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# Four Domains of Knowledge in Education

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Four Domains of Knowledge in Education

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Ms.Ed Secondary Education – Music

BME – Instrumental Music

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Master of Arts in Philosophy

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## Abstract

American educational curricular policy defines knowledge in an unfortunately narrow way. Specifically, it favors theoretical knowledge that is both appropriate for college bound students and is easy to assess by mass distributed standardized tests. But there are many domains of knowledge which, when implemented into the curriculum, serve equally well to prepare students for life after schooling. In this paper I construct a logical space for discussing knowledge in an educational institution that is not so narrow. I divide knowledge into two main categories, virtues and techne. The domain of virtues contain contains two additional categories, virtues of character and epistemic virtues. The domain of techne contains both theoretical knowledge and productive knowledge. I then explain what types of knowledge properly belong in which domain and argue that any student that graduates from high school fully with a deficiency in one or more domain has been improperly prepared for life after school, regardless of the post-schooling path he or she chooses.

## DEDICATION

A special “thanks” to Dr. Jon McGinnis, Dr. Stephanie Ross, and Dr. Jill Delston. I came here knowing little, left knowing nothing, and am all the wiser for the experience.

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## Introduction

In 1983 a report entitled “A Nation at Risk”, commissioned by President Ronald Reagan’s Secretary of Education T.H. Bell, and published as an open letter to the President and the public, declared that the education system in America was in dire need of reform. The report included an emotionally charged introduction that postulated the eroding of the educational foundations of society by a “rising tide of mediocrity that threatens our very futures as a Nation and a People” and suggested that “if an unfriendly foreign power had attempted to impose on America the mediocre educational performance that exists today, we might well have viewed it as an act of war” (Commission on Excellence in Education). Though the foundations of standards based educational reform had begun to be laid at the turn of the 20<sup>th</sup> century, “A Nation at Risk” would give rise to a sense of urgency that would lead to the authorization of the “No Child Left Behind Act of 2001”, which would mark the largest federal intrusion into American Education Policy in history.<sup>1</sup>

Indeed there is a crisis in American education, but it is not the crisis that “A Nation at Risk” identified. It is a crisis of test dependency which, unfortunately, was greatly exacerbated by the publication of this report and the legislative actions that would quickly follow. At face value, it is easy to see why standardized testing seems valuable. The easiest way to assess whether a broken system is improving is to look at the numbers. Numbers are highly illustrative, easy to understand, and accountability can be more easily determined through the study of quantitative data than it can through other, more qualitative assessments. But there are limits to the types of knowledge that can be

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<sup>1</sup> For a more detailed history of the rise of standards based reform see Ormsby, Justin T. *To Test or not to Test: Standardized Testing in Music*. Springfield, MO: Missouri State University, 2015.

easily tested. Multiple choice testing can easily determine if a student has accurately memorized facts such as dates, or even methods such as mathematical conventions, but it cannot so easily measure a student's creativity, aesthetic astuteness, or kindness. Were these standardized tests merely a part of a larger, more thorough system of assessment, then perhaps they would not be problematic. But standardized testing has become the definitive method of assessing student performance, and thus, the performance of teachers and school districts as a whole. Teacher retention, pay, and school funding have become tied to quantitative assessments and so, naturally, promoting this limited view of knowledge has become highly desirable.

2009 saw the development of the Common Core State Standards Initiative. Without addressing any of the problems that came from No Child Left Behind, Common Core created a new problem by, again, defining knowledge in too narrow a way, this time by placing heavy emphasis on college preparatory learning via a standardized curriculum designed for all students nationwide. Certainly, setting the academic bar high seems the intuitive way to ensure that no student is cheated out of a quality education. While college preparatory knowledge of the type best assessed by standardized tests is important, it is not wholly important. To define knowledge simply as the memorization of rote fact does not do justice to the complexity of the term and an education policy which focuses only (or even strongly) on this definition of knowledge fails to provide students with the complex matrix of skills that will be necessary for success after graduation. In this paper I expand this limited definition of knowledge by presenting two categories of knowledge each of which is divided into two subcategories. The first, virtues, represents those types of knowledge which are good for all students, which must

be habituated and not taught, and which are identified by their occupation of a mean between corresponding vices of excess and deficiency. Because of the universal application of virtues, these types of knowledge should be considered in all classes for all students. Virtues are then divided into two subcategories of knowledge; practical knowledge (or character virtues) and epistemic virtues which themselves are not a type of knowledge but are present in those who acquire knowledge most successfully. The second category, *techne*, represents the types of knowledge that are good for students by way of their intended post-schooling destinations and are taught and not habituated. *Techne* is then divided into theoretical knowledge which includes knowledge about how the world is, and productive knowledge<sup>2</sup>, or knowledge about how to produce a good or service. Because *techne* is good for students only in relation to their intended destination, these skills should be mandatory instruction only in selective instances.

I argue here that all four of these categories of knowledge are necessary to student success because any student who has a deficiency in one or more of these types of knowledge will be poorly prepared for life after schooling. First, I further explain a good in terms of one's role in society. Then I introduce the four categories of knowledge beginning with the virtues followed by the *techne*. Finally, I conclude that each of these types of knowledge is important for student success because a deficiency in any category leads to poor post-schooling preparedness, even when students show strengths in the other categories.

It is important here to note that my intent is to set up a logical space within which "knowledge" can be discussed in a useful way within the context of an educational

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<sup>2</sup> Aristotle calls this "craft"

institution. I believe that the four domains described in this paper make for worthy candidates for expanding a functional definition of knowledge. I consider all four domains to be necessary conditions for producing well prepared students. I do not, however, consider these domains to be sufficient for success. There are additional domains of knowledge which are worthy of discussion. I withhold possibility that the four domains in which I've described may deserve to be divided further into additional and more descriptive domains. My general thesis here is to show that the way knowledge is currently being discussed within an educational context is too narrow and thus insufficient for describing the adequate preparation of graduating students. Further study should be done to so examine other potential categories of knowledge.

### **Good in Virtue of Role in Society**

Aristotle considers the successful exercise of reason to be the greatest good for humans because it leads to flourishing universally across the species regardless of class, role in society, race etc. It is the type of good by which all humans who seek it are benefited. But humans seem to possess a diversity which, for example, tomato plants do not possess. For a tomato plant to flourish all that is required is the production of tomatoes. In this way the greatest good for tomato plants, producing tomatoes, is the only good necessary for the tomato plant. But the complex nature of human society requires far more variation in the individual role in society of the members of the species. Certainly individual humans may flourish best when exercising reasoning but species survival, or at least flourishing, seems dependent on the successful exercise of good in virtue of an individual's role in that society. Doctors, for example, need not only to exercise reason in a virtuous sense, but must also possess the practical knowledge

necessary to practice medicine successfully. So too with teachers, lawyers, cooks, carpenters, musicians, and any other specific role a human may have within society. As humans, unlike tomato plants, are strongly dependent on each other for survival, the functional good of doctors and teachers benefit not only the doctors and teachers, but all of those who rely on them for medical and educational needs.

In this way a carpenters and musicians share a common universal good -- that which is afforded to them by their membership in the same species, but they also possess widely varying goods by virtue of their role in society. A carpenter may be a good human but a horrible carpenter if he possesses the universal good afforded him by species membership but not the good by virtue of his role as a carpenter. Likewise, he may be a great carpenter but poor human if he possesses good in virtue of role in society but not in virtue of his humanness. In either case when a human suffers an imbalance between these types of good, it is fair to say that in some sense he is not able to maximize his capacity to flourish. Furthermore, it is pertinent to question whether a carpenter who expresses this imbalance can flourish even in his craft. An excellent craftsman will undoubtedly be employed infrequently if potential clients admire his work but consider him to be a cheat or a liar.

The divide between the carpenter and the musician is yet to be too narrow to accurately account for flourishing in humans. All musicians can share a common good by virtue of their role as musicians but may still require vastly different skills in order to perform their role successfully. For example, a pianist and a trombonist both share the role of playing music excellently. Furthermore the requirements for excellence in this role are often similar. Both the pianist and trombonist should possess a high degree of

musical literacy, have knowledge of historical and modern performance practices, desire to work hard to perfect their craft, etc. Yet the pianist requires a specific skill, namely finger dexterity, that the trombonist does not require and the same holds true in reverse (the trombonist needs well developed breath control while the pianist does not).

The diversity of goods by which humans flourish should be of particular note to the educator whose job it is to ensure that her students leave prepared for whatever awaits them. Were the educator like the botanist the tasks of preparation would be simple. To prepare tomato plants for success is to cater only to a single good, but humans, as we have seen, are much more complicated. Now the best of educators, who is perhaps given a class of thirty students, needs to ensure that all thirty graduate the classroom prepared for success as human beings, but also as potential musicians, carpenters, philosophers, etc. Likewise the best administrators and counselors who are given a building with hundreds of students need to recognize that each student's needs differ from his neighbor and must suggest coursework that is most beneficial for the student according to his or her intended after-schooling destination.

One could object that this job is simpler than I here claim. For example, modern educational reform suggests that all students should be prepared as if their intended destination is University.<sup>3</sup> I argue that this simplistic position ignores an importance of the variance of roles within a society and is often detrimental to students who indeed do not choose college as they suffer an opportunity cost in which they could have been developing skills more appropriate to their future role. If the purpose of education is

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<sup>3</sup> Sheehy, Kelsey. "Use All 4 Years of High School to Prep for College." - This is an article published in US News and World Report which intimates the attitude I have just described. This article is but an example of a mindset that seems to be dominant in the current state of educational reform. Obviously, it is not possible here to dive as deep into this claim as is deserved.

success after schooling, and educators want to see their pupils flourish, then it becomes inexcusable not to consider students as individuals with differing educational needs. If this is too cumbersome a task<sup>4</sup> to be practical, then it is at least inexcusable not to consider students in groups of a kind, with (for example) college bound academics in one, artists in another, and vocationally bound students in a third. In the following sections I suggest four categories of knowledge which, when considered together, maximize student flourishing.

### Categories of knowledge

In the following sections I propose two general categories of knowledge each of which is subdivided into two additional subcategories. First, I will define virtues and show how this category represents knowledge that is universally applicable to all students, which must be habituated, and which is identified by being a mean between two corresponding vices, one of excess, one of deficiency. The two subcategories of virtues are practical knowledge, which accounts for the way people act and the attitudinal dispositions they hold about their actions, and epistemic virtues which are themselves not a type of knowledge but are present in those who best acquire knowledge. Second, I will discuss *techne*. This category encompasses knowledge as it is more traditionally defined and includes scientific knowledge – knowledge about the way the world is, and productive knowledge – knowledge about how to produce a product or express a service.

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<sup>4</sup> I include this statement as a response to those who may object that individualizing education is simply an impossible task. I do not agree with them however and hold strong to my belief that the best of teachers do this regularly and effectively. Still, should the reader refuse to accept this claim then I offer a second, though less desirable option, namely, considering students in groups of a kind.

It is important to note that those philosophers who may have a strong familiarity with Aristotle's ethics will notice that in several cases I have chosen to use Aristotelian vocabulary in a way that is inconsistent with what Aristotle himself had to say in these matters. I have done so intentionally and for the following reasons. 1) Aristotle's language is illustrative and it is a detriment to replace it altogether, however, here I am making an argument for the good of a particular group of humans, namely students, which is distinct from Aristotle's argument about good in virtue of species membership. While Aristotle does show some concern about education, the complex American educational system would have been quite foreign to him. In this way I apply general Aristotelian language to a modern educational system which requires some alterations to his original positions. 2) Some of the material that I cover here, especially epistemic virtues, are conceptually new even within the field of epistemology and were never considered by Aristotle. In this way it is fair to make a best effort to incorporate these new ideas within the Aristotelian framework and not, rather, revise the entire schema. 3) While I intend this paper to contain some philosophical depth, I wish it also, and perhaps even more so, to be a useful scaffold by which professional educators and education policy makers can construct an education curriculum that is more considerate of the complicated needs of modern students. It is for this reason that I construct four broad categories of knowledge that, I think, are approachable even to those who know little or nothing of Aristotle's works on the matter. Those philosophers who are more interested in embracing the strictly Aristotelian concept of virtue would be best to consult the Aristotle's treatises on ethics or more modern works which specifically intend to clarify or summarize Aristotle's original positions. In the following sections I am careful to

define all of the terms to make clear the ways in which I use them. In general, all terms taken from Aristotle should not diverge so far from the source as to make them incongruous, though there are differences, sometimes subtle, sometimes less so.

## Virtues

When applied to education virtues represent the types of knowledge that are universally applicable to all students, are habituated and not taught, and are identified by existing as a means between to vices. The universal applicability of virtues render them not only as useful to the Ivy League academic as they are to the mechanic, but also useful in exactly the same way. Virtues then can be further subdivided into character virtues and epistemic virtues where character virtues are those goods which are related to the ways in which a person acts and the attitudinal dispositions one holds in regards to actions and epistemic virtues are those goods which are present in those who acquire knowledge excellently. Epistemic virtues may then be subdivided again into faculty virtues and cognitive virtues though this division remains hotly debated by epistemologists.<sup>5</sup>

### Virtues of Character – Practical Knowledge

Virtues of character are those virtues which, when exercised successfully, are present in people who act appropriately and for the right reasons. In this way virtues of character relate not only to one's actions but also to one's passions, for a truly virtuous person will not only perform virtuous acts but will do so in a way that is not contrary to his feelings.<sup>6</sup> In this way virtues of character can be thought of as practical knowledge.

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<sup>5</sup>Greco, John. "Virtue Epistemology." Section 3 paragraph 3

<sup>6</sup> Andre, Claire, Michael J. Meyer, S J. Meyer, and Manual Velasquez. "Ethics and Virtue." Markula Center for Applied Ethics. <http://www.scu.edu/ethics/practicing/decision/ethicsandvirtue.html>.

They represent a type of knowledge because they are skills that are acquired by a person, in this case by habituation, through experience. They are practical because they are concerned with actual doings and not theoretical understandings. It is not enough, for example, for a person to perform a virtuous action by accident or by luck. One must not only do the right thing but must know that it is the right thing. Inversely one who knows the right thing to do but abstains does not express virtue. In keeping with Aristotle I will continue to refer to practical knowledge as virtues of character, but it is important to remember that this type of virtue does indeed represent a type of knowledge as I have previously described it.

Identifying an exhaustive list of virtues of character has proven problematic and has been a matter of debate since Aristotle<sup>7</sup>. Describing the criteria for a virtue is a more simple exercise. Virtues of character, as previously mentioned, must be related to actions, must be applicable to all students, and must exist at the median between two corresponding vices. The first of these criterion criteria has already been outlined in the preceding paragraphs. The second category will be briefly explained in the concluding paragraphs of this section. The final criterion, that of existing in the median between two vices, is where I now turn my attention.

To qualify for a virtue of character a candidate needs to be shown to exist in a mean between two vices.<sup>8</sup> Courage is an often cited virtue of character and serves well to illustrate this point.<sup>9</sup> To express the virtue of courage one must know when courage is warranted, act courageously in only those times, and do so for the right reasons. If one

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<sup>7</sup> BBC "Virtue Ethics"

<sup>8</sup> *Nichomachean Ethics* 2.8 1108b12-13

<sup>9</sup> *Nichomachean Ethics* 2.2 1104a20-25 – A brief representation of Aristotle's position on courage

were not to act when action is required by virtue then one is rightly called a coward. If one acts when action is not required by virtue then one is rightly called rash. In this way cowardice represents a vice of deficiency of action while rashness is a vice of excessive action. Thus, one who rushes into a burning house to save a kitten is acting courageously only if that action was appropriate given the circumstances. One who kicks down a door to rescue a kitten when it is clear that the chances of success are slim is acting rashly. One who refuses to rush in to save a kitten even though the likelihood of his success are great expresses cowardice, that is, he refused to act when action was required. In this way all virtues can be defined. What applies to courage, cowardice, and vice, applies equally to modesty, shyness, and shamelessness and so too for any character trait that can be labeled a virtue.

It is important to note that the term “median” is not synonymous with an arithmetic mean. For given a line of potential actions with the most cowardice actions at one end and the most rash at the other, courage may not occupy the place directly in the center for any person and may in fact occupy a different position for different people. If 2 is too little and 6 is too much then it does not follow that 4 is appropriate.

For if ten pounds [of food], for instance, are a lot for someone to eat, and two pounds a little, it does not follow that the trainer will prescribe six, since this might also be either a little or a lot for the person who is to take it – for Milo [the athlete] a little, but for the beginner in gymnastics a lot...<sup>10</sup>

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<sup>10</sup> *Nichomachean Ethics* 2.6 1106b2-5

Were virtues of character to only regard actions then one might ask why habituation is required. A rigorous series of punishments and rewards can certainly serve to train a person to act in accordance with virtue<sup>11</sup> and this is a matter of conditioning and not of habituation. A student, for example, who is spanked every time she lies is likely to be conditioned to tell the truth. But, a virtuous person is not only the type of person that acts appropriately but the type of person that takes joy in doing so. Consider the following analogy. A man is given a choice between traveling to The Sudan to help the poor or pursue his dream of being an actor. If this man chooses to aid the poor without giving thought to following his dreams, then he is truly virtuous. But if he chooses to aid the poor while inwardly regretful of his sacrifice, then he acts in accordance with virtue, that is, he does the right thing, but does not possess virtue.<sup>12</sup> “To keep such destructive inner forces at bay [the virtuous person needs] to develop the proper habits and emotional responses...”<sup>13</sup> Humans can be conditioned to act in appropriate ways but proper emotional responses to those actions need to be habituated, preferably from an early age. “It is not unimportant, then, to acquire one sort of habit or another, right from our youth. On the contrary, it is very important, indeed all-important.”<sup>14</sup>

I should speak as to why virtues of character are applicable to every student. Virtues, when properly understood, are universal goods and lead to flourishing in all who possess them. The college bound student who cheats on a test will not flourish, for even

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<sup>11</sup> For more on this see “classical conditioning” – a common and unfortunate practice in education. Hopefully the reader will see that conditioning behavior is not a substitute for habituating proper character virtues.

<sup>12</sup> This analogy was adapted from a podcast on virtue ethics delivered by Marianne Talbot of Oxford University. At the time of this writing all of Talbot’s podcasts, including the one from which this analogy was derived are available freely at: <https://podcasts.ox.ac.uk/people/marianne-talbot>

<sup>13</sup> <http://plato.stanford.edu/entries/aristotle-ethics/>

<sup>14</sup> *Nicomachean Ethics* 2.1 1103b23-25

if he is not caught cheating, his necessity to cheat likely indicates that he did not learn the material for which he is now being tested. As an academic who holds knowledge as the tool of his trade he has diminished his capacity to perform his role in society well. In the same way a carpenter who possess adequate skill in the production of buildings but cheats by introducing unsafe shortcuts in his work, will not flourish because even if he is never found out the structural integrity of his buildings are degraded and his product less desirable. He has expressed dishonesty, and his role as a carpenter is impaired by this vice.

Finally, it might be objected that virtues of character are not the type of thing that fall best into the domain of public education at all but are best left to parents, families, churches, etc. The effectiveness of schooling relies on the successful exercise of these virtues. If a student is given homework because the teacher believes that it will aid in learning, then it is also necessary that he do the homework himself and not hand it over to a friend or a parent. The benefit obtained from this homework, knowledge, relies heavily on the exercise of honesty when completing this assignment. If the teacher must rely on these virtues (and he must) then he must also be responsible for habituating them. If this was not the case then it would seem unjust to punish students for their dishonesty since the school had no hand in shaping their character. In the same way that it would seem to be unjust to punish a student for poor performance on a math test when the math itself was not taught at the school but expected to be brought in from home, it is equally problematic to punish a student for dishonesty if the school has no role in the habituating of moral virtues.

Virtues of character are well respected virtues globally. There are no functional societies where honesty is viewed negatively, or even neutrally. Virtues of character are not to be confused with religious doctrine which may be controversial. The virtue in Christianity that says one should “honor no other god before me” is of a completely different nature than a general virtue of character such as honesty, courage, and generosity. In this way the shaping of moral character should not be controversial as they neither conform to a specific religion nor are they opposed.

#### Epistemic Virtues

Epistemic virtues share with character virtues the properties of universal applicability, habituation, and a mean between vices. They differ in that while character virtues relate to the way in which a person acts, epistemic virtues relate to the way in which a person thinks. Epistemic virtues do not represent a type of knowledge, but rather represent the traits that, when present in a person, makes both possible and efficient the acquisition of knowledge. “To say that someone knows is to say that his believing the truth can be credited to him. It is to say that the person got things right due to his own abilities, efforts and actions, rather than due to dumb luck, or blind chance, or something else.”<sup>15</sup> Epistemic virtues then, are those abilities that are present in the type of people who acquire knowledge excellently.<sup>16</sup>

Some virtue epistemologists have further divided epistemic virtues into faculty virtues and trait virtues where faculty virtues represent faculties such as memory and perception and trait virtues represent refined character traits such as open-mindedness

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<sup>15</sup> Greco, John. "Knowledge as Credit for True Belief.

<sup>16</sup> For a non-Aristotelian perspective on the difference between knowledge and opinion see Plato's Republic or the Meno.

and conscientiousness.<sup>17</sup> Epistemologists here often quibble with regard to which of these subcategories should be prioritized or excluded.<sup>18</sup> But “it is not clear why practitioners need to choose between faculty-virtues and trait-virtues. At first glance, excellent perception, good memory, open-mindedness and humility all seem equally good candidates to promote excellence or flourishing.”<sup>19</sup> If our focus is on education then this is true. Both good vision and open-mindedness do seem to be good candidates for promoting the acquisition of knowledge. Students then seem equally benefited from both trait virtues and faculty virtues and it would be in error to exclude either.

I admit here that this subset of epistemic virtues fails to meet the habituation requirement but I also maintain that they prove to be significant and it would not do to exclude them all-together. One potential option would be to separate faculty virtues from trait virtues and place faculty virtues under the category of *techne* which will be covered in the sections that follow. This is however, inadequate for two reasons. First, *techne* represent goods for students that are dependent on that student’s intended role in society. Secondly, though faculty virtues seem different than trait virtues, they also seem closely related in that both represent traits that, when possessed by a person, aid in the acquisition of knowledge. Finally it doesn’t seem appropriate to remove habituation from faculty virtues completely. One who possess certain perceptive faculties can learn to use them more efficiently through habituation. A clear example might be found with hearing. While those who are deaf cannot be brought to hear by habituation, those who do hear can hone this faculty in a way that leads to a more efficient acquisition of

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<sup>17</sup> Greco, John. "Virtue Epistemology."

<sup>18</sup> For more on this see virtue reliabilism vs/ virtue responsibilism

<sup>19</sup> Greco, John. "Virtue Epistemology." section 3, para. 3.

knowledge.<sup>20</sup> One might, for example, learn to recognize the most important parts of a lecture that is delivered by audition and ignore sonic information that is unimportant. In this way it is best to continue to place faculty virtues alongside trait virtues within the category of epistemic virtues.<sup>21</sup>

The presence of faculty virtues also causes problems for my assertion that all virtues are to be found in a medium between corresponding vices of excess and deficiency. Certainly the deficiency of good sight is blindness but there is no vice of excess that corresponds to seeing too much, or seeing when seeing isn't appropriate. But, an argument can be made for faculty virtues existing as means in a similar way to that which I have already proposed for habituation. For one who can see, then the virtue is found when that sight is directed at the proper objects and by way of the proper attitudinal disposition. The corresponding vices then are demonstrated when one cannot focus at all (deficiency) and thereby misses seeing what is important, and when one focuses on too much thereby not recognizing what is important.<sup>22</sup> Though these vices do not seem to be easily named, perhaps something like "dullness" works for deficiency and "distractibility" works for excess.

The corresponding vices as they relate to trait virtues are much easier to describe. Open-mindedness then is a virtue because it falls as a mean between the vices of stubbornness and gullibility where stubbornness describes the person who refuses to consider new intellectual positions when appropriate and gullibility describes the person

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<sup>20</sup> This seems to be particularly so in the study of art where much attention is placed on learning to see and hear the right things.

<sup>21</sup> There seems to be a similar position in philosophy of perception where the concept of "ideal perceivers" is important.

<sup>22</sup> This poses a particular problem for those with ADHD or autism who can be overly stimulated by perception.

who considers these positions even when such consideration is not appropriate. Open-mindedness can then be said to be expressed when a person who is presented with a new position recognizes that it is worthy of consideration, considers it, and does so with the proper attitudinal disposition.

Finally, epistemic virtues are universally applicable to all students in the same way as character virtues. The academic who is presented with a new philosophical theory is benefited from open-mindedness in the same way that a carpenter who is presented with a new building technique. In each case, consideration of the new position, when consideration is required, will lead to knowledge whereas the lack of proper consideration will lead to a misunderstanding. The academic who is presented with a new philosophical position, who then considers that position, will accept the new position if it is better than his own, adapt his own position, or reject the new position after having newly formed reasons to do so. One who fails to exercise open-mindedness will either continue to accept his own position despite good reason to do otherwise, or accept the other position even though good reason to do so is absent. Similarly the carpenter who exercises open-mindedness about building techniques will either continue to exercise his craft as he has always done because he's found the new position to be inferior, adopt his own techniques, or adopt the new technique because he has found it superior. Failure to exercise open-mindedness will lead the carpenter to either continue to utilize his building technique even though the new technique is better, or accept the new technique even though his current technique is better.

## Techne

The final two types of knowledge are both types of “techne” and represent a type of knowledge which has distinctly different properties than virtues. First, techne are learned and not habituated, and secondly, techne are applicable to students by way of their intended role and not universally.

The two types of knowledge that fall under this category are theoretical knowledge which includes knowledge about the way the world is and productive knowledge which includes knowledge of how to make things. Productive knowledge then includes those skills which lead to the production of an object, such as building a table, as well as those skills which lead to the offering of a service, such as how to be a doctor.

### Theoretical Knowledge –

Theoretical knowledge concerns facts about the world as it is. Knowledge of the motion of the planets qualifies as theoretical knowledge but so would the knowledge that the American political system is a Democratic Republic. This knowledge is not eternal for the fact that America is now a Democratic Republic does not indicate that it will always be so, but it is so at present and thus represents the way the world is now.

Now, as I have argued knowledge that exists within the category of “techne” is beneficial for students in relation to their intended post-schooling destinations. I do not wish here to attempt to parse out what specific pieces of knowledge are important for which groups of students. This is, in fact, an issue which deserves much discussion and debate in the same way that creating an exhaustive list of character virtues does. Instead, I define some criteria by which educators and education policy makers can make

decisions about this issue. I do however, insist that the claim that every student need be responsible for knowing that which is appropriate for strongly academic, pre-college student is both nonsensical and harmful to students who will not find themselves in Universities.

Certainly, some pieces of knowledge can be applicable to a large group of students and still qualify as techne. For example the American political system is intended to be participatory. Every graduating student, assuming they remain in this country, are subject to the same laws and thus should have at least the knowledge<sup>23</sup> that allows them to participate in the democratic process. In this way knowledge of the basic structure and role of government bodies as well as knowledge about the voting process are beneficial to all students. Certainly it could also be said that any student who graduates from high school and does not know the shape and basic motion of the planets has been in a very serious way, failed to be educated and I would agree that this also constitutes a type of theoretical knowledge that is equally applicable to all students. But, the fact that the moon is tidally locked to the Earth, an understanding of the intricacies of cellular-biology, the atomic weight of noble gasses and so forth constitute a type of theoretical knowledge that has some benefit for university bound students (and perhaps, only for university bound students intending to study astronomy, biology, and chemistry respectively) but not for those intending to pursue careers in a more vocational and less academically intensive destination.

The line between what knowledge has universal benefit and what does not is arbitrary and I don't intend here to put forth a position places certain pieces of knowledge

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<sup>23</sup> Though not the obligation

on one side of the divide. What I do suggest is that education policy makers and professional educators should carefully consider in what ways knowledge is useful to a student before mandating that knowledge be learned. It could be argued that all knowledge can be life-enhancing, and to this I would not disagree. But clearly a student can only be expected to learn a certain amount of knowledge. This is true in a life time and especially true in the brief time one spends in the education system. Courses that are required for students, then, should be structured in such a way as to maximize the types of theoretical knowledge that are important to a student by virtue of intended role and any courses that provide theoretical knowledge beyond what can be reasonably required from a student by virtue of role should be, at best, electives. It is important here to place that emphasis on “role” and this will help the educator decide between what knowledge is life-enhancing but not necessary and what knowledge is absolutely essential for a student to move on to an intended university, job, vocational school, or other destination.

Theoretical knowledge then clearly fits within the criteria I have proposed for *techne*. It is taught and not habituated. One must be taught that the Earth revolves around the sun. There is no way to attain this knowledge by habituation. It is beneficial to students by virtue of their role and not universally as I have previously shown. I have previously argued that knowledge of the basic political structure is applicable to a large group of students but it is not universal in the way that kindness and courage are universal. Courage is universally applicable to everyone regardless of role and knowledge of political structure is only applicable to students by virtue of their role as citizens of a country. Should a student leave the country after graduation kindness would be as beneficial to him in Germany as it was in the United States, but his knowledge of the

basic structure of the American government is no longer applicable in the same way it had previously been.

**Productive Knowledge –**

Productive knowledge represents that type of knowledge that leads to the production of a product or service. It is both a type of knowledge that is acquired through teaching and is applicable to students only by virtue of their role. In the *Nicomachean Ethics* Aristotle categorizes this type of knowledge as “craft” and defines it as follows: “A craft, then, as we have said, is a state involving true reason concerned with production. Lack of craft is the contrary state involving false reason and concerned with production.”<sup>24</sup> Productive knowledge may lead to an oil painting it may also lead the production of any tangible good or a service such as medical treatment. I have again, broadened Aristotle’s original category but I maintain that his definition is still applicable. Productive knowledge then is concerned not only with production but production by way of reason. One may intuitively build a table, but one can be taught to build a table excellently by appeal to reason. Similarly one might treat an illness by accident but one who has acquired productive knowledge in the ways of medicine will treat illnesses by way of reason excellently. One who does not know how to produce or knows only how to produce badly is lacking this type of knowledge.

Before moving further it is perhaps beneficial to further distinguish productive knowledge from theoretical knowledge as they are distinct but often related which may be cause for confusion. As has been said, theoretical knowledge includes knowledge of the world as it is, both as it has been always and will continue to be, that is, eternal truths,

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<sup>24</sup> *Nicomachean Ethics* 6.4 1140a21-24

and how it is at the moment despite the fact that it may not always continue to be so. In this way knowledge of numbers and basic mathematical principles constitute theoretical knowledge.  $2 + 2$  has always, and will continue to always equal 4. It is an unchanging fact regarding the nature of mathematical truths. In this way the basic principles of mathematics constitute theoretical knowledge. Using numbers in such a way that allows one to practice the profession of accounting successfully is however, a matter of practical knowledge. Though it makes use of the basic principles of mathematics which constitute theoretical knowledge, it does so in a way that leads to the successful exercise of a service, namely, accounting. Similarly, rote facts concerning the shape and distance of celestial bodies constitute theoretical knowledge while an understanding of how to use those facts to land a rocket on the moon constitutes productive knowledge. In this way theoretical knowledge indicates an understanding about what is while productive knowledge indicates the ability to use this knowledge to produce a product or exercise a service.

Here one might object that productive knowledge often requires practice in order to produce a product or exercise a service successfully and thus productive knowledge must also require habituation. I admit that further work needs to be done to disambiguate these two terms. I here suggest only that “practice” is a repetitive exercise done in order to better facilitate the successful exercise of an action while “habituate” is a repetitive exercise done in order to develop the proper attitudinal dispositions towards that action.

## Objections

Throughout the course of this paper I have argued that there are multiple domains of knowledge in education, each of which is necessary for the production of highly

prepared graduating students. Additionally I have argued that some domains of knowledge are of greater importance for some students than for others. A future college student might be best prepared for the future by attending classes that prioritize theoretical knowledge. A future mechanic might be best prepared for the future by attending more classes that focus on productive knowledge. It might then be argued that what I'm advocating for is a system of educational tracking. In this way "tracking" is defined as identifying a student's aptitudes and forcing (or at least strongly recommending) a specific educational track for that student based on her strengths and weaknesses. I want to make it quite clear that not only is this not my intent, but that my intent is actually contra to the idea of tracking. It should be noted that the curricular policies in American education at present, especially post Common Core, constitute a rather unorthodox tracking system in their own right. Rather than tracking specific students into college preparatory courses and others into vocational studies, students are all being tracked into a college preparatory career track. I am here suggesting that this type of unidirectional tracking is a disservice to all students who will not attend college after high school in that these students are being denied opportunities to attend classes which better prepare them for their intended destinations. I do not argue that it is the school district's responsibility, teacher's responsibility, or state or federal government's responsibility to identify which students should be placed into certain tracks and then force a course of study upon them. In fact I am of the opinion that a student's desires, more so than his aptitude, should be the greatest factor in deciding which courses a student should take. In this way I am pointing out a fact that mandatory college preparatory curriculum ignores. It simply is the case that not all students will go to

college. This fact has remained and will continue to always be true whether all students are forced to study college preparatory material or not. For those students who do not continue their formal education beyond high school, a mandatory college preparatory education comes with a significant opportunity cost.

One might also object that a college preparatory education is the best possible education for all students. One can never have too much knowledge and thus students who possess strong theoretical knowledge beyond that which they might need in their intended post-school destinations are potentially benefited from this higher degree of understanding, or, at the very least, not harmed by it. This assertion of course ignores the opportunity costs of which I have discussed in this paper. All things being equal a future musician or mechanic with an understanding of physics or calculus may very well have greater value than a musician or mechanic that does not. But employment of the *ceteris paribus* clause here is inappropriate. I argue here that by allowing students with vocationally oriented career paths to participate more frequently in courses that focus on their area of emphasis rather than general academic courses like physics or calculus the result will be students who have a greater understanding within their area of interest than do students who participated in a broad college preparatory curriculum. I am simply suggesting that for the future mechanic or musician, skills in car repair and music are important and should be prioritized over a broader course of instruction that caters less to the specific needs of the student.

## **Conclusion**

Again, it is important to emphasize that my intent for this paper is only to set out the logical space within which knowledge should be discussed in an educational context.

I do not hope here to set out a strict rubric that suggests which courses should be offered and to whom. What I do claim is that to take a narrow definition of “knowledge”, one that includes primarily theoretical knowledge, is to ignore the complexity of the term in such a way that is potentially harmful to students. In 2004 the American Diploma Project issued the following statement. “No longer do students planning to go to work after high school need a different and less rigorous curriculum than those planning to go to college.”<sup>25</sup> Certainly I agree that rigor should be required of every student. But to suggest that the types of knowledge that best prepare a future University student also best prepare a future mechanic is not only nonsensical but potentially harmful for students that will decide to pursue a more productive and less theoretical education. The unstated implication here is that a strongly academic education is best for everyone. But this accounts for only one type of knowledge and, I argue, that any student who is in possession of one type of knowledge but deficient in any of the other three is not adequately prepared for life after high school. In order to make more efficient curricula that maximize preparedness for all students, the definition of knowledge needs to be broadened and extended beyond strictly academic material. What I have proposed here are four potential categories of knowledge that every prepared student must necessarily possess. While I maintain the claim that a deficiency in any of these categories makes for underprepared students I do not claim that these four categories constitute all types of valuable knowledge. Continuing work should be done to better expand or refine these categories but, in the meantime, professional educators and education policy makers must make an attempt to consider all of the possible types of knowledge that are present in

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<sup>25</sup> ACT “Crisis at the Core: Preparing All Students for College and Work”

excellent students. To continue to write and enforce education policy without doing so is not only negligence but unintentional malevolence.

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