning will occur. While there is a new cognitive and biological structure in place, it is up to the individual to create new learning possibilities. Thus, for Fischer and Rose, the ability to validate a truth requiring a sophisticated argument may develop independent of learning. Fischer and Rose, however, leave the door open for the concept that learning may also produce a new, expanded mental structure when they discuss the concept of a “new opportunity.” This implies that learning may also play a part in the ability of people to validate truth. The following discussions focus on that point.

Diamond and Hopson (1998), through their research with synapses, dendrites and growing brain cells, also discuss the development of new mental structures. They write: “Throughout adolescence and all during adulthood, the dendrites continue to branch, grow and form new synaptic connections as a person learns and experiences more of the world” (p. 225). Here Diamond and Hopson are illuminating the fact that as a person continues to engage in new experiences, the mind will continue to make new connections. They expand on that idea later:

> If a connection, a branch, or an entire dendritic tree withers from lack of use, plant another through stimulation of the senses, and multiple intelligences. . .but the

> etching of subtle lines, textures and details can go on for a lifetime in the dendrites and synapses. (p. 225)

Diamond and Hopson are making a strong case for a two-sided approach to the validation of truth. They initially state that development does not necessarily act as a function of learning. They, along with Fischer and Rose, adhere to the belief that the brain experiences growth on its own. In this vein both Fischer and Rose and Diamond and Hopson believe that learning and development are not the same phenomenon. Diamond and Hopson, however, present a second perspective. Based on their research, they believe that the thinking process (knowledge) of an individual grows through the interaction with the environment. They clearly bring to the forefront the idea that people will grow mentally through stimulation from the environment.

As individuals interact with the environment, they empower the brain to make new connections. These new connections represent growth. Thus, learning and development seem to be equivalent to each other. Nevertheless, the work of Fischer and Rose and that of Diamond and Hopson present a clear blueprint for this relationship between learning and development. Rather than being equivalent, learning and development are parts of a two-sided coin. While development may occur independent of learning, thus leaving learning behind development, rich interaction with the environment (learning) provides more opportunities for the brain cells to make new connections.

Other educators and researchers also support this two-sided approach to the relationship between learning and development. There is support for the premise that personal experiences act with the maturation process to produce new knowledge (Siegler,

1998). Siegler discusses this viewpoint and succinctly describes it: “Intelligence develops through the interaction of brain maturation and experience”
(p. 336). Siegler supports the position that learning and development, the two players in the process of validating Constructivist truth, exist via a two-way relationship.

This section discussed the epistemological question of how one validates truth. For the Constructivist this question is directly related to what level of knowledge the student can connect to. In other words, students can validate situations only to the extent that their knowledge base is at a level that is equivalent to the level of the particular situation at hand. At first glance this situation seems to indicate that the ability to validate truth is equivalent to one’s level of development. However, the theories of Fischer and Rose, Diamond and Hopson, and Siegler indicate that the relationship between learning and development is a “two-sided coin.” On the one side of the coin learning and development are independent of each other. Development, in cycles, may occur without any direct intervention from learning. Thus, the developmental level of students may not be evident by merely observing what they do in class. The other side of the coin indicates that, through interaction with the environment (learning), students construct more connections and thus add to knowledge structure. Thus, learning does have an effect on development.

Relationship between Meanings

Tenet Eight: Bodies of Disciplinary Knowledge and Knowing Are Interdependent

Up to this point, the process of analyzing the epistemological foundations of Constructivism has developed the concept that knowledge (a continual thinking process) is subjectively constructed into a flexible system that develops independently and by

interaction with the environment. In the spirit of Constructivism, this psychological structure is now ready to expand on itself by connecting to new questions and ideas. The logical question that surfaces is this: If the individual creates different meanings, what is the relationship among those different meanings? For the Constructivist, meaning is a system of psychological and biological connections, and any discussion concerning the relationship among meanings is actually a discussion of how connections are actually constructed by the learner. Tenet Eight summarizes this concept: "Bodies of disciplinary knowledge and knowing are related to each other by their interdependency. Each body of knowledge informs and modifies the other."

Learning, for some researchers and educators, is a continual process of reorganization. Dolk, Uttenbogaard, and Fosnot (1997) hypothesizes that this reorganization is a result of interaction between the learner and the environment:

> From this perspective, learning is understood as a developmental process of conceptual reorganization resulting from interactions between the learner and the environment and the subsequent generating by learners of reflective abstractions across and beyond these experiences (Piaget, 1997). This conceptual reorganization most often occurs in one of two forms. (p. 3)

Dolk and his colleagues view learning as the reorganization of an a priori conceptual structure. In other words, new knowledge is actually the reorganization of prior knowledge. For Dolk, Uittenbogaard, and Fosnot the reorganization of a student's mental structure is the mind's ability to connect different, preformed knowledge (prior knowledge) in different ways. The key phrase is "learners of reflective abstractions across and beyond these experiences." The concept of reorganization through abstraction

across and beyond experiences is the key. To connect across experiences implies that the mental structure of these experiences already exists. For the Constructivist, the relationship among different meanings is actually the relationship between prior knowledge and the newly constructed knowledge.

Others express this concept in another way. S. G. Grant (1997) expresses this idea when he writes:

> Learners do not receive information as whole cloth. Instead, they make sense of ideas by working them into and around their existing mental structures or schemes. Of course, learners learn new information. They do so, however, in contexts that are rooted in prior knowledge and in social contexts. What students know may be demonstrated through the recall of specific information. (p. 95)

Grant's ideas revolve around the concept of the learner reworking ideas around "existing mental structures" and using contexts that are "rooted in prior knowledge." Grant's perspective, like the perspective of Dolk and his colleagues, stipulates that new knowledge is the result of working with and modifying existing knowledge. Grant's ideas continue the concept that prior knowledge is the starting point for the creation of new knowledge.

Again, the work of Diamond and Hopson is relevant. Of particular importance is their perspective of knowledge formation. Their model describes a "connecting" activity between preexisting neurons. This model depicts electric-chemical connection between cells. With the connection between pre-existing cells the concept of prior knowledge comes into play. In other words, new knowledge is dependent on previous knowledge for

its existence. Different knowledge bases and meanings depend on each other for their existence and inform and modify each other.

While Diamond and Hopson's theory discusses the biological dynamics of creating a relationship between meanings, Dolk and Grant discuss the psychological mechanics. The psychological dynamics of creating a relationship between meanings is centered on the "weaving" or "blending" of different knowledge bases into a new knowledge base. The philosopher John Dewey (1991) supports this idea and expands on it. In his discussion concerning thinking, he supports the theorem that knowledge is actually a network of interdependencies:

> Reflection involves not simply a sequence of ideas, but a consequence— a consecutive ordering in such a way that each determines the next as its proper outcome, while each in turn leans back on its predecessors. The successive portions of the reflective thought grow out of one another and support one another. (p. 3)

Here Dewey is summarizing the Constructivist view that different meanings are related by their logical interdependency. If ideas owe their existence to other ideas, Dewey is certainly embedding the concept of prior knowledge into his philosophy. When Dewey uses the phrase "in such a way that each determines the next as its proper outcome, while each in turn leans back on its predecessors," he is stating that each idea or thinking process owes its existence to the other. For Dewey, different ideas are related by the fact that they are logically dependent on each other. For the Constructivist the relationship between among different meanings is actually the logical relationship between prior knowledge and the knowledge that flows from it.

In applying the theme from the above paragraphs of creating new knowledge by working on prior knowledge, I now ask this question: What are the *exact, concrete* actions that are the components of the process of using previous knowledge to create new knowledge? The following paragraphs address this issue.

As learners engage in new experiences, they may encounter contradictions and these contradictions are stimuli for creating new knowledge (Fosnot & Perry, 2005). Catherine Fosnot and Randall Perry discuss the nature of the individual's mental structure as it is developing. They explain the concrete actions that represent the construction of the relationship between meanings. Moreover, they discuss the reasons for the individual's desire to modify an existing thinking process. Fosnot and Perry write:

> At successive points in this spiraling equilibration, learners construct contradictions to their actions and ideas. These contradictions may be in the form of actions on objects that are not working. . . . On the other hand, the contradictions may be in the form of two theories that both seem plausible and yet are contradictory, or theories that become insufficient given new evidence. (p. 18)

Here Fosnot and Perry present two situations where the modification of previous knowledge is necessary. In the first situation the existing thinking process is not sufficient. In the second situation two thinking processes are combined in order to solve a new dilemma. Fosnot and Perry view contradictions as the starting point of new knowledge.

Our discussion of the relationship between different meanings has focused on the modification of prior knowledge. This modification consists of distinct behaviors and situations.

Our discussion concerning the relationship between meanings has focused on the parameter that meanings are related to each other by modifying each other to solve new situations. Our discussion has focused on both the internal environment and the external environment. In terms of Constructivism I must use this thinking process to ask another question: "Where do these new or contradictory situations come from? Obviously new situations come from the external environment, or society. Tenet Nine discusses the influences of the external environment on the meaning-making process.

Tenet Nine: Learning Is Both Social and Internal.

Educators, sociologists, and researchers have studied the social aspect of knowledge construction (Fogarty, 1999; Gardner, 1993; Kelly, 1997; Vygotsky, 1978). Vygotsky envisioned an interaction between the social environment and the internal workings of the individual's mind. Doolittle (1997) summarizes Vygotsky's perspective on this interaction: "Vygotsky emphasized the process of *internalization*, by which a student first experiences an idea, behavior, or attitude in a social setting and then internalizes this experience" (p. 84). This view supports the idea that learning takes place not in isolation, but within the context of society. Tenet Nine, which examines this concept, states: "Social interaction complements the internal interaction of the learner."

Diamond and Hopson also advocate the precept of the social construction of knowledge. They believe that social interaction has influence in the construction of knowledge. Diamond and Hopson discuss the work of James Connor, who studied the effects of social isolation on rats. Connor's work suggested that a rat that was isolated had a less developed mental structure than rats that had experienced social contact. Diamond and Hopson also cites the work of Richard Coss, a researcher at the University

of California at Davis. In his study, Coss found that bees that had contact with the external world had a more sophisticated mental structure than bees that had not flown into an external environment.

If society affects the development of knowledge, what are the exact actions of society? There are actually two sets of actions. One set involves the interaction between two people. Another person may bring up apparent contradictions or may confirm the validity of a working hypothesis (Gallimore & Tharp, 1990; Hardy, 1997). Michael Hardy, in discussing Von Glaserfeld, writes: "Von Glaserfeld argues further that social interaction is both the most frequent source of perturbation. . . " (p. 140).

Vygotsky takes the above ideas one step further. Vygotsky takes a detailed look at the interaction between two people through his concept of the "zone of proximal development" (ZPD). Vygotsky defines ZPD as the difference between what a students can do independently and what they can do with the assistance of an adult or a more capable peer (Vygotsky, 1962). One then sees knowledge as what the student is capable of growing toward. This idea blends with the idea of knowledge being a flexible, changing, growing structure. The ZPD, however, is more than a point in time, such as the teacher providing some suitable help and direction. Just as knowledge grows in terms of abstraction and the ability to express itself in different modes, the ZPD is a flexible, growing relationship that will change with each interaction. The ZPD represents a range of behaviors, with one end being a dependency on others, and the other end being independency (Gallimore & Tharp, 1990). Gallimore and Tharp envision the ZPD as a model for learning, and this model implies the concept of development:

> Higher mental functions that are part of the social and cultural heritage of the child move from the social plane to the psychological plane, from the intermental to the intramental, from the socially regulated to the self-regulated. The child, through the regulating actions and speech of others, is brought to engage in independent action and speech. (p. 184)

Vygotsky, from Gallimore and Tharp's perspective, sees the relationship between a more experienced "mentor" and the student as a developmental process.

The internal perspective analyzes development in terms of the strength of connections, the number of connections, the number of different modes used, and the level of abstraction. The sociocultural view, from Vygotsky's concept of ZPD, measures the level of independence exhibited by the learner. Vygotsky's model ZPD is a continuum characterized by the level of independence exhibited at each stage. Vygotsky's ZPD is part of a recursive loop in which the learner needs assistance from more capable others, then assists himself, internalizes and automates the knowledge, and then starts the cycle over. For Vygotsky, performance capacity is a progression through different levels of independence.

While Vygotsky constructs the concept of a continuum of interdependence, the concept of social interaction adds another aspect to this concept. For real learning to occur, in Samuel Hausfather's (1996) view, both the "novice" and "expert" must learn:

> Adults, peers, and cultural tools can assist the child during cognitive change, but joint construction must exist for cognitive change to occur. . . In an ethnographic study of the transmission of knowledge and skills in 35 Hispanic households, Moll and Greenberg (1990) found zones of proximal development were

> constantly generated by the productive activity of family members. Knowledge was not imposed by adults but was obtained by children within reciprocal social relationships. It was the reciprocity of social networks that allowed children jointly to construct knowledge within social contexts. (p. 4)

Hausfather adds another aspect to the ZPD. Hausfather's aspect is analogous to Vygotsky's concept of spontaneous and scientific concepts. Vygotsky postulated that both types of concepts inform one another, a state of reciprocity. Hausfather applies the concept of reciprocity to the ZPD. For the Constructivist, knowledge is a reciprocal social interaction.

The second societal contribution to knowledge construction is that of transmitting those skills important for participation in society. There is a school of thought that asserts that different societal environments will result in different societal need. As the types of skills needed for societal success change, the definition of intelligence will change. Mindy Kornhaber and Mara Krechevsky (1993), in discussing the theories of Gardner, compare the definition of intelligence for an agrarian society with the definition of intelligence for an industrial society. In an agrarian society, intelligence involves the ability to maintain social ties. It makes sense, then, that those who can secure such cooperation are said to be intelligent. In an industrialized society, however, survival depends on different skills; large portions of the society are not engaged in the production of food. This type of society develops a wide range of occupations that come from and need technological knowledge.

The demand for new inventions and the increased complexity of finance, distribution, and other fields require a literate populace. Literacy is a necessary tool if one

(or even a whole society) is to use science, mathematics, or other fields of study. Kornhaber and Krechevsky (1993) summarize this view: “All definitions of intelligence are shaped by the time, place and culture in which they evolve” (p. 231). Not only does society provide interactions with others that influence learning, but it also presents the skills that are necessary to participate in society.

Tenet Nine discusses the influences of external factors on the relationship between meanings or ways of knowing. Whereas bodies of knowledge depend on each other for their logical meaning, it is society (and its members) that provide the foundation for what is to be considered meaningful. It is society that sets the landscape for developing relationships between meanings.

Role of Language

Tenet Ten: The Linguistic Process Forms the Concept It Is Describing.

For my first 20 years of teaching, I viewed language as an instrument that communicates one’s thoughts and ideas. My studies at National-Louis have taken on a Constructivist viewpoint. Whereas I originally viewed knowledge as the transporter of one’s thoughts, I now have a different view of the role of knowledge. There is a realm of thought that places language as part of the process of knowledge construction. Indeed, several educators and researchers present this premise (Fauconnier, 1997; Fauconnier & Turner, 2002; Foucault, 1972). Tenet Ten examines this concept and expresses the relationship between knowledge construction and language: “Knowledge construction and meaning making involve the linguistic process of choosing words that will form the concept (naming the word). The words, syntax, and grammar represent a construction in their own right.”

Foucault (1972) clearly presents the postulate that language is more than a system of signs; rather, language is actually a process that forms the objects or ideas that it communicates:

> A task that consists of not— of no longer— treating discourses as groups of signs (signifying elements referring to contents or representations) but as practices that systematically form the objects of which they speak. Of course, discourses are composed of signs; but what they do is more than use these signs to designate things. It is this more that renders them irreducible to language (langue) and to speech. It is this "more" that we must reveal and describe. (p. 49)

I have integrated the phrase "what they do is more" into my Constructivist philosophy, as I illustrate below.

Gilles Fauconnier and M. Turner (2002) support Foucault's supposition that language is part of the process of knowledge construction. Fauconnier writes:

> The various schemes of form and meaning studied by rhetoricians can be used by the skilled orator, the everyday conversationalist, and the child. Similarly, modern language science has shown that there are universal cognitive abilities underlying all human languages and shared by the adult and the child. (p. 17)

The use of the phrase "universal cognitive abilities underlying all human languages" indicates the belief of Fauconnier and Turner that language is not merely a transporter of a person's thought but that language is actually the construction of that thought. Fauconnier and Turner view the mental operations of metaphor, grammar, analogy, and reasoning as being part of the process of conscious awareness. Thus, language is a mental operation that brings one's thoughts to the conscious level.

Fauconnier (1997) summarizes his beliefs and the beliefs of Foucault when he writes, "Mappings between domains are at the heart of the unique human cognitive faculty of producing, transferring and processing meaning" (p. 1). Fauconnier views language as a construction process itself. For Fauconnier, the mapping of a concept from one domain to another is construction of knowledge. Fauconnier confirms his belief in this idea when he writes: "*Meaning construction* refers to the high-level, complex mental operations that apply within and across domains when we think, act, or communicate" (p. 1). Fauconnier sets out the premise that visible language is itself a construction. This is important for the Constructivist teacher because it emphasizes how the process of putting thoughts into words is an act of construction in its own right.

Fauconnier views language as an act of mental construction, but what exactly are the concrete actions of this construction? Fauconnier answers this question with his concept of "mappings between cognitive domains." For Fauconnier, these mappings are the core operations of linguistic mental construction. For example, Fauconnier believes that we map our conception of space and motion to organize our concept of time:

> Some of these mappings are used by all members of a culture—for instance in English, TIME AS SPACE. We use structure from our everyday conception of space and motion to organize our everyday conception of time, as when we say: Christmas is approaching; The weeks go by; Summer is around the corner; The long day stretched out with no end in sight. (p. 9)

Fauconnier views the process of the construction of a concept to include the construction of the mappings that are used to make the concept concrete.

Fauconnier's concepts of language as a construction process via a one- to- one mapping runs parallel (the phrase "runs parallel" is an example of what Fauconnier is talking about) with the views of some hermeneutic philosophers. There is a train of thought that believes that the context in which a word is used is part of the process of meaning construction. Theodore Kisiel (1985), in discussing the nature of the hermeneutic relation between people, says this:

> Because language is first of all not an object but the element in which our understanding is lived, the continual "concept formation" which occurs historically on a pre-conceptual level has naturally been overlooked by many past students of the reality of language. For a word multiplies itself not only uniformly, as logic would have it, but also creatively, according to a varying context, in what might be called "the living metaphoric of language. (pp. 12, 13).

Here Kisiel is hinting at a Constructivist perspective of language. His use of phrases such as "continual concept formation," "a word multiplies itself," and "creatively, according to a varying context," indicates that he is in accordance with Tenets One and Two. Kisiel believes language is the result of a subjective and continual process that results in words whose meaning vary with context.

Kisiel, in the spirit of Fauconnier, goes one step further and suggests the mechanics of this process. Kisiel views language construction as a subjective process of matching words with the particular experience:

> What comes to language is not something that precedes language "but receives in the word the determination of itself." For an experience is not first wordless and then subsumed under the generality of a word through naming. One seeks and

> finds just the right words to display one's experience, and without them the experience itself would not be possible. In this sense, the words are intimately involved in and really belong to their subject matter. (p. 14)

This quote from Kisiel has two effects. First, it confirms the precept that language itself is a process of construction and not a ready-made container for the transporting of a concept. The second effect is that Kisiel describes, to some degree, what the process of construction really is. Kisiel uses the phrase "seeks and finds just the right words," and this certainly points to Fauconnier's concept of a one-to-one mapping. The concepts of "a one to one mapping" and "finding the right word" have a commonality running through them, namely, that the individual uses language as a construction that actually forms the meaning. This commonality forms the foundation of Tenet Ten.

For the Constructivist, language is not a transporter of an already formed concept. Rather, language is a process that forms and constructs the meaning of the concept. It is through the language used to described the concept that the concept receives its meaning.

Summary

I began the process of reflecting on my experiences and using new experiences to create a new vision for Constructivism. Using the conceptual framework of five epistemological considerations, I have created ten tenets that will go toward creating a new strategy and vision for my practice. These ten tenets will also form the basis for determining observable behaviors in the Constructivist classroom (see Appendix A).

CHAPTER SIX: CONSTRUCTIVISM AND CLASSROOM PRACTICE

Translating Constructivism into Behaviors

This section is analogous to the day my son was born. When the nurse handed me my son, I panicked because I did not know what to do with my "new bundle of joy." When I first studied Constructivism, I was excited with this new philosophy, but I did not know what to do with it or how to translate it into pedagogy. The goal of translating the Tenets into pedagogy and curricular guidelines structured my ensuing studies. Through my CAS studies and my doctoral studies I have analyzed my implementation of the Constructivist philosophy. I have asked myself the following questions:

- What does a Constructivist classroom look like?
- What does a Constructivist classroom sound like?
- What are the roles of students?
- What are the roles of the teacher?
- What are the nature and role of dialogue?
- What is the role of social interaction?
- What does the assessment process look like?

I have blended these questions with the tenets and epistemological considerations to come up with the "Standard Six." This is a list of behaviors that correspond with the epistemological considerations and the tenets of Constructivism.

Table 1: The Standard Six Behaviors of That Describe Constructivist Teaching

Constructivist Concept/Tenet	*Teacher /Student Behaviors and Questions*
The Nature of Knowledge Perceived as a Process of Personally Imposing Order on New Experiences. *1. Knowledge is a personal construction.* *2. Knowledge construction is a process* *3. Knowledge has two functions. The first function is that of imposing order and new experiences.* *4. People regulate and analyze their unique way of learning.*	*1. Can you create your own definition?* *2. What is your best guess?* *3. How did Bill's explanation change your opinion?* *4. Can you combine steps to form a new procedure?* *5. What have you added to your thinking process?* *6. How is this problem different from previous problems?* *7. Can we use Sue's ideas to solve this problem?* *8. What do you already know that you can use to solve this problem?* *9. Why can't what we learned yesterday help us with this problem?* *10. Write down what surprised you about today's lesson.* *11. What method of doing this problem is easier for you to understand?*
The Nature of Knowledge Perceived as Multiple Ways of Knowing *1. Knowledge is subjectively presented by various modes.* *2. Students use the visual, symbolic, and linguistic modes routinely.*	*1. How would you reword that?* *2. Can you put that in the form of "If…then…?"* *3. Please come to the board and draw a diagram that represents what you just said.* *4. Look at the diagram. Say, in your own words, what the diagram communicates.* *5. Can you say that using the mathematical symbols?* *6. Your assignment today is to summarize the main ideas by writing a poem or rap song about them.* *7. You seem confused. Can you put in words what is bothering you?* *8. Students use manipulatives and everyday experiences.*
Measuring Knowledge as Distinct Modes and Skills That Are Used to Solve Authentic Problems *1.Students use different domains to solve authentic problems. For example, students use Geometry to determine the cost of putting sod in an irregular-shaped lot, and then write a letter to the customer explaining his calculations.* *2. Students write out a flight plan.*	*1. What do we know?* *2. What do we need to know?* *3. What does the customer want me to do for him?* *4. What is the final cost of?* *5 Let's reword what we need to do.* *6. How does this new information change the nature of the problem?* *7. Let's read this article from yesterday's paper and see what problem it presents.*
The Validation of Truth and the Relationship between Meanings as Functions of Previous Experiences and Development. *1. Students learn by modifying their previous understandings.* *2. Students learn by connecting their life experiences to their school experiences.* *3. Students discuss the relationship between their school knowledge and their everyday knowledge.* *3. The teacher must determine what the present mental structures are able to connect to in terms of*	*1. Can we use yesterday's lesson to solve this problem?* *2. How does this relate to your everyday life?* *3. Can we use this lesson to solve a problem you have encountered on your job?* *4. I want you to use your definition, but just remember that the book states it another way.* *5. The teacher uses the concept of classifying cars to classify triangles.* *6. The teacher uses the concept of wrapping and unwrapping to teach the solving of equations.*

modes.	*7. The teacher has the students use their own wording of a theorem in a proof.* *8. I know that you can say it in words, but your goal is to use a diagram. This will be your goal for the quarter.*
Social Interaction Influences/ How People Make Meaning *1. People learn from one another.* *2. Other people can confirm one's understanding.* *3. Other people can present contradictions to one's understanding.* *4. Other people can present the understanding of a concept in a different mode.* *5. In general, society presents what skills are important.*	*. Sue, what do you think of Bill's comments?* *2. Jackie, do you agree with Jim?* *3. The teacher puts students in groups, and expects students to document how they learned from each other.* *4. The teacher structures the class so a student who is an "expert" in one area can help others.* *5. Ask your parents what skills are important in their job and then reflect about how this class can help you learn that skill.* *6. Lessons are centered on authentic problems found in the newspapers, etc.* *7. Students are continuously working with different people in a group setting.*
The Role of Language (The Act of Putting One's Understanding into Words). *1. Language is not a ready-made container that one places one's understanding into.* *2. The act of putting understanding into words is a construction in itself.* *3. Words are not used to transport the understanding but actually form the understanding.*	*1. The teacher continuously has students express their understanding verbally and orally.* *2. The teacher continuously has students reword their understanding.* *3. Cheryl, can you use another word?* *4. Bill, was that what you meant to say?* *5. Gwen, can you reword it so Chris can understand what you said?* *6. Students, as part of authentic problems, write letters, write bids, etc.*

Problem Based Learning and Constructivism

For five years I attempted to translate Constructivism into pedagogy. I was somewhat successful, but something was missing. My classes were engaging in the Standard Six, but we were doing so in order to prove an abstract theorem that the students would never apply outside the classroom. If we did an application problem, it did not have the effect that I wanted. The students seemed to be mindlessly applying the principles we learned to a pre-fabricated problem. It was as if they were just applying an algorithm to yet another abstract problem and checking with the teacher to see whether the answer was right. I started to think of what I was required to do when, as a reserve officer, I was activated for eight months. This reflection led to the following revelation:

In real life your boss does not hand you a well-defined problem for which you can easily and directly apply an already established algorithm. In real life you are handed (usually at 4:00 on a Friday before a vacation) a messy, confusing, loosely defined situation, for which you must define the problem and structure the thinking processes in order to create the best possible solution (as opposed to a clear-cut right answer as is presented in academic situations). In the real world, successful people must use higher order-thinking skills in order take a messy situation and define the problem, construct questions to be answered in order to solve the problem, rank these questions, define the resources to be used, construct possible solutions, debrief the problem, and then start this cycle over again. Up to two years ago I was looking for a pedagogy that was centered on this principle. My previous attempts to implement Constructivism were stifled because they did not represent what really happens in the real world. My implementation of Constructivism was centered on understanding a predetermined, well-defined principle and then applying it to a predetermined, clearly stated problem. This scenario did not empower the students to develop the higher-order thinking skills of defining problems, solutions, and creating a solution for a messy situation. When I read about problem-based learning (PBL), I felt that I found the instrument for translating my Constructivist philosophy into a pedagogy that would result in students demonstrating authentic problem solving skills. After more reading and reflection I used Constructivism to blend my Standard Six (I did not call them that until just recently) with PBL in order to form pedagogy and a curricular template.

As with Constructivism, PBL has many versions and many educators who claim to implement it. There are many definitions and versions of PBL, but there are some

constants for all of these versions (Duch, Groh., & Allen, 2001; Kilpatrick, 1929; Levin, Dean, & Pierce, 2001; Stevenson, 1921; Torp & Sage, 1998). I have used these constants and blended them with my Standard Six to create pedagogy.

Definition and Implementation of PBL as Pedagogy

PBL is pedagogy and a curricular organizer that uses a hands-on, minds-on, experiential approach. It is centered on a messy, ill-defined authentic problem in which the student takes on the role of a person who has ownership of or stake in the problem. Here are some examples. Students work as reporters for a new sports magazine that is lacking in female readership. The editor wants the reporter to write an article entitled, "Will Women Outperform Men in Athletics?" In my college algebra class we used data collection and linear regression to do this. In a composition class students act as a consultant to a warden who is concerned with recidivism among woman prisoners. The warden wants to know why these women do not succeed in the outside world. He wants to know what kind of communication skills these women will need. The warden has commissioned the consultant to design a program to address these needs. In each case, PBL presents the situation first, and that situation is messy, cloudy, and ill defined. The students then construct the problem definition and then construct the questions to be asked in order to solve the problem. The PBL pedagogy consists of eight steps:

1. Meet the problem.
2. Identify what we know, and what we need to know, and rank our ideas.
3. Define the problem statement.
4. Gather and share information.
5. Generate possible solutions.

6. Determine the best solution.

7. Present the solution.

8. Debrief the problem.

An examination of these steps reveals that the PBL process is in accordance with the ten tenets. Students must construct their understanding and definitions, use multiple modes, and work with others in order to solve an authentic problem. PBL is a tool for delivering the Constructivist philosophy.

Summary

In this chapter I used the five epistemological considerations and my ten tenets of Constructivism to create a list of behaviors that describe, control, and predict behavior in the Constructivist classroom. The result is what I will call the Standard Six behaviors of Constructivism. This is in accordance with curricular theorizing. The Ten Tenets and The Standard Six Behaviors that Describe Constructivist Teaching represent strategies and a vision for action in the classroom and they receive their meanings from the five epistemological considerations.

CHAPTER SEVEN: BLENDING CONSTRUCTIVISM WITH BENEDICTINE VALUES

General Analysis of Benedictine Educational Practices and Benedictine Values

This chapter examines the process of blending Benedictine values with the Constructivist philosophy. This process begins with an overall analysis of Benedictine educational practices and Benedictine values. This is done in order to determine the degree to which Benedictine monasticism is Constructivist. The second part is the examination of characteristics that are unique to Benedictine monasticism. These characteristics are then translated into Constructivist behaviors in order to create pedagogy that is unique to the Benedictine order. This pedagogy is structured by four hallmarks, which are characteristics that are necessary for pedagogy to be called "Benedictine."

Benedictine Knowledge: Subjective and Internal Construction of Knowledge

Tenet One presents the Constructivist belief that knowledge is subjective and is constructed by modifying previous knowledge through interaction with the environment. Benedictine pedagogy supports and exemplifies the notion that a person subjectively constructs knowledge. Father Placidius Schorn (1926), a Benedictine monk, discusses how one learns. He states the following, "We can teach the student but little; we can arouse his interest, show him the field of study, guide him in the solution of problems, and then direct his efforts in reading and studying" (p. 59). Here Shorn, back in 1926,

was advocating the subjective construction of knowledge. Another Benedictine, Father Peter Hammett (1988), also discusses the subjective construction of knowledge. Hammet, though he does not directly address pedagogy, does discuss the subjective dimension of knowledge. He does this by discussing the role of the abbot:

> The abbot is to be so attuned to various personalities in the community that he will know when to use firm argument and when to appeal for greater virtue. Finally, to indicate that the abbot is dealing with the subjective dispositions of unique individuals, Benedict says that the abbot "must so accommodate himself to each one's character and intelligence" that he will not only lose none of the flock entrusted to him but "will rejoice in the increase of a good flock" (RB2.32). (p. 279)

Hammett is expressing the Constructivist view that knowledge is a subjective entity, and thus he is in alignment with Tenet One.

The Rule of Benedict also addresses the issue of the subjectivity of knowledge. The Rule, in the interpretation of Fry (1981), views interaction with individuals as interaction with knowledge of God. In Chapter 53 Benedict writes: " All guests who present themselves are to be welcomed as Christ, for he himself will say: *I was a stranger and you welcomed me* (Matt 25:35)" (pp. 255, 257). Later, in the same chapter, Benedict writes: "All humility should be shown in addressing a guest on arrival or departure. By a bow of the head or by a complete prostration of the body, Christ it to be adored because he is indeed welcomed in them" (p. 257). Benedict also discusses this concept in Chapter 19: "We believe that the divine presence is everywhere" (p. 215). Interaction with people, for Benedict, is interaction with Christ Himself.

Benedict believes not only that people represent knowledge but that people are unique and have different needs and talents. In Chapter 2 Benedict discusses the qualities of the abbot in dealing with the monks in his monastery, and he writes: "This means that he must vary with circumstances, threatening and coaxing by turns, stern as a taskmaster, devoted and tender as only a father can be" (p. 175). Benedict extends this idea in Chapter 3 when he discusses how the abbot must make an important decision. Benedict states that the abbot must consult with all members of the monastic community because "the reason why we have said all should be called for counsel is that the Lord often reveals what is better to the younger" (p. 179). Here Benedict is indicating that younger monks may have qualities and talents that other monks may not possess. Benedict, in effect, summarizes his ideas on the subjectivity of knowledge and the different forms of knowledge when he writes, "Brothers will read and sing, not according rank, but according to their ability to benefit their hearers" (p. 239). For Benedict each individual represents Christ, and each individual is unique; thus, knowledge is subjective and manifests itself in different forms. Benedict's view that knowledge is subjective and comes in multiple forms is consistent with Tenets One, Two, and Four.

Benedict presents a "second layer" to the concept of multiple ways of knowing. Benedict believes that the whole person consists of three parts (de Waal, 2001). Benedict, according to de Waal, believes that "since the body, mind and spirit together make up the whole person the daily pattern of life in the monastery should involve time for prayer, time for study, and time for manual work" (p. 86). Since interaction with an individual is knowledge and man is made of different components, an individual can be thought of as representing different knowledge bases.

While Benedict and his followers believe that there are multiple ways of knowing, he does not mean that these ways of knowing are static. He wants all activities and learning modes not only to be represented but also to be connected to each other. He writes, “Let us stand to sing the psalms in such a way that our minds are in harmony with our voices” (p. 217). Benedict uses the analogy of a ladder to address this idea. He writes, “Then by our ascending actions we must set up that ladder on which Jacob in a dream saw *angels descending and ascending* (Gen 28:12)” (p. 193). De Waal (2001) states that the use of a ladder as a symbol is significant: “When in chapter 7 St Benedict employs the image of a ladder he uses it as the ancient classical symbol of unity and integration” (p. 88). A ladder with lopsided rungs certainly represents a reality that is out of sync and not balanced. For the Benedictine educator implementing Constructivist pedagogy, all types of knowledge must be connected to each other, and this is in accordance with Tenets Four and Eight.

Benedict addresses the concepts of balance, unity, and integration throughout the rule. Benedict’s Rule sets out many guidelines for the living of an ordered and regulated life. In Chapter Two he writes, “Everyone is to keep to his regular place” (p. 175). In Chapter Forty-Seven Benedict says, “So that everything may be done at the proper time” (p. 249). The concept of balance, order and unity is discussed in Chapters 8 through 20, in which Benedict lays out the guidelines for prayers.

De Waal extends this idea to include the architecture of the monastery. She writes:

> In the monastic life itself of course the monastic setting, the buildings and their relations both reflect and encourage this inter-connectedness of activity. One

> contemporary Benedictine makes this point, seeing the life of the monastery as a seamless garment. (p. 93)

For Benedict, different activities and different types of knowledge are continuously growing toward each other, and the effect is a one seamless knowledge base. This is analogous to Dewey's continuity principle and to Vygotsky's concept of scientific and spontaneous knowledge influencing each other. Both of these concepts are represented by Tenet Eight, which states that different bodies of knowledge are interrelated to each other by the fact that they inform and modify each other.

Benedictine Knowledge: Social Construction of Knowledge and Solving Authentic Problems

While Hammett and Shorn present the perspective that knowledge construction is an *internal* activity, there are Benedictine educators who not only discuss the internal dimension of learning but also discuss the social aspects and influences of learning. The environment in which a person lives also influences learning. This is evident by the new thinking patterns displayed by college students (Kohake, 1968). Father Kohake, in his discussion of the problems in institutions of higher learning, states that new college students think differently because they are influenced and shaped by an environment that is much different from the environment that the educators who are teaching these students experienced. Father Kohake believes that these phenomena have shaped and influenced the lives of entering college students. He says the following, "The world fashions man's mentality, and present-day students have been deeply influenced by television, cybernetics, space-exploration and a continuous flow of new inventions"

(p. 117). Father Kohake advocates the view that society presents new problems and new needed skills for each generation. As society changes, it brings with it a need for a new style of thinking. This is in accordance with Tenets Four and Nine.

In general, the monastic way of life does incorporate the view that the social environment influences learning. A. W. Richard Sipe (1983), though he did not specifically focus on Benedictine education and pedagogy, believes that the monastic lifestyle acknowledges the effects of society on the growth of monks. Sipe states, "Because of this need to adapt to one's circumstances, the monk needs to be aware of his particular time and place-it is an historical realism that allows him to grow" (p. 425). Sipe views a changing environment as an impetus to monastic growth. Sipe, earlier in the same article, summarizes his view by stating, "Indeed, there are both individual and communal (or social) components of this search for new or better ways to live and serve" (p. 425).

Not only does Benedictine pedagogy recognize the influence of society on learning, but also the work of the Benedictine order has been influenced by the needs of society. While the Benedictine order has been recognized for preserving written histories, much documentation indicates that the Benedictines have helped society in whatever endeavor that called for help. Daniels (1997), while discussing the work of the Benedictines, emphasizes how the order has adapted to changing times, and acknowledges that such change has resulted in new skills for the monks. Daniels writes:

> Benedictine communities have always achieved a relationship with the world around them. For example, the original Benedictines generally settled on hills, but the monks of the Cistercian branch preferred the valleys. This topographical

> variation in the location of their monasteries proved to be of great economic and technological significance, because it broadened the influence of the Benedictines in the development of Europe. Also, because it was know that they had learned to control malaria, the Cistercian Benedictines were entrusted with draining the Roman Campagna. (p. 8)

Daniels, later in her book, expands on the theme of the Benedictine response to the needs of society. She describes how the Benedictines, though they did not immediately launch into the sciences, did believe that the same person could learn different skills. This resulted in the Benedictine influence on science and technology. Daniels discusses this phenomenon: “This sort of atmosphere proved of enormous importance for the development of European technology and science” (pp. 10, 11). Thus, from the Benedictine perspective, society provides the background and individuals needed for the development of new thinking to solve new problems. This point is brought out by the theme of Daniels’s book. In addition to discussing Benedictine endeavors in general, Daniels focuses on the work of one monk, Pedro Ponce de Leon. Ponce de Leon saw a need to educate deaf people and is generally credited with being the first teacher of deaf people.

Interacting with and being influenced by society can characterize Benedictine pedagogy and ministry, and this is in accordance with Tenets Four and Nine. Not only does society interact with Benedictine ministry, but also the Benedictine ministry is focused on the solving of problems. The Constructivist lens interprets this focus as being congruent with Tenets Four and Nine. Tenet Four describes knowledge as being domain specific, and Tenet Nine describes knowledge as being dependent on social interaction.

As the Benedictine order saw its ministry as dealing with problems, the Benedictine Constructivist envisions pedagogy as being centered on solving authentic problems and creating authentic products. This is in accordance with Tenets Four and Nine and implemented through PBL.

Benedictine Values, Educational Practices, and Cognitive Development.

As mentioned earlier, Benedict discusses in Chapter Two how the abbot must deal with different dispositions and this implies that individuals are at different levels of development. In another reference to development, Benedict discusses the allotment of food for his monks. Benedict states that the monastery should provide for two kinds of food because "the person who may not be able to eat one kind of food, may partake of the other" (p. 239). In Chapter Forty-Eight Benedict recognizes that people can only do what they are capable of doing: "Brothers who are sick or weak should be give a type of work or craft that will keep them busy without overwhelming them or driving them away" (p. 253). In Chapter 68 he writes, "A brother may be assigned a burdensome task or something he cannot do" (p. 291). Here Benedict is recognizing the different levels of capacity of individuals. Benedict's view of development of his monks aligns with Tenets Five and Six.

Tenet Nine, while it states that learning is both internal and social, discusses the concept of development through Vygotsky's ZPD. The ZPD is the difference between what a student can do independently and what the student can do with the assistance of a more capable peer. As was stated in Chapter Three, the ZPD can be viewed as a developmental concept. A common practice in monastic schools was that of applying a similar principle (Quinn, 1985). While the master teacher would present the lesson, the

monastic school would apply “a practice whereby more advanced learners directed the lessons of the lesson advanced students” (p. 112). In terms of development, Benedictine values and educational practices align with Tenets Eight and Nine.

Benedictine Values, Educational Practices, and Constructivism

The preceding discussions examined the relationship between Constructivist principles and practices. This examination brought to light the congruence between Constructivist principles and Benedictine values and pedagogy. While the use of monastic principles within a Constructivist framework will result in effective practice, it does not guarantee that this practice will represent a unique form on Constructivism. The following paragraphs discuss the process of analyzing such uniqueness.

Benedictine Community and Constructivism

The purpose of this section is to examine Benedictine values and practices that are unique to the order so that they can be translated into Constructivist practices that will represent a unique form of Constructivism. In looking for the unique characteristics of the Benedictine order and Benedictine educational practice, a good starting point would be the study of the practice of community (Strange, 2002). According to Strange, educators use the concept of community to structure the discussions of their practice: “When we wish to elevate the nature of our work as educators we often invoke symbols of community. We call ourselves a community of scholars. We are members of an academic community” (p. 5).

The concept of community as a parameter for studying education is not new. Strange discusses how the writings of early historians are filled with examples of

communal activities in an educational setting. Strange, in discussing cenobites (men and woman who lived together in a community), writes:

> About 335 A.D. Pachomius wrote the first rule for those living in communities which laid out the regulations for "the good order to be preserved in everyday affairs, such as food, drink, use of books, care of the sick, coming late to prayer" (Fry, 29). A parallel might be found in the purposes and procedures of a modern day college handbook. (p. 5)

Thus, an analysis that examines the uniqueness of Benedictine values should start with an examination of the Benedictine communal lifestyle. For the Benedictine order and for Benedictine educational institutions, the theme of community is important. Appendix B contains the mission/value statements of Benedictine secondary schools, colleges, and universities, and a close look at it bears out the importance of community in Benedictine institutions. Marmion Academy aims to "build a community of skilled and dedication educators, and talented and receptive students," while Benedictine College (KS) invokes a vision of a "the education of men and women within a community of faith and scholarship". Mount Marty College of South Dakota promotes the values of "awareness of God, community, hospitality, and life-long learning." The idea of community is also prevalent at St. Gregory's in Oklahoma. St. Gregory's mission statement holds that "St. Gregory's University promotes education of the whole person in the context of a Christian community ." A closer look at Appendix B will reveal that "community" is an important framework for Benedictine institutions.

Strange believes that to understand the Benedictine monastic tradition and thus understand Benedictine educational practices, it is prudent to begin "articulating what we

believe to be the essence of the Benedictine tradition by focusing on six foundational values" (p. 7). Strange lists theses values as follows:

- Traditio et Regula (Documented and lived experience. It is the documented rules, regulations, and traditions of the community)
- Stabilitas (The importance of commitment—to this community).
- Conversatio (The importance of commitment to growth and change).
- Ora et Labora (The integration and balance of work and prayer. For the educator it points to the integration of theory and practice).
- Obedientia (The active listening to others and the giving over of oneself to others in trust).
- Hospitalitas (The importance of being open to those from without)

The following discussions will examine the significance of these values to the uniqueness of the Benedictine community, and this will lead to Constructivist behaviors that will define a unique pedagogy.

Traditio et Regula

Since most communities have a written statement that defines their purpose, goals, order, and identity, it is quite natural for a community of learners to have a written document that defines its rules and traditions. Strange views rules and regulations as an essential and defining component of a community: "The Rule of Benedict is a written document, and most communities have a written statement that defines their identity and purpose and order. Nations have constitutions. Religions have scriptures" (p. 3). While at first glance it may seem that a course syllabus may suffice for this purpose, Strange raises the point that there may be more to it:

> In recent years I've thought more carefully about these aspects of my own teaching and I have tried to identify what might characterize my own classes in the minds of my students. What is my rule and what is my tradition? (p. 3)

The phrase "my rule and my tradition" piques my curiosity. While I have a syllabus that is over fifteen pages long, it really does not contribute to the development of community in my classes. My syllabus is a managerial tool, but since it does not address the ideas of my personal traditions, it is ineffectual for developing community, which in turn produces a distinctive identity.

Strange presents some ideas for creating a Regula et Traditio. Strange creates a "Class Compact" which each student must sign and for which a student is responsible. It is more than a managerial too because it is "a document we revisit often, usually at the beginning of the class when we might focus on one or another of its provisions" (p. 4). I must ask these questions: (a) what are my traditions as an educator? (b) In what areas will I allow the class to create their own traditions?; (c) what personal rules and traditions might I want to compromise on or change? In order to create a unique Benedictine pedagogy it is imperative that I create my own Regula et Traditio.

My Personal Regula et Traditio

What are my traditions that make me a unique educator and/or determine my educational identity? Obviously, it is my application of the Constructivist philosophy. It is not only that I am a Constructivist teacher that determines my identity, but that I have my own form of Constructivism. My rules must include my expectations of the role of both teacher and student in the Constructivist classroom structured by my philosophy. My tenets and Constructivist behaviors (Standard Six) structure my rules and tradition.

Other behaviors that structure my tradition are the following: (a) answering a question with another question; (b) starting with a case study; (c) creating authentic products: (d) having students take ownership of the class by presenting topics; (d) class discussions and presentations center on the question, “How will you use this in your practice?” (e) having the class center on creating authentic products that can be used in practice.

A second area to be investigated is that of having students determine a behavior that defines the tradition of the class. This is a Constructivist activity and involves the discussion of a practice that helps them to learn. This is in agreement with Tenets Three and Nine, which discuss the functions of knowledge and the importance of social interaction in knowledge formation. The process of defining a class tradition empowers the class to “take ownership” in the creation of a unique identity and tradition.

The purpose of this study is to describe behaviors that frame a unique form of Constructivism. The discussion thus far has started the process. What will an observer experience when he walks into a room structured by Constructivism and “Traditio et Regula”? The observer will see students engaged in creating their own definitions, using multiple modes, working in groups to solve authentic problems, assuming the role of instructor, using previous knowledge to create new knowledge, analyzing and monitoring their own behavior, and using PBL techniques. The observer will also witness the class determining their own unique tradition and constantly referring to that tradition (through a written document) in order to monitor and modify that tradition. Now, what makes this class so unique? First, many students have not experienced a Constructivist classroom, and this maybe unique for them. Second, many students have not experienced a classroom in which “tradition and identity” are discussed, developed, and modified.

While many students have not experienced this type of environment, there may be some that have experienced portions of this type of practice. To develop a totally unique form of Constructivism through Benedictine values, it is necessary to look at the other characteristics of Benedictine community.

S*tabilitas*

For Benedict stability is a commitment to the community (Strange, 2002). The Benedictine vow of stability requires more commitment and loyalty than what is required in the modern world (de Waal, 2001). The Benedictine vow of stability "raises the whole issue of commitment and fidelity which is curiously alarming to those in the world who are not asked to undertake the solemn profession demanded of the Benedictine novice" (p. 55). Benedict, in the Rule writes, "Do not grant newcomers to the monastic life an easy entry, but, as the Apostle says, *Test the spirits to see if they are from God* (1 John 4:1)" (p. 267). Benedict, in the same chapter, embellishes this concept: "The novice should be clearly told all the hardships and difficulties" (p. 267). The question that naturally ensues is, how does this idea of total commitment play out in the Constructivist classroom? Strange (2002) answers this question by referring to Traditio et Regula: "Stability of course, and rules and regulations, go hand in hand. A person identifies with a particular community by adhering to its rules" (p. 4). Regula et Traditio has, to some extent, addressed the issue of commitment to the community (Stabilitas). By reading and signing the "class compact" (my personal Regula et Traditio), students have expressed their commitment to the class community.

Commitment, as Benedict describes it requires the commitment of the *entire* person. Benedict, in the prologue to the Rule writes, "We must, then, prepare our hearts

and bodies for the battle of holy obedience to his instructions" (p. 165). Benedict again refers to the total commitment in Chapter 7. In discussing humility Benedict writes:

> The twelfth step of humility is that a monk always manifests humility in his bearing no less than in his heart, so that it is evident at the Work of God, in the oratory, the monastery or the garden, on a journey or in the field, or anywhere else. (p. 201)

Here Benedict addresses all aspects of man: the heart, body, and mind. Benedict is asking for a commitment from the total person. Traditio et Regula has touched on this, but Strange presents another perspective on the relationship between Stabilitas and commitment. Strange envisions Stabilitas as charging the teacher to educate the total student:

> Once again, thinking of my classroom, the hallmark Stabilitas requires the presence and commitment of the whole student—body, mind. Spirit, and affect. I like to encourage that commitment, so I make it my custom to spend a little time occasionally at the beginning of class attending to students as whole human beings, asking them how things are going in their lives. "How did you spend your weekend?" is a question that might start the week, and "What was most challenging to you during the week?" is another question that might end the cycle. (p. 4)

Strange, while discussing the whole person, continues by discussing how this ideas relates to the academic side of the student:

> Hearing their reflections reminds me of the context for their learning and it hopefully invites them…to intersect the big story of the discipline with the small

> story of their lives. This makes learning real and present; it also reminds me that I don't teach education, I teach students. (p. 4)

Strange is discussing commitment to the different aspects of the student's life. How does this translate into Constructivist behaviors? His phrase "to intersect the big story of the discipline with the small story of their lives" provides direction for this answer to this question. Tenets Four and Eight state that different forms of knowledge are dynamic in that they inform each other and grow toward each other. This is connected to Strange's interpretation of Stabilitas. While Strange discusses the Benedictine commitment to the development of the entire man, a curricular interpretation views a student as taking different courses and having different knowledge bases. Each of these knowledge bases has the capacity to grow toward each other, and the Benedictine educator has the obligation to empower the student to integrate the different courses that the student is taking. The Benedictine educator will not only ask the student how this course is related to another course, he will structure assignments that ask the student to do this. The instructor will work with instructors from other courses to determine how their courses can interrelate with his particular course.

Creating a stable environment is a hallmark of Benedictine pedagogy as seen through the Constructivist lens. The behaviors that shape Stabilitas are as follows:

- Students make a total commitment to the course by signing the "class Comact," a written document that contains the details of the class rules and regulations.
- Students actively participate in the unique tradition of the class, and this includes Constructivist activities.

- The entire class participates in creating their own tradition.
- The instructor frequently reviews the class compact with the class.
- The instructor works with other instructors in order to determine how their different courses relate to and inform the other.
- The instructor builds into his course assignments that empower the student to integrate knowledge from other courses (this includes previous courses and future courses).

Stabilitas and Community

Stabilitas is not only manifested through Traditio et Regula, it is manifested through the practice of community (Klassen, Renner, & Reuter, 2002). Stability is essential to community because "stability impels us to build relationships with trust and depth sufficient to face together life's real issue" (p. 169). Stability then is the basis for developing relationships, and this leads to the hallmark of social interaction. As was previously mentioned, social interaction is a prominent characteristic of Benedictine monasticism. The translation of this to Constructivist pedagogy is in line with Tenet Nine. While the Benedictine community is earmarked by social interaction, this study examines this hallmark in order to determine what is unique about Benedictine community.

Benedict provides numerous examples of the uniqueness of Benedictine community. One set of examples focuses on the role of the abbot. Benedict discusses the modeling done by the abbot (p.173):

> He must point out to them all that is good and holy more by example than by words, proposing the commandments of the Lord to receptive disciples with

words, but demonstrating God's instructions to the stubborn and the dull by living example.

How does this modeling look like in the Benedictine classroom? What does the teacher model? The teacher can model for students how he carries out his own class tradition. As an example, I often discuss with my class how my presentation follows Constructivist principles. I have also discussed how my background in business administration (I have an MBA) blends in with or informs my classroom practice. I have also discussed with my classes how I would like to modify or experiment with my rules and regulations. Thus, social interaction in the Benedictine tradition involves modeling the unique characteristics of one's classroom practice.

Another characteristic of Benedictine social interaction involves the teacher's role in the class. Benedict discusses the fact that the abbot recognizes that certain monks may have special traits or skills, and thus the Abbot can learn from the other monks. In Chapter Three he discusses the decision- making process in the monastery. The abbot is expected to consult all the monks, even the younger ones because "the Lord often reveals what is better to the younger" (p. 179). Looking at this idea through the lens of pedagogy means that the abbot may take on the role of learner. This is in accordance with the monastic school tradition of having the older students teach the younger ones. The abbot is responsible for "all their souls—and indeed for his own as well" (p. 179). The abbot is responsible for his own growth and learning. This "role swapping" flows into other values. The teacher, while working in cooperative groups with students, can model how to work in a group. The teacher can also model for students how to ask questions or, even

more important, he can model how students live the “Traditio et Regula.” The teacher can model how students can help each other learn.

The previous paragraph discusses how the teacher can model how students can help each other learn. This leads to another unique characteristic of Benedictine community and social interaction, and this characteristic is the obligation of students to teach each other. While the monastic schools utilized older students to teach younger ones, a close examination of the Rule of Benedict reveals a special characteristic. Benedict envisions monks being responsible for each other: “On arising for the Work of God, they will quietly encourage each other, for the sleepy like to make excuses” (p. 219). Later on Benedict writes, “The brothers should serve one another” (p. 233). From a pedagogical standpoint, Benedict is stating more than “all students should help each other.” He is stating that the purpose of the community is to serve the individual, not the other way around. Thus, a purpose of the Benedictine community is to have all the members help each other. Looking at this from the pedagogical perspective, one can conclude that the Benedictine classroom demands that students teach other. While the Constructivist classroom will include the practice of one student teaching others, the Benedictine classroom demands this and obligates students to teach each other. In the Benedictine tradition students are expected to become “experts’ or “more knowledgeable so they can teach others. How does this look in the classroom? How does the instructor empower students to take on such an undertaking? The Traditio et Regula helps answer this question. The “class compact” will contain the requirements that students are expected to frame their class participation by continuously assuming the role of teacher.

The instructor must structure his class so that students continuously become the instructor.

The special features of Benedictine community can be described by the following behaviors:

- Students know that they are expected to teach classes, take different roles in a cooperative learning situation, and, in general, help other students learn.
- The teacher models and discusses how he lives his own tradition.
- The teacher models how one learns.
- The teacher models how a student helps another student learn.

Conversatio

Conversatio is the focal point for the Benedictine community (Strange, 1998). Conversatio comes from the word *convertere*, which means to change or to turn around. It is about the process of changing and living the life we were meant to live (Strange, 2002). The concept of change is totally consistent with the Constructivist philosophy. Constructivism is centered on the precept that knowledge is changing and growing as it interacts with the environment. Tenets One, Two, Three, and Four address this concept. Cognitive change, for the Constructivist educator, is a dynamic process that is ongoing. Strange views Conversatio as "becoming, about giving oneself more and more to the life one is called to live" (p. 5). This is in accord with the tenets. Change, therefore, is an ongoing activity. Strange (2002) describes some behaviors that help in constructing the defining behaviors for Conversatio. Strange, in examining how this plays out in the classroom, states that educators and students should ask themselves the following questions. How do we grow and change? How have we changed? What risks do we wish

to take? How do I resist change? These types of questions represent the metacognition function, and this goes with Tenet Three. The teacher can structure his class with tools that empower students to change. Among these tools are KWL (Know, Need to know, What have I learned) charts; pre reading forms; previewing forms for movies. The teacher can also have students complete journal entries that discuss questions such as What surprised me? What was difficult? What was easy? What teaching technique is most effective at empowering me to learn? Can I use what I learned yesterday to help me learn today? These are behaviors that agree with Tenet Two, the tenet that analyzes the self-regulating function of the mind. What, then, constitutes the unique Benedictine aspect of this characteristic? Using the Benedictine characteristic of blending truths together, the answer lies in re-examining Stabilitas. One of the framing behaviors of Stabilitias is that of students teaching each other. Combining this with Conversatio results in a construct that has students reflecting on how they empowered change in other students, themselves, and the entire classroom. The behaviors that structure this unique Benedictine characteristic are as follows:

- Ongoing change is part of the Traditio et Regula of the class. The instructor and the entire class discuss this continually. Many assignments are structured on the topic of change.
- Students reflecting on what was effective in helping the other student learn.
- Students reflecting on what was not effective in helping the other student learn.
- Students reflecting on how the other student helped them change.

- Students reflecting on how their interactions with each other may have changed, modified, or enriched the class tradition.

Conversatio and Stability combine to construct a unique behavior that frames Benedictine pedagogy.

Obedientia

Obedientia is a behavior that is central to Conversatio because, without it, there is no learning (Strange 1998). The foundation of the word Obedientia is in the concept of hearing: *Ob* + *audire* (Strange 2002). Strange points out that Obedientia is "not just passive listening though. If one truly listens, then one will know how to respond" (p. 5). Obedientia, then, is the extension of active listening because it translates the understanding into action. Listening, which is a component of Obedientia, results in action.

Benedict implores action when, in the first line of the prologue, he says, "Listen carefully, my son. To the master's instructions, and attend to them with the ear of your heart" (p. 157). Benedict views action and good works as evidence that a person has listened to God. Benedict writes that such a person is, "clothed then with faith and the performance of good works" (p. 161). Benedict endorses the precept that people, when they truly understand what they have heard, embrace instructions by translating their understanding into action. Benedict writes, "Run there by doing good deeds" (p. 161). Translating this through an epistemological lens results in the axiom that to truly understand something means to translate it into action or a product. How does this look in a Constructivist classroom? In my Measurement and Evaluation course I always ask my students, "How are you going to use this when you teach?" I will also phrase it this way:

"That's a nice buzzword, but how will this help you be a more effective teacher?" When this class studies a new chapter, I will structure it around the idea of "How will you apply this when you teach?" A Traditio et Regula in all my classes is this: If you are not sure how to answer the question or what to write about, write about how you will apply the concept in your class. It is a practice that I am well known for. The practice of creating authentic products is a practice that structured my practice long before I studied Benedictine monasticism. While this practice may be unique for many students and teachers (from my practical experience, I know this to be true.), it is a common enough practice to warrant looking more deeply to construct a more unique manifestation of Obedientia.

Obedientia and Stabilitas

A close look at blending Obedientia with Stabilitas will create a framework for Obedientia that is uniquely Benedictine. One way in which Stabilitas is manifested is that of creating a "class compact." The requirement that authentic products are to be considered when students present lessons, or conduct cooperative groups, or participate in group discussions is to be included in the "class compact." Using the Stabilitas behavior of blending knowledge bases results in the activity of having students discuss how they would use what they have learned in their other classes. As an example, in my Measurement and Evaluation class students would discuss or produce a written document explaining how they would use their plan for working with the Special Ed teacher (a requirement in the class) relates to their class on the Survey of Exceptional Children. Having students reflect on how their plan for assessing multiple intelligences in their teaching practice relates to what they learned in Educational Psychology class.

Stabilitas also frames the behavior of applying what one has learned to one's life as a student. Again, let's look at the Measurement and Evaluation class. In this class we create a rubric for assessing essays. How can this rubric affect how the student writes essays in other classes? In this class students are expected to create their own test for a particular subject and chapter that they would want to teach. Suppose that a student wishes to teach precalculus (I tell them to think of their "dream class" and create a test for that class. Of course I do not tell them that they might not get their "dream class"). I have students reflect on how creating that test can help them study for their own college math class. It is the activity of empowering students to continually blend course requirements with the other parts of students' life that results in a component of a unique Benedictine pedagogy.

Obedientia focuses on translating listening and understanding into action or concrete behaviors. A class that is structured by Constructivism and Obedientia will empower the following behaviors:

- Creating authentic products
- Reflecting on how their authentic products relate to other classes they have taken
- Creating a plan that translates what they have learned from their authentic product into helping them in their own courses

Ora et Labora and Hospitalitas

The phrase "Ora et Labora" literally means "Prayer and Work" (Strange, 2002). The section "Benedictine Knowledge: Social Construction of Knowledge and Solving Authentic Problems" brings out the fact that an important component of Benedictine

pedagogy is the solving of authentic problems. This is done through PBL. Again, this is an unusual approach for students, but it is not such a prominent feature as to be considered a defining feature of a unique pedagogy. The purpose of this section is to construct a defining feature of Benedictine pedagogy.

Classen, Renner, and Reuter (2002) provide a framework for defining a unique feature of Ora et Labora. They believe that Benedictines are committed to practicing social justice. A close examination of the Rule reveals that there is no direct reference to the phrase "social justice," but "the practice of justice is pervasive in the Rule's articulation of how to make community life work and how to create an environment where each member is treated fairly" (p. 166). The Rule addresses social justice not by using the phrase directly, but by providing examples of it. Benedict gives examples of social justice when he discusses the qualities of the abbot. Benedict writes, "The abbot should avoid all favoritism in the monastery. He is not to love one more than another unless he finds someone better in good actions and obedience" (p. 175). A few lines later Benedict writes, "Therefore, the abbot is to show equal love to everyone and apply the same discipline to all according to their merits" (p. 175). Social justice, in the Benedictine community, is a defining characteristic.

Min (1995) discusses updating Benedictine education by addressing the social justice implications in modern problems:

> Certainly, the old conception of work has to be abandoned in favor of a more complex conception that would also be sensitive to both the dynamics of society and technology and the immense human suffering of those without work….It involves a sensitivity to and a knowledge of the actual world of contemporary

> work in its routine, boredom, alienation, and, often enough, outright exploitation in the factories, mines, stores, sweatshops, offices, and laboratories. (p. 144).

Blending PBL with Min's ideas results in a construct that centers on using social justice as a parameter for defining a problem. Consider designing a middle-school project around the declining frog population in an area bordering a middle school (Torp & Sage, 2002). Science classes from that school usually use that area to collect and study plants and animals. Lately, students and their teachers have noticed that there are not as many frogs as in previous years. A PBL could be framed around this idea. Now, let's look at another PBL. With increasing growth in Will County a new bridge is needed across the Des Plaines River. There have been several sites proposed. One site crosses a forest preserve, and another site crosses bird sanctuary. A third site would result in homeowners being forced to leave. Which of the three sites should be chosen? While both of these represent promising activities, the second problem combines content issues with social justice issues. A Constructivist pedagogy framed by Benedictine values will feature PBL and case studies that involve social justice issues. The Benedictine focuses on social justice issues are the decisive factor in creating a unique pedagogy.

While Benedictine pedagogy looks at social justice issues in general, there is another perspective of social justice that Benedict presents, and this is the perspective of marginalized people, the "others". The story of the Benedictine Pedro Ponce de Leon and his work with deaf people is an example of this. Benedict presents numerous references to the "others." Benedict expects the abbot to "take the greatest care that cellarers and those who serve the sick do not neglect them for their shortcomings of disciples are his responsibility" (p. 235). In the next chapter he writes, "Although human nature itself is

inclined to be compassionate toward the old and the young, the authority of the rule should also provide for them" (pp. 235, 237). Benedict, in discussing the abbot's table, brings up the concept of relating to "others" or outsiders: "The abbot's table must always be with guests and travelers" (p. 265). Benedict is advocating social justice through attending to the needs of the marginalized of society. For the Benedictine educator, authentic problems and case studies that examine the social issues of the "others" are an organizing component of pedagogy.

A further look at the Rule will provide more insight into a unique form of implementing PBL. The concept of reflection is expressed in the Rule as prayer (Ora). The abbot, according to Benedict, is to "announce, day and night, the hour for the work of God." He may do so personally or delegate the responsibility to a conscientious brother, so that everything may be done at the proper time" (p. 249). Benedict extends the importance of blending work and reflection when he writes:

> We believe that the times for both may be arranged as follows: From Easter to the first of October, they will spend their mornings after Prime till about the fourth hour at whatever work needs to be done. From the fourth hour until the time of Sext, they will devote themselves to reading. (p. 249)

Benedict is advocating the balance between work and reflection. In the context of pedagogy, this implies that students must constantly reflect on their PBL, case studies, group work, and PBL activities. Reflection is a component of all versions of the application of the Constructivist philosophy. Benedict's setting time for reflection is congruent with the Constructivist philosophy. In and by itself, it is not a distinguishing feature. To create that distinguishing feature, one must look at the other hallmarks and

distinguishing features. Strange (1998) provides insights. In discussing the relationship between work, reflection, and community he writes, “What aspects of our work sustain the community” (p. 8). Strange’s ideas point to the practice of viewing professional practices as being done in the context of the community and society. This idea brings up the possibility of viewing professional (this includes all professions, especially education) practices as tools for creating social justice in the community and in society. Combining the idea that a profession can be used as a tool for social justice with Traditio et Regula creates a tradition or embedded theme within a course. It is that of examining how professional practices can affect or have an impact on the marginalized “others” of society.

Knowledge of God, for Benedict, is done in the context of living. Interaction with people and the solving of authentic problems involving social justice issues are defining features of the Benedictine ministry. Social justice issues focusing on the marginalized people of society are defining parameters for case studies and PBL. Reflection activities, in Benedictine pedagogy, are focused on how action affects the community, society, and the marginalized “others.” The following activities are the identifying factors for Benedictine pedagogy as structured by the Constructivist philosophy:

- PBL, case studies, and current issues structure the curriculum. The “traditional” curriculum (course descriptions, books, syllabi) is supplemental to these activities
- The theme that professional practice is a tool for social justice and change is part of the class tradition.

- All case studies and PBL activities are embedded with social justice issues.
- Issues concerning the "others" shape social justice issues.

Extending Hospitalitas through Obedientia

Hospitalitas has another dimension to it, and this dimension is best described through Obedientia (Strange, 2002). While Strange believes that Obedientia empowers one to translate understanding and belief into action, he believes that it also means being open to the ideas of others. He writes, "Our habits of intellectual confirmation often restrict both what we allow ourselves to hear and what we choose to ignore" (p. 5) Strange discusses how, in a multicultural class, he wants to hold students accountable for hearing the differences. Strange advocates and practices having students hear the perspectives and opinions of others. He has created a technique called the "Voice Project." Each of his students must focus on gender, race, ethnicity, sexual orientation, and socioeconomic status in order to develop a different perspective. I have used a similar technique in my classes. I often use the phrase "Let's hear the rest of the story." An example will quickly illustrate this technique. In a Math Methods class, I preach and practice using Constructivist principles. However, there is "the rest of the story." Constructivist principles may leave one's class three chapters behind that of everybody else's, and one may not cover the material needed for the state exam. Also, Constructivist techniques do not necessarily cover multiple-choice type questions that will be on state exams. Moreover, many students, having been taught by the rote memory technique, may not be receptive to Constructivist pedagogy. Another example comes from my Measurement and Evaluation course. While it is "fashionable" and "contemporary" to

bash “No Child Left Behind” (NCLB), there is more to the truth about it. There are testimonials (though these are not publicized) supporting NCLB. There are many truths, and the purpose of Hospitalitas and Obedientia is not only to present these truths but also to discuss the relationship between them. The blending of Hospitalitas and Obedientia is actually the adoption of the hermeneutics perspective. Hermeneutics proposes that there are multiple truths and that one should search for the relationship between these perspectives (Wachterhauser, 1994). Wachterhauser, in discussing that complex phenomenon may have many perspectives, believes that “we are nevertheless in a dialogue that should be governed by the search for the coherence between these various perspectives” (p. 24).

A Benedictine educator who blends Hospitalitas with Obedientia will structure his practice through the following behaviors:

- Establishing the hermeneutic approach in the Traditio et Regula
- Using the Voice Project
- Using “The rest of the story”

Describing Benedictine Pedagogy through the Constructivist Lens

This section finalizes the purpose of this study by presenting and discussing concrete behaviors that represent Benedictine pedagogy as seen through the Constructivist lens. These behaviors, or hallmarks, represent behaviors that are necessary elements for pedagogy to be called “Benedictine.”

The Conceptual Framework.

The conceptual framework for Benedictine pedagogy is shown below. It is based on the medal of St. Benedict.

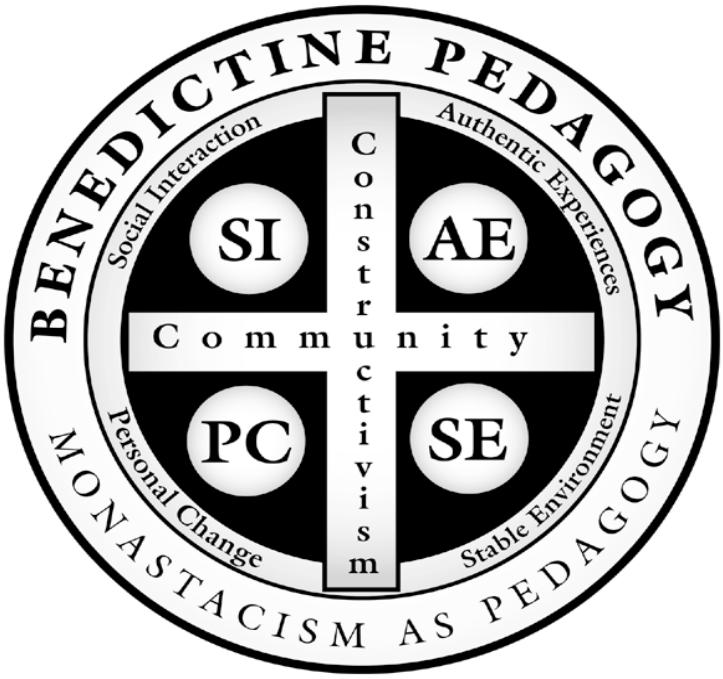

Figure 4: Conceptual Framework of Benedictine Pedagogy

Figure 4 is an adaptation of one side of what is known as the Jubilee Medal of St. Benedict. The medal was struck in 1877 (and issued officially in 1880) to commemorate the 1400th anniversary of Saint Benedict's birth. There were earlier versions of this medal, all of which had a "cross side" with letters that reflected words describing the "Cross of Saint Benedict." The actual history of the medal of St. Benedict is not totally clear (Deutsch, 1948). While some historians have suggested that the medal goes as far back as 1054, the earliest date of historical information on the medal is 1682. The Jubilee Medal has, on one side, an image of Benedict holding a cross in one hand, and holding the *Rule* in the other. The other side of the medal is the basis for the conceptual framework constructed by this study.

The vertical and horizontal portions of the cross divide the entire logo into the four areas. The two portions of the cross, representing Constructivism and community, are the foundations for Benedictine pedagogy. The intersection forms the four sectors,

and these four sectors, or hallmarks, represent behaviors that would be included in a consideration of "Benedictine pedagogy." While these four hallmarks may represent behaviors that any Constructivist teacher may incorporate in their practice, they are essential for a unique Benedictine pedagogy. For an educator to state that he is practicing Benedictine pedagogy, he must incorporate these behaviors into his practice.

Personal Change

The Benedictine hallmark of personal change describes the behaviors that come from Conversatio and from synthesizing Conversatio with Stabilitas. There are two groups of behaviors. The first group of behaviors comprises behaviors that are essential to creating a distinctive form of Benedictine pedagogy. They represent pedagogy that is distinctively Benedictine, and this is because they are the combination of two Benedictine characteristics. These characteristics are Conversatio and Stabilitas. The essential Benedictine behaviors for Personal Change are as follows:

- Students reflecting on what was effective in helping other students change or learn
- Students reflecting on activities that did not empower themselves (or other students) to change
- Students reflecting on how another student helped them change or learn
- The teacher discussing how he has learned or changed as the result of an interaction with students
- The teacher, on a regular basis, modeling how he learns and change

The following behaviors represent pedagogy that is minimally Benedictine because they relate only to Conversatio. These behaviors are as follows:

- The use of learning instruments that measure change, such as KWL charts
- The use of learning instruments that measure change, such as prereading assignments
- The use of learning instruments that measure change, such as previewing assignments
- Journal-type entries that measure change

Social Interaction

The hallmark of social interaction is used to describe the behaviors that are the result of synthesizing community with Stabilitas and Hospitalitas. Since these behaviors are the result of two or more Benedictine characteristics, they are essential to creating Benedictine pedagogy.

- Students are responsible for teaching classes.
- Students are responsible for creating items that can be used to assess the classes that they taught.
- Students are responsible for assuming different roles in cooperative groups.
- The teacher, through his participation in cooperative groups, models how one learns.
- The teacher models how a student helps another student learn. He discusses this idea with the entire class.
- Students discuss and reflect on how opinions different from their own have changed them.

Authentic Experiences

The hallmark of Authentic Experience is derived from Obedientia, Hospitalitas, Ora et Labora, and social justice. It describes behaviors that represent translating knowledge into action. Just as Benedict called on his monks to translate their knowledge and love of God into action, Benedictine pedagogy empowers students to translate static knowledge into action. There are two sets of behaviors in this hallmark. The first set is essential for implementing Benedictine pedagogy, and the second set represents a minimal level of Benedictine influence. The set of behaviors that represent essential Benedictine pedagogy is as follows:

- The theme that professional practice is a tool for social justice and change is part of the class tradition.
- All case studies and PBL activities are embedded with social justice issues.
- Issues concerning the "others" shape social justice issues.
- New concepts are examined through the lens of the "others."
- New concepts are examined through the construct of advantages/disadvantages.
- Students reflect on how their authentic products relate to other classes they have taken.
- Students create a plan that translates what they have learned from their authentic product into helping them in their own courses.
- The instructor works with other instructors in order to determine how their different courses relate to and inform the others.

- The instructor builds into his course assignments that empower the student to integrate knowledge from other courses (this includes previous courses and future courses).

The behaviors that minimally represent Benedictine pedagogy are as follows:

- PBL, case studies, and current issues structure the curriculum. The "traditional" curriculum (course descriptions, books, syllabi) is supplemental to these activities
- Newspaper articles, magazine articles, and newscasts structure the curriculum.
- Authentic products are created as part of the curriculum.

Stable Environment

The hallmark of Stable Environment structures the commitment of the entire class to include the instructor, to live the unique tradition of the class. The "class compact," which contains the rules and traditions that are expected to be practiced, symbolizes this total commitment. Appendix C contains an example of a class compact. The behaviors forming this hallmark are listed below:

- Students sign the class compact.
- Students actively participate in the unique traditions of the class, and this includes Constructivist activities.
- The entire class participates in creating their own tradition.
- The instructor frequently reviews the class compact with the class.
- The instructor models how he learns and changes.
- The teacher models and discusses how he lives his own tradition.

An analysis of these behaviors indicates that they are Constructivist in that they agree with Tenets Four, Nine and Ten. A further analysis indicates that these behaviors do represent a “Traditio et Regula” that will reinforce a communal structure in the classroom.

Pedagogical Tools

Since this study is a personal construct, it follows Constructivist principles. These include the idea of creating authentic products that can be used in one’s practice. Appendix A contains the tenets of Constructivism; Appendix C discusses behaviors in the Constructivist classroom, and contains an example of a class compact. Appendix D contains a lesson plan/organizing checklist for a Benedictine pedagogy. These appendixes represent the concrete behaviors that can structure not only a Constructivist practice but also a unique Constructivist practice that blends with Benedictine values. The behaviors and their descriptions in the appendixes are the structural concepts for implementing a unique Benedictine pedagogy.

CHAPTER EIGHT: A CONCLUDING CONSIDERATION OF STRATEGIES FOR IMPLEMENTING A NEW VISION OF CONSTRUCTIVISM AND A UNIQUE BENEDICTINE PEDAGOGY

Revisiting the Goals, Outcomes, and Purpose of This Study

Chapter 2 presents the desired outcomes of this study. The outcomes of this study are deeper understandings of Constructivism, Benedictine values, and pedagogy. These deeper understandings are manifested through three authentic products: (a) my personal tenets of Constructivism, (b) a list of behaviors that structure the Constructivist classroom, and (c) checklist/lesson plan for implementing Benedictine pedagogy. This study has produced these outcomes as evidenced in Appendices A and D, and Table 1. This section concludes, temporarily, the curricular theorizing cycle. This section discusses the strategies for implementing my new visions.

Revisiting the Curricular Theorizing Cycle

The curricular theorizing cycle illustrated in Figure 2 indicates that this study is in the "Reflection" component of the cycle. This study has reflected about my Constructivist practices in the classroom, modified them, and created new paradigms and strategies for implementing them. Figure 2 also contains the words "describe", "explain," and "control"/predict". This study has exhibited those behaviors. I have explained the Constructivist philosophy by discussing in detail the construction of the tenets of Constructivism. The study has described the behaviors that structure the Constructivist

class. Professional educators can use these to structure their practice, and this represents the functions of controlling and predicting. The same functions were applied in developing the behaviors that structure Benedictine pedagogy.

This section continues with the reflecting activities, creating new vision activities, and then creates a plan of action for implementing these. The curricular theorizing idea that reflecting activities flow directly into a new vision and implementation of that vision is consistent with another construct. That construct is the Benedictine practice of translating experiences and knowledge into action. The Benedictine construct of transforming knowledge into action runs parallel with curricular theorizing. This section extends the strategizing needed for implementing my new vision of Constructivism and for implementing the vision of a unique Benedictine pedagogy. It does this by discussing what I have learned and then discussing what action this translates into.

Strategies for Translating a New Vision into Action: Constructivism

I have learned that the Constructivist theory can be consistent with the information-processing model of cognition. Now, I must translate that into action.

I learned that both Constructivism and the information-processing model focus on what develops cognitively and how this development occurs. Since the Constructivist philosophy believes in "many entries points and modes," it is mandatory to integrate this model into my methods courses. The question is, "How do I do this?" A closer look at the two constructs indicates that there is a difference between the two. While Constructivism focuses on whether the mental construct can be modified to accommodate new experiences, the information-processing model examines memory limitations and how

strategies are produced to overcome these limitations. My new vision of Constructivism and strategies for implementing this vision include the following:

- Information processing cognitive models must be blended with Constructivism.
- Examining and constructing a relationship or coherence between the differences between the two models. Specifically, this means studying how the memory limitations focus of information processing models is related and may be congruent to the Constructivist concept of examining whether the cognitive structure can create modifications in order to understand new experiences.
- The timeline for this would be to have this started during the month of June so I can discuss this with my new group of Alternative Certification interns.

The fact that the word "Constructivism" does not become a descriptor in ERIC until 1977 brings up the question of why the field of education changes so slowly. While the curricular field has documented the influence of the factory model on educational practices, I cannot say that this offers a full explanation for the slowness of the integration of the Constructivist philosophy into classroom practice. With the influence of postmodern thought on society, it would seem that the Constructivist philosophy would be readily accepted by society, especially by professional educators. One answer may the effects of NCLB. The pressure for educators to have their students do well on high-stakes tests discourages them from implementing the Constructivist theory. As a practitioner, I did experience this phenomenon. I "fought the temptation" and did apply the

Constructivist philosophy. My students did not fare any worse on high stakes testing. This study has presented research indicating that students who are taught by the Constructivist method do as well or better than students who are taught by "traditional methods". This leads to the phase of implementing a new vision. My vision is that the Constructivist approach will produce students who score as well as or better than students taught by the traditional approach. My vision is to do more research on this topic in order to get more data, and this would include data on middle-school students, high-school students, junior-college students, and college students. This data should also be disaggregated by race, gender, and the like. Since Constructivism is the basis for my pedagogy and for the curriculum of the Alternative Certification Program (through problem-based learning) that I work in, I believe that this is a necessity.

The third area of Constructivism that I need to reflect about and create a new vision of is that of brain-based learning theory. This study presents information indicating that the Constructivist philosophy coincides with brain-based learning theories, and vice versa. This study has empowered me to realize that the two philosophies are expressing the same concept. I have reflected whether I should teach the two constructs separately or together. One approach to answer that question is to consult with the instructors of our Educational Psychology courses to determine their recommendations. Brain-based learning has the potential of making the Constructivist philosophy more concrete and relevant, and thus this approach must be considered.

Strategies for Translating a New Vision into Action: Benedictine Pedagogy

Actualizing Benedictine pedagogy is the reason I became engaged in this study. The behaviors that constitute Benedictine pedagogy must now be translated into action.

This section discusses the logistics of implementing the four hallmarks of Benedictine pedagogy.

Strategies for Implementing Personal Change

The hallmark "Personal Change" is centered on reflection. While reflection has been considered an important part of Constructivist pedagogy, it is important to assess the effectiveness of Benedictine reflection activities. It is paramount to assess the effectiveness of reflecting on how a person helps another person learn. This assessment would include comparing Benedictine pedagogical reflection activities to reflection activities of traditional Constructivist pedagogies. In order to assess the effectiveness of Benedictine reflection activities, the following must be accomplished:

- Find research that examines the effectiveness of all types of reflection activities.
- Find research that examines the effectiveness of reflecting on how a student helped or taught another student.
- Create an instrument that measures the change students believed occurred because they worked collaboratively or were taught by another student.

Another part of my new vision for this hallmark comes from the activity of the teacher modeling how he learns. While I believe that this form of Benedictine pedagogy is effective, I need to create an instrument for assessing the actual effectiveness of this practice. I must develop an instrument that empowers students to assess this activity.

Strategies for Implementing Social Interaction

In terms of social interaction, there must be some type of rubric developed to assess the work done in cooperative groups. Since cooperative groups are an important

part of Benedictine pedagogy, this activity must be assessed and become a part of the grade. Also, since I teach assessment courses, the act of developing a rubric for assessing cooperative groups could be a class project.

While I have developed a rubric for assessing the student presentation (see Appendix E), I believe that I must re-examine this instrument. I need to modify it so that it reflects, more fully, Benedictine values. This may include adding a category of how the student presenters got the class into groups. This also could become a class project or the focus of a PBL.

The hallmark of Social Interaction must be fully developed by implementing the following:

- The development of a rubric to assess cooperative learning groups.
- The development of an instrument that measures the effectiveness of different types of cooperative learning activities.
- The re-examination of the student presentation rubric.

Strategies for Implementing Authentic Experiences

The hallmark of Authentic Experiences will require a close examination of the curriculum for the courses that I teach. Since the process of analyzing curriculum is a time-intensive activity, I plan to analyze my course in Tests and Measurement. This hallmark requires the instructor to structure the curriculum and class activities around authentic activities. While my Tests and Measurement class involves authentic activities, a closer examination of it reveals more opportunities for authentic experiences.

One of the assignments in this class is to go to a local school and administer, score, and analyze an individualized intelligence test to a student. This analysis results in

a report that I send to the school. The school uses this report as part of the process of helping students. Currently, this class administers the Key Math test. As teachers, my students may need to become familiar with tests that cover a wider range of subject areas. Also, while writing a report is an important and authentic task, the process of presenting the results to the teacher or administrator is also an authentic task.

Another method of bringing authenticity into the course is to examine and analyze contemporary issues in the tests and measurement field. This would entail bringing in articles concerning tests and measurement issues from newspapers and magazines. These articles would be used to create a PBL experience.

A third phase of bringing authenticity into this course is to look at how the content of this course helps students in their other courses or how this course informs what students have learned in previous courses.

To fully enact the hallmark of authentic experiences into my tests and measurement class, I must do the following:

- Investigate individual intelligence tests that test domains other than mathematics.
- Look into the possibility of having students present their report to the appropriate school official (counselor, principal, test coordinator, etc).
- Develop PBL situations based on authentic events
- Work with other instructors to determine how our courses inform each other.

Strategies for Implementing a Stable Environment

The big item in the hallmark of Stable Environment is the class compact. While I know that the purpose of the Class Compact is to create community and class tradition, I must make sure that the class and I have the same definition of "community" and "tradition."

Again, developing an assessment instrument is the major activity for implementing my vision of Benedictine pedagogy. I must also think clearly about how to word the outcomes of this activity. This activity may lead to another important topic, and that is creating questionnaires. Teachers often have students rate them, but from my experience most teachers do not take the time to analyze the content of the questionnaire or the results. This creates an opportunity to include another practical element into my practice.

Concluding Remarks

This study has been a totally personal experience. The five epistemological questions that represent one of the structural concepts in this study are a construct that I have developed during my studies at National-Louis University. While they may be common to many people, they represent a personal construction. The tenets, Constructivist behaviors, and behaviors of Benedictine pedagogy are personal constructions, and I take full responsibility for them. I strongly believe that they represent a unique contribution to the curriculum field.

This study is an examination into my thought process of reflecting on my practice. This curricular theorizing study represents what I have done for most of my career without realizing that I was theorizing. I have lived this concept of theorizing, but this

dissertation has empowered me to define and describe what I have lived and apply it to another aspect of my career. I look forward to participating again in the curricular theorizing cycle.

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APPENDIX A: TENETS OF CONSTRUCTIVISM

- Tenet One*: Knowledge is constructed subjectively by linking previous knowledge with new ideas through interaction with the environment (nature of knowledge)*
- Tenet Two*: Knowledge is created through a dynamic process comprising multiple ways of knowing (nature of knowledge).*
- Tenet Three***:** *Knowledge serves two functions. The first function deals with the process of imposing order on new experiences and the creation of new thinking processes. The second function involves self-regulation and how one learns and how one verifies truth (nature of knowledge).*
- Tenet Four***:** *Knowledge is measured as distinct skills, communicative modes, and problem-solving processes that are unique to a particular cognitive domain or needed to create products that are needed by society. Knowledge is perceived to be arranged in a hierarchal arrangement that is flexible and dynamic (measurement of knowledge).*
- Tenet Five***:** *The different ways of knowing (or intelligences) that make up knowledge are not uniformed in their development. Each way of knowing develops at its own rate (measurement of knowledge).*
- Tenet Six***:** *An individual's ability to validate truth is a function of his/her ability to make meaning from new experiences (validation of truth)*

- Tenet Seven***:*** *Biological, cognitive, and emotional development and learning are dynamically related (validation of truth).*
- Tenet Eight***:*** *Bodies of disciplinary knowledge and knowing are related to each other by their interdependency. Each body of knowledge informs and modifies the other (relationship between meanings).*
- Tenet Nine***:*** *Social interaction compliments the internal interaction of the learner (relationship between meanings).*
- Tenet Ten*: Knowledge construction and meaning making involve the linguistic process of choosing words that will form the concept (naming the word). The words, syntax, and grammar represent a construction in their own right (role of language).*

APPENDIX B: MISSION STATEMENTS AND OTHER IMPORTANT STATEMENTS FOR BENEDICTINE COLLEGES, UNIVERSITIES AND SECONDARY SCHOOLS

Benet Academy

Benet Academy Mission Statement

The mission of Benet Academy, as a Catholic Benedictine, college preparatory high school, is to provide a disciplined educational environment that fosters the on-going religious, intellectual and social development of all members of the Benet family.

Benet Academy Outcomes

The Benet Academy Web site also discusses religious outcomes, academic outcomes, and social outcomes. Among the outcomes discussed are the understanding of the Benedictine motto of the need for balance of prayer and work, the development of an attitude of compassion and justice for all people, and a willingness to respond to God's call to lead lives of loving service to the world around them.

Marmion Academy

Marmion Academy Mission Statement

Marmion Academy is a college preparatory school. Its mission is the education of young men in leadership skills and a value-based liberal arts education, founded on the Roman Catholic Faith and the Benedictine tradition of a desire for God and a love for learning.

To accomplish this, Marmion strives to build a community of skilled and dedicated educators, and talented and receptive students. Parents, teachers, support staff, alumni and students work together to foster respect for each person and to develop God-given talents.

Saint Bede Academy

Saint Bede Academy Mission Statement

The mission of St. Bede Academy is the Christ-centered development of the whole person with compassion and integrity. Therefore, we respect individual differences while nurturing communal identity. We value our ties to the Benedictines of St. Bede Abbey, who founded our school in 1890, in whose mission our school shares, and to the Roman Catholic Church, whose prayers and traditions shape our school's philosophy and practices. Aware of this spiritual heritage and our history as a college preparatory school, we dedicate ourselves to academic excellence, life-long learning, holistic growth, and Christ-like leadership through service.

Belmont Abbey College

Belmont Abbey College Mission Statement

The mission of Belmont Abbey College is to educate undergraduate students from diverse religious, ethnic, and cultural backgrounds in the liberal arts tradition as guided by the Catholic intellectual heritage and inspired by the 1500 year-old Benedictine monastic tradition. This heritage is sustained through fidelity to the Christian message as is comes to us through the Church. Such an education provides knowledge of traditional Judeo-Christian moral principles, and prepares students for responsible citizenship and a successful career.

In pursuit of this mission, the College also provides preparation in professional studies to enable its students to face successful the challenges of a changing society, and equip them in directing their own learning throughout a lifetime. In addition, the College provides quality undergraduate programs for which there is a demand in the local areas served by the College, and in other areas where programs are sustainable through collaborative arrangements.

Belmont Abbey and the Local Community

The vision statement of Belmont Abbey College is accompanied by the college's vision of interaction with the community. This vision encompasses the tradition of providing the local community with educational, religious, artistic, and cultural benefits through its tradition of liturgy, theater, distinguished speakers, scholarly research, library access, athletic events, and other outreach services.

Benedictine University (Illinois)

Benedictine University (Illinois) Mission Statement

Benedictine University dedicates itself to the education of undergraduate and graduate students from diverse ethnic, racial and religious backgrounds. As an academic community committed to liberal arts and professional education distinguished and guided by its Roman Catholic tradition and Benedictine heritage, the University prepares its students for a lifetime as active, informed and responsible citizens and leaders in the world community.

Benedictine University (Kansas)

Benedictine College (Kansas) Mission Statement

Heir to the 1500 years of Benedictine dedication to learning, the Benedictine College mission as a Catholic, Benedictine, liberal arts, residential college is the education of men and women within a community of faith and scholarship.

Benedictine College (Kansas) Vision Statement

Open to new opportunities, Benedictine College embraces the new millennium seeking to secure its position as a respected and innovative academic institution. Our student-centered curriculum emphasizes the creative and collaborative learning embodied in our identity as America's Discovery College.

The college's commitment to the development of the individual within community provides our students with the principles, knowledge and skills for a life of learning, leadership and service, "that in all things God may be glorified."

College of Saint Benedict

College of Saint Benedict Mission Statement

The mission of the College of Saint Benedict is to provide for women the very best residential liberal arts education in the Catholic university tradition. The college fosters integrated learning, exceptional leadership for change and wisdom for a lifetime.

College of Saint Benedict Mission Commitments

The College of Saint Benedict also publishes a list of practices that help the university fulfill its mission. One of these practices is that of offering an environment that recognizes the interdependence of a women's personal and cognitive development. Another practice is the offering of Benedictine values grounded in a women's monastic

community, which empowers students to see her gender in active societal and church roles.

Mount Marty College

Mission Statement of Mount Marty College

Mount Marty College, an academic community in the Catholic Benedictine liberal arts tradition, prepares students for a contemporary world of work, service to the community, and personal growth.

Values of Mount Marty College

Mount Marty also provides a list of values that it holds to. These values are an awareness of God, community, hospitality, and life-long learning.

Saint Anselm College

Saint Anselm College Mission Statement

Saint Anselm College is a Catholic liberal arts college in the Benedictine tradition. The College proposes to offer its students access to an educational process, which will encourage them to lead lives that are both creative and generous. Saint Anselm challenges its students to engage in the fullest experience of a liberal arts education, to free themselves from the strictures of ignorance, illiteracy and indecision, and to dedicate themselves to an active and enthusiastic pursuit of truth. It is through an appreciation of the several kinds of truth—the scientific, the technical, the poetic, the philosophical, and the theological—that students may learn to challenge resourcefully both personal and social problems. Saint Anselm seeks to admit students who are capable of benefiting from the liberal arts education that it offers. The College stands open to receive students of every race, national origin and creed. Indeed, the College seeks to

enroll a student body which reflects a variety of racial and cultural backgrounds .As a Catholic, Benedictine institution, Saint Anselm observes and promotes Christian and Catholic standards of value and conduct. The College accepts and retains students on the condition that they respect and observe those standards.

Saint Gregory's University

Saint Gregory's University Mission and Goals

St. Gregory is a Roman Catholic University, offering through the bachelor's degree level a liberal arts education that has been cherished and handed down in the educational institutions of the Benedictine Order. **St. Gregory's University promotes education of the whole person in the context of a Christian community in which students are encouraged to develop a love of learning and to live lives of balance, generosity and integrity.** As Oklahoma's only Catholic university, St. Gregory's reaches out to Catholics and to members of other faiths who value the distinctive benefits which it offers.

Values of St. Gregory's University

St. Gregory's also provides values that it seeks to exhibit. One value is that of living as a Benedictine community. Within this parameter the university endorses community living, reflecting on the dimensions of life, and the promoting of the disciplines of prayer, work, study, and leisure.

Saint John's University

Saint John's University Mission

The mission of Saint John's University is to renew the fabric of community from one generation to the next, ever striving for excellence, ever grounded in Benedictine tradition.

Saint John's Mission and Its Course Offerings

Saint John's discusses how it aligns its mission with its educational offerings. Saint John's discusses how all educational offerings are made unique by the Benedictine practices of community life, prayer, hospitality, the search for wisdom, and by Saint John's commitment to the well-being of diverse communities.

Saint Leo University

Saint Leo University Mission Statement

Saint Leo University is a Catholic, liberal arts-based University serving people of all faiths. Rooted in the 1,500-year-old Benedictine tradition, the University seeks balanced growth in mind, body and spirit for all members of its community. On its home campus and many extension centers, Saint Leo University offers a practical, effective model for life and leadership in a challenging world, a model based on a steadfast moral consciousness that recognizes the dignity, value and gifts of all people.

To accomplish its mission, the University community creates a student-centered environment in which love of learning is of prime importance. Members of the community are expected to examine and express their own values, listen respectfully to and respond to the opinions of others, serve the community in which they live, welcome others into their lives and care for all of God's creations.

Saint Martin's College

Saint Martin's College Mission Statement

To know, to care, to serve, to educate: the commitment of Saint Martin's College to the student, the community, and the world.

Saint Martin's College Guiding Principles and Academic Values

With the Catholic, Benedictine tradition as our guide, we accomplish our mission by recognizing the spiritual and ethical dimensions of all human activity and by celebrating the uniqueness of and worth of each human being. Our goal is to provide a living and learning environment that prepares students for active, responsible, and productive lives in their professions and as members of the local and global community.

Saint Martin's also discusses its academic values. One of these academic values is that of hospitality.

Saint Vincent College

Saint Vincent College Mission Statement

Saint Vincent College is an educational community rooted in the tradition of the Catholic faith, the heritage of Benedictine monasticism, and the love of values inherent in the liberal approach to life and learning. Its mission is to provide quality undergraduate and graduate education for men and women to enable them to integrate their professional aims with the broader purposes of human life. The programs, activities, and encounters that make up student life at Saint Vincent College encourage the intellectual gifts, professional aptitudes and personal aspirations of students to mature harmoniously.

University of Mary

The Mission of the University of Mary

Christian, Catholic, and Benedictine, The University of Mary exists to serve the religious, academic, and cultural needs of the people in the region.

Vision Statement for University of Mary

The University is committed to providing leadership experiences for every student to include competence mastery in their profession, decision-making skills based on Benedictine values and service to others as they prepare to lead in their professional, religious, civic, and global communities.

APPENDIX C: CLASS COMPACT EDUC 310

The purpose of this document is to create a total commitment on the part of everyone in this class to create and sustain a unique community embedded in the Benedictine educational practices and Constructivist tradition. A community is characterized by its practices and traditions. The following behaviors and expectations will structure the tradition, and activities in this class.

Students will be expected to participate in student-centered activities as directed by the instructor. Examples of this are: (a) Creating your own definitions; (b) rewording your thoughts; (c) relating course material to other courses; (d) participating in group work; (e) completing reflective exercises.

1. Students are expected to create authentic products that they can use in their own practice.
2. Students will create an authentic product that will help a student in a local school.
3. Students are expected to relate course material to current educational practices and events
4. Students are expected to help other students learn.
5. Students are expected to present lessons and create questions or activities that assess their lesson.
6. Social justice issues will be embedded in course discussions

7. Students are expected to apply this course material to other courses or other aspects of their lives.
8. Students are expected to reflect upon how they learn in this course.
9. The instructor will discuss his personal traditions.
10. The instructor will discuss how teaching this course has empowered him to learn.
11. The instructor will discuss how switching roles and becoming a student has empowered him to learn new perspectives.
12. Students will create their own class tradition.

APPENDIX D

Lesson Plan/Organizing Checklist for Benedictine Pedagogy

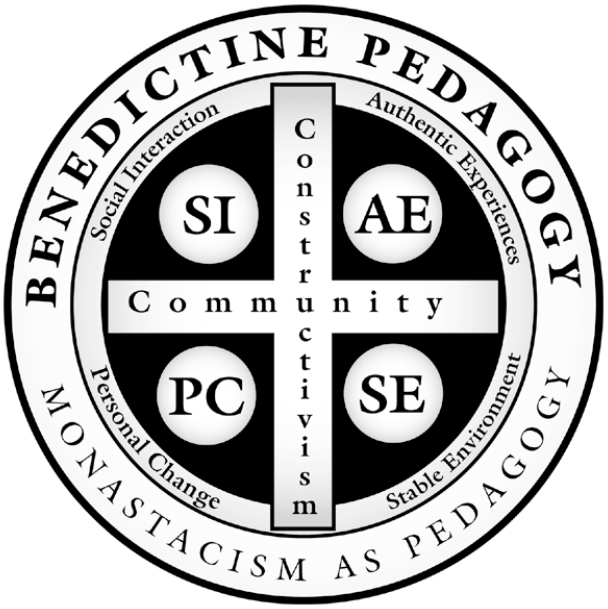

Figure 5: Conceptual Framework of Benedictine Pedagogy

PERSONAL CHANGE: Necessary elements

- Students reflecting on what was effective in helping other students change or learn
- Students reflecting on activities that did not empower themselves (or other students) to change
- Students reflecting on how another student helped them change or learn
- The teacher discussing how he has learned or changed as the result of an interaction with students

- The teacher, on a regular basis, modeling how he learns and changes

PERSONAL CHANGE: Other Elements

- The use of learning instruments that measure change, such as KWL charts
- The use of learning instruments that measure change such as prereading assignments
- The use of learning instruments that measure change such as pre-viewing assignments
- Journal-type entries that measure change

SOCIAL INTERACTION

- Students are responsible for teaching classes.
- Students are responsible for creating items that can be used to assess the classes that they taught.
- Students are responsible for assuming different roles in cooperative groups.
- The teacher, through his participation in cooperative groups, models how one learns.
- The teacher models how a student helps another student learn. He discusses this with the entire class.
- Students discuss and reflect on how opinions different from their own have changed them.

AUTHENTIC EXPERIENCE: Necessary Elements

- The theme that professional practice is a tool for social justice and change is part of the class tradition
- Embedding all case studies and PBL activities with social justice issues

- Using issues concerning the “others” to shape social justice issues
- Examining new concepts through the lens of the “others”
- Examining new concepts through the construct of advantages/disadvantages
- Reflecting on how their authentic products relate to other classes they have taken
- Creating a plan that translates what they have learned from their authentic product into helping them in their own courses
- The practice of having the instructor work with other instructors in order to determine how their different courses relate to and inform the other
- The practice of having the instructor build into the course assignments that empower the student to integrate knowledge from other courses (this includes previous courses and future courses)

AUTHENTIC EXPERIENCE: Other Elements

- PBL, case studies, and current issues structure the curriculum. The “traditional” curriculum (course descriptions, books, syllabi) is supplemental to these activities.
- Newspaper articles, magazine articles, and newscasts structure the curricular
- Authentic products are created

STABLE LEARNING ENVIRONMENT

- Students sign the class compact.
- Students actively participate in the unique traditions of the class, and this includes Constructivist activities.
- The entire class participates in creating their own tradition.

- The instructor frequently reviews the class compact with the class.
- The instructor models how he learns and changes.
- The teacher models and discusses how he lives his own tradition.

APPENDIX E: STUDENT PRESENTATION RUBRIC AND EXPECTATIONS

EDUC 640 Mr. Pelech

Student Presentations. ***50 points***

Students will pair up with two other students to form a group of three (no more than three). Each group will present a topic for a 40-45-minute class period. The presenters will be expected to run the class for the entire 40-45-minute period. The presenters will get the attention of the class, conduct their presentation, and then run a class discussion (the presenters must have discussion questions ready). The topics for theses presentations are from the book and from other sources. They will supplement the work done in class. Thus, students will be "co-teachers" with Mr. Pelech as a "silent partner." There will be a sign up sheet. The group must meet with Mr. Pelech at least a week before their presentation in order to coordinate with Mr. Pelech. This meeting will last no more than 20 minutes. Mr. Pelech's presentation and the student presentation must be coordinated in order to increase the learning of the entire class.

The requirements and rubric follow.

General Requirements:

- The group must meet with Mr. Pelech in order to go over the presentation.
- The group must have an outline of the presentation that is handed in on the day of the presentation.
- Each student must present an equal amount of time.

- The presentation must include class participation and multiple modes
- The presentation must use the information from the book and AT LEAST ONE OTHER SOURCE. THIS SOURCE MUST be handed in with the outline of the presentation.
- The presenters must hand in two questions from their presentation that may be used on the final.

Rubric:

- Accuracy of information (5 points)
- Was information presented in such a way that students can use it in their own practice? (10 points)
- Was the class engaged in the lesson right from the start? (5 points)
- Was the class engaged in the lesson for the entire length of the class? (5 points)
- Were all the presenters equally involved? (5 points)
- Outline and additional source handed in? (5 points)
- Overall enthusiasm of all of the presenters (5 points)
- Did the presenters present an organized plan when they met with Mr. Pelech? (5 points)
- Fulfill general requirements (5 points)