

ST. THOMAS AQUINAS ON THE NATURE AND PURPOSE OF EDUCATION:
THE IMPORTANCE OF ARISTOTELIAN-THOMISTIC PRINCIPLES FOR
EDUCATIONAL LEADERS

BY

JOSEF CHARLES FROULA

A Dissertation Submitted to the School of Graduate Studies
in Partial Fulfillment of the Requirement for the Degree of
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Abstract

Author: Josef Charles Froula

Title: ST. THOMAS AQUINAS ON THE NATURE AND PURPOSE OF EDUCATION: THE IMPORTANCE OF ARISTOTELIAN-THOMISTIC PRINCIPLES FOR EDUCATIONAL LEADERS

Dissertation Chair: Sousan Arafeh, Ph.D.

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The purpose of this textual analysis is to ascertain the most fundamental principles that govern education conceived of as the perfection of the faculty of reason. Considered as such, education is ordered to happiness. This purpose determines the arts and sciences that constitute education and dictates the role of teacher. Because all education presupposes self-evident principles, the role of the teacher is to aid students in their progress from these principles to conclusions that they can support and defend on their own. This consideration of the nature and purpose of education is necessary for educational leaders who design curricula and formulate policy for instructional practice.

To my wife, H el ene, without whose undying love and faithful support
this dissertation could never have been written

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CHAPTER 1: INTRODUCTION

Purpose of the Study

The purpose of this study is to determine the most fundamental principles of education according to Aquinas, how these principles relate to the proper relationship of the teacher to the student, and how this purpose and this relationship is important and useful for educational leaders. The way that one understands the nature and purpose of education as a whole influences the understanding of the teacher-student relationship, which in turn influences the decisions of educational leaders concerning curriculum design and instructional practice. Because all of the work of educational leaders is directed to the final end of learning, determining the purpose of this learning and how this purpose is attained is the primary concern of all educational leaders whose role is to coordinate the

To accomplish this goal, however, it will first be necessary to relate what is now referred to as mastery orientation to what Aquinas identifies as the purpose of education. According to Aquinas, all of education is ordered to human happiness (eudaimonia). The foundation for this conception of education is twofold: first, the Aristotelian-Thomistic understanding of the arts and sciences, and second, the treatment of human happiness in the *Nicomachean Ethics* of Aristotle (Aristotle, trans. 1984, 1097a15-1099b8).

Therefore, after treating the philosophical origins of the arts and sciences that constitute the most fundamental principles of education and the conception of human happiness as the purpose of education, the significance of this conception for the role of

the teacher and educational leaders will be examined. Finally, the connection between these considerations and educational leadership will be made.

Background/Problem

In contemporary education, policies and practices are invariably formulated and implemented on the basis of some understanding of the purpose of education in general, and of each discipline in particular. However, while these purposes are seldom examined or articulated beyond their applicability to practical ends, educational leaders are expected to articulate, defend, and accomplish them.

In general, the role and instructional practice of the teacher in relation to the student is considered of paramount importance in raising student achievement. However, the nature of this role is elusive. "Student achievement" tends to be axiomatically defined in terms of standardized test scores—a definition that is often not questioned, let alone discussed, in the context of instruction in the classroom. Also educational leaders are responsible for the support and professional development of teachers. This responsibility is based on conceptions of what teachers should know and be able to do that are broadly accepted but not necessarily examined or articulated in relation to the most fundamental principles.

Whether common knowledge or not, the nature and purpose of education, the role of the teacher, the definition of student achievement, and the question of how educational leaders should shape and support these areas are all based on foundational principles of epistemology grounded in specific traditions of philosophy. It is important that these principles be articulated and defended.

A further difficulty is that there is widespread disagreement about the place of the philosophy of education in educational leadership programs ordered to understanding and advancing education. Views widely diverge. For example, some claim that because we live in a culture that embraces individualism and the Romantic expression of self, there simply is no such thing as the philosophy of education (Case, French, & Simpson, 2011). Another point of contention is the place of the philosophy of education in the university. Some maintain that it belongs in the philosophy department, while others hold that it is an essential element of an education curriculum (Biesta, 2014).

Complicating this further, there is practically no body of work focused on the philosophy of educational leadership (Pryor, Sloane, & Amobi, 2007). Thus, this is an area ripe for exploration and analysis.

Of those who insist on the treatment of educational foundations and the philosophy of education in educational leadership programs, many claim that they are essential for leaders to make sound judgments and efficacious decisions in a variety of challenging situations. Despite this, some have observed that isolated courses in the philosophy of education have in many cases been entirely omitted from educational leadership curricula (Pryor, 2007).

In light of these considerations, it is necessary and useful to challenge this tendency to overlook the foundations of education, take a step back, and more closely examine core philosophical and epistemological principles upon which education in the United States is based. This is particularly important for educational leaders who shape curriculum and instruction. To this end, the researcher proposes to contribute to the discussion by examining one of the most historically influential thinkers on the subject of

the philosophy of education: St. Thomas Aquinas. By the investigation of his works, the hope is to determine the purpose of education and to raise fundamental concerns that will encourage educators to consider more deeply the most important questions of what we are doing in education and why.

The purpose, then, of this dissertation is to explore the foundations upon which education is built. In so doing, the goal is to address a gap that exists in contemporary scholarship: the absence of clearly articulated and fundamental principles on the basis of which educational decisions are made at the highest levels, such as which disciplines will be taught and for what purpose, how these disciplines will be approached, and how curricula will be planned and instructional practice determined in accord with the overall purpose of education. The failure to consider these principles is a serious omission; for without them, there is no way to judge the overall quality of education or to measure progress in a way that assesses outcomes in reference to intended goals. While it is true that there is a system of standardized testing in place at state and national levels, there exists no common understanding and consensus concerning what the overall goal of education is and how each discipline is related to this goal. As a case in point, former Princeton University president Shapiro argues in his book, *A Larger Sense of Purpose: Higher Education and Society* (2005) that American Universities lack a sense of purpose. To address this problem, the following questions will be investigated.

Research Questions

- 1) What is the nature and purpose of education according to Aquinas?
- 2) How does Aquinas define the purpose and role of the teacher?

- 3) What is the relevance of Aquinas's philosophy of education for teachers and for educational leaders who design curricula?

Overview of Framework and Methodology

This dissertation will proceed according to an Aristotelian-Thomistic conceptual framework. This framework is derived from the following works of Aristotle, together with the commentaries of St. Thomas Aquinas on these same works: 1) *The Organon* 2) *The Physics* 3) *The De Anima* 3) *The Nicomachean Ethics* and 4) *The Metaphysics*. Taken in this order, these works lay out the path to wisdom, which is knowledge in the fullest sense and an essential element of happiness, which is the principal goal of education according to Aristotle and Aquinas.

The methodology used in this exploratory qualitative analysis is composed of three parts: dialectic, definition, and demonstration. "Dialectic" refers to reasoning from opinions that are generally accepted. "Definition" refers to words that signify distinctly the nature of the thing. "Demonstration" refers to a syllogism whose premises are statements which are either self-evident principles derived from these principles (Aristotle, trans. 1984, 100a20-101a3).

The Significance of This Study

An honest assessment of the purpose of contemporary education is that it has a tendency to be career-oriented. In other words, our curricula are finally directed to forming students who will attain economic success and live as "productive" citizens. As important as it is to be economically successful, it is necessary to take up the question of whether this kind of education is the most humanizing. A humanizing education in Aristotelian-Thomistic terms is ordered to attaining a knowledge that is perfective of

human nature. This knowledge is attained principally in the disciplines of logic, mathematics, natural philosophy, ethics, and metaphysics. The reason that these disciplines are considered to be the most humanizing is that they are directed to the perfection of reason, which is the highest faculty of human nature. For Aristotle and St. Thomas, one who has the most universal knowledge and uses this knowledge to order human acts has attained happiness, which is the greatest excellence of life (Aristotle, trans. 1984, 1098a1-17; Aquinas, trans. 1995).

Might it be that our society as a whole has a tendency toward a narrative and banking style of education? Might it be that we are, with the best of intentions, cultivating a pedagogy of the oppressed (Freire, 1970)? Might it be that the "goal orientation" of economic success is dehumanizing in ways that we do not realize or take precautions against? If so, it is crucial to discuss the purpose of education and whether this purpose is being accomplished by teachers and educational leaders. This dissertation will investigate these questions by examining the historical and philosophical foundations of the kind of education that is ordered to perfection and happiness, which is facilitated by teachers and guided and supported by educational leaders. In so doing, this dissertation proposes to fill a gap in the literature concerning the relation of a sound philosophy of education to the area of educational leadership that concerns curriculum design.

Definition of Terms

1) **goal-oriented education:** Goal-oriented education is directed to achieving a practical goal beyond the knowledge itself. For example, saying that the primary goal of education

is to turn out students who are "college and career ready" characterizes goal-oriented education (Strambler & McKown, 2013).

2) **mastery-oriented education**: Mastery-oriented education is directed to mastery of the subject matter. It is not directed to a goal beyond the knowledge itself. Rather, knowledge is the purpose of this kind of education in the sense that this knowledge perfects human nature. This kind of knowledge is considered to have a humanizing effect on the student (Strambler et al., 2013).

3) **eudaimonia**: This term is used by Noddings in her work *Happiness in Education* (2003) and originates from the *Nicomachean Ethics* of Aristotle. Though it is usually translated "happiness," it has the connotation of the highest good for human nature. For Aristotle, this activity in accord with perfect virtue, both moral and intellectual. Because the intellect is the highest human faculty, the perfection of this faculty is the highest human good. Eudaimonia, then, consists in human flourishing or perfection. Aristotle puts it this way in the *Nicomachean Ethics*, speaking of happiness as the highest human good: "human good turns out to be activity of soul in conformity with excellence, and if there are more than one excellence, in conformity with the best and most complete" (Aristotle, trans. 1984, 1098a16-18).

4) **self-actualization**: This term refers to a process of realizing or fulfilling one's potential. Interestingly, Aristotle defined change as the actualization of the potential as such. So, self-actualization is rooted in Aristotle's notion of nature. What makes us more human is a process of bringing into actualization those faculties of knowledge within us (Aristotle, trans 1984, 201a9-11).

5) **narrative or banking education**: In this form of education, the teacher deposits facts or narrates information that the student is expected to return or display through some means of assessment. The criticism of this process is that it fails to perfect the human faculties of critical thought and instead focuses on getting an answer or achieving high scores as an end in itself. The criticism is that assessment is treated as not only the terminus or last consideration of instruction, but the telos or final end for which education ultimately exists. The defense of this form of education is that the knowledge of core disciplines requires inevitable memorization of facts and standardized tests afford both an incentive to memorize these facts and an objective means of assessing progress (Freire, 1970).

6) **the dialogical process**: In contrast to narrative or banking education, this term describes a method of education that is based on dialogue between the student and teacher. It centers on the development of mental faculties by inducing students to take an active role in exercising logical skills in reaching substantive and worthwhile knowledge for themselves. In this understanding, students are not passive recipients of a narrative but take the lead role in actualizing themselves, taking possession of knowledge that they have arrived at on their own (Freire, 1970). The dialogical process is often called "The Socratic Maieutic" because Socrates was the earliest known practitioner of this method (Neumayr, 2015).

7) **Aristotle**: Aristotle was an ancient Greek philosopher. He was born in Stagira, Chalcidice, Greece in 384 B.C. and died in Chalcis, Euboea in 322 B.C. He was "one of the greatest intellectual figures of Western history. He was the author of a philosophical and scientific system that became the framework and vehicle for both Christian

scholasticism and medieval Islamic philosophy. Even after the intellectual revolutions of the Renaissance, the Reformation, and the Enlightenment, Aristotelian concepts remained embedded in Western thinking" (Amadio, 2015, p.1).

8) **St. Thomas Aquinas**: Aquinas was an Italian medieval philosopher and theologian who lived from 1225-1274 A.D. He was the foremost medieval Scholastic. He was a philosophical disciple of Aristotle and wrote commentaries on all of Aristotle's major works. He is widely respected for his contributions to both philosophy and theology (Chenu, 1964). Along with Aristotle, Aquinas is one of the most influential thinkers on the subject of the philosophy of education.

9) **purpose of education**: this term refers to the aim or goal of education as a whole. Determining the purpose of education is particularly important because the nature of education and all of the individual components of an educational institution are directed by and ordered to the purpose of the whole.

10) **aims talk**: this expression was coined by Noddings (2003) in her book *Happiness in Education* and refers to the discussion of and inquiry into the aims or purposes of education as a whole.

11) **educational leader**: an educational leader is one who is responsible for organizing the parts of a whole and directing the whole to a purpose. In this dissertation, the parts being organized are the specific arts and sciences treated in chapter three. These arts and sciences form a whole that is directed to the purpose of happiness. Thus, the specific kind of educational leadership that this dissertation concerns is curriculum design and implementation. Throughout this dissertation, then, "educational leader" refers to someone who is responsible for designing curricula and influencing instructional

practice. Though the dissertation is most relevant to curriculum designers, it is also applicable to administrators such as college deans and presidents who play a role in the implementation of policies concerning curriculum, policymakers under whose purview the design and implementation of curriculum falls, and teachers in the classroom who are most closely associated with the findings of this research.

Delimitations

The principal delimitation of this exploratory qualitative analysis is that the philosophy of two thinkers, Aristotle and Aquinas, will be investigated. No attempt will be made to represent the entire contribution of either philosopher or the contributions of other authors. Rather, their thought on the nature and purpose of education and how this applies to leaders who shape curricula and instructional practice will be the subject of research. Also, the discussion will focus on higher education. Though many of the principles discussed will be applicable to education at all levels, whenever the term "education" is used, the meaning intended is "higher education" unless otherwise noted. Also, though one can speak of both moral and intellectual education, the focus here will be on the cultivation of the intellect or mind, rather than on the development of the moral virtues.

Also, primarily because education in the United States is dominated by the influence of almost exclusively western works, this dissertation will be concerned itself with those works. This western purview notwithstanding, the arguments made herein are not intended to apply exclusively to education in the west. Since the scope and treatment of disciplines is based on human nature, the findings are applicable in non-western traditions as well.

Limitations

Because this research is philosophical at its core, it is limited to universal conclusions about the nature and purpose of education. This methodology does not extend in its applicability to a particular implementation of the conclusion of the findings in a particular setting the way an empirical study might. Therefore, given the limitations of this approach, the focus is on principles universally applicable rather than very specific practices that may be utilized in a particular setting.

Further, because the focus of this dissertation is the most fundamental principles guiding the method of the arts and sciences, it will be concerned specifically with how these principles concern those educational leaders responsible for designing curricula and setting standards for instructional practice in conjunction with curricula. The consideration of leadership in general or administration in particular is outside the scope of the research.

CHAPTER 2: LITERATURE REVIEW

The Relevance of the Philosophy of Education to Educational Leadership

The subject of the importance of the philosophy of education for educational leaders is certainly not among the most frequently discussed topics in the field of educational leadership. Dominating the conversation are such considerations as formative and summative assessments, closing the achievement gap, the self-efficacy of leaders, distributed leadership, policy studies, and organizational change. Even in the current literature, there seems to be a dearth of articles that treat of the philosophy of educational leadership and the significance of the role that the philosophy of education plays in the duties of educational leaders (Pryor et al., 2007).

Some go so far as to assert that there is no such thing as the philosophy of leadership, let alone a philosophy of educational leadership in particular. Case et al. (2011) make the following claim: "In a significant sense, there is no philosophy of leadership" (p. 1). These authors supply the following reason for their assertion: "In the first place, it would be foolish to claim there to be but *one*, singular, philosophy of leadership. Common sense dictates that there are, at the very least, multiple *philosophies* of leadership populating, and coexisting in, the contemporary world (p. 1).

The authors seem to be saying here that something called "the philosophy of leadership" means that there is a right way and a wrong way of viewing leadership that does not account for each person's individual philosophy: "We live in an epoch where there are strong Romantic and heroic imperatives to be one's own person, to make one's

mark in one's job or career and thus to give expression to one's individual philosophy (Case et al., 2011, p. 1).

Perhaps this viewpoint helps explain why the philosophy of education is not more common in the literature and in academic programs focusing on educational leadership. Despite the relative paucity of literature on the subject, however, there is a quiet conversation taking place in the corner of the room.

Part of this conversation is that ancient philosophers offer help in meeting the current demands of education. Grint (2007), for example, writes in the journal, *Leadership*, that Aristotle teaches how to lead by helping to find the road to wisdom. Others argue similarly that Aristotle's theory of learning is crucial to leadership (Morrell, 2007).

Related to this point, there are others who maintain that the philosophical disciplines of ethics and epistemology are necessary fundamentals in the practice of organizational management and change (Knights, 2008).

Going even further, some say that current curricula in educational and organizational leadership are inefficacious because of the failure to attend to foundational ethical principles of leadership and decision-making (Pfeffer & Fong, 2004).

Taking a fresh look at the philosophy of education, Biesta (2014) suggests that the field of education suffers because it is insufficiently informed in the field of philosophy. He observes that there is a serious chasm between the fields of philosophy and education and that what is called the "philosophy of education" has largely been the only way that these two disciplines relate to each other. While it is common that the philosophy of education is studied in philosophy departments, Biesta's view is that it really belongs in

departments of education. "With White, I believe that this kind of scholarship should indeed be located in departments, schools, or institutions of education" (p. 2).

One of the most formidable obstacles to the inclusion of philosophy of education courses in educational leadership programs, however, is the conception that they lack practical application. As a result of this, "many have noticed that foundational courses (in particular philosophy of education courses) have become either less a staple or have entirely disappeared as stand alone courses" (Pryor et al. 2007, p. 77).

Lamenting this failure to consider educational foundations and principles covered in the philosophy of education, others have noticed significant deficiencies in key areas of leadership and pedagogy or instructional practice. Perhaps the most crucial of these is a lack of clarity about the goals of education (Feinberg & Soltis, 2004). Noddings (2003) makes this very point in her book, *Happiness and Education*: "Looking at contemporary policymaking, we'll see that talk of aims might be considered a missing dimension in the educational conversation" (p. 74). It has been observed that one of the effects of this lack of clarity is an inability to make prudential and efficacious decisions in school settings. The connection between the philosophy of education and decision-making is precisely this. If there is a lack of understanding about the goals to be attained in the classroom, one lacks the necessary capacity to direct efforts toward these goals and to address difficulties that prevent the objectives from being attained.

Another possible danger in omitting educational theory is that teachers will be impaired in their ability to exercise reflection and judgment.

The ability of these practitioner-trained teachers to make judgments about effective educational practices could be seriously impaired by their lack of understanding

of educational theory and probably will not produce the type of reflective practitioners that many believe are essential for the improvement of today's schools (Morey, 2001, pp. 309-310).

One additional benefit of taking a philosophical approach in educational leadership programs is that it develops leadership skills that are universally applicable. Because every leader in the field of education enters into a variety of unpredictable tasks and challenges, these kinds of skills, such as "substantive inquiry, intellectual debate, and deep reflection" (Butin, 2004, p. 7) are indispensable.

Yet the challenge remains to implement the philosophy of education in the courses of leadership programs in such a way that its practical application is manifest and adaptable. To meet this challenge, one possibility is to implement practical exercises in the curriculum that draw from philosophy in its application to educational decisions, especially those regarding curriculum design (Petress, 2003).

Also important is the understanding of coherence and consistency in the philosophical tradition of learning. It is for this reason that this study seeks to explore key philosophical notions of Aristotle and Aquinas relating to educational leadership in the area of curriculum design. This exploration will begin by considering some of the most relevant original ancient and medieval sources at the foundations of the philosophy of education and educational leadership.

What the Philosophy of Education is and Why it is Necessary

"There is nothing so practical as a good theory" (Lewin, 1951).

Given the pressing practical considerations of education, one may justifiably question the relevance and importance of what seems to be a theoretical concern such as the philosophy of education (Flewelling, 2005).

The objection against a focused and thorough treatment of educational philosophy may be formulated as follows. At a time when test scores are falling, the drop-out rate is staggering, and the achievement gap is widening, our sole concern should be addressing these urgent issues that demand immediate attention. While students are suffering, it seems irresponsible for educational leaders to spin their wheels in esoteric discussions that do not address the needs at hand. We ought to be serving our scholars rather than entering into feckless debates that fail to address practical problems (Thomson, 2012).

This objection certainly carries weight and ought to be carefully considered. To be sure, the most necessary and time-sensitive problems should be first on the agenda. To address the objection that the philosophy of education should not be the immediate concern of educational leaders, it is first necessary to explain what the philosophy of education is. For, if there is no common understanding of what the philosophy of education is, it would make no sense to enter into a discussion of whether it is important or relevant (Hayden, 2011).

Philosophy, by its etymology, is the love of wisdom (Burnyeat, 2011). It pertains to wisdom to determine the nature and purpose of things. The word "nature" in this context refers to the essence of a thing or what it is and the word "purpose" refers to what a thing is for. Applying this to education, the primary subject matter of the philosophy of

education concerns what education is and what it is for (Barrow & Woods, 2006). In other words, the first and most important questions that pertain to the philosophy of education are "What are we doing?" and "Why are we doing it?" (Griffiths, 2014).

That these questions should be the paramount concern of educational leaders is made clear by the following examples. In all human endeavors, purpose commands and dictates all other activities and procedures. To begin with a simple example, everything that goes into the production of an axe, such as the long, light, smooth handle and the heavy, sharp, durable blade, is determined by the axe's purpose of chopping wood. To cite another example, the purpose of an internet service provider is to deliver the highest quality internet service at a reasonable price. Everything that goes into the operation of the company is directed to this one goal (Lewis, 2005).

Likewise, in the realm of education, everything is, or at least ought to be, directed by the purpose. Supposing that the purpose of higher education is to prepare students for careers, everything should be directed to this one purpose. Supposing that the purpose is wisdom, everything would likewise be directed to this purpose (Angioni, 2014). One of the difficulties facing leaders in higher education today is the lack of clarity concerning the unifying purpose of institutions. While it is very clear what the purpose of an axe or an internet service provider is, the purpose of education is more nebulous and more of a matter of contention. It is the hope that this dissertation will provide some clarity on the issue of the purpose of education (Barrow & Woods, 2006).

Therefore, because the purpose of education ought to dictate every element of education, the philosophy of education, which examines and determines this purpose, is far from being outside the due consideration of educational leaders. On the contrary, the

philosophy of education, whose principal objects are the nature and purpose of education, ought to be their principal concern. For it is the role of a leader to ensure that the parts of an endeavor are properly arranged in relation to the whole and that the purpose or design intended be accomplished by the most advantageous means. It is for this reason that Elmore (2004) contends that the primary concern of educational leaders is instructional practice. (Though Elmore's focus was on K-12 education, his general principles can also be applied to higher education, where the interaction of teachers and students in the presence of content is still the primary concern.) It pertains to educational leaders, then, to secure a situation in which others cooperating in leadership know and can articulate the nature and purpose of the institution: "what we are doing," and "why we are doing it." Because the nature and purpose of education fall under the consideration of the philosophy of education, educational leaders must concern themselves with this in order to be efficacious (Noddings, 2012).

Why Aristotle and Aquinas?

Granting this, one may well wonder why anyone should consider the thought of ancient and medieval authors in the context of contemporary education. It seems that recent advancements in our understanding of education have displaced ancient and medieval thought altogether (Rose, 2015). Surely, the argument goes, we have advanced far beyond what these thinkers have contributed. Aren't the best thinkers on the subject of education the most current ones, who have the benefit of the most recent advancements (Davies, 2014)? To address this concern, we should first examine the reasons why one should consider old works at all.

Because of the customs of our day that no one chooses and into which everyone is born, we are necessarily inclined to certain lines of thinking. These habits of thought that come from our culture and customs cannot be adequately understood without considering the origins upon which they are based. For example, the legal system of the United States cannot be fully understood without a consideration of the Greek, Roman, and British legal systems that form the foundation of American legal practice (Kohli, 2014). To cite another example, current military strategy necessarily examines military history for the purpose of minimizing errors and ensuring the best possible outcome. In short, the examination of the historical foundations of our era is a great aid in avoiding the mistakes of the past. Lewis (1970) puts it this way: "Every age has its own outlook. It is specially good at seeing certain truths and specially liable to make certain mistakes. We all, therefore, need the books that will correct the characteristic mistakes of our own period. And that means the old books" (p. 32).

Certain ways of thinking permeate our modern world and habituate us to biases that can influence our judgment. For example, in the United States, some have observed an emphasis on individualism. Tocqueville (1990) remarked that along with the social condition of democratic equality comes the Cartesian tendency to appeal only to the individual effort of one's own understanding in the resolution of difficult quandaries: "I discover that in most operations of the mind each American appeals only to the individual effort of his own understanding. America is therefore one of the countries where the precepts of Descartes are least studied and are best applied" (p. 3). This tendency to appeal to our own understanding and not to seek out the positions of others in history is nowhere more prevalent than in contemporary education. One way to escape this

tendency is to study older traditions of learning and compare them with our own (Bailey, 2014). In this way, we appeal to more than just the individual effort of our own understanding: we are able to compare our ideas with those of others as a means of testing their veracity.

Currently, when it comes to settling a question or resolving a topic of controversy, the latest opinion, like the latest piece of technology, is at times thought to be necessarily an improvement over earlier ones. Against this error, Lewis (1970) says, "The only palliative is to keep the clean sea breeze of the centuries blowing through our minds, and this can be done only by reading old books" (p. 202).

Further, in the reading of only modern works there arises a danger to which the scholar of the ancients is immune. It consists of donning the fleeting fashions of the hour that will pass away as quickly as they came (Hayden, 2011). It may be that an idea currently in vogue will stand the test of time. Yet, whether it will last is difficult, if not impossible, to determine: "A new book is still on trial and the amateur is not in a position to judge it. It has to be tested . . . and all its hidden implications (often unsuspected by the author himself) have to be brought to light" (Lewis, 1970, p. 201).

To be sure, it would be a grave mistake to ignore current contributions to the discussion of education. Even still, one should at least begin with a study of older works (Schofield, 2012). An additional reason for this is that the best recent works are most often a reply to, or founded upon, earlier ones. Without an appreciation for the context of a work in this progression, one misses the importance of the work as a whole and the relevance of particular points being made: "If you join at eleven o'clock a conversation

which began at eight you will often not see the real bearing of what is said" (Lewis, 1970, p. 201).

Another important consideration is that human beings are still human, now as they were in ancient and medieval times. So, what was dehumanizing long ago is still dehumanizing today. In the search for what is what is most humanizing in education, one who ignores the perennial wisdom of the past is at a great disadvantage: without considering the knowledge that history bequeaths to us, we are forced to re-invent the wheel in each generation.

In light of this consideration, the study of educational foundations informs us of the origin of our current situation. A study of the roots of how and why our contemporary practices are enacted will place educators and educational leaders in a much better position to judge instructional practices and to make improvements in curriculum. For example, current educational research is divided into two kinds: qualitative and quantitative (Roberts, 2010). Interestingly, the origin of the use of these terms is the distinction between quality and quantity is the *Categories* of Aristotle (Aristotle, trans. 1984). Understanding and evaluating this division in its origins, then, would require an examination of Aristotle (Angioni, 2014).

To cite another example, verbal and mathematical reasoning in contemporary education are considered to be among the most fundamental habits of universal knowledge required for competency in both undergraduate and graduate education. Evidence for this is that the general test for both the SAT and GRE are devised by the College Board to test these two forms of reasoning: verbal and mathematical. This distinction, in turn, is based on the traditional distinction between the trivium and

quadrivium, which are the two categories of disciplines that form the traditional liberal arts. To understand how our current understanding of what is most fundamental in education is rooted in the philosophy of Aristotle and St. Thomas, it is necessary to discuss the historical foundation of the liberal arts and how these arts were understood by St. Thomas (Rose, 2015).

Now that the question of why ancient and medieval works are relevant in the discussion of contemporary education has been discussed, it remains to address why Aristotle and St. Thomas Aquinas are being treated together.

Why Aristotle is Necessary to Understand Aquinas on Education

It is no exaggeration to say that without Aristotle, the works of Aquinas would not exist. Thomistic philosophy is based almost entirely on the thought of Aristotle, whom he repeatedly refers to with the respectful title, "the Philosopher" (Ashley, 2006). Aquinas adopts the worldview of Aristotle and incorporates his principles into almost all of his works (Koslicki, 2012). Even in his theological treatises, Aquinas hardly draws a single conclusion without paying tribute to Aristotle. For Aquinas, all advanced knowledge presupposes fundamental axioms rooted in sense experience, as observed by Aristotle. Because Aquinas deemed the ancient Greek philosopher to be a master of what the human mind can attain in the arena of natural knowledge, Aquinas became his intellectual disciple and never wavered in his adherence to his principles.

Largely, the philosophical assertions of Aquinas can be found in Aristotle more fully explained and defended. The works of Aquinas presuppose, therefore, a study of the works of Aristotle, without which they cannot be fully understood (Davies, 2015). In fact, to aid his students in the study of philosophy, Aquinas wrote extensive commentaries on

the principal works of Aristotle. In addition, he composed his own philosophical treatises expounding on the subtler points first asserted in Aristotle's treatises (Chenu, 1964).

Because so much of Aquinas's thought on education, then, is rooted in Aristotle, it presupposes an understanding of his work: no complete treatment of the principles of education according to Aquinas can ignore his chief mentor on this subject. It is for this reason that the thought of Aquinas is often called Aristotelian-Thomistic. The following examination, therefore, will incorporate a treatment of the chief works of Aristotle as a necessary prerequisite for the exposition of Aquinas on the role of the teacher.

One may still wonder why Aquinas is being considered at all. If the focus is the foundational epistemological principles of education, why not confine the treatment to Aristotle? The answer to this question is twofold. First of all, the works of Aristotle and Aquinas illumine each other. Because the commentaries of Aquinas on Aristotle's works are so clear and accessible, they clarify the meaning of his words and are a great aid in textual analysis. Second, the works of Aquinas go beyond those of Aristotle and apply his principles to the practical application of the role of the teacher and instructional practice, which Aristotle does not discuss.

Along these lines, it is also important to address the distinction between Aristotle and Aquinas regarding happiness conceived of as human perfection. Perhaps the most telling point of reference is that concerning Aristotle's conception of happiness, Aquinas does not take issue with Aristotle in his commentary on the *Nicomachean Ethics*. So, in the fundamentals concerning Aristotle's treatment of happiness, Aquinas is in perfect agreement. Aquinas, however, does apply what Aristotle says to what he believes by faith and considers the perfect fruition of happiness to be realized in life after death in

heaven. Yet this is outside the concern of this dissertation, which focuses on the perfection of reason apart from the consideration of faith.

Philosophy and Education in Aristotle and Aquinas

In common speech, the word "philosophy" tends to have a very particular meaning denoting an isolated area of study. For example, most universities have a philosophy department and students can choose to major in philosophy and graduate with a degree in the subject. When one studies philosophy, particular areas such as logic, natural philosophy, ethics, and metaphysics are treated (Feser, 2013). Interestingly enough, the division of these areas of philosophy follows the division according to which Aristotle delineated the subject matter of each of his works (Aristotle, trans. 1984). Other subjects, however, such as mathematics, literary criticism, and education are commonly considered to be areas distinct from philosophy and therefore are studied in separate departments.

In contrast, for Aristotle and Aquinas, "philosophy" meant something much more universal. By its etymology, "philosophy" means "the love of wisdom." This wisdom was considered to be the goal of all of education. Everything necessary for wisdom was thought to be part of philosophy (Augros, 2007).

So, the subjects of mathematics, literary criticism, and education, far from being isolated disciplines, are all branches of philosophy (Ashley, 2006). The consideration of the philosophical disciplines according to the Aristotelian-Thomistic schema, therefore, is synonymous with the consideration of education itself. For example, for Greeks, mathematics was the first discipline of philosophy and a prerequisite for any higher learning. Above the door of Plato's academy was inscribed the words, "Let no one

ignorant of geometry enter here." Literary criticism was a subject taken up by Aristotle in his *Poetics* (Aristotle, trans. 1984), which Aquinas considers to be part of logic because one can use poetry as a teaching tool (Davies, 2014). Finally, education is a subject considered throughout the works of Aristotle, but principally in his *Metaphysics* because it belongs to metaphysics to divide and order the disciplines that lead up to it. Therefore, to consider the philosophy of Aristotle and Aquinas is nothing other than to consider their thought on education. Education was for them a way of life (Rose, 2015). Education was not for the sake of making a living, but making a living was for the sake of education. Being a lifelong learner was for the sake of attaining the highest human good, which is the perfection of reason. Nothing was more important or more crucial to one's happiness. Happiness or eudaimonia, which for Aristotle is synonymous with the highest goods that human beings can possibly attain, is secured by perfecting the power of reason (Neumayr, 2015).

In fact, until the industrial revolution, education was thought to be coextensive with a study of philosophy as Aristotle conceived it. It is for this reason that those who were granted a terminal degree were given the title of *philosophiae doctor*, or doctor of philosophy, the initials of which we still retain in the conferral of the vast majority of doctoral degrees: Ph.D. In the Greek tradition of Aristotle adopted by Aquinas, therefore, the study of education necessarily requires a treatment of the philosophical disciplines (Ashley, 2006).

The Relevance of Aristotle and Aquinas for Educational Leadership

Such a practical concern as the duties of a leader in the field of education seems at first to have nothing to do with the speculative and erudite works of ancient and medieval

thinkers. Could the works of Aristotle and Aquinas really be relevant to the current debates in education?

In order to bring about change for the better, effective leadership in the field of education necessitates an investigation of and adherence to the most fundamental principles (Standish, 2014). The best leadership demands a clear articulation of the purpose of education as a whole and a cogent understanding of how specific measures such as the choice of a curriculum or the instructional practice of a teacher are related to this purpose.

As a case in point, the principle of articulating a clear end or purpose and then proceeding to enact measures to attain that end is in current parlance referred to as "backward mapping" or "backward design" (Buehl, 2000). This principle has historical foundations in Aquinas, who articulates it as follows Question 1, Article 1 in the *Prima Secundae* of the *Summa Theologiae* : "Although the end be last in the order of execution, yet it is first in the order of the agent's intention" (Aquinas, 1947, p. 583). Explaining and defending this practice of backward mapping, therefore, is greatly aided by an examination of its origins in the thinkers who first articulated it clearly (Buehl, 2000).

It is of the utmost importance in educational leadership, then, to establish as a guiding principle the end or purpose of education and the role of the curriculum and instructional practice in attaining this end. Without this, attempts at curriculum reform run the risk of being endless and aimless, beginning anywhere and ending nowhere. It is this in particular that necessitates a return to the consideration of the educational foundations (Bailey, 2014). Therefore, though it may be criticized as abstract and theoretical, an examination of St. Thomas Aquinas is quite concrete and practical:

nothing is more useful for understanding and guiding the concepts and practices of effective curriculum design than the foundation upon which everything is built (Mooney & Nowacki, 2014).

Educational Leadership and the Role of the Teacher

It pertains to the role of leaders not only to design curricula but also to influence the instructional practice that necessarily goes along with it. Elmore (2004) contends that instructional practice is the primary concern of educational leaders. Also, the culture and practices of an institution are largely shaped by the leaders who establish and act in accord with the principles, goals, and practices that define and characterize a school. For example, the stated goal of Great Hearts charter schools, which is to form critical thinkers, dictates the teaching method used in the classroom. "Classical education forms critical thinkers. The Socratic method we use in our classrooms and our insistence on logic, reason, and evidence forges a student who can think deeply, see opposing viewpoints, change position when merited, and solve problems with flexibility" (Scoggin, 2015). This Socratic method is being used in many other public and private schools across the country. Some examples are The Lyceum in South Euclid, Ohio, and St. John's College at its two campuses in Santa Fe, New Mexico and Annapolis, Maryland. All of these schools implement the discussion method as an official policy. Also, the ReadWriteThink organization encourages the use of the Socratic method as explained by Israel (2002):

The Socratic method is a formal discussion, based on a text in which the leader asks open-ended questions. Within the context of the discussion, students listen closely to the comments of others, thinking critically for themselves, and

articulate their own thoughts and their responses to the thoughts of others. They learn to work cooperatively and to question intelligently and civilly (p. 89)

The role that the teacher plays in the use of the Socratic method is clearly determined by the school leadership. This is tangible evidence that there is a strong connection between educational leadership and the instructional practice and role of the teacher.

CHAPTER 3: RESEARCH METHODS

The Method of This Dissertation

This method this dissertation will utilize is an exploratory qualitative textual analysis that uses a philosophical framework and methodology. In other words, texts on the principles of education will be examined on the basis of a qualitatively critical analysis. This method is used to study existing theory on the basis of which further empirical research may be conducted (McKinnon, 2015).

The Relevance of a Philosophical Methodology to Educational Theory

Considering the relative paucity of philosophy of education classes in education and educational leadership programs, one may be inclined to think that its relevance in the realm of educational theory is limited or wholly unnecessary. Alsaleh (2015) argues to the contrary: "The importance of educational philosophy is made clear by the following points: it helps to understand and to modify the educational process. It helps to identify conflicts and contradictions in any theory. It develops the human capacity to raise questions about theory. Also, it clarifies concepts and assumptions that are underlying educational theories" (p. 1). So, according to Alsaleh, it belongs to educational philosophy to spot possible conflicts in a theory and to hone in on concepts assumptions that underlie educational theories. These concepts that underlie theories are of dire importance in the realm of education.

Why This Research Methodology Must be Pre-scientific

Every inquiry that involves data collection and research methods determining the gathering and analysis of data necessarily requires governing principles which are not and cannot be established by those same research methods. These governing principles or axioms form the basis and grounds upon which all subsequent research is based. For example, in the psychological and social sciences, there exists the general consensus that one should proceed according to quantitative methods, qualitative methods, or a mix of the two. However, there is no data gathered by either of these methods to support this threefold distinction of methods. In other words, the methods according to which scientific research is conducted are not established by scientific research. No empirical scientific method has drawn the conclusion that certain methods be followed. Rather, it is an axiom largely unquestioned that research be conducted in these methods.

To be clear, there is no attempt here to present an argument that one should support and verify scientific methods by previous scientific methods. The point is rather that one should not expect that the foundational principles upon which further inquiry is based be established by data collection and analysis. Because this dissertation concerns foundational principles that are most fundamental in the field of education, the conclusions drawn will not be based on results discovered by empirical research. Rather, the present concern is the foundation upon which empirical research proceeds. This foundation consists of first principles, which all other scientific methods presuppose but do not establish or substantiate by their own methods. In this sense, the subject matter is pre-scientific (Alsaleh, 2015).

At this point, one may legitimately raise the objection that all educational decisions and every proposal for change at the level of the organization or the classroom should be data-driven and scientifically verified. There are two principal problems with this approach.

First, the dictum, "all educational decisions should be data-driven and scientifically verified" is not itself data-driven or scientifically verified. Yet it is certainly an educational decision that all educational decisions be supported in this way. In fact, there is no data to support the conclusion that we should always be using data and there is no scientific research that verifies the insistence that scientific research must always be used. The premise, then, that all educational decisions should be data-driven and scientifically verified is illogical because the statement is inconsistent with itself.

Second, it would in fact be impossible to insist that every educational decision be supported by scientific research. The reason for this is that every component of the research process itself, such as the selection of the sample and the instrument, would require scientific research to verify. But this research would in turn depend on other components that would require scientific research to verify. Following this line of reasoning to its logical conclusion, one would be caught in an infinite regress of research that would be impossible to complete.

Therefore, there must be some first principles in the field of education that are not verifiable by scientific research but must be verified and supported in other ways. The attempt here is not in any way to deny or derogate either the importance of scientific research in education or in the psychological or social sciences. The point is rather that the subject matter of this dissertation concerns the fundamental basis upon which further

scientific research may be conducted, and that this fundamental basis cannot rely on empirical methods to verify it.

To support the point that not all educational decisions can be supported by scientific research, it may be helpful to cite a few parallel examples to support this claim.

First, within the realm of education itself, the common practice is to conduct research within a theoretical or conceptual framework. This framework may take many forms and be constructed according to a variety of models. The framework itself, however, is not the result of scientific research. Rather, it forms the basis of that research. It functions as a guiding and ruling principle of inquiry and affords a vantage point from which further research may be conducted. The fundamental epistemological principles of learning are similar to this (Alsahleh 2015).

Second, in the realm of mathematics, not all mathematical truths can be supported by proof. There must be first principles that are known immediately and without proof. The reason for this is that each proof involves a minimum of two steps or premises to establish a conclusion. If it were true that every premise required proof, it would follow that each of the two premises would require two more premises for them to be known as true. Now there are four statements in need of proof. But then each of these statements would require two more statements to substantiate them. Now eight premises would be required. So if every premise or statement required proof for someone to know it, one would find oneself in an infinite regress of proofs that in the end would be impossible to know. The inescapable conclusion, then, is that the most fundamental principles must be established and verified by some other process than argument. This process is precisely the method of philosophical inquiry that will be followed in this dissertation.

The Area of Educational Leadership to Which this Research Pertains

Regarding the relevance of this dissertation for educational leaders, the question arises concerning whose purview curriculum design falls under. Putting it another way, "Who are the leaders that this dissertation is addressing?" The answer to this question will vary widely depending on the particular setting. The ones who are responsible for curriculum design depend on whether the institution is public or private, how large it is, the degree of shared governance, and the responsibilities assigned to those in leadership positions.

Because of the nature of this research, which is at the level of establishing universal principles, the manner and extent to which it is applicable in a given setting is outside the scope of this dissertation. On the other hand, because the principles are universal, they can be brought to bear on all aspects of learning, though to a greater or lesser extent depending upon the limitations in place.

Granting this, recent research concerning curriculum design and development has yielded findings that may be helpful for implementing curricular changes. Oliver and Hyun (2011), for example, conducted a study concluding that the collaboration between faculty and administration promotes widespread participation and promotes organizational change. Yet, because widespread participation is required, radical curriculum reform is difficult (Cohen et al., 2005). An additional factor that may affect the applicability of his dissertation, therefore, is the level of collaboration in place between faculty and administration and the degree to which the institutional culture permits this collaboration to grow.

Another important concern regarding implementation of curricula is the notion that postmodern curriculum development, "is a nonlinear process with no master plan or rationale for curriculum (Oliver and Hyun, 2011, p. 3). Because this dissertation presents principles for designing curricula, the postmodern view would certainly present obstacles to implementation.

Also affecting the practical application of philosophical principles governing curriculum design is the adherence to academic freedom and autonomy among professionals in higher education (Innes, 2004). As Oliver and Hyun indicate, "comprehensive curricular change where the focus is on how the parts fit together is less common" (2011, p. 3). Because this dissertation certainly concerns comprehensive curricular change centering on the parts of a curriculum that form a whole, institutions that place a high value on autonomy would present challenges to implementation.

Burgess (2004) points out that a significant difficulty forestalling the adoption of instructional practices are "the competing and contradictory forces in curriculum design" (p. 164).

Given these and other challenges that must be assessed and which vary according to individual circumstances, the manner in which the findings of this dissertation could be implemented in a particular setting is beyond the scope of this research. Nevertheless, the universal principles established serve as a standard for a level of improvement determined by the degree to which pertinent factors permit.

The Aristotelian-Thomistic Method of Philosophical Inquiry

According to St. Thomas, the purpose of philosophy is the attainment of wisdom, which consists in a knowledge of the essences of things (what they are) and their causes

(why they are). (Lewis, 2013). In other words, to understand something most fully, one must be able to give an account not only of the phenomena, but also of the reasons or causes of these phenomena. For example, one may understand that there are four seasons and know when these seasons begin and end, but not know *why* there are four seasons. The one who knows not only *that* there are four seasons, but *why* there are four seasons is wiser in this respect. This attainment of wisdom, however, is neither quickly nor easily achieved. It is a long and difficult process that involves the mastery of many disciplines and capabilities along the way. In the quest to answer the most important and perplexing questions, philosophy uses a method of attaining knowledge, which has as its end understanding the natures and causes of things.

There are three key parts of philosophical inquiry on the basis of which the texts of Aristotle and Aquinas will be examined: dialectic, definition, and demonstration. At the heart of this threefold distinction among the parts of philosophical method is the notion that an assertion must be supported by a logical argument.

To this point, Angioni (2014) observes that scientific demonstration depends on a thorough explanation of the essences signified by the terms used in the demonstration: "When Aristotle says that demonstration must proceed from necessary principles, he means that each demonstration requires the principle that is the necessary one for the fully appropriate explanation of its explanandum" (p.1). This kind of explanation demands that one address the essences of those things that the demonstration concerns and not simply the terms that signify those essences: "This picture also provides a key to understand Aristotle's thesis that scientific explanation depends on essences: it is the essence of the attribute to be explained (rather than the essence of the subject-term within

the explanandum) that should be stated as the fully appropriate explanatory factor" (Angioni, p. 1).

The substance of Angioni's (2014) point here is that for Aristotle, knowledge is attained by way of logical argument. But logical arguments use terms that refer to the essences of things. Therefore, if one is to attain the knowledge that results from the argument, one must first be able to explain the essences of those things that are referred to in the argument itself.

To cite a practical example, Plato, who was the teacher of Aristotle, makes the point in the *Meno* that one cannot approach the question whether virtue can be taught without first knowing what virtue is. There is no way that one could claim to know that virtue can or cannot be taught without first being able to explain what virtue is. Further, in the *Ion*, Socrates shows that Ion is not competent to speak about whether the *Iliad* is a great poem unless he can first supply a definition of poetry, or, in other words, unless he is able to explain the nature of poetry.

Applying these terms to this exploratory qualitative text-based analysis, one has a standard on the basis of which to proceed in the examination of arguments in the text. If one is presenting a complete argument clearly and persuasively in a given text, a full explanation of those things that the argument concerns must be given (Feser, 2013). In order to apply this kind of explanation as a standard of textual analysis, however, an account of what makes a good explanation must be given. At the heart of this explanation is a definition of those things signified by the terms of the argument.

The reason that definition is so important is that it signifies distinctly in words the essence of something that is understood by the intellect (Burnyeat, 2011). So, if one

cannot supply a definition of what one is making an assertion about, one really does not understand what is being said (Peramatzis, 2010). Once one has supplied a good definition, one is ready to begin to present an argument about the thing defined (Goldin, 2013). This argument may be either dialectical or demonstrative. Aristotle distinguishes dialectic from demonstration at the beginning of his *Topics*:

Now a deduction is an argument in which, certain things being laid down, something other than these necessarily comes about through them. It is a demonstration, when the premisses from which the reasoning starts are true and primitive, or are such that our knowledge of them has originally come through premisses which are primitive and true; and it is a dialectical deduction, if it reasons from reputable opinions. (Aristotle, trans. 1984, 100a25-30).

So, a demonstration is a syllogism that argues from true and primary premises, which are either first principles themselves or premises that have come from first principles. Demonstrations yield certain knowledge (Malink, 2013). In contrast, dialectic is not grounded in indisputable first principles, but in opinions that are generally accepted. For this reason, dialectic yields knowledge that is not certain, but only probable. It is nevertheless important to consider dialectical arguments because they are the starting point of an inquiry and concern what the majority or the experts in a given field are saying.

In sum, the epistemological claims made by Aristotle and St. Thomas will be textually analyzed on the basis of dialectic, definition, and demonstration (Feser, 2013). In other words, it will be made explicit in the textual analysis the manner in which Aristotle is using these three methods. Specifically, in his treatment of happiness, he

begins with dialectic by examining the differing opinions about what happiness is. Then, by way of demonstration, he shows that certain of these opinions are inconsistent with human happiness. Finally, he concludes with a definition of happiness (Aristotle, trans. 1984, 1097a15-1099b8).

Because St. Thomas considers that happiness is the goal of education and that the arts and sciences as Aristotle conceived of them form the nature of education at its core, Chapter 4 will be devoted to a consideration of these arts and sciences, examples of how the principles established in these arts and sciences impacts curriculum design and instructional practice, and how these arts and sciences are related to happiness. Chapter 5 will then examine the role of the teacher in concerning these arts and sciences. Chapter 6 treats of how these fundamental notions relate to the role of educational leaders who design curricula. The following diagram illustrates the order of the parts of Chapters 4-6 of this dissertation and shows how they are connected.

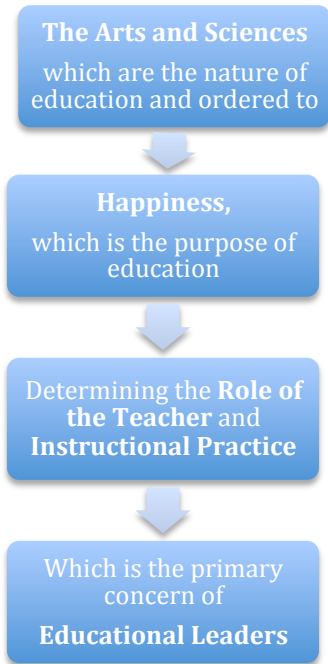


Figure 1. The order of the parts of Chapters 4-6 and the connection between them.

CHAPTER 4:

THE NATURE AND PURPOSE OF EDUCATION ACCORDING TO AQUINAS

In the following statement in his commentary on the *Metaphysics* of Aristotle, Aquinas articulates clearly his understanding of the purpose of education: "Now all the sciences and arts are ordered to a single thing, namely, to man's perfection, which is happiness" (Aquinas, trans. 1995, p. xxix). It is difficult to overestimate the importance of this passage when examining the position of Aristotle and Aquinas on education: it is the focal point of this dissertation. It is significant for two main reasons. First, Aquinas enunciates what constitutes the nature of education at its core: the arts and sciences. Second, he states what education is ordered to, or in other words, what its purpose is: happiness. In Aquinas's day, the arts and sciences were considered the fundamental basis of education and prerequisites for any future study. Hence, they formed the basis of all higher education. But because the arts and sciences are ordered to the perfection of human nature, which does not change, they are the fundamental basis of education today as well. What was humanizing then is still humanizing now. So, because the arts and sciences comprise an education directed to knowledge that perfects the mind, considering them in some detail is necessary for educational leaders who design curricula and instructional practices directed to this knowledge.

It is significant that Aquinas addresses the purpose of education in his commentary on the *Metaphysics* of Aristotle because according to Aquinas, metaphysics is the highest philosophical discipline. As such, it pertains to metaphysics to address all

of education. This is why this statement on all the arts and sciences is found at the beginning of his commentary on the *Metaphysics* of Aristotle.

This chapter of the dissertation has two purposes. The first is to explain this passage in detail. This is important because it states the nature and purpose of education according to Aquinas, which as the title of this dissertation indicates, is the central focus. The second purpose is to supply specific examples of how the principles established in the arts and sciences are applicable to the area of educational leadership that concerns curriculum design. This will be done by examining particular disciplines and applying to them the principles established in the arts and sciences that are explained.

Philosophical Principles and Educational Leadership

Elmore (2004) observes that the primary concern of educational leaders in the improvement of instructional practice. If, therefore, the nature and purpose of education according to Aquinas is of importance to educational leaders, it will necessarily be relevant to improving learning in the classroom. In light of this consideration, after the following discussion of the liberal arts, a practical example of how a Thomistic understanding of the liberal arts can be applied in practice will be extenuated. Likewise, after each section of the dissertation that treats of a major work of Aristotle, the application of his principles regarding the teaching and learning of the discipline related to that work will be made in light of how it impacts curriculum design and instructional practice.

It should be noted that the philosophical principles discussed in this chapter concern the area of educational leadership that concerns curriculum design specifically. These principles are applicable neither to administrative leadership nor to a broad-based

consideration of leadership in general, which would be beyond the scope of this dissertation.

In their book, *Instructional Rounds in Education*, City et al. (2009) assert that instructional practice chiefly concerns "the relationship between the teacher and the student in the presence of content" (p. 22). When the Aristotelian-Thomistic principles are applied to a particular discipline, then, two areas will be covered: the subject matter ("content") and the pedagogy ("the relationship between the teacher and the student").

It is important that the teacher and the student not be considered independently of each other, but that they be considered together in light of the "relationship" between them. The reason for this is that teaching and learning do not take place independently of each other: there is no teaching without learning. Aristotle makes this point when he says that teaching and learning consist in "one identical actualization" (Aristotle, trans. 1984, 202b2). He goes on to explain, "Teaching is the activity of a person who can teach, yet the operation is performed in something—it is not cut adrift from a subject, but is of one thing in another" (Aristotle, trans. 1984, 202b6-8). Because the one activity of teaching is performed in the student, the activity of teaching cannot be cut adrift from the student, wherein learning takes place. Teaching and learning, therefore, will be treated together under the heading of "pedagogy."

In some cases, the application of Aristotelian-Thomistic principles to instructional practice in the classroom will be a reinforcement of current practice. In many instances, however, serious changes to conventional methods will be required. City et al. (2009) observe that significant differences should be expected whenever instructional practice is significantly improved: "Making meaningful and productive changes in instructional

practice requires us to confront how they upset and, in some sense, reprogram our past ways of doing things" (p. 22).

The Arts and Sciences in Aristotle and Aquinas

Because Aquinas often used terms in a different way from their current meaning, an explanation of the terms as they apply to education is in order. First of all, by the word "science" he means a subject or discipline whose study yields a knowledge that one can support with argument. For example, philosophy is a science for Aquinas: the meaning of this term is not limited to such subject areas as biology, chemistry, and physics, though it certainly includes these disciplines. Aquinas divides the sciences into two distinct categories: practical and speculative. The practical sciences exist to direct our actions and the speculative sciences exist for the sake of knowledge that perfects the mind. The practical sciences are ethics, domestics, and politics and the speculative sciences are mathematics, natural philosophy, and metaphysics. Second, the word "art" refers principally to the seven liberal arts upon which education was based in the middle ages: grammar, logic, rhetoric, arithmetic, music, geometry, and astronomy. These arts were seen as necessary skills that one needed in order to advance in the sciences that followed them.

According to Aquinas, these sciences and arts are "ordered to one thing." For one thing to be "ordered to" another means that it exists for the purpose of that other. For example, if one says that a framing hammer is ordered to pounding in nails, this means that the hammer exists for the purpose of pounding in nails. Likewise, to say that a house is ordered to shelter means that the house exists for the purpose of providing shelter. Following this explanation, if one were to say in the language of Aquinas that all the arts

and sciences are "ordered to" one thing, this means that they exist for the purpose of bringing that one thing about. In other words, when Aquinas says that all sciences and arts are "ordered to" human perfection, he means that the purpose of studying the arts and sciences is human perfection. Human perfection, then, is the purpose of education according to Aquinas.

To the notion of human perfection, St. Thomas adds the words, "which is happiness." By putting it this way, he is equating human happiness with human perfection. Because the word, "education" was hardly ever used in the Middle Ages, Aquinas's thought on the purpose of education must be determined by what he is saying the purpose of the sciences and arts is because, according to Aquinas, the sciences and arts made up the essentials of good education. This education is directed to human perfection, which Aquinas equates with happiness. In the following passage, he explains the connection between human perfection and happiness.

To make this clear, two points must be observed. First, that man is not perfectly happy, so long as something remains for him to desire and seek: secondly, that perfection of any power is determined by the nature of its object. Now the object of the intellect is *what a thing is, i.e.*, the essence of a thing, according to *De Anima* iii.6. Wherefore the intellect attains perfection, insofar as it knows the essence of a thing. If therefore an intellect know the essence of some effect, whereby it is not possible to know the essence of the cause, *i.e.* to know of the cause *what it is*; that intellect cannot be said to reach that cause simply, although it may be able to gather from the effect the knowledge that the cause is. Consequently, when man knows an effect, and knows that it has a cause, there

naturally remains in man the desire to know about that cause, *what it is*. And this desire is one of wonder, and causes inquiry, as is stated in the beginning of the *Metaphysics* (i.2). For instance, if a man, knowing the eclipse of the sun, consider that it must be due to some cause, and know not what that cause is, he wonders about it, and from wondering proceeds to inquire. Nor does this inquiry cease until he arrive at a knowledge of the essence of the cause (Aquinas, trans. 1947, I-II Q3 A8).

There are three important things to note about this passage from Aquinas. First, he is basing his understanding of happiness and the perfection of the mind on the works of Aristotle. In this particular passage, he cites the *De Anima* and the *Metaphysics*. This shows the importance of examining the works of Aristotle in order to arrive at a complete understanding of how Aquinas considers education to be ordered to happiness. Second, he is saying that the component of happiness that concerns the perfection of the mind consists in knowing the causes of things. For example, if one sees an eclipse of the sun, one naturally wonders why this phenomenon occurs. This wonder about the cause of the eclipse is not satisfied until one knows that the eclipse is caused by the moon coming between the sun and the earth and obstructing the view of the sun. Third, the knowledge of the cause perfects the mind because the object of the mind is the essence of the cause. In other words, knowing why things are a certain way perfects the mind and contributes to human happiness. According to Aristotle and Aquinas, the arts and sciences lay out the path that the mind follows to obtain the knowledge that perfects it.

Therefore, in order to better understand what the purpose of education is for Aquinas, one must first investigate thoroughly the following two categories of things:

first, the arts and the sciences that made up an education (Chapter 4), and second, Aquinas's understanding of human perfection or happiness (Chapter 5). Because the arts of which Aquinas speaks, namely the liberal arts, were first in the order of learning, these arts will be examined first. Following this examination, the sciences will be considered.

Before examining the Aristotelian-Thomistic understanding of the liberal arts, it is important to note that the meaning of the term "liberal arts" in the time of Aquinas was quite different from its meaning today. In contemporary education, "liberal arts" usually connotes a large area of study that includes non-scientific or non-technical disciplines such as literature, history, music, and the visual arts. In the Middle Ages, however, following an ancient tradition, the term "liberal arts" referred to something much more specific. To ascertain this specific meaning of what a liberal art was for Aquinas, it is first necessary to investigate what he meant by "art" and second, what it means for an art to be "liberal."

What is a Liberal Art According to Aquinas?

Aquinas defines art at the very beginning of his commentary of the *Nicomachean Ethics* of Aristotle: "right reason applied to things to be made" (Aquinas, trans. 1993, p. 4). Putting it in more simple terms, this definition could be restated in this way: "using knowledge to make things." In defining art this way, Aquinas meant to speak of art in a very general sense. In other words, it does not refer only to the fine arts of painting and sculpture, for example, but rather to any process in which knowledge is used to make something or put something together, step by step. By this definition of art, then, cooking, carpentry, and even computer programming would be considered arts. According to this meaning of art, therefore, anything that involves using human reason to

make something is worthy of being called an art. In contrast, natural functions of the body such as digestion would not fit the definition because they are entirely involuntary and take place without the direction of the mind or a process of reason.

Aquinas not only presents this definition, but explains why it functions well as a definition. In his explanation, he presents the following argument. "We see architecture as a kind of art, and also as a kind of habit for making something through reason. Likewise, every art is so constituted that it is a habit, concerned with making, under the guidance of reason. Likewise, no productive habit of this kind, i.e., directed by reason, is found which is not an art. Hence it is evident that art is the same as a habit concerned with making under the guidance of true reason" (Aquinas, trans. 1993, p. 367).

Aquinas is using a dialectical argument here, which means that he starts the argument by referring to what most people think about art. A sign that he is starting with what most people think is that he starts the argument by saying that *we see* architecture as a kind of art. Then he says that we also see architecture as a habit of making something with the use of reason. By the word "habit," he means something like a skill set or ability to make something that has been developed over time by repeated action. This ability to make something is guided by reason or the knowledge of what has to be done to bring about the desired result. Next, not only architecture, but everything that we call an art, is a habit of making something under the guidance of reason. Conversely, every time we find someone with a habit of making something under the guidance of reason, we call it art. Therefore, art must be a habit of making something under the guidance of reason. So, according to this understanding, art is a knowledge or skill directed to making something, or "right reason applied to things to be made."

This method that Aquinas is using here to explain his definition is a good example of how he applies practically his theory of education. For example, he does not stop at merely stating the definition for his readers to accept or reject, but he supplies his reasons for thinking that it is a good one. He does this by showing that his definition is convertible with the thing that he is defining, namely art. In so doing, he appeals to common knowledge and what is easiest to grasp.

He does this specifically by showing that every thing called an art answers to the definition and, conversely, everything that answers to the definition is called an art. In other words, he shows that everything called an art is convertible with the definition. To cite another example, if a triangle is correctly defined as a three-sided rectilinear plane figure, every triangle should be a three-sided rectilinear plane figure and every three-sided rectilinear plane figure should be a triangle. As a counter example of a definition that does not fit this criterion, "an animal that flies" could not be the definition of a bird because not all birds fly and not all flying animals are birds. So, it is not the case that the proposed definition, "an animal that flies," is convertible with all things that are called birds. Thus does Aquinas demonstrate the qualities of a good teacher by supplying an exposition and defense of his definition of art. Now that it has been determined what art is according to Aquinas, it remains to ascertain what it meant for an art to be liberal.

Education was first called "liberal" or "free" in reference to the liberal arts which were distinguished from the servile arts because they were practiced by free men as opposed to slaves. (Rose, 2015). One of the earliest references to the liberal arts we find in the very first chapter of Aristotle's *Metaphysics*, which is an introduction to all of

education (Charles, 2011). Here Aristotle divides the arts into three kinds and establishes a hierarchy among them. The following chart illustrates this threefold division.

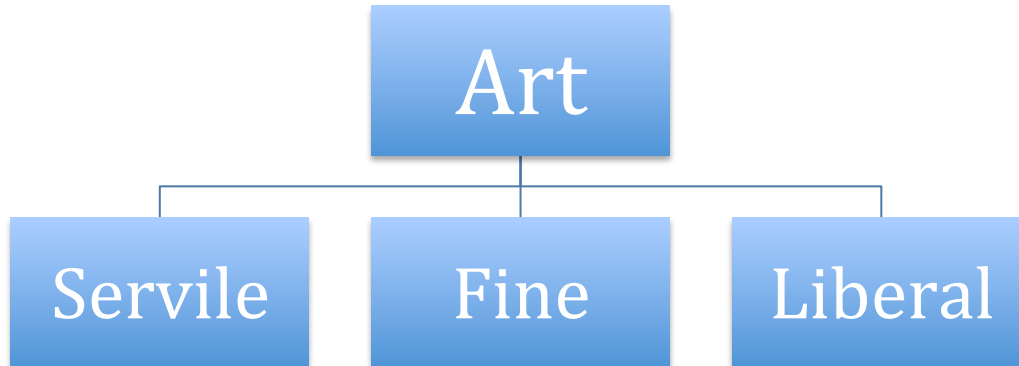


Figure 2. The threefold division of the arts.

Why the Arts are Important for Educational Leaders

Who Design Curricula

The order and design of curricula, as well as courses within those curricula, is determined by their purpose. Broadly speaking, the purpose of education can be divided into two categories: practical and speculative. A practical purpose is one ordered to action and a speculative purpose is one ordered to knowledge that perfects the mind. Regarding the threefold distinction of the arts into servile, fine, and liberal, the servile arts are practical because they are directed to producing necessary and useful things and the fine and liberal arts are speculative because they are directed to those pursuits that are in themselves perfective of human beings. One may ask, then, given any course offered at the college level, "Is it primarily practical or speculative?"

The blurring of this distinction and a lack of clarity concerning whether the primary purpose of such disciplines as mathematics is understanding or action has led to confusion and to the skewing of a curriculum that favors practicality over understanding, doing over knowing, and the repeating of information over the firm grasp of the truth. For example, in the popular Saxon mathematics series, Saxon says, "it is also important not to let the emphasis on understanding interfere with our ability to do" (Saxon, 1984, p. 14). If understanding should not interfere with doing, then the emphasis is clearly on doing over understanding. This means that mathematics, according to Saxon, is pursued as a servile endeavor rather than a science the knowledge of which is ordered to happiness; not surprisingly, the mode of instruction follows suit.

In light of this, it is incumbent upon educational leaders to assess whether their curricula favor doing or understanding. The consequences of the failure to address this question are potentially disastrous, for we run the risk of churning out a population of citizens who can get answers without knowing what they are doing or why. The ability to answer this question, though, depends on a thorough understanding of the distinction among these three kinds of art, which will now be explained.

First are the servile arts, myriad in number, which are ordered to the production of what is necessary or useful for human life. Examples of the servile arts are carpentry, medicine, and farming. Next are the fine arts, which aim at what is beautiful and therefore pleasing (Aristotle, trans. 1984, 981b14-25). These are traditionally enumerated as the following seven: music, theater, dance, painting, sculpture, architecture, and literature. At the top of the hierarchy are the liberal arts, which are ordered to knowledge. They are divided into the logical arts of the trivium (grammar, logic, and

rhetoric), and the mathematical arts of the quadrivium (arithmetic, music, geometry, and astronomy). This hierarchy is in fact rooted in Aristotle's notion of intellection in his *De Anima*. It is because the intellect is the highest human faculty that the liberal arts are at the top of the hierarchy: what develops the higher faculty is the higher art.

Pieper (1963) explains this contribution of Aristotle's in *Leisure, the Basis of Culture*: "the Christian and Western conception of the contemplative life is closely linked to the Aristotelian notion of leisure. It is also to be observed that this is the source of the distinction between the *artes liberales* and the *artes serviles*, the liberal arts and servile work" (p. 23). Pieper here is referring to the distinction in Book I, Chapter 1 of Aristotle's *Metaphysics* between what came to be known as the servile arts and the liberal arts. His point is that in our leisure time, which is the time not needed for procuring the necessities of life, makes us more human if we use it for contemplation or developing the mind. The arts to be pursued in leisure time were originally called "free" as opposed to "servile" because they were studied by those who were free as opposed to those who were slaves.

There is another meaning of the word "liberal" or "free," however, which merits the retention of the name as applied to education. In the *Summa Contra Gentiles*, Aquinas (1934) defines "free" as "that . . . which is for its own sake" (p. 241). This more precise meaning of free is in fact related to the original meaning. Here, "for its own sake" means simply "for the sake of the perfection of the human person" as opposed to being ordered to some other practical or utilitarian end. So, one who is free is able to devote oneself to those pursuits specifically ordered to the perfection of human faculties. In contrast, a slave is treated as a mere possession that is ordered to someone else's benefit.

This is why slavery is dehumanizing and wrong: slaves are not treated as human beings who realize within themselves their own ends, but as objects that exist for the sake of someone else. True freedom in this sense lies in self-governance and self-determination and in the ability to act in a human way.

This Aristotelian-Thomistic understanding of knowledge for its own sake sheds light on an underlying assumption and unspoken first principle that governs educational policy in contemporary times. This principle is that education is a *humanizing* endeavor. In other words, it is suited to our humanity to become educated citizens. No one would deny that historical practices of denying a human being an education because of race or sex or for any other reason is dehumanizing. Yet, the reason that it is dehumanizing to deny someone an education is that it is humanizing to provide that education. In other words, developing the mind is a characteristically human activity that is conducive to actualizing one's full potential (Maslow, 1954). When St. Thomas speaks of human perfection, the understanding is that human beings develop their abilities and actualize their potential.

Following this understanding of freedom and its connection to human actualization or perfection, then, an education that is liberal or free is an education that is for its own sake. In other words, it is ordered to the kind of knowledge that is an end in itself because it forms and perfects the human person. Newman (1927) puts it this way in *The Idea of a University*: "I am asked what is the end of University Education, and of the Liberal or Philosophical Knowledge which I conceive it to impart: I answer, that . . . it has a very tangible, real, and sufficient end, though the end cannot be divided from that

knowledge itself. Knowledge is capable of being its own end . . . sufficient to rest in and to pursue for its own sake" (p. 321).

Historically, then, a liberal education was considered to be an education that was free in the sense that it is for its own sake, meaning that it is humanizing or perfective of human beings. The liberal arts, which focus on verbal and mathematical skills, are the beginning of this liberal education.

This original understanding of what constitutes a liberal education is important because it forms the basis for understanding why our current educational culture, which considers verbal reasoning and mathematical reasoning the most fundamental skills required for success in both undergraduate and graduate schools. This distinction between verbal and mathematical reasoning mirrors the distinction between the logical arts of the trivium (verbal reasoning) and the mathematical arts of the quadrivium (mathematical reasoning). In short, a thorough examination of ancient methods helps us to understand why our current system emphasizes certain disciplines. Also, the current emphasis on mathematics and science began with Aristotle (Lewis, 2013; Harry, 2015).

The study of ancient and medieval forms of education, then, provides a knowledge of the foundations of our own ways of thinking about education. The parallel between the verbal (trivium) and mathematical (quadrivium) arts of the Middle Ages and our own emphasis on verbal and mathematical reasoning on the SAT and GRE tests speak volumes in answer to the question of why we focus our attention on reading and math as foundational disciplines. This historical and philosophical inquiry into the origins of our educational subjects also provides us with a lens through which we can examine the changes that have been made and whether these changes are for the better.

The following chart delineates the difference between the three logical arts of the trivium and the four mathematical arts of the quadrivium:

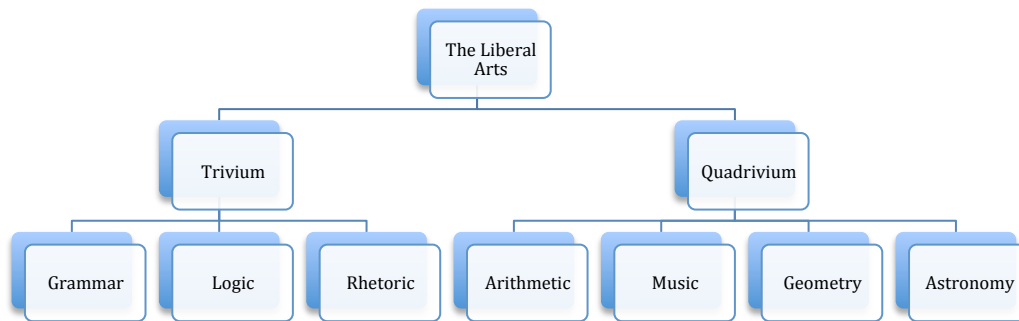


Figure 3. The Seven Liberal Arts.

In her famous essay on the liberal arts of the Middle Ages, "The Lost Tools of Learning," Sayers (1948) presents a fascinating critique of twentieth-century education. This essay has inspired a mini-revival in classical education and has prompted other works detailing the strongpoints of medieval education: "The modern revival of the Trivium or language arts was influenced by a famous essay called 'The Lost Tools of Learning,' by Dorothy L. Sayers (best known for her fictional detective, Lord Peter Wimsey)" (Caldecott, 2012, p. 17).

In this essay, Sayers (1948) argues that "Too much specialisation is not a good thing" (p. 1). This raises an interesting question. Though the number of majors and areas of specialization are continually increasing as the collective amount of knowledge

increases, does this necessarily mean that contemporary students know more and are better equipped as problem-solvers and lifelong learners than the students of the past? Sayers puts the question this way, "Is not the great defect of our education to-day . . . that although we often succeed in teaching our pupils "subjects," we fail lamentably on the whole in teaching them how to think? They learn everything, except the art of learning. It is as though we had taught a child, mechanically and by rule of thumb, to play *The Harmonious Blacksmith* upon the piano, but had never taught him the scale or how to read music" (p. 7). Perhaps the same sentiment is expressed by so many math and science teachers who lament that they are beholden to standardized tests rather than to more traditional ways of teaching mathematics that emphasize logical thinking. Does our modern schema favor the outcome of forging test-takers rather than problem solvers? Sayers seems to think so. She identifies the difference between modern and medieval education as follows. "modern education concentrates on *teaching subjects*, leaving the method of thinking, arguing, and expressing one's conclusions to be picked up by the scholar as he goes along; mediaeval education concentrated on first *forging and learning to handle the tools of learning*, using whatever subject came handy as a piece of material on which to doodle until the tool of learning became second nature" (p. 10). The "tools of learning" to which Sayers refers are the seven liberal arts as they were conceived of in the Middle Ages.

In *The Lost Tools of Learning*, then, Sayers (1948) alights upon perhaps the most essential difference between the way that Aquinas conceived of education in the Middle Ages and the way that it is conceived of by so many in the current system. This difference is stated most succinctly as follows: Aquinas conceived of education as

ordered to *universal* knowledge, whereas the current system conceives of education as ordered to *particular* knowledge. For example, medieval education emphasized the disciplines of the trivium: grammar, logic, and rhetoric. These disciplines are universal in the sense that everyone needs grammar to speak and write; everyone presents and responds to logical arguments and everyone appeals to rhetoric to persuade others. These disciplines were studied in great detail by everyone and were considered universal in their application in that everyone speaks, thinks, and persuades and they are used in all of the sciences. Aquinas puts it this way: "before all the other sciences a person should learn logic, which teaches the method of all the sciences; and the trivium concerns logic" (Aquinas, trans. 1986, p. 17). Caldecott (2102) also emphasizes the notion that the trivium is the foundation of all the other disciplines and remains active throughout the pursuit of future knowledge: "The three arts [of the trivium] are not 'left behind' as one moves up the educational ladder, but they remain foundational, and each of them can color one's whole approach to learning" (p. 61). Though it would be a mistake to say that these disciplines are no longer studied in contemporary curricula, they are emphasized less in deference to a greater number of subjects that emphasize a particular knowledge required for specialized skills. To remedy this, a paradigm for how the liberal arts may be incorporated will now be presented.

Curriculum Design and Instructional Practice: the Liberal Arts

Subject Matter

Everybody thinks, speaks, writes, and attempts to persuade. For this reason, the arts that perfect these activities should be part of everyone's general education. An

excellent way to incorporate the arts of the trivium (grammar, logic, and rhetoric) that improve these tasks is in composition class.

The reason that composition class is an ideal setting to practice the arts of the trivium is that in order for an essay to excel, it must exhibit a command of the three arts of the trivium in the following ways. First, it must be grammatically correct. The art of grammar concerns the proper construction of the sentence. Without correct grammar, clarity suffers and the reader's trust in and esteem for the writer wanes considerably. Second, the reasoning must be sound. Without logical arguments and solid evidence, critical readers are unlikely to be convinced. Third, the essay must be persuasive. Thus, it must attend to rhetoric, which is the art of persuasion. Rhetoric takes into account such things as the tone of writing, the intended audience, and the emotional appeal that a style of writing may have. To reinforce the arts of the trivium, then, attention should be paid in composition class to these three arts specifically.

Pedagogy

This reinforcement can be accomplished in three stages. First, salient examples of essays and speeches celebrated for their persuasive power can be subjected to critical analysis. The speeches and letters of Lincoln, for example display superlative applications of grammatical, logical, and rhetorical prowess. In order to encourage as active a role as possible on the part of students, they should be required to pinpoint and categorize deft grammatical constructions, valid modes of argument, and the most convincing rhetorical devices after being introduced to these in principle by a teacher.

The second stage of learning the arts of the trivium is to require of students that they compose essays utilizing the same general methods that were identified in the

models analyzed. For example, students could be asked to formulate a *reductio ad absurdum* argument for their own positions and then to answer objections in moderate and charitable tone that displays regard for the proponent of the opposing view.

In the third stage, again emphasizing the active role of the student, participants in the class should present their essays to the class for discussion. In this way, the entire group garners further practice in critical analysis and in offering and receiving constructive evaluation and critique.

If these three stages are followed, the liberal arts of grammar, logic, and rhetoric can be practiced and markedly improved. The point of this class would not be to master formal logic, which would be the subject matter for another course. Even still, the more general modes of argument could be identified and practiced. Questions such as the following could be used when analyzing a model. Does the author have a central thesis? If so, what is it? Is it implied or stated directly? How does the author arrive at the thesis? Are the arguments dialectical or demonstrative? Are they inductive or deductive? Are the most formidable objections raised in a way that the objector would present them? Are the objections answered in a moderate and charitable tone that concedes the merit of the opposing side when necessary?

For explanatory essays, the following questions could be addressed. Does the author supply a definition of the explanandum? What kind of definition is it? Is it a nominal definition (as one would find in a dictionary), or a real definition (a philosophical definition that would stand up to the strictest scrutiny)? Is the definition clear and accurate? Does the author make the necessary distinctions concerning the subject of explanation? Are these distinctions precise and exhaustive? Does the author

supply examples of what is being explained? Are the examples familiar and illustrative? Does the author properly qualify or limit what is being said? If not, are the claims being made too broad in scope? What are the implications of the author's explanatory account? Questions such as these can serve to help the reader identify the quality of the author's writing and can be used as a checklist for the student's own writing.

Given that a liberal education, according to a Thomistic understanding, has as its purpose the attainment of that knowledge which is ordered to human perfection, it remains to determine what this knowledge consists of beyond the liberal arts. Because we desire our perfection and our highest good for its own sake, and everything else for the sake of this, a truly liberal education consists in the knowledge required to perfect our reason both in its proper operation and in its ruling of the other faculties. To this end, it is necessary to examine not only the arts, but the sciences as well. It is for this reason that Aquinas says, "Now all the sciences and arts are ordered to a single thing, namely, to man's perfection, which is happiness" (Aquinas, trans. 1995, p. xxix). This quotation states the guiding principle for those educational leaders who design curricula and determine instructional practice. Understanding this principle, however, requires examining the arts, the sciences, and the nature of happiness in some detail. Having examined the arts in the first part of this chapter, the sciences will now be considered. But because St. Thomas meant by "the sciences" the works of Aristotle, it is helpful to examine his works as a whole before turning to the individual sciences that establish principles so crucial and necessary of educational leaders who design curricula.

The Examination of Aristotle's Works as a Whole

Examining the sciences according to Aquinas, then, is nothing other than examining Aristotle's major works, on which he wrote line-by-line commentaries: namely, the *Organon* (logical works), the *Physics*, the *De Anima*, the *Nicomachean Ethics*, and the *Metaphysics*. It may seem that this treatment of these ancient and abstruse treatises is irrelevant to the vast majority of individuals living today. To appreciate how Aristotle and Aristotelian-Thomistic philosophy applies not only to the philosopher or historian with a cultural interest in ancient and medieval ways of thinking, but also to education in every age, and most especially to educational leaders who design curricula, it would be helpful to reflect for a moment on the worldview of Aristotle and Aquinas, insofar as Aquinas is an Aristotelian through-and-through and embraces all of his philosophical principles.

Today, philosophy is often considered to be an arcane and isolated discipline. It is often regarded as a subject of little practical application, studied by intellectuals who have some cultural or historical interest in the expression and development of ideas throughout history. Aristotle, however, did not consider philosophy this way. Rather, philosophy was the most relevant consideration not only for the highly educated, but for all human beings. Philosophy was a way of life. We find evidence for this in the *Poetics* where Aristotle says, "to be learning something is the greatest of pleasures not only to the philosopher but also to the rest of mankind, however small their capacity for it" (Aristotle, trans. 1984, 1448b 13-15). According to Aristotle, then, growth in knowledge is a pleasure that everyone can and should partake in. Every teacher's greatest hope is that a student become a lifelong learner who takes pleasure in learning. This, finally, is

what educators strive for: a lasting effect on the student that governs that student's entire life. This is precisely what Aristotle's philosophy is about and precisely why it should be a consideration for educational leaders.

The notion that being a lifelong learner is a desirable thing at all is based on the notion of what a human being is. A human being is fundamentally an intelligent being. In other words, the mind is the greatest human power. If this is true, then the development of this power is the very best thing that a human being can do. A sign that this is true is that human beings alone take part in formal education. Everyone would agree that it is dehumanizing to deny someone an education. But if it is dehumanizing to deny someone an education, then it is humanizing to provide an education. And if it is humanizing to provide it, this must mean that it is good for us as human beings to be educated and to develop the human mind. This is precisely what Aristotle's philosophy is about.

Rather than specialize in an isolated subject, Aristotle intended his core philosophical treatises to cover the most universal consideration of intellectual development that would be useful for all disciplines, no matter how particular or specialized. This is precisely why his works are relevant for educational leaders who design all manner of curricula.

This is also why his logical treatises should be read first in preparation for putting a curriculum together. There is no discipline, whether it be mathematics or literary criticism, where illogical thinking should be accepted. Logic and consistency is demanded in every kind of writing and in every subject matter. Everyone needs it. One might say that we are all logicians, yet some are better or more advanced at logic than

others. For example, a baseball fan needs to appeal to the rules of baseball to determine whether a player on the field is out or safe. Any time that a rule or principle is applied to a particular case, logic is being used. When a citizen disputes a ticket for a traffic violation, an argument must be made on the basis of whether a traffic law was broken or not. Most especially, though, logic is used in education to govern the mind's advance in knowledge. Logic for Aristotle was not considered to be one of the most perfective sciences in itself; rather, it is a tool used for all the sciences. As an example of a practical application to a science curriculum, it will now be explained how astronomy can be approached while observing a logical progression.

Curriculum Design and Instructional Practice: Astronomy

We all know that the earth and the other planets of the solar system travel around the sun in an elliptical path. Or *do we*? The fact is, very few know how to verify the heliocentric theory. If Aristotle is right, one knows that something is true only if an argument can be given from self-evident principles that can be, in this case, verified by sense experience.

Though everyone learns astronomy as part of physics, an infinitesimal percentage of students will *use* this knowledge for any practical purpose. It makes more sense, then, to teach astronomy, if it is taught at all, in such a way that students leave with knowledge that can be verified and defended because it has been presented in a logical order.

Subject Matter

A rewarding and fruitful method for accomplishing this purpose in the classroom is to trace the historical development of astronomical inquiry. This method would follow a "Great Books" approach, focusing on the original works of scientists rather than

textbooks. A curriculum may begin with Ptolemy (90-168) who argued that the earth was stationary. Next in the progression is Copernicus (1473-1543), who argued for a heliocentric theory, but with circular planetary motion. Then Kepler (1571-1630) adopted the theory of Copernicus, but added that the path of the planets was elliptical, setting the stage for Newton (1643-1727), who retained Kepler's theory, adding the theory that the reason for the elliptical path of the planets was the natural uniform straight line motion of the planets coupled with the law of universal gravitation.

The advantage of tracing the historical development of astronomy in the classroom by the careful reading of the texts of those who made the discoveries themselves for the first time is multifarious. First, the mode of discovery follows Aristotle's logical method. These scientists present the arguments that brought them to the conclusions that they arrived at, leading students step by step to see the same things that they saw. By engaging in such a study, a student is led to see not only *that* the planets travel in elliptical paths, but also to consider *why* they do so.

Pedagogy

To do this, however, it is necessary that students are themselves capable of making the same arguments that the scientists themselves make. To ensure this result, and at the same time to cultivate active participation in the classroom, pupils should be required to present from memory for the class the same demonstrations and proofs that make up the original works of these scientists.

Perhaps the most important application of Aristotle's logic, then, is just how important it is for each person to know something on one's own. Because of the way that the human mind works, namely, by the simple apprehension of individual substances and

qualities, followed by formulating statements based on this apprehension, followed in turn by using these statements to reason, it is important for everyone to understand what is learned for oneself. So, if one really knows something in a way that is perfective of the human mind, this knowledge can be resolved to first principles that are known immediately without proof. This has profound implications for education and educational leaders who design curricula. Regarding the example given above, it is common for one to think that one *knows* that the earth travels around the sun and not vice-versa. However, according to Aristotle one does not really know this truth unless one is able to present the full argument which resolves to self-evident and undeniable first principles. Thus, very few really know that Kepler was right and Ptolemy was wrong. Most just *believe* in the heliocentric theory without actually *knowing* that it is true. So, if one were to follow Aristotle's line of thinking in his logical works, education should be designed so that knowledge is attained and that our progress in knowledge is based on true science, not just belief (Fine, 2010). Following this line of reasoning, it is the responsibility of educational leaders to support curricula and teaching styles that foster a growth in knowledge that can be explained by the phenomena, supported with arguments, and defended against objections by students.

For Aristotle, one develops one's humanity by perfecting the mind and one perfects the mind by knowing the world and our place in it as much as possible. After the study of logic, then, comes the inquiry into nature or the world around us. This is covered in Aristotle's natural philosophy, which is made up of the two works: the *Physics* and the *De Anima*. The *Physics* concerns the most universal principles of the natural world and what is common to all natural things. Just as science is part of everyone's

education, even if one is not destined to become a vocational scientist, the study of nature was considered by Aristotle to be something that would perfect the mind of everyone. It is more human to know about one's surroundings than not. Aristotle's natural philosophy is the most general consideration of science in the sense that it provides the most universal principles of every branch of natural science. This is most important for those educational leaders who design science curricula because the order of progress and the manner in which the subject matter is presented are determined by these works of Aristotle.

Also included in natural philosophy is the more particular study of the soul. By "soul" Aristotle meant the principle of life in living things: plants, animals, and human beings. The discussion of what is common to all living things and what *distinguishes* one living thing from another is the consideration of the *De Anima* (Polansky, 2007). The most important part of this treatment, however, is that of human life and human nature. For it is in the *De Anima* that Aristotle considers human knowing and how this takes place. Though there is no separate treatise dealing with epistemology, the branch of philosophy and psychology that now goes by this name is covered in Aristotle's logical works and in the *De Anima*. This understanding of how a human person comes to know governs how one should proceed in the advance toward knowledge. For example, because all knowledge begins with the senses, there is nothing in the intellect which is not first in the senses. Thus, the natural road in our knowledge is from the senses to reason. In other words, our understanding of absolutely everything begins with receiving a particular stimulus in one of the five senses. Consequently, our progress in knowledge should always begin with what we can sense. For this reason, one should always supply

examples that can be sensed. This has applications at every level and in every branch of knowledge. For example, it is due to this principle that hands-on experiments in science are always preferable to reading about those experiments that have been performed by someone else. *Hearing* an example of a chord progression in music is always preferable to being told about it. *Seeing* a falling star or a supernova is invariably better than reading about it. *Touching* or *holding* different specimens of minerals is the best way to know their qualities. The principles of the *De Anima*, therefore, are not esoteric notions without practical application. Rather, they govern our lives as human beings and should govern the decisions of educational leaders about curricula, instructional practices, and teaching methods.

After the study of natural philosophy comes the study of ethics. Again, Aristotle's *Nicomachean Ethics* is not just a treatise about morals; it is about the whole of human life and what all human beings strive for. Everyone wants to be happy; but all do not agree on what happiness is. Determining the things we have in common that contribute to the greatest human goods, therefore, is a consideration for everyone, not just the philosopher. Are there things that contribute to the human flourishing of all, regardless of race, sex, and religion? Why is it that as a society it is preferred that one is educated rather than not? Why do we consider freedom a good that everyone should have? Why do we hold as an undeniable and self-evident truth that everyone should be treated equally before the law? Is happiness the purpose of education? These are all questions of ethics that are determined by returning to the most fundamental principles in Aristotle's work.

Finally, the last discipline to be studied according to Aristotle is metaphysics. This work is in some ways the most relevant to education and the intellectual life because

it pertains to all of learning. As the highest discipline, it governs all of the others. So, metaphysics is to the other disciplines of philosophy what a principal or curriculum director is to a school. It supplies the ordering and organizing principles. It searches out the final answers to all the questions that ask "Why?" In other words, it treats of the causes of all things and supplies the most universally applied principles. It treats of what is most common to every inquiry: being itself. In this way, the treatment of metaphysics rounds out and completes an education that is searching for answers and an explanation of the world around us. Though no knowledge is complete or perfect, metaphysics aims at coming as close as possible.

Aristotle's philosophy, then, is really a way of living as human beings. It is a way to live life to the fullest and to become more perfect and happier human persons. As such, it is universally applicable, just as education in society extends to as many citizens as possible.

At this point it is important to answer an objection against the idea that Aristotle's philosophy is really for everybody. First of all, there seem to be many who are disinclined to study and incapable of entering into the life of a philosopher. Given the necessity to make a living, few have time to devote their lives to a study of what Aristotle considered the highest things. Further, even concerning those with time and inclination, it seems that only very few, after a very long time, and with many errors and disagreements among them would arrive at the same conclusions that Aristotle did.

To answer this objection, it must be conceded that there is a certain truth to it. Very few attain true wisdom. Most of humanity must be concerned with the necessities of life to such an extent that a life entirely devoted to leisure is impossible. At the same

time, every step in the direction of wisdom is worthwhile and humanizing. Saying that we should not use philosophy as a model for the life of the mind would be like saying that because few master calculus, no one should study mathematics at all. Even a beginning toward wisdom is far better than no knowledge at all. Knowing *some* mathematics, even if one learns nothing of calculus, is immeasurably better than knowing no mathematics at all.

The life of the philosopher, then, is really a life for all, even if few advance very far along the path to wisdom. Some knowledge is better than no knowledge. Well begun is half done. If one begins life with some fundamental principles of governing the life of the mind insofar as the mind directs one's life as a whole and the growth in knowledge, one can attain far more and live a far happier life than if one acts by no principles at all. Thus, a consideration of the truths of Aristotle is a benefit not only to the philosopher, but to all, however small one's capacity for knowledge might be. Seeing how Aristotle and St. Thomas regarded philosophy as a whole is the key to understanding the relevance of their works for educational leaders. Now it remains to treat the elements of the sciences which are most pertinent to educational leaders who design curricula and to supply specific examples of how these elements are can be applied in particular disciplines.

What is a Science According to Aquinas?

The word "science" used by Aquinas in the passage above refers to something quite different from the way that the word is used today. One may think first of biology, chemistry, or physics when hearing the word science. In fact, more often than not, contemporary speech distinguishes mathematics from science, as in the common expression, "math and science" or when the field of education refers to the STEM field of

learning (Science, Technology, Engineering, and Mathematics). The meaning that Aristotle and Aquinas intend, however, is much broader than its contemporary meaning. For Aquinas, science includes mathematics and many other disciplines.

Aquinas uses the term science, (*scientia* in Latin) in this more universal sense to mean any reasoned-out knowledge, or knowledge that is the result of careful reasoning or logical argument. So, any time someone attains certain and universal knowledge by a logical process, one is engaging in science. This sense of the term is not altogether unfamiliar, even to the modern ear. For example, it is common to distinguish between what are called the “hard sciences” of biology, chemistry, and physics, and the “soft sciences” which include such things as sociology, psychology, and political science.

For Aquinas, all sciences, as all arts, are directed to attaining wisdom, which is a comprehensive and universal knowledge of the world around us. In his article, "Reconciling Science with Natural Philosophy," Augros explains the Aristotelian-Thomistic meaning of the word "science." He says,

In its ancient sense, *scientia* or *episteme* meant a very perfect knowledge, a certainty of something obtained by seeing the reasons why it is so. Accordingly, mathematics would be the most scientific of all the sciences, as one can judge by the standards laid out for "science" in Aristotle's *Posterior Analytics*. In this sense of "science," the more general study of nature is more "scientific," because it is much more certain than the detailed study of nature which rests upon hypotheses (2004, p. 109).

For Aristotle and St. Aquinas, then, the sciences are more certain or more scientific because they include a more general study of nature. These sciences include such

disciplines as the philosophy of nature, of which Aristotle treats in his work, the *Physics*. The *Physics* examines the most general principles relevant to the study of the natural world. In the passage quoted above, Augros alludes to a passage in the *Posterior Analytics* of Aristotle wherein he lays out the criteria for a science. To get some sense of his use of the term "science" Aristotle's use of will be examined in key texts. The most universal and fundamental account of his notion of science is presented in this key passage of the *Posterior Analytics*.

One science is more precise than another and prior to it if it is at the same time of the fact and of the reason why and not of the fact separately from the science of the reason why and if it is not said of an underlying subject (e.g. arithmetic and harmonics); and if it depends on fewer items and the other on an additional posit (e.g. arithmetic and geometry). (I mean by an additional posit, e.g. a unit is a positionless substance, and a point a substance having position—the latter depends on an additional posit.) (Aristotle, trans. 1984, 87a31-36).

In this passage, Aristotle supplies three criteria for a science being more precise and prior to another science.

First, a science is more precise than and prior to another if it pertains to not only *that* something is true but also *why* it is true. For example, in the science of medicine, it is better to know not only *that* penicillin kills infections, but also *why* it does so. To cite another example, if someone knows that the gravitational force of the moon causes the change between high and low tide, this is superior to knowing simply that there is such a thing as high tide and a low tide. Applying this general principle to education, one should always investigate causes and strive for a knowledge that gets to the heart of the

reasons why natural phenomena occur. This principle also has applications for other non-scientific disciplines. The historian who knows the causes or reasons for the Civil War has a better knowledge than the historian who knows simply the events that occurred without knowing the reasons for those events. For Aristotle, then, knowledge is always superior if it includes the reasons and causes of a thing. Those who design curricula, then, should ensure that causes and reasons for all phenomena are investigated by students according to instructional practices that require them to present these causes and reasons.

Second, one science is more precise than and prior to another if "it is not said of an underlying subject." This means that if one science concerns an underlying subject, namely matter, it is less certain than one that abstracts from matter. For this reason, music theory is less precise or less certain than mathematics. The implication of this point is that if one understands the mathematical principles of music theory, that student would know music theory better than the one who knows the theory without understanding the mathematics behind it. Yet if someone knew music theory well without being able to defend any of the mathematical principles upon which it is based, this knowledge would be less certain than the knowledge of the mathematician who could explain and defend the truth of all mathematical statements and resolve them to first principles. The implication of this particular example for curriculum design is that a mathematics class that focuses on the reasons why mathematical theorems are true should be a prerequisite for music theory. Music theory should also focus on the mathematical causes of tonality.

Third, one science is more precise and prior to another if it "depends on fewer items." For example, in mathematics, geometry presupposes arithmetic, but arithmetic

does not presuppose geometry. For instance, one must be able to count in order to know that a triangle has three sides, but one need know nothing about the figures in geometry to be an expert in arithmetic.

The following commentary of Aquinas on this passage concerning the three characteristics of sciences is illuminating.

He begins by positing three ways in which one science is more certain [more precise] than another. The first way. A science which knows both the fact and the reason why is more certain and prior to a science which knows the fact only, separately from the science which knows the reason why. This is the relationship that a subalternating science has to a subalternated science, as explained earlier. For the subalternated science knows the fact without knowing the reason why. For example, the physician knows that circular wounds heal more slowly, but does not know why. This latter knowledge pertains to the geometrician, who considers the nature of the circle insofar as it has parts which do not come near each other as angles do. Because of this nearness, triangular wounds heal more quickly.

The second way. A science which is not about a subject is more certain than one which *is* about a subject. The word "subject" refers here to sensible matter. As Aristotle teaches in *Physics* II, some sciences are purely mathematical, i.e., the sciences which abstract altogether, according to reason, from sensible matter. Such are geometry and arithmetic. Other sciences, those which apply mathematical principles to sensible matter, are intermediate sciences. Thus, optics applies the principles of geometry to the visual line, and harmonics

or music applies the principles of arithmetic to sensible sounds. This is why Aristotle says that arithmetic is more certain and prior to music; it is prior because music makes use of arithmetical principles, and more certain because the cause of uncertainty lies in the changeability of sensible matter. Hence, the more closely a science approaches matter, the less certain it is.

The third way. A science which proceeds from fewer principles is prior and more certain than one which adds something. For example, geometry is posterior to and less certain than arithmetic, since it adds something to the principles of arithmetic (Aquinas, trans. 2007, pp. 199-200).

The fundamental notion here is that a science is higher in the sense that it is more certain and more precise if it is closer to principles that account for the reasons for why things are the way that they are. Thus, if a science deals with the *why* or the cause of things, is not dependent on matter that changes, and is not dependent on other knowledge, it has more the characteristic of science. In other words, as knowledge it is independent and more certain and precise than other knowledge.

It may seem rather obvious at first that someone who knows that the moon causes the change in the tides has a better kind of knowledge than someone who knows that there is a change in the tides but does not know why. Nearly everyone would agree that a student of geology should know this. Yet, what Aristotle is saying has far more significant implications for education. He is saying that for a student to *know* that the moon causes the change in the tides, this student must be able to present a reasoned argument beginning with phenomenon that everyone can observe and proceed logically to the inescapable conclusion that the effect of the falling tide is caused by the increase in

the gravitational force that the moon exerts on the surface of the earth. Yet this mode of procedure is practically non-existent in science classes. A student who is *told* that the moon causes the tides does not really have the kind of knowledge or science that Aristotle is speaking of. Rather, unless this student is able to present the complete argument from beginning to end, he or she merely *believes* the conclusion. If Aristotle is right, it is a worthwhile and humanizing endeavor to examine the complete arguments that establish the reasons why things are the way that they are. This has monumental significance of educational leaders, whose primary role, according to Elmore (2004), is to improve instructional practice in the classroom. Educational leaders should design curricula and encourage instructional practices that begin with sense experience and proceed by logical steps to the certain knowledge of the causes of phenomenon surrounding us. This is the kind of knowledge that perfects the mind and leads to happiness. Without this kind of inquiry, the students are at best able to repeat information and really have no knowledge at all, but only belief. They have not been taught *how* to think, but have been told *what* to think. They would be incapable of supporting or defending the facts which are on loan but in no way their own.

By examining these three criteria for a science being more precise or prior to another, Aristotle was explaining what kind of knowledge one should aim for in education. He was developing a universal principle that could be applied at all levels and in all disciplines. This gives us some sense of how he viewed philosophy as a whole and how his understanding of philosophy applies to educational leaders. Because educational leaders formulate and implement policies concerning curriculum and methods of instruction, it pertains to these leaders to ensure that the kind of knowledge being pursued

is worthwhile. If Aristotle and Aquinas are right, the most worthwhile kind of knowledge includes the ability to know the causes of things: to know not only *that* they are so, but *why* they are so. If the curriculum is not set up so that the students will be able to explain, support, and defend on their own the knowledge that they have attained, then it does not achieve this purpose. To get the necessary understanding of the general principles that govern this knowledge and apply to the broad range of disciplines, a delineation of the sciences as Aristotle and Aquinas understand them will now be presented.

For Aristotle and Aquinas, philosophy, which was comprised of what they called sciences, was not an abstruse and singular discipline, but a way of life directed to knowledge and living in accord with this knowledge. Thus, his works have as their ultimate goal the attainment of excellence in accord with the unique human activity, which is reason. Living a life in accord with reason consists in the proper exercise of two kinds of knowledge that Aristotle distinguishes between in Book II, Chapter 1 of the *Metaphysics*:

It is right also that philosophy should be called the knowledge of the truth. For the end of theoretical knowledge is truth, while that of practical knowledge is action (for even if they consider how things are, practical men do not study the eternal, but what is relative and in the present). (Aristotle, trans. 1984, 993b 19-23)

In this passage, Aristotle divides knowledge into two kinds: practical and speculative. Practical knowledge is ordered to perfecting our *actions* and speculative knowledge is ordered to perfecting our *understanding of the truth*. In Book VI of the *Topics* (145a15-18) he adds a third kind of knowledge to this: productive knowledge or art. One reason

perhaps that this is not mentioned in the passage above from the *Metaphysics* is that the goal of both practical and speculative knowledge is the perfection of the individual, whereas the goal of productive knowledge is the perfection of the thing produced. Therefore, the division in the *Topics* is more complete, but the division in the *Metaphysics* exhausts the kind of knowledge that is perfective of the individual as an individual. Concerning the practical and speculative sciences, each is further divided into three kinds. The practical sciences are divided into ethics, domestics, and politics. Ethics concerns the governing of the self, domestics the governing of the family, and politics the governing of the state. The speculative sciences are also divided into three: mathematics, natural philosophy, and metaphysics. The following chart manifests these divisions.

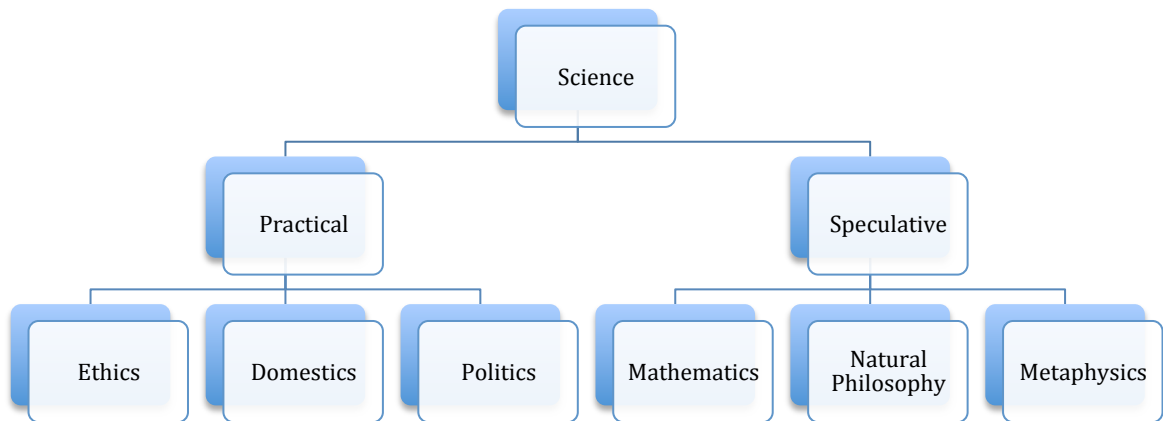


Figure 4. The Six Sciences According to Aristotle.

Following Aristotelian-Thomistic principles pertinent to curriculum design, it is important not merely to assert *that* there are three speculative sciences, but to explain *why* there are three and only three. Aristotle explains this division of the speculative sciences in Book VI of the *Metaphysics*:

For natural science deals with things which are inseparable from matter but not immovable, and some parts of mathematics deal with things which are immovable, but probably not separable, but embodied in matter; while the first science deals with things which are both separable and immovable. Now all causes must be eternal, but especially these; for they are the causes of so much of the divine as appears to us. There must, then, be three theoretical philosophies, mathematics, natural science, and theology, since it is obvious that if the divine is present anywhere, it is present in things of this sort (Aristotle, trans. 1984, 1026a 13-20).

The main point that Aristotle is making here is that there are three speculative sciences the knowledge of which is ordered to human perfection: mathematics, natural science, and theology, which is now usually referred to as metaphysics.

In his commentary of the *De Trinitate* of Boethius, published under the title of *The Division and Method of the Sciences*, Aquinas elaborates on the reason for this division and explains why it is exhaustive. Because a thing's intrinsic intelligibility depends on its degree of separation from matter and motion, this degree of separation also determines the division of the sciences. Mathematics depends on matter for its existence, but not for its definition because the objects of mathematics are considered apart from their existence in matter. The objects of natural science depend on matter for

their existence and their definition, for we are studying natural things without abstracting from their material existence. Finally, the objects of metaphysics depend on matter neither for their existence nor their definition because the object of metaphysics is being as such, which is considered in its universality, which transcends material things. The only other logical possibility in this division would be a science that depended on matter for its definition but not for its existence. This in reality, however, is impossible because a definition always signifies the essence of a thing and it would make no sense to have matter in the definition without matter in the *definitum*, the thing defined (Charles, 2010). This division, therefore, is exhaustive of speculative sciences and divides completely theoretical knowledge of things that reason alone can attain (Aquinas, trans. 1986, p. 11).

Interestingly enough, the science of logic does not find a place in the division of either the practical or the speculative sciences. This seems strange because logic does concern the way the human mind comes to know, which seems to be matter at least for the speculative science of natural philosophy, which includes the study of the soul or principle of life in living things. Yet, logic is not *principally* a speculative science because its chief concern is to direct the mind in its attainment of the knowledge of the practical and speculative sciences. As such, it is more an instrument of attaining knowledge than it is an object of speculative science. Aquinas explains: "So logic is not included under speculative philosophy as a principal part but as something brought under speculative philosophy as furnishing speculative thought with its instruments, namely syllogisms, definitions, and the like, which we need in the speculative sciences" (Aquinas, trans. 1986 p. 16). Though logic is not a speculative science in the strict sense, however, it is a science that is necessary for the attainment of knowledge that is

necessary for human perfection and happiness. Thus, to complete this account of the arts and sciences, an examination of the logic of Aristotelian-Thomistic philosophy is necessary. It is also necessary as a consideration of educational leaders (Davies, 2014). The reason for this is that all disciplines are governed by logical thinking; there is no subject area that is improved by logical fallacies and illogical thinking. Because of this, a knowledge of logic is crucial to make the determination that all of the disciplines in a curriculum are proceeding in a logical and orderly way. Now that the sciences according to Aristotle and Aquinas have been explained, and that it has been established that logic is necessary for those sciences, the principles of these disciplines pertinent to curriculum design will be examined.

Logic

Joseph Owens (1959) points out that logic should be studied first among the disciplines of philosophy: "Before anyone can rightly approach a theoretical science, he must have first studied the processes of human reasoning" (p. 295). Aristotle makes this point in Book IV of the *Metaphysics*: "And the attempts of some who discuss the terms on which truth should be accepted, are due to a want of training in logic; for they should know these things already when they come to a special study, and not be inquiring into them while they are pursuing it" (Aristotle, trans. 1984, 1005b 2-5). Because logic is absolutely indispensable and necessary for the study of any discipline in Aquinas's philosophy of education, then, a brief account of Aristotelian-Thomistic logic will be presented here.

The *Organon*, which refers to the logical works of Aristotle, includes the following titles: *The Categories*, *De Interpretatione*, *Prior Analytics*, *Posterior Analytics*,

Topics, Rhetoric, Poetics, and Sophistical Refutations. This list of logical works is supplied by Aquinas in his *Proemium* to his *Commentary on Aristotle's Posterior Analytics* (Aquinas, trans. 2007, p. 3).

The reason that one should know logic before approaching a specific area of study like math or science is that logic is the common method of all the sciences and all disciplines. In other words, every subject uses logic and depends on its principles in order to proceed: it dictates the mode of procedure in every subject area. It supplies for every learner a common method that is applicable to every kind of intellectual pursuit. Aristotle did not conceive of logic as merely a consistent and self-contained set of rules. Rather, Aristotle's attempt in the *Organon* was to explain the method that every human being must follow in order to attain and grow in knowledge (Leshner, 2001). Because human nature transcends time and place, the way that one comes to know the truth is the same in every age and in every circumstance. In fact, the division of Aristotle's logical works is nothing other than a step-by-step explanation of how *every* human mind operates in order to attain knowledge. It is for this reason that these works are now often considered part of epistemology, which is the science that explains how knowledge is attained.

This process begins with the *Categories*, which treat of the first act of the intellect, which is sometimes called simple apprehension (Agnioni, 2014). In this act of the intellect, the mind understands a simple or indivisible entity and conceives of the essence of the thing or what it is (Charles, 2000). The kind of being conceived by the intellect is of two kinds: substantial and accidental. Of the ten categories of Aristotle, the first, substance, refers to what has being of itself and cannot be present in anything else. The other nine categories of being refer to accidents that cannot exist of themselves and

are present only in some other substance. For example, a continuous quantity, such as length, cannot exist by itself, but only in some other material thing that has length.

The second act of the intellect is predication. Once one has grasped the essence of a thing, it is possible to predicate one thing of another, which is called composition, or to deny one thing of another, which is called division. This act of the intellect is treated in Aristotle's *De Interpretatione*. It is here that truth and falsity are found, for a statement in which one thing is predicated of another is required for truth and falsity (Akrill, 1963).

The third act of the intellect is reason properly speaking, when a conclusion is drawn from two premises and a syllogism is made. Aristotle treats of the syllogism formally in the *Prior Analytics* and the *Posterior Analytics*. In these treatises, the method of attaining scientific knowledge is accounted for (Burnyeat, 2011). Making sure that one is proceeding according to a curriculum design that is logically ordered, then, requires a fundamental knowledge of the basic principles of the syllogism enumerated here.

However, though the syllogism yields the most certain kind of knowledge, it is not the only way of arriving at the truth. In fact, in difficult matters, one should not begin with the most certain kind of argument. Rather, one begins by examining the opinions of others and making probable arguments from what is generally accepted. This art is called "dialectic," which Aristotle examines in the *Topics*.

In addition to arguing from what most think and what the experts in a given field think, in the art of dialectic, one must also consider the process by which others are persuaded of the truth. This discipline is called "rhetoric" which is defined as the art of determining in any given circumstance the available means of persuasion. Interestingly

enough, the *Poetics* of Aristotle is also considered by Aquinas to be part of the science of logic. He says,

Sometimes we are moved towards one part of a contradiction by nothing other more than a kind of regard or esteem resulting from the way something is represented. This is analogous to the way in which a particular food appears disgusting when it is represented in the image of something disgusting. The art of poetry is ordered to this. For the poet's vocation is to guide us to what is virtuous by representing it as attractive. (Aquinas, trans. 2007, p. 3)

The reason, then, that the examination of the poetic art is considered part of logic is that poetry can move readers to one side of a contradiction by disposing them to accept or reject something based on how it is represented (Berquist, 1994). To elaborate on Aquinas's example, if I were to convince someone not to eat a bowl of soup by saying that it looks like vomit, I would be moving to think and act in a certain way by representing the food in the image of something disgusting. Because the kind of fiction we read can influence the way we think, poetics is in some sense part logic because it deals with how individuals arrive at the truth. Considering this logical element of the *Poetics* is an important element of classes concerning literary criticism. It should be noted, however, that in literary genres such as the novel, though a reader may be moved to hold a position or to think a certain way, the literary mode does not move the reader by presenting arguments or strict demonstrations.

Finally, Aristotle's work *On Sophistical Refutations* concerns the refuting of faulty arguments. It is necessary in the consideration of any truth not only to advance the truth, but also to address sophistical arguments. One has a much better grasp on the truth

if one is able not only to supply reasons in favor of one's own position, but also to refute sophistry that has only the appearance of truth. This completes the whole of the corpus of Aristotle's logical works.

Aristotle's *Organon* was written with a view to explaining how this collection of treatises is divided according to the ways that the human mind arrives at the truth. Like the other disciplines of Aristotle, he considered his treatment of logic to deal with something that was discovered, not something that he invented. In other words, it corresponds to the way that the human mind naturally arrives at knowledge.

Thus, philosophy, which for Aristotle and Aquinas is a way of life governing the pursuit of wisdom, must begin with a study of logic as a prelude to the examination of the speculative sciences.

The next science to be considered in Aristotle's enumeration is mathematics. Yet no work of Aristotle's devoted to mathematics has survived. Therefore, in lieu of treating mathematics according to Aristotle, his logical methods will be applied to current methods used in teaching mathematics.

Curriculum Design and Instructional Practice:

Teaching Mathematics

Subject matter

No core curriculum is complete without a course in logic, which is the art of thinking or reasoning. Because all disciplines require reasoning, the mistakes of drawing a false conclusion or arguing fallaciously should be sedulously avoided in every branch of education. More advanced students will profit from a careful reading of the *Organon* which is the corpus of the logical works of Aristotle, known as the father of logic. For

less advanced students, fundamentals of logic can be learned from textbooks such as *Logic: the art of defining and reasoning* by Oesterle (1963), and *Logic: an Aristotelian approach* by Spangler (1993).

Logic should be approached in such a way that it is brought to bear on all other disciplines. Because logic is often ignored, however, fallacies go unnoticed in many disciplines. This difficulty is perhaps most conspicuous in mathematics, which is the most logically rigorous discipline. One common logical error that is almost universally accepted is that a line, which has size or magnitude, is made up of points which have no size or magnitude. In the popular math textbook, *Advanced Mathematics*, author Saxon (1993) says, "a mathematical point is so small that it has no size at all" (p. 47). On the very next page he says, "a line is made up of mathematical points" (p. 48). This is a logical fallacy because it violates the principle of non-contradiction. It is impossible for a line, which *does* have size to be made up of points that *do not* have size. No amount of things that have no magnitude can make up something that does have magnitude, no matter how many of them there are. In spite of this impossibility, the principle that points make up lines and all other geometrical figures is accepted without question almost universally because of an inattention to logic.

The error that a line is made up of points leads to additional errors in mathematics, which further demonstrate the necessity of logic for this discipline. For example, angles are defined as "the geometric figure formed by two rays that have a common endpoint. This definition says that the angle is the set of points that form the rays" (Saxon, 1993, p. 50). The angle, according to this explanation, is also made up of points. This definition, therefore, is faulty because it depends on the faulty definition of a

line. Thus, the logical error multiplies as the study of mathematics proceeds. To avoid these errors, both the study of logic and the attention to logic in the study of mathematics is necessary.

Pedagogy

Often logic is taught in conjunction with mathematics, the readiest and clearest paradigm for logical principles. One solution to the difficulty of the logical errors in the current approach to mathematics is the study of Euclid's *Elements* which pays particular attention to a rigorously logical and orderly procedure. To ensure the active participation of students, they should be required to prepare the theorems or proofs for demonstration in front of the class. In this way, students themselves take part in the teaching process by instructing and evaluating themselves, with guidance from the professor. This also fosters public speaking skills, the ability to field questions, answer objections, and explain difficult concepts to those who do not understand them, all with the most rigorous logical procedure. These skills are useful in all other disciplines and in any walk of life.

Physics or Natural Science According to Aquinas

The two chief works dealing with natural philosophy are the *Physics* and the *De Anima* (Feser, 2013). To establish the principles that govern design of curricula and the educational practices that go along with it, a brief summary of their subject matter will be presented. Aquinas addresses natural science in his work entitled *The Principles of Nature* (Aquinas, trans. 1965). The subject of natural philosophy or natural science is mobile being. In other words, it is all things that are subject to motion. When Aristotle and Aquinas use the word, "motion," however, they mean something more general than what the word means today. By motion, they mean what we mean by the word "change."

So, natural science refers to the discipline that examines all things that change. This fits with the contemporary division of science into biology, chemistry, and physics. What is common to all things studied in these and other related sciences is that they examine things that change (Harry 2015). The *Physics* of Aristotle, then, provides the principles necessary for designing science curricula in these three areas of science.

In natural science, the kinds of beings that undergo change according to Aristotle and Aquinas are either substantial or accidental. A substantial being is one that exists of itself and never in another being. For example, to say that a human being exists refers to substantial existence, because human beings are not part of other existing things; rather they exist on their own. An accidental being is one that cannot exist by itself and only exists in some other being. Height, for example, only exists in other beings that have height. To say that the man is tall, for instance, refers to accidental existence because "being tall" can only be in something else. The subject of natural philosophy, then, is the change that each of these kinds of existence (substantial and accidental) undergoes. An example of this distinction of Aristotle's is preserved in chemistry. When two elements combine to form a compound, such as hydrogen and oxygen combining to form water, substantial change is occurring. However, when two substances join to form a mixture, such as mixing salt and water together, accidental change is occurring. Aristotle's most fundamental principles of change, therefore, serve as guides in the development of the sciences: the distinctions he made are still applied in the study of the sciences (Coughlin, 2014). These distinctions also have far-reaching ramifications for the study of ethics, which is based on the principle that a human being has one nature to which certain acts are suited and others are not.

Corresponding to substantial and accidental existence are two kinds of form: substantial and accidental. A substantial form makes a substance to be the particular kind of substance that it is. Examples of substances whose act is due to a substantial form are a man, a horse, a bird, a tree, gold, water, and oxygen. Each of these is a substance that exists on its own. The accidental form refers to the accident itself. Examples of accidents are height, weight, skin color, knowledge, density, and temperature. These qualities or accidents cannot exist of themselves, but only in other substances. For example, "being tan" must exist in a material body. There is no such thing as "tan" existing on its own or floating around in the air. "Being tan" must exist in a physical body.

Given these two kinds of form that give rise to substantial and accidental existence, each of them can come to be (be generated) or pass away (corrupt). When a substance comes to be or passes away, it is called substantial change. When an accident comes to be and passes away, it is called accidental change, of which there are three kinds: local motion (change of place), alteration (change in quality), and growth and diminution (getting bigger or smaller).

There are three things required for generation or substantial change: matter (being in potency), form (that through which being is actual), and privation (not being in act). In other words, for a change to take place, it is necessary to have a thing that changes (matter), that from which the thing changes (form) and that to which it changes (privation). So, matter is what underlies or remains the same throughout the change. Form is what the matter possesses before it undergoes the change. Privation is the from to which the matter is changing but lacks in actuality during the change. For example,

when a leaf changes from green to red, three fundamental principles are involved in the change: 1) the leaf (the thing that is changing or the *matter*) 2) the color green (that from which it changes or the *form*) and 3) the color red (that to which it changes or *privation*.)

Thus, privation is a *per accidens* principle because during the motion or change it does not yet exist. Matter and form are *per se* principles because the matter and the form together constitute a substance with actual existence.

In all accidental changes, a substance corresponds to the matter because the substance remains the same throughout the change. It underlies a change from one accidental form to another. Yet in a substantial change, prime matter underlies the change. Prime matter exists only potentially: it has no actual existence. As such, it has no form or privation but is subject to form and privation.

So, for all changes, at least three principles are required: matter, form, and privation. Yet these are not sufficient for generation to occur. The reason for this is that what is in potency cannot bring itself to actuality. In other words, a thing cannot give itself what it does not have: a statue cannot make itself. There must be some outside cause to bring something from potency to act. This outside cause is called the agent. But the agent does not act by chance, but by intention. So there must be some fourth cause, namely what is intended by the agent. This is called the end or final cause. There are, then, four *per se* causes: the matter, the form, the agent, and the end. Of these four, the matter and the form are intrinsic causes because they belong to the subject of change itself. The agent and the end are extrinsic causes because they are outside the subject of change and belong to something else.

The reason that privation is not considered one of the four causes is that it is not a *per se* cause, but only a *per accidens* cause and principle (Berquist, 2010). Privation is simply the lack of what the changeable being is changing to. Considered as such, it does not have actual existence.

It is important to note that "principle" is more general than "cause" in the sense that every cause is a principle, but not every principle is a cause. For example, if a leaf changes from green to red, green is a principle of the motion or change from green to red, but it is not a cause of the change.

Also, "cause" is said only of that whose existence is prior in being to another. Hence, a cause may be defined as that from whose being another follows (Aquinas, trans. 1965). A cause is always prior in being, though not necessarily prior in time, to the effect.

Regarding the causes of being and becoming, it is important to note that a thing can have a variety of causes. For example both the artisan and the bronze are causes of the statue. In this case, the artisan is the agent cause and the bronze is the material cause.

It is possible for the same thing to be both an effect and a cause of the same thing, though not in the same respect, but only in different respects. For example, walking is the cause of health as an agent cause, but health is the cause of walking as a final cause. To put it another way, the act of walking contributes to health, yet becoming healthy can be a reason why someone engages in the act of walking. Similarly, matter is the cause of form insofar as matter is necessary for the existence of the form of material things. But form is the cause of matter in that matter has actual being only through the existence of form.

What is most fundamental in the Aristotelian-Thomistic account of nature, which includes all things subject to change, is that our knowledge of these things begins with sense experience. All things that the mind understands have a foundation in our sensory awareness: there is nothing in the intellect that is not first in the senses. With this as a starting point, we have a fundamental knowledge of the things around us that is self-evident or *per se notum*. This is sometimes called "the knowledge of common experience." One example of the knowledge of common experience is the perception of substantial unity. For example, everyone knows that one's mother is one thing and not a heap of things. The same is true for animals, plants, and all living things: they are substantially one (Berquist, 2010).

This kind of knowledge is the most certain of all and it forms the foundation of all other inquiry. By this self-evident knowledge that is common and accessible to all, we know certainly the principles of nature that he expounds in the *Physics*. For example, everyone knows that there are things in the world are subject to change. Everyone also knows that this change involves three things: the thing that changes, that from which it changes, and that to which it changes. This sums up Aquinas's understanding of the principles of nature, the knowledge of which begins with things that everyone is certain of. This most basic kind of knowledge of the external world, or the knowledge of common experience, is the beginning of the inquiry into knowledge of the universe. It governs and guides the progress of the mind as it grows in knowledge and constitutes the principles of the scientific disciplines. Through the entire curriculum of the sciences, these principles serve as the guides and guardrails of advancement in knowledge. The following practical example will show how important it is for educational leaders who

design curricula to ensure that these guardrails are present by requiring a philosophical treatment of science.

Curriculum Design: Aristotle's *Physics* and Modern Physics

Now that certain fundamental notions of Aristotle's natural philosophy have been discussed, it is important to determine how and why these fundamentals should be implemented in a classroom setting.

One reason is that Aristotle is the source for the current division of the sciences into biology, chemistry, and physics. The *De Anima* deals with the principles of biological science, whose subject matter is the living as opposed to the nonliving. The principles of chemistry are established in the first two books of the *Physics* where Aristotle distinguishes between substantial and accidental change. These principles are further developed in the work, *On Generation and Corruption*, which deals with substantial change. Finally, modern physics can trace its origins to the *De Coelo* of Aristotle, which treats of the motion of the heavens.

Another reason is that because natural philosophy is nothing other than an investigation of the principal truths about nature that are most fundamental and which are the basis for all further scientific inquiry, no treatment or study of science is complete without attending to these principles. On a practical level, these philosophical principles could be examined in a prerequisite for science majors or for any high-level sciences course. A course called "The Philosophy of Nature" or "The Fundamentals of Natural Science" could be part of general education requirements. Ideally this would be accomplished by reading the *Physics* of Aristotle. Granting the difficulty of this text,

however, these fundamentals could be established with manuals or secondary sources based on the text and methods of Aristotle.

The fundamental principles of all motion or change are an unavoidable and integral part of physical science, whose common subject matter is all things subject to motion. It is of the utmost importance to examine these principles. If they are not addressed they will either be assumed without question or dismissed without cause.

To cite some examples of principles that are largely assumed without question, nearly everyone assumes the principles asserted in Newton's *Mathematical Principles of Natural Philosophy* (Newton, trans. 1934). It is in this work that we find for the first time such concepts as gravity, inertia, absolute time, and absolute space. We also find an account of planetary motion based on Newton's first law of motion which is stated thus: "Every body continues in its state of rest, or of uniform motion in a right line, unless it is compelled to change that state by forces impressed upon it" (Newton, p. 13). This law, is, in fact, based on Newton's definition of inertia which is as follows: "The *vis insita* [inertia], or innate force of matter, is a power of resisting, by which every body, as much as in it lies, continues in its present state, whether it be of rest, or of moving uniformly forwards in a right line" (Newton, p. 2). Newton is saying here that a body, such as a planet, moves forward in a straight line by its own innate force of matter, or inertia. If this is true, however, then either the motion of the planets is an effect without a cause or the planets cause their own perpetual motion. One difficulty that can be raised with the Newtonian notion of inertia is that it contradicts the very notion of what motion is, which must be understood in light of Aristotle's principles of matter, form, and privation, which were explained above.

Aristotle defines motion as follows: "The fulfillment of what is potentially, as such, is motion" (Aristotle, trans. 1984, 201a11). By "motion," Aristotle meant what we mean by "change." Putting this definition in more familiar terms, all change is the acquiring of something new that was not previously possessed. If this is so, then nothing can change itself or move because it would have to give itself something that it does not have. It would have to be in the possession of something and not in the possession of it at the same time and in the same respect. Yet this is precisely what the notion of inertia requires. The point here is not so much to argue that Aristotle was right and Newton was wrong. Rather, the point is that neither should be accepted without critique and investigation. Yet this is exactly what we do as a society. The force of inertia is uncritically and unquestionably assumed as a fact of our existence. To remedy this difficulty, it is necessary for educational leaders to establish as part of every science curriculum courses that teach the philosophy of nature to which one must necessarily appeal to resolve the discrepancies between Aristotle and Newton.

After the determination of *what* is known about the natural world, Aristotle turns to the treatment of *how* we know the world, the part of philosophy known as epistemology.

Aristotle's Epistemology: The *De Anima*

Epistemology, or the science of human knowledge, is now often treated as a single philosophical discipline. This was not the case, however, for either Aristotle or Aquinas. Neither of them spoke of "epistemology" as one of the sciences of philosophy. Rather, human knowledge was treated in the areas of logic and natural philosophy. An inquiry into Aristotelian-Thomistic epistemology, then, requires an examination of

Aristotle's logical works and natural philosophy, which is comprised of his *Physics* and what is commonly known as the *De Anima* or *On the Soul* in which he treats of the human faculties that make up the capacity for knowledge (Polansky, 2007). Having already examined Aristotle's logic and the fundamental principles of natural philosophy discussed in the *Physics*, it remains to discuss his *De Anima*.

In this work, Aristotle treats of the *powers* of the soul that make the acts of knowing possible. According to Aristotle, all knowledge begins with sensation as the foundation of what is known in the intellect. This has profound significance for the philosophy of education. For example, if all concepts understood by the mind have a foundation in physical sensation, then the natural way to progress to abstract and universal concepts is by first sensing the particular and material things around us (Davies, 2014).

Aristotle's Notion of Sensation

At the heart of Aristotle's understanding of epistemology, then, is that all knowledge begins with the senses, which means that there is nothing in the intellect that is not first in the senses. What the five external senses –touch, sight, taste, smell, and hearing–perceive form the basis of *all* human knowledge. In other words, if there were no sensation in a human being, there could be no natural knowledge (Menn, 2002).

According to Aristotle and Aquinas, it follows from this that non-sentient living beings, namely plants, have no knowledge or self-awareness. All higher animals that have the five senses have sense knowledge and therefore some awareness of the world around them. In addition to these five external senses found in higher animals are also found four internal sense powers: imagination, memory, the common sense, and the

cogitative power. Working in conjunction with each other, the imagination and the memory are able to conjure up and retain the impressions of the external senses. The common sense (*sensus communis*) unites and coordinates the activities of the external senses so that, for example, we are aware that the wine that we see and smell is the same wine that we touch and taste. The cogitative power allows us to react to objects of sense that are to be pursued or avoided. In animals, for example, the cogitative power informs the deer that the wolf is dangerous and to be avoided. This same power informs the wolf that the deer is food and to be pursued. In human beings, this power gives a child a fear of heights or potentially dangerous situations. Let this suffice as a summary of Aristotle's account of the external and internal sense powers of the soul.

Curriculum Design and Instructional Practice: Biology

Subject Matter

Aristotle's *De Anima* establishes the principles of the study of all living things and is the beginning of the study of the biological sciences in the sense that what separates biology from the other disciplines is that it considers living things as opposed to non-living things. (For Aristotle, all living things have a "soul" which is a principle of life within them.)

Because the study of living things and their principle of life also concerns the study of their operations or activities, it includes the study of how human beings acquire knowledge. For this reason, the epistemological facet of Aristotle's work on living things also concerns how the knowledge of living things is approached.

In his account of human knowledge, Aristotle observes that all knowledge begins with the senses. Because the order of our progression in knowledge is from the

particulars of sense knowledge to the more general or universal concepts understood by the mind, the order of learning should follow in kind. What is first sensed should be first learned.

This, however, is not the order followed in the biological sciences. To cite a typical example, in the Holt, Rinehart, and Winston science series, the textbook *Modern Biology* (Otto & Towle, 1985), begins with the treatment of the cell in Unit 1 and then progresses to tissues, organs, systems, and finally ends with a study of the whole organism and animal behavior within ecosystems at the end of the book in Unit 8. This order is typical of the vast majority of biology textbooks.

The first thing that is striking about this order is that it is not the order of discovery. Animals themselves and their behavior in their environment were objects of human knowledge for thousands of years before the existence of the cell was first discovered. Likewise, even today all human beings have an experience of animals and their behavior before cells are studied. So, what is first sensed in the order of discovery, namely the animal itself, is the last thing studied in biology classes. One of the difficulties of approaching a discipline in the reverse order of discovery is that it lends itself to making mistakes in judgment about the object of study.

For example, in modern cell-theory, the cell is considered the "unit of life" (Otto and Towle, 1985). A unit is what is fundamentally one, complete, and whole. But what is fundamentally one, complete, and whole is not the cell, but the entire organism. The animal is more of a unit than the cell is.

In contrast, in Aristotle' view, all the parts of the organism exist for the sake of the whole organism (Aristotle, trans. 1984). For example the digestive system of an animal

exists for the purpose of supplying nutrition to the animal, which is essentially one thing and a unit of life. If, however, one considers the cell to be essentially one, the entire organism is not essentially one, but essentially many things without a single nature. This causes significant difficulties in the understanding of the natures of living things.

The solution to this difficulty is to begin at the beginning and start with a study of animal behavior, which approaches the study of the whole animal as unit (one thing) with a single nature. In this way, the order of instruction follows the natural order of learning and the mind is habituated to see the systems of the animal (digestive, respiratory, and circulatory) as existing for the sake of the whole animal, the organs for the sake of these systems, the tissues for the organs, and the cells for the tissues. Cells, then are not fundamentally and essentially one, but parts of the whole animal which is fundamentally and essentially one.

Books for biology classes, then, should be chosen on the basis of whether they proceed according to the order of learning, which is the order of discovery. For example, the French biologist and entomologist J. Henri Fabre does an excellent job of recounting his studies of animal behavior. A collection of his best work is published in *The Insect World of J. Henri Fabre* (Fabre, trans. 1991). Another fine example is the work of Konrad Lorenz (2002).

Pedagogy

Biology classes should always begin with or at least include the sense experience of animals, so far as this is possible. When this is not possible, descriptive studies of scientists who have made compelling discoveries in the area of animal behavior can serve as a worthy substitute. Inner cities, for example, do not usually afford the opportunity for

the study of natural things in their environment. When studies in the field are not possible, active participation in the process of inquiry can still be encouraged. If students are required to read the accounts of great biologists, they should be asked to recount what they have learned and to participate actively in a discussion of the implications of what they have learned. Also, in-class experiments and portable exhibits can serve as a substitute for first-hand experience of animals in their own habitats.

The Objective Character of Sense Knowledge

Regarding the sense powers, for Aristotle and Aquinas, what is known by the sense power is the object, which is external to the sense power (Taylor, 1990). For example, if a human being sees a mountain, the mountain is the object of sense knowledge. For this reason these philosophers are called "objectivists." This name comes from the notion that the "object" which is external to the knower is the primary object of knowledge.

Beginning with the empiricist philosophers, however, the external object was no longer viewed as the primary object of knowledge. Rather, the sense impressions themselves, which are the effect of the external object of sense on the sense power, were seen as the primary object of knowledge. Because the sense impressions are in the subject, this ideology is known as "subjectivism." For a subjectivist, the sense impression is the very object of knowledge. In contrast, for Aristotle, the sense impression is that by which we know the external object of sense. This raises a question regarding how Aristotle might defend his understanding of sensation when faced with objections from modern philosophers. In answer to this question, it should first be pointed out that it is not possible to present a demonstration from premises more known

to us that things exist outside of us and that these things are known with certainty. The reason that no argument can be presented is that this truth is self-evident. It is what is most fundamental in our knowledge. All other knowledge presupposes this. Because all knowledge comes from the senses, the certitude of the senses is the starting point of all other inquiry. Despite the truth that no demonstration can be presented in favor of objectivism, the truth of Aristotle's position can be manifested by showing the deficiencies in arguments against it. We will focus on two modern philosophers: Descartes and Hume.

Hume (1955) presents this argument that we cannot trust our senses and that we really know our sense impressions, not the world around us:

The table which we see seems to diminish as we remove further from it; but the real table, which exists independent of us, suffers no alteration. It was, therefore, nothing but its image which was present to the mind (p. 161)

Hume's conclusion here is that the mind knows only the image of table, not the table itself. His argument is that when we move further from the table, the actual table suffers no alteration. Yet, it appears smaller to us as we move away. Therefore, we really cannot trust that what we perceive with our senses conforms to reality.

There are two key problems with Hume's argument. The first problem is that he presupposes in his argument the opposite of what he concludes from it: he says "the real table . . . suffers no alteration." This he could only know by *sensing* the table. He claims to be able to sense what the real table is like; for he says that the *real table* suffers no alteration. Here he is presupposing the certitude of his sense powers in order to deny the certitude of his sense powers.

The second difficulty is that the phenomenon that he notices, namely that the table appears smaller as we move farther away, is a necessary component of perceiving distance. If all things appeared the same size to us, no matter how far away they were, we would have no way of telling how far away familiar objects are. The fact that an object appears smaller as we get farther away, then, contributes to the certitude and accuracy of our senses; it does not detract from it.

In the end, Hume's (1955) attempt to argue that we do not sense external objects but only their images strengthens the case of the certitude of our senses. Without realizing it, he contributes to the certainty we have that we can trust our senses.

Next, Descartes (2006) presents the following argument that we should not trust our senses:

I have learned from certain persons whose arms or legs had been amputated that it still seemed to them sometimes that they felt pain in the parts which they no longer possessed. This gives me reason to think that I could not be entirely sure either that there was something wrong with one of my limbs, even though I felt pain in it. (Descartes, p. 131)

Again, there are two problems with Descartes' argument here. First, like Hume, he presupposes the opposite of what he is trying to prove. He claims to be certain that others have lost their limbs and that he has not. How could he possibly know this? Only by being certain that he can trust his sense powers. Yet this is the very thing that he denies.

The second problem with his argument is that he bases it on the perceptions of one whose sense organs have been damaged. One should not expect someone with a

severed limb to be the standard by which sensation is judged. This would be like saying that because someone with a damaged eye cannot trust his sight that neither should anyone else. This amounts to making an aberration the norm.

Similarly, most other subjectivist philosophers such as Locke, Berkeley, and Kant supply arguments against the certitude of the sense powers by presupposing the certitude of these same sense powers or by basing their judgments of what is normal on what is knowingly defective. As such, their arguments, rather than shaking the ground on which Aristotle stands, actually solidify and strengthen it.

Because all of our knowledge begins with the senses, any attempt to deny the senses must be done by using them and trusting their ability to lead us to true conclusions. The arguments against the certitude of the senses actually confirm the reasonability of Aristotle's position. The next of the disciplines taken up by Aristotle is ethics, which treats of human action.

The Importance of Aristotle's Ethics for Educational Leaders

Aristotle's *Nicomachean Ethics*, upon which Aquinas's understanding of human action is based, is much more than a treatise on what is usually thought of as ethics or morals. It is a consideration of the whole of human life. The author intended the work to be universally applicable in all times and cultures. It was meant to address what is common and natural to all human persons regarding their happiness and what is necessary for directing their lives in a way that allows them to flourish and reach their full potential. In other words, it is a work about the end or purpose of human life and all that is required to attain this purpose. Aristotle's *Nicomachean Ethics* begins, then, with a

discussion of happiness, or *eudaimonia*, which is usually translated as "happiness" but also as "human flourishing" or "living well."

This consideration is crucial to the discussion of education because Aquinas, along with contemporary scholars, argue that education is directed to happiness. Getting some sense of what this means requires a careful examination of what Aristotle meant by happiness.

First of all, the term "happiness" used in the *Nicomachean Ethics* does not connote what is normally meant by the term in contemporary parlance. When one hears the term, one usually thinks of an emotion of joy or a feeling of delight. If someone were to ask, "Are you happy or sad?" one would usually be inquiring about an emotion. Aristotle, however, used the term to refer to the greatest human good or the best thing that human beings can attain.

This is of the greatest significance for education and educational leaders. For if education, identified by Aquinas as the arts and sciences, is ordered to the fulfillment of the greatest possible potential, education is a key component in the most exalted of human endeavors. If happiness is the purpose of education, then determining what it is and how to attain it would be the paramount concern of educational leaders to whom it falls to direct others to its attainment and design curricula and determine instructional practice in accord with this (Kingsland, 2010).

How, then, does Aristotle go about determining what happiness consists in? He begins by asking this question: "What is the highest of all goods achievable by action?" (Aristotle, trans. 1984, 1095a16). He begins his answer to the question by saying that the highest of all goods that we can achieve by action cannot be something that we want for

the sake of something else. For if we wanted it for "something else," that "something else" would be more desirable than the happiness we desire. So, happiness must be desirable for itself, and not for the sake of something else.

This greatest human good, which is desirable for its own sake, must be the highest kind of action that human beings are capable of. Because the faculty of reason is the highest human faculty, it necessarily follows that the exercise of this faculty is the highest human activity. Aristotle puts it this way: "Now if the function of man is an activity of soul in accordance with, or not without, rational principle . . . human good turns out to be activity of soul in conformity with excellence [virtue], and if there are more than one excellence [virtue], in conformity with the best and most complete" (Aristotle, trans. 1984, 1098a7-8 and 1098a17-18). To exercise human rationality with excellence or virtue, then, is the greatest human good in which happiness consists. To put in simply, Aristotle's position is that human happiness is virtuous activity.

This virtuous activity, which is nothing other than excellence in accord with reason, is divided into two kinds: moral and intellectual. Though a strong case can be made that education must deal with both kinds of virtue, the focus of this dissertation is on the intellectual virtues or the cultivation of the mind. In the *Nicomachean Ethics*, Aristotle enumerates three virtues of the speculative intellect: understanding, science, and wisdom (1139b15). In keeping with Aristotle's logical works, he identifies understanding as a knowledge of self-evident first principles. Science is the ability to draw conclusions from these principles. Finally, wisdom is a knowledge of causes which is attained by the virtues of understanding and science. Aquinas explains these three intellectual virtues as follows:

The Philosopher (*Ethic.* vi.1) reckons these three alone as being intellectual virtues, viz., wisdom, science, and understanding. I answer that, as already stated (A.1), the virtues of the speculative intellect are those which perfect the speculative intellect for the consideration of truth: for this is its good work. Now a truth is subject to a twofold consideration,—as known in itself, and as known through another. What is known in itself, is as a *principle*, and is at once understood by the intellect: wherefore the habit that perfects the intellect for the consideration of such truth is called *understanding*, which is the habit of principles.

On the other hand, a truth which is known through another, is understood by the intellect, not at once, but by means of the reason's inquiry, and is as a *term*. This may happen in two ways: first, so that it is the last in some particular genus; secondly, so that it is the ultimate term of all human knowledge. And, since *things that are knowable last from our standpoint, are knowable first and chiefly in their nature* (*Phys.* i., text. 2,3); hence that which is last with respect to all human knowledge, is that which is knowable first and chiefly in its nature. And about these is *wisdom*, which considers the highest causes, as stated in *Metaph.* i. 1, 2. Wherefore it rightly judges all things and sets them in order, because there can be no perfect and universal judgment that is not based on the first causes. But in regard to that which is last in this or that genus of knowable matter, it is *science* that perfects the intellect. (Aquinas, trans. 1947, I-II Q57 A2)

The intellectual virtue of understanding, then, concerns the starting point of the reasoning and the process of education because it governs the knowledge of first principles which are the beginning of all knowledge. Science governs the progress and method of attaining further knowledge on the basis of the principles of understanding. Wisdom is the virtue that governs the knowledge of causes that are most perfective of the mind (Berquist, 1996). This is the greatest of intellectual virtues and the one that is perfected in the discipline of metaphysics, which will be considered in the next section.

According to Aquinas, then, all arts and sciences, which constitute the core of education, are ordered to happiness in the sense that they are ordered to the perfection of the mind according to the attainment of the intellectual virtues. Because these virtues can be acquired only by a thorough study of the arts and sciences, it pertains to educational leaders to design curricula and implement teaching methods that are ordered to perfecting the mind through these disciplines so as to attain happiness (Mooney & Nowacki, 2014).

Curriculum Design and Instructional Practice: Aristotle's *Ethics*

Subject Matter

Cicero (trans. 1975) says at the beginning of his treatise, *De Officiis (On Duties)*, that the branch of philosophy dealing with ethics or morals has the widest practical application:

Although philosophy offers many problems, both important and useful, that have been fully and carefully discussed by philosophers, those teachings which have been handed down on the subject of moral duties seem to have the widest practical application. For no phase of life, whether public or private, whether in business or in the home, whether one is working on what concerns oneself or

dealing with another, can be without its moral duty; on the discharge of such duties depends all that is morally right, and on their neglect all that is morally wrong in life. (p. 7)

Cicero's point here is that because moral duties enter into every phase of life, the examination of these duties constitutes the most widely applicable discipline in philosophy. If this is true, then ethics should be part of the requirements of both general education and more particular fields. In fact, this is currently the case in many programs. For example, medical ethics is often a requirement for those studying medicine, business ethics for those in MBA programs and social equity in education programs.

Because particular applications of ethics in medicine, business, and education, for example, always depend on the use of more general principles, courses in fundamental ethics required early on in general education would greatly aid more particular considerations.

Pedagogy

Because Aristotle's *Nicomachean Ethics* is completely independent of any religious considerations and draws conclusions based on what is common to all human beings, the subject matter is universally applicable. Also, the text is more accessible than most of Aristotle's other works.

Ethics in the classroom could be implemented in a variety of ways that encourage the active participation of students. For advanced students, seminars on such works as the *De Officiis* of Cicero and the *Nicomachean Ethics* of Aristotle could be conducted. For less advanced students, manuals or textbooks using excerpts and highlighting the contributions of key ethical thinkers could be used.

The most important consideration, however, is that the students take the role of being the primary agents in their education. To this end, seminars discussing the texts of great thinkers, debates examining both sides of a moral issue, and papers presented and discussed are all instructional practices that foster respect for students as the primary agents of their education.

Curriculum Design and Instructional Practice: Aristotle's *Metaphysics*

Owens begins his treatment of Aristotle's *Metaphysics* or "Theological Science" by saying,

The motive urged for its pursuit is the natural desire that all men have to *know*, as desire that can be satisfied only through understanding **things** by means of their **highest principles** and **causes**, and that is aroused by a **wonder** at things of which the cause is not apparent" (Owens, 1959, pp. 322-323).

It is difficult to overestimate the profundity and importance of this observation not only for the science of metaphysics but for all of education. Owens makes two crucial points for the understanding of the subject matter of metaphysics. The first is that this science can trace its origins to the natural desire to know which is nourished by *wonder*. Second, the subject matter of the science can be determined from this natural desire. This section of the dissertation is devoted to showing this connection between our natural desire to know and the subject matter of metaphysics (Ashley, 2006).

It is significant that the very first line of Aristotle's *Metaphysics* is "All men by nature desire to know" (Barnes, 1984, p. 980a20). As support for this observation, he says, "An indication of this is the delight we take in our senses; for even apart from their usefulness they are loved for themselves; and above all others the sense of sight"

(Barnes, p. 980a23). The most necessary reason for the senses is self-preservation: our senses aid us in procuring the necessities of life. However, in addition to their usefulness, we often delight in viewing such things as a sunset or a beautiful flower. It is significant that when we take part in such activities, there is no end or purpose beyond the activity itself; it is for its own sake. In other words, when one stops to look at a beautiful sunset, one does not do this in order to do something else with the experience: it is an activity that is enjoyed for what it is in itself. One might say, then, that the senses have a practical end regarding the acquiring of what is necessary for self-preservation, and a speculative end regarding what is experienced simply for its own sake, such as the enjoyment of the beauty of a sunset.

The reason that Aristotle begins with this example is that it is far easier to grasp what we can sense and imagine than it is to grasp what we can understand, but not imagine. In this case, a sunset or a flower can be sensed and imagined, but the objects of speculative knowledge, such as what a cause is, cannot. Because all knowledge begins with the senses, the natural way for us to arrive at difficult truths is from the senses to reason or from the particular to the universal (Taylor, 1990). Now that he has made this observation regarding the senses, the more difficult truth regarding the intellect becomes easier to see.

Regarding the mind there are also two kinds of knowledge: one for the sake of action and another, purely for its own sake. The desire for knowledge for its own sake we call *wonder*. It is important to distinguish wonder, which is an intellectual virtue, from curiosity, which is an intellectual vice. Curiosity in the strict sense is the desire for particular knowledge, which is useless or even harmful for us to have. Gossip about

failures in the lives of others is an example of the kind of knowledge that springs from curiosity. Such knowledge may satisfy curiosity, but it does not perfect the human mind. Most often, we are better off without this kind of knowledge. It should be noted, however, that it is common to use expressions like "epistemological curiosity" or "intellectual curiosity" to refer to a genuine desire for humanizing knowledge. The word "curiosity," however, does have a negative connotation as well. Wonder, on the other hand, is the desire for universal knowledge that of itself perfects the human mind. It is this kind of desire that Aristotle is speaking of in the first line of the *Metaphysics*. Growth in knowledge can come about only when one is nourished by genuine wonder and guarded by the fear of error. Without wonder, there is no wisdom (Caldecott, 2012).

Wonder and the Subject Matter of Metaphysics

Because all knowledge begins with the senses, we know effects before we know causes. For example, we know *that* the ocean is salty before we know *why* it is so; we know *that* the moon has phases before we know *why*. When we encounter an effect, however, we naturally seek the knowledge of the cause of that effect. In fact, every time we ask the question "Why?" we are seeking a cause. However, when the cause we are seeking is itself an effect of something else, we want to know the cause of that cause. Our mind is never satisfied completely, then, until we arrive at a cause that is not the effect of anything else, but is the cause of all things. Therefore, if human knowledge is to be satisfied, we must have knowledge of the first cause (Berquist, 2010). This will be knowledge of the highest kind because it concerns the truth of things that do not depend on anything else for their existence. The highest science, then, must deal with the first cause. This is what Owens means when he says that this desire for knowledge "can be

satisfied only through understanding things by means of their highest principles and causes" (Owens, 1959, pp. 322-323).

Aquinas supports this conclusion in his *Proemium* to his *Commentary on the Metaphysics*. First, he makes the point that metaphysics deals the most intelligible objects, or in other words, the most perfective kind of knowledge: "that science which is intellectual in the highest degree should be naturally the ruler of the others. This science is the one which treats of the most intelligible objects" (Aquinas, trans. 1995, p. xix). Then he argues that the science which is intellectual in the highest degree must be about causes: "Therefore, since the certitude of science is acquired by the intellect knowing causes, a knowledge of causes seems to be intellectual in the highest degree" (Aquinas, trans. 1995, p. xix). A sign that the knowledge of causes is intellectual in the highest degree is that we are most certain of something when we can explain *why* it is so. For example, one is really not certain of the truth that the exterior angle of a triangle is equal to the two opposite interior angles until one can prove the theorem. If one just memorizes the formula, there is no certainty or knowledge that can be supported with evidence. If one is able to prove this theorem, then one is certain of it because one knows why it is true. Therefore, the most certain kind of knowledge must deal with knowing the cause or reason why things are the way that they are.

The most perfective kind of knowledge, however, will be the most universal kind of knowledge, for the universal is what is most characteristic of knowledge itself. For example, the senses can perceive an individual triangle, but the intellect, in knowing what a triangle is, knows *all* triangles universally. (For this reason, if one knows what a triangle is, one can identify any three-sided plane figure as a triangle, regardless of the

size and ratio of the sides.) Therefore, because universal knowledge is the highest kind of science, metaphysics must deal with the most universal principles that pertain to all things. This is why Aristotle treats the axioms in the *Metaphysics*, the chief one of which is that a thing cannot both be and not be at the same time and in the same respect. This axiom is the most universal because nothing can be so if it is not so. Aristotle confirms this when he says, "Now the reason for undertaking this investigation is that all men think that the science which is called wisdom deals with the primary causes and principles of things" (Barnes, 1984, 981b28). In addition to being about causes and principles, metaphysics also concerns *being* as such. The reason for this is that the highest and most universal kind of knowledge must be in some way about all things that exist. But one discipline or kind of knowledge cannot be concerned with all aspects of the existence of everything. It must cover only what is most universal or common to all existing things. And this is being itself (Ashley, 2006).

By a consideration of human nature and the natural desire that all human beings have to know, a determination of what constitutes the highest or most perfective kind of knowledge can be reached. The highest kind of knowledge must be the most certain and the most universal. Therefore, the subject matter of metaphysics, must concern the first cause, the first principles, and being as such.

Principles of Education Derived from the *Metaphysics*

In the passage quoted above from Aquinas's commentary on the *Metaphysics* of Aristotle, he says that metaphysics is the discipline that is the "ruler of all the others." This means that it really pertains to metaphysics to divide the disciplines and to speak about the methods of each one. In a very real sense, then, an educational leader who

designs curricula and determines the instructional practices that go along with these curricula across the disciplines is doing the work of a metaphysician! Regarding this, it is important to teach the most universal principles that guide the whole of an education, most especially to those who will be educational leaders. In light of this, how educational principles and foundations apply across the disciplines is something that should be taught at the end of one's education, for it is only then that the subject matter of each discipline can be examined with the purview necessary to see the order among them. The following ten principles listed below, then, form the basis for the subject matter of a course that deals with the part of metaphysics that explains the rationale for the universal principles of education.

From a treatment of the arts and sciences according to Aristotle and Aquinas, the following principles, suitable for a class on metaphysics concerning the whole of education, can be derived.

- 1) Education begins in wonder and aims at wisdom. Wonder is the natural desire for knowledge that perfects the mind and wisdom is the knowledge of the reasons why things are the way that they are.
- 2) The path to wisdom follows a natural method from things that we can experience with our senses that are easier to understand to more abstract concepts that are more difficult to understand.
- 3) Logic guides the mind along the path to wisdom and ensures the direction and order of progress. With the use of logic, wisdom can be attained more easily and with fewer mistakes along the way.
- 4) Mathematics is necessary for forming the mind in a logically rigorous way. It is

also necessary for understanding and the physical world.

- 5) The principles of natural science govern and guide all the disciplines that concern the study of material things subject to change.
- 6) The human person is part of the natural world. The study of the natural activities of which a human being is capable, such as sensing, imagining, and understanding, are necessary for understanding the human person.
- 7) Knowledge acquired by means of education is of two kinds: speculative and practical. Speculative knowledge perfects the mind and practical knowledge perfects human actions. Thus, practical knowledge is acquired through the ethical sciences.
- 8) All human beings want to live well. Happiness, which is nothing other than living well, is attained by perfecting the mind's ability to attain knowledge and direct human action. Thus, happiness is a life in accord with perfect intellectual and moral virtue.
- 9) What is now called metaphysics, also called "first philosophy" or "wisdom" or "theology," concerns the most universal causes that concern all existing things. Metaphysics directs all other disciplines and orders them to the attainment of wisdom.
- 10) Because the mind is the highest human power, living well a life of the greatest possible happiness requires the perfection of the mind in its ability to know the truth and direct human action. Therefore, all education is ordered to human perfection, which is happiness.

According to the following statement of Aquinas, then, the arts and sciences constitute the core of education: "Now all the sciences and arts are ordered to a single thing, namely, to man's perfection, which is happiness" (Aquinas, trans. 1995, p. xxix). Therefore, in order to understand what education is and how its purpose is human

happiness, it was necessary to explain the subject matter of the arts and sciences according to Aquinas. Further because Aquinas's understanding of the arts and sciences is derived from the corpus of Aristotle's major works, understanding these works is necessary for understanding the thought of Aquinas on education.

These ten principles come directly out of a consideration of how Aristotle and Aquinas understand the arts and sciences, which govern and dictate the life of the mind and the method and progress of all of the education. The nature of these arts and sciences, which also examine how a human being arrives at knowledge and what this knowledge is directed to, in turn, determine the design of a curriculum as a whole and instructional practices and role of the teacher. So, given that the arts and sciences have now been treated in this chapter, the next chapter will focus more particularly on the philosophical basis for the role of the teacher in this process.

CHAPTER 5: THE ROLE OF THE TEACHER ACCORDING TO AQUINAS

The purpose of this chapter is to explicate the position of Aquinas on the role of the teacher as expounded in the First Part of the *Summa Theologiae* Question 117, Article 1. In this article, Aquinas asks "Whether One Man Can Teach Another." In answering this question, which is based on his epistemology, light is shed on the entire process of education, yielding far-reaching implications for teachers and educational leaders. This exposition will focus on the main point that Aquinas makes in this article: that the student, not the teacher, is the primary agent in the growth of the student's knowledge. The term "primary agent" calls for further explanation. In any activity that involves more than one thing that is responsible for that activity, the primary agent (or principal agent) is the one most responsible for that activity. For example, when a rider directs the path of a horse, the horse is the primary agent of the action of the rider being carried along. Though the rider may direct the path of the horse, and encourage it with vocal sounds and kicks, the motion from point A to point B is more due to the horse than to the rider. In this case, the horse is the primary agent and the rider is a secondary agent of the motion. Similarly, when a teacher aids a student in the growth of the student's knowledge, the change from ignorance to knowledge takes place within the student and is more due to the student than to the teacher if the learning is genuine. Because of this, the student is the primary agent and the teacher is the secondary agent. Aquinas gives two other examples of primary agents, which will be expounded upon in this chapter. He compares the teacher to both a farmer and a doctor. In the case of the farmer, the primary agent in

the growth of a plant is the plant itself; the farmer aids the growth of the plant as a secondary agent. Concerning the example of the doctor who prescribes medicine, the patient's body is the primary agent in the process of healing; the doctor acts as a secondary agent.

Applying these examples to education, the teachers should lead students in such a way that the motion from ignorance to knowledge is due to the primary agency of the student rather than the teacher. For example, in a class on mathematics, students rather than teachers should be the ones demonstrating theorems in front of the class. To cite another example, it is much better for a teacher to guide a discussion among the students of a text of literature as opposed to the teacher expounding upon it to the students.

To manifest and further explain the point that the student is a primary agent, it is necessary to expound upon on prior principles of epistemology that Aquinas develops in his work on logic and natural philosophy and which constitute his method of approaching the question of how one person teaches another.

Aquinas's Method

When Aquinas explains how the teacher is a cause of knowledge in the student, he uses the very method of teaching that he is explaining: dialectic. At the beginning of his treatise, the *Topics*, Aristotle defines dialectical reasoning: "it is a dialectical deduction, if it reasons from reputable opinions" (Aristotle, trans. 1984, 100a30). A dialectical argument is distinguished from a demonstration by the nature of the premises and by the degree of certitude that it produces in the knower. A demonstration yields certain knowledge because its premises are either first principles or derived from first principles. The reasons that this kind of knowledge is so certain is that it is derived from

those truths which are in themselves the cause of all other truth. Yet a dialectical argument is only probable because its premises are not derived from undeniable first principles, but from reputable opinions. Aristotle defines "reputable opinions" as follows: "those opinions are reputable which are accepted by everyone or by the majority or by the wise—i.e. by all, or by the majority, or by the most notable and reputable of them" (Aristotle, trans. 1984, 100b20-22). In dialectic, therefore, one begins with what others have said. It makes sense to examine the opinions of what most individuals think or what the most notable or reputable think. The reason for this is that if the wisest or the experts in a given field assert something, they are usually, though not always, correct. In other words, there is more reason to trust those who have advanced in a field of study and are recognized for this than there is to trust those who are not. Also, as will be manifested below, even if they are not correct, they almost always supply useful knowledge that one can learn a great deal from.

Regarding the universal question of just how one person can teach another, which is taken up in Question 117, Article 1, Aquinas opens with a dialectical consideration of his predecessors. Referring specifically to his method, which begins with opinions, he says, "It should be said that concerning this question there have been various opinions" (Aquinas, 1941, I Q 117 A1, C). At the outset, he examines what the most reputable or influential thinkers have said about whether one man can teach another. In this case, the two opinions he treats are those of Averroes, the Arab commentator on Aristotle, and Plato, Aristotle's teacher. After examining these two opinions, Aquinas considers to what extent each of them conveys something useful that the teacher can benefit from. Subsequently, he expounds upon his own consideration of the matter, appealing to what

he has previously established in his works on logic and the philosophy of nature, the two disciplines in which his epistemology is found.¹ The first expert he examines, then, is Averroes.

Averroes

Aquinas begins his answer to the question of whether, or rather, in what respect, one man can teach another by examining the position of Averroes. Because Averroes held, based on his interpretation of Aristotle's *De Anima*, that all human beings share the same intellect, he also held as a consequence that all share the same knowledge. If this is true, then the teacher communicates to the student the very same knowledge that the teacher has. About this opinion, Aquinas says that although it is not the case that all share the selfsame intellect, what Averroes says is true insofar as the thing known is the same. Because of the identity or sameness of the object known, the knowledge of that object is in some sense the same for all: "This opinion [that of Averroes] is true insofar as the knowledge in the student and the teacher is the same, if the identity of the thing known is considered; for the student and the teacher know the same truth of the thing in reality" (Aquinas, 1946, I Q117, A1, C). For example, if both a both a geometry teacher and a student know that the interior angles of a triangle are equal to 180 degrees, this same truth of mathematics is known by the teacher and the student.

There is, then much truth in the opinion of Averroes. Because truth is measured by the existence of things in reality, the truth that we share is the same because the thing

¹ St. Thomas makes no reference to "epistemology" as a philosophical discipline. What is usually referred to as the epistemology of St. Thomas is found in his logical works, most notably his commentary on the *Posterior Analytics* of Aristotle, and in his works on the soul, such as his commentary on the *De Anima*, which he considered part of natural philosophy.

known in reality is the same. This turns out to be especially significant for Aquinas's explanation because the truth that is taught by the teacher to the student regards their common knowledge of the selfsame reality. Therefore, the teacher must take steps to bring the student to the knowledge of the reality that the teacher knows.

Plato

The second of the two opinions that Aquinas examines in this article is that of Plato. The Platonists held that our souls possess knowledge from the very beginning of our existence by means of participation in separated forms. So, his theory goes, human beings possess all intelligible species, which means that they possess an understanding of all existing things. Because the soul is united with the body, however, the rational part of the soul, which is the mind, is hindered in its act of understanding. According to Aquinas, there are two difficulties with this theory. First, it is based on the notion that it is unnatural for the soul to be united to the body. All human beings in this analysis would be misfits or defective beings from birth.² But if a human being with the capability of reasoning and understanding is not a defective being, it does not seem likely that there would be a natural hindrance to knowledge which is built into us. Second, it seems unreasonable that we should forget things that are naturally known to us. For example, the first principles, such as "the whole is greater than the part" are naturally known. Because they are not based on any prior argument, they are impossible to forget. These principles are still known as soon as the terms used to state the principles are

² That the body and soul form a natural union and that the possible intellect is in pure potential to intelligible species will not be fully defended here. See *Summa Theologiae* I Q79 A2 and Q84 A3 for more complete arguments.

known. For example, as soon as anyone knows what a whole pie is and what part of a pie is, this person immediately knows that the whole pie is greater than part of the pie.

It follows from the opinion of Plato that one man cannot really teach another because all learning is really remembering. A teacher, then, only rouses a student to remember: there really is no true teaching that occurs. Plato gives an example of this in the *Meno*, when Socrates is purportedly able to draw out of the slave boy the pre-existent knowledge of how to geometrically construct a square, which is double the area of another square simply by asking him questions.

Though Aquinas does not mention this specifically, there is some truth even in Plato's notion that all learning is recollection. Though axiomatic first principles, such as "a thing cannot both and not be at the same time and in the same respect," are not remembered, they are naturally known in a way similar to what Plato thought. In other words, these first principles are not, strictly speaking, taught to one person by another. It is in the definition of a proposition that is self-evident or *per se notum* (known through itself) that it is known as soon as the terms are known. Aquinas puts it this way: "any proposition is self-evident (*per se nota*) when the predicate is included in the notion of the subject, such as 'man is an animal,' for animal is included in the notion of man" (Aquinas, 1941, I, Q2 A1, C). Following this understanding of what it means for a proposition to be self-evident, all self-evident statements are necessarily known to be true as soon as the meaning of the terms are known. For example, if one knows what a right angle is and also knows what it means for two angles to be equal, one also knows immediately that all right angles are equal. This truth really *cannot* be taught, strictly speaking, because it is impossible not to know once the realities signified by the terms are

known. It is upon this way of understanding self-evident statements, which is seen in part by Plato, that Aquinas bases his understanding of teaching.

Aquinas on How One Person Can Teach Another

Aquinas separates himself from Plato, however, by saying, "the teacher does cause knowledge in the learner by reducing the learner from potency to act (Aquinas, 1941, Q117 A1 C). By "reducing the learner from potency to act," Aquinas means that the student starts with an ability (potency) to grow in knowledge and then comes to actually possess and exercise this knowledge (act). So, being in a state of potency means not having knowledge, but having the ability to attain it. Being in act means actually possessing knowledge. Aquinas is saying, then, that with the help of the teacher as an agent, the learner can, in opposition to what Plato says, acquire and grow in knowledge.

To make clear just how this growth in knowledge comes about, Aquinas distinguishes between two different ways that an effect can proceed from an exterior principle or cause. In the first way, the effect always proceeds from an exterior principle. For example, when a carpenter builds a house, nothing of the matter of the house is responsible for the form (which in this case refers to the accidental form or the orderly arrangement of the parts to each other). Another way of making this same point is that if a carpenter arranges wood in a certain configuration, as when the frame of a house is built, this configuration is caused by the carpenter and not by the wood itself: the wood is incapable on its own of putting itself into the shape of a house. Similarly, in all such cases when a rational agent (in this case a human being) builds something by means of an art, the materials all on their own are not capable of arranging themselves in the proper way: another cause is required. Perhaps the following example will help to verify this

principle. No one would look at a house and think that the house built itself. Everyone knows that workers were involved in the construction of every existing house. Aquinas's way of saying this is that the cause of the form of the product is exterior to the product.

In the second way that an effect proceeds from an exterior principle or cause, it sometimes comes from an exterior principle, sometimes from an interior principle. For example, when a sick person is healed of an infirmity, such as a bacterial infection, this sometimes comes about by means of an exterior principle, as when an antibiotic kills the bacteria. At other times, the effect comes about by means of an interior principle, as when one the body restores itself to health by fighting off the infection without an antibiotic.

Aquinas considers teaching to be like this second case rather than the first: it is more like a doctor giving a patient an antibiotic that helps the body's natural process than it is like a carpenter building a house. Thus, the teacher acts as an exterior principle in cooperation with an interior principle within the student. In addition to this, there are two things that should be noted in this second case which are relevant to the art of teaching. First, when the exterior principle operates, it brings about the effect by means of imitating or aiding the natural process that occurs as a result of the interior principle. For example, antibiotics heal the body by eliminating an infection in the same way that the body would on its own: by killing the bacteria. Second, the exterior principle does not act as the primary or principal agent when bringing about the effect, but works along with the interior principle, which is the principal agent. For example, when a doctor prescribes medicine to aid the body in the process of healing, the doctor works along with the

interior principles of the body which are the principal causes of the restoration of health: the doctor is not the primary cause of the health of the body.

Applying this analogy to the art of teaching, the teacher, as an exterior principle, should consider the proper relation between the teacher and the student. In this relation, the teacher aids the natural process of the student who is acting as the primary agent in the process of education. The implications of this understanding of education are as follows.

If the student is the primary agent in the process of education, then all students must possess for themselves the knowledge that pertains to the subject matter. This means that for learning to take place, one must attain knowledge for oneself, always being able to trace advanced knowledge back to self-evident first principles. Aquinas puts it this way: "For in every man there is a certain principle of knowledge, namely the light of the agent intellect, by which certain universal principles of all the sciences are naturally and immediately known from the beginning" (Aquinas, 1941, Q117 A1, C). One example of a universal principle of knowledge that is known by the intellect without any prior knowledge is that any whole is greater than any one of its parts. As soon as the intellect grasps what a whole is and what one of its parts is, it is immediately known that the whole is greater than the part. To cite another example, the intellect immediately knows that a thing cannot both be and not be at the same time and in the same way. For instance, if two plus two equals four, it cannot also be true that two plus two does not equal four if all the terms in these two statements mean exactly the same thing in both cases.

These universal principles, which, according to Aquinas are known by all, are then applied to the knowledge of particular things, the memory or experience of which is acquired through the senses. In this way, one can advance from the known to the unknown. Thus, all teaching and learning proceed from previous knowledge of universal principles. Aristotle makes this point in the very first line of the *Posterior Analytics*: "All teaching and all intellectual learning come about from already existing knowledge" (Aristotle, trans. 1984, 71a1).

This sheds light on what it really means to have knowledge. To cite an example from mathematics, if one is to know the truth that the interior angles of a triangle are equal to two right angles, one must be able to prove not only the theorem itself, but also all of the theorems that it depends upon. One who has simply memorized this theorem does not really know the truth of it. This is precisely the way that Euclid proceeds in his *Elements*. He begins with self-evident first principles and proceeds step by step, teaching the student all that needs to be known to have certain knowledge of the theorem from principle.

Aquinas's epistemology, then, has far-reaching implications for the role of the teacher. Practically speaking, the teacher should function as an aid, a catalyst, a secondary agent who directs the natural process of students who arrive at knowledge for themselves. The etymology of the word "educate" points to this method. To educate, *educare*, means "to draw out." Rather than depositing facts and information to memorize, the effective teacher draws out from the student an argument that resolves to first principles, leading students in such a way that they see for themselves the same truth that the teacher sees.

How the Teacher Aids the Student

It has been argued that according to Aquinas, it belongs to the teacher, as a secondary agent, to draw out (*educare*) the truth from students in a way that they see this truth for themselves. Yet the method for accomplishing this end has not been addressed. It is now necessary to supply particular examples of how the teacher aids the student. These are presented in summary form in the latter half of the body of Q117 A1 of Part I of the *Summa Theologiae*.

A key term that is important for understanding Aquinas's position on the method of the teacher is the Latin *manuductio*, which is translated "leading by the hand." This word occurs in verb form in Q117 A1. Aquinas says, "the intellect of the learner is led by the hand (*manuducitur*) to a knowledge of the truth [previously] unknown" (Aquinas, 1941, I Q117 A1, C). When explaining this term, he says that there are two ways that the teacher leads the student from the known to the unknown. These two ways will now be explained in detail.

The First Way a Teacher Leads a Student From the Known to the Unknown

Regarding the first way, he supplies four instances of how the teacher leads the student by the hand when teaching:

The teacher leads the student from the known to the unknown in two ways. First, by proposing to him certain aids or instruments which his intellect makes use of acquire knowledge; for example, when he proposes to him certain less universal statements which nevertheless the student can judge from previous knowledge; or when he proposes to him certain sensible examples, or likenesses, or opposites, or other things of this sort (Aquinas, 1941, I Q117 A1, C).

Four Aids or Instruments

There are, then, four examples of aids or instruments that the teacher uses to lead the student by the hand from the known to the unknown which will now be explained one by one: 1) less universal statements, 2) sensible examples, 3) likenesses, and 4) opposites.

Less Universal Statements

Because all knowledge begins with the senses, there is nothing in the intellect that does not in some way have a foundation in the senses. Yet, because the object of all the senses (the external thing that is sensed) is something particular and the object of the intellect is the universal, it necessarily follows that the natural way of acquiring knowledge is by moving from the particular to the universal. Because we all begin with the particular and ascend to the universal, more particular or less universal statements are easier to grasp than more universal ones. For this reason, Aquinas says that a helpful tool at the disposal of the teacher is the use of less universal statements.

For example, suppose that a teacher wanted to manifest to a student that effects in the natural world are easier to know than their causes. This statement, "Effects are better known than causes," is universal and difficult to grasp. With the use of less universal statements that manifest this principle, however, it becomes much easier to see. For example, we know *that* something is so before we know *why* it is so. We know *that* the ocean is salty (an effect) before we know *why* it is salty (the cause). We know *that* it is cold in the winter months before we know *why* it is so. We know *that* the moon has different phases before we know *why*. In fact, whenever we ask the question "Why?" we are saying that we have knowledge of an effect and we are searching for a cause.

To cite another example, the observation that the knowledge of the intellect is superior to the perception of the senses is difficult for some to understand. To see the superiority of the intellect, one is aided by less universal statements. For example, while the senses can perceive only a limited number of triangles at a time, the intellect can know *all triangles* at once by knowing *what a triangle is*. When the mind knows what a triangle is, namely a three-sided rectilinear plane figure, there is no limit to the kind or number of triangles that are known. *All* triangles can be recognized as triangles regardless of the size of the angles or the ratio of the sides. This kind of knowledge, which includes knowing something about all triangles, is greater than knowing a limited number of triangles that can be perceived by the external senses of sight or touch.

Also, the superiority of the intellect is shown by the dominance of the animal kingdom by human beings. Most animals have sense powers superior to those of human beings. But because human beings have an intellect, they dominate the animals with superior physical endowments. Eagles can see much better than humans, yet we subdue eagles; they do not subdue us. Dogs have superior hearing and smell, but humans train dogs, not the reverse. So, the general truth that the intellect is superior to the senses can be manifested by supplying less universal statements that display more clearly particular elements of superiority.

Sensible Examples

It is difficult to overestimate the importance of the use of examples in the art of teaching. Because we always know the universal through the particular and the purely intelligible through the sensible, one of the best ways for a teacher to aid a student in the

understanding of a universal and non-sensible principle is by means of a sensible example.

Example may be defined as a particular part of a universal whole that represents that whole. To manifest this definition as an aid to supplying good examples, it is helpful to examine the common etymology of and relationship between the words "example" and "sample." Both are derived from the Old French word *essample* which in turn comes from the Latin word *exemplum*, which is a derivative of *eximere*, which means "to take out." Both samples and examples, then, are parts "taken out" of wholes. A sample is part of a composed whole, which is a sensible whole that is composed of and equal to the sum of its parts. For example, when a vendor offers a sample of cheese from a large wheel, he is giving the buyer a part of the whole so that he will better know what the whole is like. At a wine tasting, those who taste a small amount of wine are receiving a sample indicative of the quality of the entire barrel from which the sample was taken. A sample, then, is part of a composed whole which exists for the purpose of knowing the whole.

Similarly, an example is a part of a whole that exists for the sake of knowing the whole. There is, however, an important difference between a sample and an example. An example is part of a *universal* whole, not a *composed* whole. Whereas the composed whole can be sensed and is nothing other than the sum of its parts, the universal whole is not sensible, but only intelligible, and is not composed of its parts.³ Rather, it is *more than* the sum of its parts. For example, the genitive case is something more than and different from all the words that can be in the genitive case. Simply listing all the words that are in this case would not be an adequate explanation of what the case is. The

³ The common expression, "The whole is greater than the sum of its parts" is said in reference to the universal whole.

essence of the genitive is something beyond this mere sum. To know what the genitive case is, one must make use of examples of it, namely phrases or sentences that use individual words that are in the genitive case. Similarly, to make known a universal truth that cannot be sensed, one should make use of parts of the whole or particular instances of a universal truth that can be sensed and imagined.

Aquinas was a master at this. His examples of very difficult philosophical principles were sensible and imaginable instances that allowed the student to grasp the universal. In the following examples, he supplies instances of things that we have all sensed.

- 1) "subsequent movers move only insofar as they are put in motion by the first movers, **as the staff moves only because it is put in motion by the hand**" (Aquinas, 1941, I Q2 A3, C).
- 2) "whatever lacks intelligence cannot move towards an end, unless it be directed by some being endowed with knowledge and intelligence; **as when the arrow is shot to the mark by its archer**" (Aquinas, 1941, I Q2 A3, C).
- 3) "Now that the past should not have been implies a contradiction. **For as it implies a contradiction to say that Socrates is sitting and is not sitting, so does it to say that he sat and did not sit**" (Aquinas, 1941, I Q25 A4, C).

A good example, then, leads the student from ignorance to knowledge by supplying a particular part of a universal whole that can be easily sensed and imagined. Thus, a good teacher, like Aquinas, follows the natural road in our knowledge from the particular and sensible to the universal and intelligible.

Likenesses

When introducing something unfamiliar, it is helpful to draw a likeness to something that is closer to one's experience. Such a comparison can go a long way in explaining the nature of something that is unknown. This comparison need not, and in fact cannot, be alike in every respect. It need only bear a striking similarity. When he is explaining the knowledge of the beatific vision, which is his understanding of how God is known in heaven after death, Aquinas uses a likeness: he says that when we see God, we also see all created things, just as when we see a mirror, we see both the mirror and the objects it reflects, as by one image:

Through one image, a mirror and those things that appear in the mirror, are seen.

But all things are seen in God as in a kind of intelligible mirror. Therefore, if God Himself is not seen through some kind of similitude, but through His very essence, neither are the things seen in Him seen through certain similitudes or images (Aquinas, 1941, I Q12, A9, SC).

The vision of God is a supernatural participation in His knowledge. God's knowledge, however, is different from ours in the sense that He receives nothing from outside of Himself. He knows all things through the one and simple act of knowing Himself. Therefore, our participation in God's knowledge of Himself also includes the knowledge of all of creation, just as our vision of a mirror includes all things that are in the mirror. So, just as we see a mirror and what is in it in one image, so also, we see God and creation at once.

Because the vision of God is entirely unfamiliar to us, it belongs to the teacher to lead the student by a likeness that is much easier to grasp. Everyone can understand that

when one looks at a mirror, one sees the mirror itself and everything in the mirror at the same time. So also, when one sees God, one also sees all that He has made, for all things pre-exist in Him in the unity and simplicity of His essence.

Opposites

Because of the weakness of the human mind, it is often difficult or impossible to understand things without also understanding their opposites. By way of contrast, the thing in consideration becomes more clear. For example, headlights seem brightest at night. Because of this, to grasp fully the intensity and power of a light, one ought to examine it in the darkest conditions, so that by contrast the light may be investigated more easily. Aquinas puts it this way: "Now everything is known the more for being compared with its contrary, because when contraries are placed beside one another, they become more conspicuous" (Aquinas, 1941, Supplement, Q94 A2).

In fact, there are some things that cannot be understood without also understanding their opposites. For example, what it means for the number 4 to be *double* 2 cannot be understood without also understanding what it means for 2 to be *half* of 4. Darkness cannot be understood without reference to light; and blindness cannot be understood without reference to sight. Also, because the natural virtues are always means between two extremes, a virtue cannot be known without also knowing the vices opposed to it. It is impossible to understand courage without also understanding its deficiency, which is cowardice, and its excess, which is rashness. Temperance, which governs the right amount of food and drink, cannot be understood without also understanding how much food and drink is excessive and how much is deficient.

Because of the necessity of appealing to opposites, it is often advantageous to a teacher to begin with one opposite as opposed to another. Convincing someone that government is natural and good can be a difficult task. Yet it is easier to see that anarchy is bad. And if anarchy is bad, then some form of government must be good. Likewise, it is easier to see that solitary confinement is bad than it is to see that a human being by nature is a social being. But if forced solitary confinement is bad, then some kind of society has to be good.

Plutarch gives an insightful example of the importance of appealing to opposites in his life, *Demetrius*, where he justifies his inclusion of the lives of not only those pre-eminent in virtue, but also those notorious for their vices: "we shall be all the more zealous and more emulous to read, observe, and imitate the better lives, if we are not left in ignorance of the blameworthy and the bad" (Plutarch, trans. 1952, p. 726). Elaborating on his choice to do this he says, "both in the arts and with our senses we examine opposites . . . Medicine, to produce health, has to examine disease, and music, to create harmony, must investigate discord; and the supreme arts of justice, and of wisdom, as they are acts of judgment and selection, [are] exercised not on good and just and expedient only, but also on wicked, unjust, and inexpedient objects . . ." (Plutarch, trans. 1952, p. 726). Plutarch is contending here that our knowledge of one thing often depends on the knowledge of its opposite.

Perhaps the most conspicuous uses of the tool of opposites in Aquinas is that in the *Summa Theologiae*, he never fails to argue a position without first taking up objections contrary to it. The reason for this is that his position comes out much more clearly when it is tested by the examination of contrary arguments. One is really never in

complete possession of a position unless arguments on the opposite side can be answered. For this reason, it is essential to the role of teachers that they not only advance one side of an issue, but also consider the opposing side. Aquinas puts it this way in his commentary on the Gospel of John: "There are two things that pertain to the office of a teacher: to instruct the devout or sincere, and to repel opponents" (Aquinas, 1980, Lectio 1, p. 9) The expression "repel opponents" should not be taken as an approval of violence. It simply means that objections should be addressed.

The first of the two ways that a teacher leads a student from ignorance to knowledge, then, is by means of these four aids or instruments or tools of *manuductio*.

Moving From Principles to Conclusions

The second way is that the teacher leads the student from things that he already knows to the truth which was previously unknown. Aquinas explains this second way as follows:

In another way, by strengthening the intellect of the learner . . . inasmuch as he proposes to the student the order of principles to conclusions, who by his own strength would not have enough collative power to deduce conclusions from the principles. Hence the Philosopher says that "a demonstration is a syllogism that causes knowledge" (*Posterior Analytics* I.2). In this way a demonstrator causes his hearer to know (Aquinas, 1941, I Q117 A1, C).

This second way that a teacher leads a student, then, is by showing how one moves from a principle to the knowledge of a conclusion by means of a demonstration. In the very first line of the *Posterior Analytics*, Aristotle supplies a principle that governs how this is done: "All teaching and all intellectual learning come about from already existing

knowledge" (Aristotle, trans. 1984, 71a10). When a teacher shows a student how a principle leads to a conclusion, then, it must be by using knowledge that a student already has. Aristotle supplies an excellent example of how to do this in Book I of the *Nicomachean Ethics* when he argues to the definition of happiness. Since this dissertation argues that education is ordered to happiness, this argument will be developed in detail here.

If Aristotle follows this method of deducing a conclusion from a principle, then he must begin with a principle. Further, this principle, as well as any other premises that are necessary for deducing a conclusion, must be manifested by appealing to a knowledge that the student already has. In other words, the teacher must appeal to the knowledge of common experience, or common conceptions about the way things are that are accessible to everyone. These common conceptions are what Aristotle calls "pre-existent knowledge." They are self-evident principles which are *per se nota* or "known through themselves." Aquinas bases his entire philosophy of education on this point: in order to know something in a way that perfects the human mind, one must be able to resolve all knowledge to self-evident principles or pre-existent knowledge. In this way, teachers proceed in such a way to act as secondary agents who bring the student to the same knowledge that they themselves have. This is what Aristotle does in Book I of the *Ethics*. This method for teaching his students about the true nature of happiness will now be traced as an example of Aquinas's second method of teaching: showing the "order of principles to conclusions."

Aristotle begins the *Ethics* with an examination of the final end or purpose of human life. He argues that the final end of human beings must be the chief or highest good as follows:

If, then, there is some end of the things we do, which we desire for its own sake (everything else being desired for the sake of this), and if we do not choose everything for the sake of something else (for at that rate the process would go on to infinity, so that our desire would be empty and vain), clearly this must be the good and the chief good (Aristotle, trans. 1984, 1094a 18-23).

Aristotle is saying here that, if we have a final end, it has to be such that we desire everything else for the sake of it, yet we do not desire it for the sake of anything else. For if we desired it for the sake of something else, it would not be a final end. Further, there must be some final end of our desire. If there were not, then all of our desires would be in vain, being for the sake of other desires, which are in turn for the sake of other desires, and so on to infinity. Thus, none of these desires would be satisfied and all of our natural desires would be in vain. And because the good is defined as what all desire, our final end must be the chief good. Having established that human beings have a final end, which is the chief good, he goes on to argue that one ought to determine what this chief good is.

Will not the knowledge of it, then, have a great influence on life? Shall we not, like archers who have a mark to aim at, be more likely to hit upon what we should? If so, we must try, in outline at least, to determine what it is (Aristotle, trans. 1984, 1094a 23-26).

Aristotle is saying here that if one is to attain the end that all desire, which is the chief good for human nature, we should determine what this good is so that we will be more likely to attain it. Incidentally, this example shows that the two methods of the teacher enumerated by Aquinas are used in conjunction with each other. Here he is using a sensible example of an archer shooting at a target to show that knowledge of the end is necessary for attaining it. An archer, for example, is much more likely to hit a target by aiming at it than by shooting arrows at random.

The next question to answer is "What is the highest of all goods achievable by action?" (1095a16). This is the most important question concerning human life, for the chief or highest good of human nature is human happiness; it is living well; it is human flourishing in the fullest sense. A sign that that it is living well or flourishing in the fullest sense is that happiness is not desired for the sake of some other goal. Although everyone desires happiness, no one desires happiness so that this happiness may be used for something else. One never says, "I want to be happy so that . . ." but simply, "I want to be happy." Aristotle expounds upon this point in Book I, Chapter 7 of the *Ethics*:

Now we call that which is in itself worthy of pursuit more complete than that which is worthy of pursuit for the sake of something else, and that which is never desirable for the sake of something else more complete than the things that are desirable both in themselves and for the sake of that other thing, and therefore we call complete without qualification that which is always desirable in itself and never for the sake of something else. Now such a thing happiness, above all else, is held to be; for this we choose always for itself and never for the sake of something else (Aristotle, trans. 1984, 1097a30- 1097b1).

Happiness, then, appears to be the chief and highest good attainable by human beings; for we desire all else for the sake of happiness, but we do not desire happiness for the sake of anything else. At this point, Aristotle has supplied only a nominal definition of happiness by equating it with our highest or chief good. It remains to say what exactly this chief good or happiness is.

He begins by saying that there is widespread agreement that happiness, which is identified with living well, is our highest good. There is no widespread agreement, however, about what happiness is. He says, "Verbally there is very general agreement; for both the general run of men and people of superior refinement say that it is happiness, and identify living well and faring well with being happy; but with regard to what happiness is they differ" (p. 1095a20). A definition of happiness, then is needed. To establish this definition, Aristotle continues the method that Aquinas calls showing the "order of principles to conclusions." To do so, he makes the following argument.

First premise: The highest good of each thing is excellence of in accord with its unique activity.

Second premise: The unique human activity is the use of reason.

Conclusion: The highest human good is excellence in accord with the activity of reason.

In this argument, the first premise is the principle required to conclude that the chief or highest human good, which is his happiness, is excellence in accord with the activity of reason. Aristotle demonstrates the order of this principle to the conclusion by showing

the truth of the principle through the use of examples that are obvious to everyone. He proceeds as follows.

Presumably, however, to say that happiness is the chief good seems a platitude, and a clearer account of what it is is still desired. This might perhaps be given, if we could first ascertain the function of man. For just as a flute-player, a sculptor, or any artist, and, in general, for all things that have a function or activity, the good and the 'well' is thought to reside in the function, so would it seem to be for man, if he has a function. Have the carpenter, then, and the tanner certain functions or activities and man has none? Is he naturally functionless?

Or as eye, hand, foot, and in general each of the parts evidently has a function, may one lay it down that man similarly has a function apart from all these (Aristotle, trans. 1984, 1097b 23-32)?

Aristotle's argument here is that the good of artists such as flute players and sculptors resides in their activity or function. For example, a good flute player is one who plays the flute well; a good sculptor is one who is good at making statues; a good carpenter is one who builds well; a good tanner is one who tans hides well. These examples are things that everyone knows because they are self-evident. In other words, as soon as one knows what a flute player is, he also knows that a good flute player is one who plays the flute well. After citing numerous examples that no one can deny, he applies these examples to a more universal case.

If, in all the examples given, a good "such and such" is one who performs his activity well, it must be that a good human being is one who performs human nature's unique activity well. This is seen more easily when the function of the different parts of

human beings are examined. For it is clear that the highest good of an eye is to see well, and highest good of a hand is to grasp well. So the truth of the first premise is clear: the highest good of each thing is excellence in accord with its unique activity. Yet it makes no sense to say that each of the parts of a whole has a function, but the whole, which is the nature of man, has no function or activity at all. It remains to determine, then, what the function or unique activity of a human being is as a whole.

Thus, in the second premise Aristotle asserts that this unique activity of human beings is the use of reason. He shows this as follows:

What then can this [i.e. an activity proper to man as man] be? Life seems to be common even to plants, but we are seeking what is peculiar to man. Let us exclude, therefore, the life of nutrition and growth. Next there would be a life of perception, but *it* also seems to be common even to the horse, the ox, and every animal. There remains, then, an active life of the element that has a rational principle (1097b32-1098a4).

In this passage, Aristotle argues that a human being's unique activity is reason. He shows this by comparing human beings to other living things: plants and animals. A function or activity that is peculiarly and uniquely human cannot be a function or activity that a human beings share with other living things. Human beings grow, but plants do as well; so this cannot be a uniquely human activity. Human beings have sense perception, but so do horses and oxen; so neither can this be a uniquely human activity. However, human beings have a rational principle or an ability to reason that the other living things do not share. This, then, must be the uniquely human activity.

Now that the two premises have been established, the conclusion can be drawn. If the highest good of each thing is excellence in accord with its unique activity and if the unique activity of human beings is reason, it necessarily follows that the highest good of human beings is excellence in accord with the use of reason. Aristotle presents the conclusion this way: "Now if the function of man is an activity of soul in accordance with, or not without, rational principle . . . human good turns out to be activity of soul in conformity with excellence [virtue], and if there are more than one excellence [virtue], in conformity with the best and most complete" (Aristotle, trans. 1984, 1098a7-8 and 1098a17-18).

Human good, or happiness, then, is a *an activity of the soul in conformity with excellence or virtue*. Aristotle is saying that if one is to attain human happiness, then one must direct one's life in accord with reason and live in conformity with excellence or virtue. The highest human good, therefore, is virtuous activity. The remainder of the *Ethics* is devoted to showing more precisely what virtue consists in.

The second method of teaching according to Aquinas, then, is to show students "the order of principles to conclusions," so that students themselves have the ability to deduce conclusions from the principles. To manifest this process fully, an extended example from Book I of Aristotle's *Nicomachean Ethics* was supplied where he uses the twofold method of the teacher by using both the tools of *manuductio* and the manner of deducing conclusions from premises. This was chosen as an example because Aquinas says that all the arts and sciences in education are ordered to happiness. To understand what this statement means, the meaning of happiness must be explained. This demonstrates a practical example of applying Aquinas's principles in a universal way:

Aristotle draws on common experiences and appeals only to natural knowledge to reach his conclusion.

CHAPTER 6: THE RELEVANCE OF AQUINAS'S

THEORY OF EDUCATION FOR EDUCATIONAL LEADERSHIP

Since education is a practical concern in the sense that it necessarily entails planning and executing a series of steps for the purpose of attaining an intended result, any discussion of Aquinas's theory of education would be incomplete without an examination of how this theory could be applied to the role of educational leaders who design curricula and shape instructional practice. Granting, then, the necessity of leadership in any endeavor where many individuals are directing themselves to a common goal, it is important to address the significance of the findings of this dissertation for these educational leaders. The reason for this is that the understanding of education as a whole influences the teacher-student relationship, which in turn influences the decisions of educational leaders concerning curriculum development and instructional practice.

The Importance of Considering Philosophy When Designing a Curriculum

Because philosophy grounds educational leaders as significant decision-makers regarding educational content and process (curriculum and instruction systems), it is important to examine how this affects the ways that curriculum can be implemented and the different facets of curriculum influenced by philosophy. In his article, *Philosophy as a Basis for Curriculum Decisions*, Ornstein (1990) says, "Philosophy provides educators, especially curriculum specialists with a framework for organizing schools and classrooms" (p. 5). He continues, "Philosophy provides them with a framework for

broad issues and tasks, such as determining the goals of education, subject content and its organization, the process of teaching and learning, and in general, what experiences and activities to stress in schools and classrooms" (p. 5).

Hopkins (1941), a groundbreaking specialist in the area of the relationship of philosophy to curriculum puts it this way: "Philosophy has entered into every important decision that has ever been made about curriculum and teaching in the past and will continue to be the basis for of every important decision in the future. . . . There is rarely a moment in a school day when a teacher is not confronted with occasions where philosophy is a vital part of action" (p. 198). Philosophical principles, then, govern the design of curriculum regarding such things as intended outcomes and what is taught and why. Without the attention to philosophy, questions about what is being done and why cannot be answered.

Another foundational thinker in curriculum design, Goodlad (1979), points out that philosophy is the starting point in decisions made about curriculum and guides all subsequent decisions. According to Ornstein (1990), philosophy determines the "aims, means, and ends of curriculum" (p. 6).

In their book, *Curriculum : Foundations, Principles, and Theory*, Ornstein and Hunkins (1998) observe that with regard to curriculum, educational philosophies affect such things as instructional objectives, theories of knowledge, the role of the teacher, curriculum focus, and curriculum trends (p. 56). Without attending to the philosophy of education, then curriculum development and design will run the risk of proceeding on assumptions that have been accepted without question or critical examination. As Ornstein and Hunkins point out, one cannot avoid a set of philosophical principles on the

basis of which to proceed. The only question is as to whether these principles will be examined, supported, and defended by those who design curricula.

The next question that inevitably arises is how to implement a curricular policy based on attention to philosophical principles. Cohen (2005) points out that the more collaboration there is between faculty and administration, the more likely curricular changes will be successful. Also important to take into account are the systems and culture in place at the institution. Whether systems afford a ready opportunity for change and whether there is a culture of resistance to change are questions that should be examined.

Also important is the consideration of what kind of curriculum is currently in place and how this compares to a curriculum that would be influenced by a conscious and focal commitment to philosophical principles. Whether consciously or unconsciously, there are almost always philosophical convictions underlying curricula that are in place. Ornstein and Hunkins (1998) have categorized curricula into three philosophical bases that predominate: realism, idealism, and pragmatism. Realism seeks to educate the rational person by cultivating the intellect. Idealism aims at educating the person for the sake of competency. Pragmatism promotes democratic social living with an emphasis on social reform. If one of these three predominate, a change to another philosophical system would present challenges.

One recommendation to remedy the potential obstacles to curricular reform based on an attention to philosophical principles is to open a dialogue between those specializing in educational leadership and organizational change on the one hand and those specializing in philosophical principles on the other. Bringing these two disciplines

together in a confab has the potential for making a significant change for the better. The reason for this is that those specializing in philosophy concentrate on theory and those specializing in education concentrate on practice.

It is only by combining theory and practice, however, that realistic and efficacious changes can be made. Organizations like the *Center for Ethics and Education* (ethicsandeducation.wceruw.org) are doing just this. Their mission statement is "to foster and support work that brings the tools and perspectives of moral and political philosophy to bear on issues of educational policy and practice" (ethicsandeducation.org, 2015). The advantage of theorists convening with practitioners affords the greatest possible prospect for accomplishing meaningful and significant change at the level of implementing curricula whose design is based on philosophical principles.

One suggestion for realizing this ideal is to begin with conferences that bring philosophers and educational leaders for the purpose of opening up communication between these two disciplines which historically have been bifurcated. It is only by connecting the insights of these two fields that a realistic prospect for change can become a reality.

Teachers as Leaders

An important consideration regarding the relevance of the philosophy of education for educational leadership is that teachers themselves can be considered leaders. Aquinas seems to imply this by saying that the teacher leads the student by the hand: "the intellect of the learner is led by the hand (*manuducitur*) to a knowledge of the truth [previously] unknown" (Aquinas, 1941, I Q117 A1, C). It is important to clarify, then, the role that the teacher has as a leader.

It may seem at first that *manuductio* or "leading by the hand" de-emphasizes the active role of the student in the process of learning. This metaphor, however, could be understood in the context of Aquinas's understanding of the role of students as the principal agents in their attainment of knowledge. The two comparisons that Aquinas uses to describe the role of the teacher discussed in Chapter 5 are the doctor and the farmer. In both cases, a natural process whose primary cause is outside the one being compared to the teacher is at work. When the doctor heals with medicine, the primary cause of healing is in the patient. So also, when the farmer cultivates crops the primary cause of growth is in the plants themselves. Likewise, even when the teacher leads the student by the hand, the primary cause of learning is not in the teacher, but in the student.

This notion that the student is the primary agent of growth in knowledge is alluded to in the rest of the quotation in which the term *manuductio* or "leading by the hand" occurs. For Aquinas says that the student is led by the hand "to a knowledge of the truth unknown." Before explaining how this indicates that the primary agent of the growth in knowledge is in the student, it must first be explained what it means to gain knowledge of the truth unknown.

In the epistemology of Aristotle and Aquinas, frequent references are made to a learner moving from the known to the unknown. This language is obscure and can be easily misunderstood because it sounds like the learner is losing knowledge: going from the state of knowing to the state of not knowing, or moving from knowledge to ignorance. It must be explained, therefore, what it means to move from the known to the unknown and why Aquinas would describe learning in this way. In the course of this explanation, it will be made clear how moving from the known to the unknown

necessitates that the primary cause of growth in knowledge be in the student and not in the teacher.

To explain what it means to move from the known to the unknown, the first step is to arrive at a general sense of what is meant. Aquinas either means that the learner is moving from knowledge to ignorance or from ignorance to knowledge. The first possibility can be eliminated fairly easily. It would be absurd to say that to fulfill the duty of teaching, a teacher leads a student by causing ignorance. There must be some way, then, that this passage describes the way that a teacher helps a student move from ignorance to knowledge.

When moving from ignorance to knowledge, two possibilities arise concerning how this process occurs. The first possibility is that ignorance itself is a means to acquiring knowledge. This certainly cannot be the case. For example, suppose that someone happens to be ignorant of the square footage of a room, but wants to acquire this knowledge. One could never use complete ignorance as a means to grow in the knowledge of area. If this is the case, then it must be that the acquiring of new knowledge is brought about by means of something already known. In so doing, the student moves from the known to the unknown in the sense that the knowledge of what was previously unknown is acquired by means of what the student already knows. In other words, a true growth in knowledge builds on what is already known. To continue the example, a student could come to the knowledge of the square footage of a room by knowing the length and the width. From the previous knowledge of the length and width of a room, the new knowledge of the square footage can be attained. It is the role of the

teacher to show how the knowledge of length and width can be used to come to a knowledge of area: by multiplying the length by the width.

Once the student sees not only *that* multiplying the length by the width results in the area, but also *why* this is so, new knowledge of what was previously unknown has been acquired. It is precisely because the student has been led from what was previously known to the attainment of new knowledge that the student is an active participant and not a passive recipient of this knowledge. The student now possesses the knowledge in the manner that the teacher does and, at least in principle, can demonstrate this knowledge. This is accomplished by going through the same steps, acquired with the help of the teacher that were initially used to attain the knowledge.

Practical Examples of Applying Thomistic Principles in Core Disciplines

Considering educational leaders who are responsible for curriculum design and the instructional practice that necessarily goes along with it, these general principles will now be applied to four specific disciplines for the purpose of offering possibilities for their practical implementation: literature, history, mathematics, and science.

Literature

Given that students should be taught in such a way that they take as active a part in their education as possible, the goal for teaching literature is that students become perceptive readers, accurate interpreters, and sound critics of great literary works in such a way that they can engage in these activities for themselves.

To this end, it is far preferable to read complete works from fewer authors than to read shorter quotations or selections from a greater number of authors. The reason for this is that reading great works in their entirety fulfills the ends of growing in the

knowledge of literature much better than reading excerpts or selected passages. Given equal amounts of time, the student of drama, for example, will profit much more from reading the *Antigone* from beginning to end than from reading selections from a grouping of several Greek plays. Likewise, reading one complete epic is far better than reading one-fifth of five different epics. The same goes for novels, short stories, and all other kinds of fiction. The chief reasons for this are as follows.

A literary work, by its very nature, is a whole. It has a beginning, a middle, and an end. As such, it was written by its author with the intention that it be read from beginning to end. One cannot be a true student of literary works except by reading literary works. When a student of fiction reads only part of a novel, this is tantamount to a student of architecture seeing only the lower half of a facade or a student of painting seeing only one corner of the canvas. In none of these cases is the student in any position to benefit from the piece of art in the way that the artist intended.

Universally, those who love and appreciate fiction insist on seeing the entire work. No casual moviegoer arrives at the theater to watch part of a movie, and no lover of the novel is satisfied reading only select chapters. If the amateur insists on an appreciation of the whole, the serious student should insist on it even more because the serious student aims at a much greater kind of appreciation.

The reason for this is that one of the main goals of studying literature in institutions of higher learning is that the students become better readers and critics of literary works. Reading these works in their entirety is the indispensable first step in acquiring this ability. Two of the most fundamental questions when examining a work of fiction are as follows. a) What was the author's goal in writing this work? b) Did he

accomplish this goal? In order to answer these questions, the work must be read from start to finish. No student can grow in his or her habits of reading and critiquing fiction without actually engaging in this practice on a regular basis. For these habits require such things as referring to any given part of the work, quoting from it, and addressing the character development, the succession of events, and the resolution of the plot. The student who does not read the whole work will lack this ability and be less equipped to enter into a principled and intelligent discussion than the casual reader who peruses the novel for enjoyment.

In addition to the ability to analyze works of literature intelligently, one should not discount the formative effect of reading. Literature profits not only the intellect, but also the emotions and the imagination. The emotional effect of a work in any genre can be realized in the reader only by reading a work from beginning to end: the cathartic effect of a play is designed to come about gradually throughout the experience of the successive events of the story.

In addition to specifically literary purposes that are accomplished by reading complete works, an array of other intellectual disciplines are nurtured by this practice. An important goal of the study of great works is being able to speak and write about these works in an intelligent and persuasive way. In order to write an effective essay on a work in any discipline, one must, at the bare minimum, have read the work in question. One cannot possibly assert, explain, and defend a position on a subject connected with a work of history or philosophy or science convincingly or effectively without having read the work he is writing about. Making effective textual arguments concerning fictional works trains the student to do this in other disciplines.

History

Following Thomistic principles, the study of history should be approached in such a way that students themselves take an active a role in their learning in such a way that they can verify directly as much as possible. To accomplish this goal, the focus should be on first-hand experiences and direct evidence for historical claims rather than on the kind of second-hand or third-hand accounts related in many textbooks. Rather than using a re-telling of events, accounts written by those who experienced the events themselves should be studied as much as possible. Just as in a criminal trial, eye-witness testimony is of far more value than that of someone who talked to an eye-witness, so also a historical account penned by someone who partook of the event in question is more reliable than a report which is related indirectly.

Granting this, engaging in culturally enriching activities such as viewing or handling artifacts, using tools, eating the food, and following the customs of other cultures separated by time or distance is a way to enhance the sensory experience that impresses itself uniquely on the imagination and intellect of the student.

Along these same lines, visiting historical sites in person affords a unique experience for the student of history that cannot be replaced by a written description or even a video presentation. Walking a battlefield, entering a home of a historical figure, or laying eyes on an original document supply direct sensory experience of significant surroundings that shape our current experiences. Because, according to the Aristotelian-Thomistic schema, all knowledge begins with sensation, direct experiences are of far greater value in forming thoughts and lasting memories of past events.

Original documents that shaped political history are preferable to summaries or interpretations of these documents. The reason for this is parallel to the reason that one should begin with self-evident first principles in the scientific disciplines. Founding documents form the basis for the subsequent formulation of laws and the development of customs. Seeing these directly allows students themselves to state, support, and defend a position concerning whether the formulation of policy follows or departs from principles of rule and governance. It also allows them to trace the development of further ideas from their inception.

Mathematics

Given the Thomistic principle that the kind of knowledge that truly perfects the mind can always be traced back to undeniable and self-evident principles, mathematics should follow the same method of beginning with axioms and then proceeding by way of proof to demonstrate what the human mind can know about quantity. Excellent examples of these axioms are found in the common notions of the *Elements* of Euclid (fl. c. 300 B.C.). These common notions are as follows.

1. Things which are equal to the same thing are also equal to one another.
2. If equals be added to equals, the wholes are equal.
3. If equals be subtracted from equals, the remainders are equal.
4. Things which coincide with one another are equal to one another.
5. The whole is greater than the part (Euclid, trans. 1956, p. 155).

The essential notion behind these axioms is that the truth of the axiom is known as soon as the terms are known. Thus, no proof or argument is needed to know them. For

example, as soon as someone hears Common Notion #5 above, namely that the whole is greater than the part, the truth of the statement is immediately known. A small child, for example, knows that a whole cookie is larger than part of that cookie. This principle arises over and over again in mathematics: it is implicit in every operation of addition, subtraction, multiplication, and division. For example, to understand that $2+2=4$, one must also understand that the whole number 4 is greater than 2, which is part of 4.

In the study of mathematics, then, to proceed according to Aristotelian-Thomistic principles, one should begin with the axioms and then build the science logically by proving every theorem using the axioms as a foundation. Thus, every fact of mathematics one should know either because it is an axiom or because it has been argued from the axioms. In this way, the science of mathematics will proceed in a way that it really perfects the mind.

To cite a familiar example, the Pythagorean theorem is paramount in most textbooks of geometry. Its use is required on the SAT and GRE. However, most geometry textbooks do not present a proof of the theorem. It is merely postulated for the purpose of applying to solve practical problems. In this case, the student does not really *know* that the theorem is true. It is merely accepted and applied. In Euclid's *Elements*, however, the theorem is demonstrated in such a way that its truth can be supported with rigorous arguments that resolve to clear and obvious principles. Because of this, the truth of the theorem can be explained fully and defended against those who object to it. Without proof, however, the student of geometry is simply incapable of addressing those who may challenge the truth of the theorem. Without the ability to explain and defend

the facts upon which calculations are based, applications become mindless exercises without foundation or support.

Science

Following the principle that knowledge begins with what can be sensed and that it proceeds from what is easier to know to what is harder to know, the study of science should begin with what is easiest to know and verify by sense experience. In this way, the student will come to a knowledge of the natural world following the order of discovery. For example, in the study of astronomy, a teacher could proceed by way of observation experiments that follow the same methods by which original discoveries were made. In this way, the truths of astronomy will be known first-hand in a way that can be verified and supported by experience.

To cite one particular case, it would be quite easy for a teacher to tell a student, or to induce that student to read in a textbook, that the sphere of fixed stars revolves around the North Star. The student might docket this information, committing it to memory. If the student has no direct experience of this phenomenon, however, there is really no knowledge of it. The student merely *believes* what the teacher or the textbook says. In contrast, if the teacher were to give the student the assignment of noting the position of several constellations with respect to the North Star, and then observing these same constellations each evening in their relative position to the same star, the student will shortly have made this same discovery on his or her own. In this case, hearsay is traded for an eyewitness account, belief for knowledge, and passive receptivity for active participation (Fine, 2010). This knowledge can be explained, supported, and defended. It can be verified and elaborated upon. The student has been taught *how to think*, not

been told *what to think*. Using this same process, a great many other things about the stars can be discovered and known first hand. The student has acquired skills of observation and deduction that can be applied and developed in the science of astronomy and in other disciplines. Without this exercise, the student merely has an unverified account to memorize and to forget. Applying the epistemological principles of Aristotle and St. Thomas, then, can yield abundant fruit in the intellectual growth of the student.

The Relevance of These Principles for Educational Leadership

Now that some applications of these principles have been presented regarding specific disciplines, it remains to discuss their relevance for leadership more generally. Though leadership broadly speaking falls outside the scope of the research for this dissertation, suggestions for possible implications can be made. In addition to individual teachers being the foremost leaders who have direct contact with students and influence them on a day-to-day basis, the shaping of the intellectual culture of the institution as a whole falls to those who play a larger role in the administration. The collegiality of the faculty as a whole, for instance, is fostered by the common intellectual ideals that are clarified and reiterated by school-wide leaders. The current literature has much to offer regarding the efficacy of leaders who ensure institutional health and sustainability.

Elmore (2004), in *School Reform from the Inside Out*, states that the first principle of distributed leadership is the improvement of instructional practice. Following this principle, the primary duty of an educational leader is to improve learning in the classroom. Granting this, educational leadership thrives when those in the highest positions of leadership share in the duties of teaching. In this way, contrary to the default culture of administrators not being part of the teaching faculty, the principal or

headmaster or president can be seen as a chief teacher, master teacher, or instructional leader. Granting that this teaching cannot be full-time, ensuring that teaching occurs in the most efficacious way is greatly aided by educational leaders sharing in the process.

Support for this practice is found in Kouzes and Posner's (2002) *The Leadership Challenge*. In this work the authors state that the first practice of an exemplary leader is to model the way. In other words, an exemplary leader serves as a model for the way or means by which the principles shared by educators are put into practice. Modeling the way is difficult, not to say impossible, if the practice for which the leader serves as a model is absent. To strengthen this point, Elmore (2004) echoes this point, explaining that one of the principles of distributed leadership is that learning requires modeling.

The chief element of modeling the way consists in putting principles into practice. This consists of formulating and implementing policies that foster an environment of learning that is based on these principles. Accomplishing this end also requires building a shared vision of the outcome or goal toward which the entire school is directed (Kouzes and Posner, 2002). Given that many individuals work together in the best way possible when they share this common vision of purpose, it is necessary to incorporate a practice of systems thinking that integrates and unites the individuals working toward a common goal (Senge, 1990).

Though Aristotle and Aquinas did not develop a philosophy of educational leadership as such, they do state general principles that can be applied to educational leadership. These principles, astoundingly, mirror the very principles that are being advocated today by those most prominent in the field of educational leadership. This

implies that underlying the field of educational leadership are philosophical principles that govern the actions of leaders.

Aquinas (1993) supplies two crucial principles that apply to leaders at the beginning of his commentary on the *Nicomachean Ethics* of Aristotle. He opens the commentary by saying, "As the Philosopher says in the beginning of the *Metaphysics*, it is the business of the wise man to order. The reason for this is that wisdom is the most powerful perfection of reason whose characteristic is to know order" (p. 1). If exemplary leaders should model the way for others and, thus, lead by example, they should embrace wisdom in the sense that understanding the order that is supposed to characterize an institution and its human elements and the means of bringing this order about.

Elaborating further on the kinds of order that wisdom is concerned with, Aquinas (1993) makes the following distinction. "Now a twofold order is found in things. One is that of parts of a totality, that is, a group, among themselves, as the parts of a house, are mutually ordered to each other. The second order is that of things to an end. This order is of greater importance than the first" (p. 1). The two kinds of order, then, refer to the order of the parts among themselves and the order of the parts to the whole. In the example of the house supplied here, the order of the parts among themselves corresponds to the relative position and function of those parts. For instance, the foundation must be at the bottom, the walls above the foundation, and the roof above the walls. The foundation serves the purpose of supporting the entire structure, the walls that of enclosing the building, and the roof that of shielding its inhabitants from the elements. The second kind of order refers to the order of all of the parts of the house to the end or purpose of the whole house, which is shelter. The wise builder, then, would situate the parts of the

house correctly so that each performs its proper function in the overall purpose of providing shelter.

This distinction applies to the wisdom of leadership in a particular way. The role of the leader is to orchestrate the parts of an organization so that the parts work together for the sake of the whole. In other words, the leader engages in systems thinking (Senge, 1990). In this case, the parts of the organization are the individuals who support or engage in the process of education. The overall purpose of the whole is human perfection, which is happiness, according to Aquinas. The leader of a school then, serves by directing the parts to the whole in the sense that all parts operate to accomplish the overall purpose. This fits very well with Elmore's (2004) point cited above that the first principle of distributed leadership is the improvement of instructional practice. Further, the notion of distributed leadership supports the notion that each teacher is a leader. This supports the position of Aquinas that a teacher's role is to lead by the hand in the process of aiding the student in the task of learning.

Using Aquinas's principles as a foundation, it follows that the duty of a leader is to coordinate the efforts of the individuals in order to secure the primary objective of the whole institution.

Specific Examples of How Leaders Can Implement Thomistic Principles

Given the principle that the wisdom of a leader consists in ordering the parts among themselves and the parts to the goal of the entire institution, it is necessary to cite some specific practices that will facilitate the exercise of the office of leadership.

First, and perhaps most importantly, it is the task of a leader in education to facilitate an environment that favors a high degree of active participation on the part of

the students. Considering the teacher as a leader who acts as a catalyst for the student's growth in knowledge, teaching styles are paramount in this consideration. In short, school leaders ought to encourage methods of instruction that induce students to the maximum level of involvement in their growth in knowledge.

One method that favors this approach is what Freire (1970) calls the dialogical process. In *The Pedagogy of the Oppressed*, he maintains that the process of dialogue between the teacher and the student is essential to education as a humanizing experience. In contrast, a "narrative" or "banking" method of education is dehumanizing. He describes the narrative method of education as follows:

Narration (with the teacher as narrator) leads the students to memorize mechanically the narrated content. Worse yet, it turns them into "containers," into "receptacles" to be "filled" by the teacher. The more completely she fills the receptacles, the better a teacher she is. The more meekly the receptacles permit themselves to be filled, the better students they are (p. 71-72).

Narration (not to be confused with fictional narrative), then, consists in telling students what to memorize and repeat. It avoids the humanizing thought process and favors memorizing and repeating. For this reason, in the same work Freire also refers to this method of education as "banking":

Education thus becomes an act of depositing, in which the students are depositories and the teacher is a depositor. Instead of communicating, the teacher issues communiques and makes deposits, which the students patiently receive, memorize, and repeat. This is the "banking" concept of education,

in which the scope of action allowed to the students extends only so far as receiving, filing, and storing the deposits (p. 72)

The significant defect in banking education, as Freire (1970) points out, is students are allowed only to receive. In other words, they become passive recipients of information rather than active participants in a knowledge that they can call their own. What, then, is the remedy for the ills of narrative and banking education, which Freire considers to be dehumanizing?

In order to avoid the result of narrative and banking education, which, according to Freire (1970), constitutes the oppression of the student, he encourages the use of a dialogical liberates students rather than oppressing them. In other words, it accomplishes the purpose of the liberal arts, which is to liberate students in their use of reason by means of mastering the arts of grammar, logic, and rhetoric. These tools of thought and communication allow the student to engage in the dialogical process with proficiency. One way of implementing the dialogical process is through the use of the "Socratic Maieutic" (Freire, 1992, p. 46).

In this Socratic Maieutic, or discussion method, teaching consists in leading a discussion rather than presenting a lecture. In a lecture, the teacher gives and the student receives. In the discussion method, however, the student plays a more active role and is allowed to practice the liberal arts in a way that hearing a lecture does not permit. This method also facilitates student engagement: to engage in dialogue, students must form, express, support, and defend their own thoughts. The challenge of the discussion presses students to higher levels of achievement: they are encouraged to read more carefully

knowing that they will be explaining and debating their own reading of a text. As Neumayr (2015) puts it,

If he [the student] does this on a daily basis, his heightened intensity leads to intellectual habits that last a lifetime. Lectures are less likely to produce the intellectual virtues. At best one might remember certain ideas from a lecture, but they have probably not become part of him. But the ideas he has worked out himself are likely to stay. And not only to stay but to become a part of his mental makeup" (p. 2).

The point being made here is that the dialogical process gives students the opportunity to work out ideas for themselves and to see things on their own, rather than passively receiving them from a professor. When students go through the process of acquiring ideas for themselves, they are more likely to retain them. As Freire (1970) says, what students learn from a dialogical process satisfies their "epistemological curiosity" (p. 19).

The objection is often raised, however, that the discussion method is less efficient than a lecture and that the discussion method involving students really amounts to the blind leading the blind. A lecture, one may contend, presents a sustained, uninterrupted argument. This argument taken as a whole is likely to be far more coherent and unified than any dialogical process could be.

In answer to this objection, one may point out, first of all, that there is certainly a place for lectures in education. Every method has strengths and weaknesses and it is perhaps the case that no single teaching method will be superior to all the others in every respect. As Freire (1970) points out, however, the lecture can have a tendency to lend itself to a narrative or banking style of teaching. The purpose of education is not to cover

material, but to form the faculties of students to think for themselves. It is not to tell students *what* to think, but to liberate them by teaching them *how* to think. Though less material is covered in a less systematic way in the course of the dialogical process, because the student is more engaged in the activity of learning, the process in the end has the potential to yield the lasting results of perfecting skills of inquiry which will train students in presenting, explaining, supporting, and defending positions which they have not borrowed, but made their own.

One of the most prominent ways, then, that leaders can implement the Thomistic principle that the student, not the teacher, is the primary agent in education is by fostering an atmosphere of active participation in the classroom. This is supported by Elmore's (2004) point that the first principle of distributed leadership is the improvement of instructional practice. It is also a specific example of the first kind of order, which, according to Aquinas, it pertains to a wise person to know and implement: the order of the parts among themselves. In other words, individual teachers are parts of the whole institution and should be encouraged to work together for the active participation of the students.

The second kind of order refers to the purpose of the whole institution. Regarding this purpose, the work of Aristotle, Aquinas, Freire (1970), and Noddings (2003) coalesce beautifully. For Aristotle and Aquinas, all of the arts and sciences, in which the substance of education consists, are ordered to perfection or happiness. This happiness is achieved by a perfection of one's humanity. In the words of Freire, an educational method that fails the student by not developing the mental faculties is dehumanizing and an oppression. This understanding, according to Freire is based on an epistemological

anthropology. In other words, it is based on an understanding of human nature, and on fundamental ways that human beings arrive at knowledge.

Along the same lines, Noddings (2003), following the Aristotelian notion of happiness, asserts that education should be directed to happiness. In *Happiness and education* she says "Happiness should be an aim of education, and a good education should contribute significantly to personal and collective happiness" (p.1). Elaborating on the notion of happiness as an aim of education she says, "Happiness is not the only aim of either education or life, but it is a central aim and it can be used as an evaluative screen through which to judge everything we do. That sort of evaluation can change the lives of teachers and students" (p. 5) The point that Noddings is making here converges with the Aristotelian-Thomistic purpose of education, which is happiness. Noddings seems to agree with Aristotle that perfecting the mind as an activity essential to happiness. Speaking of Aristotle, she says,

Actually, Aristotle wrote of *eudamonia*, which is perhaps better translated as "human flourishing," but I will follow the common practice of calling it "happiness." In the view that has been most widely adopted, Aristotle analyzed happiness to find its components. This "comprehensive" view allows contingencies such as health, wealth, reputation, and friendship to enter the picture, but the exercise of reason is the major component of happiness (p. 10).

If the exercise of reason is the major component of happiness, then education, which perfects the faculty of reason, must play a central role in human happiness. Educational leaders are critical agents in creating and supporting the conditions necessary to engage and develop individual's reason and reasoning capacity.

The more current theories of education, then, which adopt the conclusions of Aristotle and Aquinas, are really based on more fundamental notions of anthropology and epistemology bequeathed to us by these philosophers. Further, these fundamental notions are accepted by nearly everyone. For example, almost everyone accepts the tenet that it is dehumanizing to deprive someone of an education and therefore that it is humanizing to provide it. To act in a humanizing way, however, is nothing other than to act in a way that fosters the perfection or good of human nature. Exactly what constitutes an education that is conducive to the perfection of human nature, however, is seldom examined. The goal of this dissertation has been to do just this.

The attempt of this dissertation has been to fill a gap that exists in current literature concerning how Aristotelian-Thomistic principles are and should be at work in educational practice and leadership. Though the literature showing the relevance and applicability of these principles to current practices in educational leadership is practically non-existent, there are a number of Aristotelians and Thomists who address their implications for education more generally.

In his article, "Is Education Possible?" DeMarco (2015) makes the point that according to Aquinas the student has an "active potency" as opposed to a passive potency. "Potency" indicates what is not, but able to be. If this potency is passive, the primary cause of the change is outside the recipient. For example, an empty bucket has the potency to be full of water. This potency is passive because the bucket is not able to cause itself to be full of water: something else must be the primary cause. In the case of education however, the potency is active. When students learn from teachers, the students are the primary cause of their own learning. Applying the principles of Aquinas,

DeMarco puts it this way: "If the teacher fails to respect the liberty of the student, he becomes an authoritarian who is not educating his students, but indoctrinating them" (P. 14). Respecting the liberty of the student amounts to allowing students to play an active role in their education. DeMarco continues, "The capacity to reason, to investigate the laws of nature, to understand more clearly the nature of the human being, is equally present in the student as it is in the teacher" (p. 14). One way to recognize this reality is to engage the student's epistemological curiosity by means of the dialogical process (Freire, 1970).

Another Aristotelian-Thomist, George (1994), takes up the important question of what determines the qualities of a good teacher. In her article, "The Protagoras: Socratic Guidelines for the Choice of a Teacher," she says, "Socrates indicates that knowledge of the proper philosophical method is to be used as a criterion. More specifically, he points out that the good teacher proceeds by way questions and short answers, the purpose of which is to make the student reflect for himself" (p. 125). The substance of this point is that good teachers should induce students to take an active part in their education by reflecting for themselves. Apropos of this point, curricula and instruction methods should be implemented and modeled by educational leaders to effect this practice.

The Aristotelian, Harry (2105), points out in the preface to her book, *Chronos in Aristotle's Physics: On the Nature of Time* that study of nature begins with the objects of sense experience in the natural world around us. It is from these objects that one begins a study of the more universal principles in nature that lead to wisdom. After describing her experience on the shores of the Bay of Kalloni, the very place where Aristotle began his

study of nature, she makes the point that his experience of the natural world around him led him to consider the more universal final cause or purpose of nature:

Aristotle took in nature; he took in life. We celebrate him because he was the first to systematize this taking in; he sought not just to experience nature, but to know it—to categorize the "same" and the "different," to name its purpose. As any biologist or naturalist will tell you, the type of dedication it took for him not only to conduct the exacting and detailed studies of natural objects, but to do so when biological study was considered useless, even disgusting (see the invitation to biology in *PA* i 5), points to the conclusion that Aristotle had taken in fully the natural world. His consequent appreciation for its being and diversity resulted in the most prolific body of scientific writing penned by any one person (p. 177).

The point that Harry (2105) is making here is that Aristotle's study, which began with sense experience of particular objects of study, led to a more universal knowledge of nature. Thus, does all of our knowledge begin with particular objects of sensation and ascend to the universal knowledge of their nature and purpose. This is precisely how students come to know things for themselves and in such a way that they take an active, not a passive, part in their education – educational leaders being students themselves.

The articulation and implementation of the principle that the goal of education is excellence in accord with *activity* of knowing, not the passivity of receiving information, profoundly influences the formulation of policies by educational leaders which are directed to this purpose. These policies are implemented at the level of instructional practice, which is the main concern of educational leaders (Elmore, 2004). Instructional

practice, in turn, is based on anthropological and epistemological considerations (Freire, 1970 & 1992). These considerations, however, belong to the discipline of philosophy to investigate and determine. It also pertains to the discipline of philosophy to establish the most fundamental principles in the arts and sciences that guide the methods and progress of all other disciplines and to direct these disciplines to human perfection or happiness. The specific area of educational leadership to which these principles pertain is curriculum design and the instructional practice that necessarily goes along with it. Without establishing these philosophical principles it is impossible to design curricula, lead institutions, and implement policies so that they lead to wisdom that perfects the mind and in which happiness principally consists.

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