Distinctive School Series

"STEM", "Social Studies," "Common Core" and other Ed. trends. Science at a classical Christian school.

"…the greatest service we can do to education today is to teach fewer subjects. No one has time to do more than a very few things well before he is twenty, and when we force a boy to be a mediocrity in a dozen subjects, we destroy his standards, perhaps for life." C.S. Lewis.

Classical education died out, not because the progressive educators persuaded us that it was a bad thing, but because they persuaded the educational establishment to replace it with something they thought was 'better' subjects. Of course, this 'better' content (these days, often STEM related or Common Core driven) competes for class and homework time, pushing out the core classical curriculum. This is what C.S. Lewis was referring to in the quote above.

Today's conventional education makes its primary purpose training for jobs in high-tech and the sciences, and it often misses. Or it succeeds in forming technicians with little ability to think through problems. This is because conventional education has a different purpose. They merely want to fill the vessel (brain) with 'material' (knowledge and skills). Classical educators seek to train students to think well, to form the soul and train the affections. Great material provides 'Gris for the mill' and results in great education. But, too often, the great is pushed out by other content promoted by progressive educators.

STEM (Science, technology, engineering, and math) has become the latest trend in conventional education. In the 1960's and 1970's the 'Social Studies' trend gradually replaced history with a dozen subjects (world geography, world cultures, social studies, economics, psychology, sociology, U.S. Government, and political science, to name a few). Physical education, health, and a myriad of vocationally oriented classes like computer programming, robotics, and business add to the pile. Christian schools often add a variety of bible surveys, etc. The list goes on. Classical Christian schools offer fewer subjects, fewer electives, and more core requirements. This allows classical schools to focus on the Paideia-- the cultivation of rightly ordered affections and a wide array of philosophy and theology to form worldview.

So are STEM or Social Studies comparable with classical Christian education? No- but components of them may be. First, we'll deal with Social Studies and other state requirements.

Common Core

Please see our separate position paper on the common core. The Common Core formally institutionalizes much of what has been the practice in schools for some time. The danger for classical schools is focus. The Common Core prescribes 'what students should know and what they can do.' This content always supplants the more formative work done through classical

Christian education. We recommend that all classical Christian schools reject the common core.

Social Studies

Because Social Studies deconstructs the core of a classical education into isolated compartments, and evaluates them with 'scientism ', this whole area of study is incompatible with classical Christian education. 'Scientism' applies a materialistic worldview to humane subjects and attempts to use the scientific method to explain social and cultural truth rather than the traditional classical disciplines of literature, history, and moral philosophy. <Recently, a wide study showed that these 'scientific', peer-reviewed studies on social topics can rarely be reproduced. Yet, this is a primary tenant of the scientific method.>

Classical Christian schools should avoid social science. We advise against using books that teach 'social studies' and, since most history or other social science textbooks are based in social science theory, we advise against using textbooks whenever possible. Instead, we encourage the use of either classical Christian materials from classical Christian providers (Classical Academic Press, Logos Press, Cannon Press, Memoria Press, Roman Roads, etc.), or the use of original sources like Eusebius, Tacitus, Suetonius, and Herodotus. We encourage geography, world cultures, political science, etc. to be included in a study of humanities and have as much integration as practical. They should not be subjects in themselves. Special care my may be required in the curriculum to ensure subjects like geography are taught.

STEM

Science and math have historically been an integral part of a classical education. STEM, however, is a creation of modern education. What we now call technology and engineering were once understood as the common arts (sometimes called the mechanical, useful, or servile arts.)—and were thus not included in a liberal arts education.

What we now call "science" was once a part of natural philosophy. Natural philosophy included not only natural science, which searched out the causes behind phenomena, but also natural history which emphasized deeply observing the phenomena. Natural Philosophy includes sciences like chemistry, physics, and biology (without taxonomy which is normally in Natural History).

Natural history (which later grew to a study-area during the enlightenment) studies the way God made the world, as we observe the evidence of the past we can see in light of the scriptural narrative and philosophical framework (creation ex nihilo, etc.). Subject categories include geology, zoology, botany, paleontology, and some observed astronomy.

Mathematics, a synonym for the Quadrivium, was in its own category and comprised four of the seven liberal arts. Mathematics was studied for its own sake in elevating the mind and also as a tool of learning to be used in later studies. Algebra is an eastern-originated shorthand for logically manipulating numbers, so it can fall in the philosophy category as well (as logic does). Because of its role in mathematical natural science, especially physics and chemistry, it should be coordinated with the natural philosophy curriculum though not subsumed by it. Mathematical philosophy can be studied through the works of Pythagoras, Archemeaies, Euclid, numerous other Greeks, on through to the medieval mathematicians to Newton and beyond.

Insofar as science and math is defined in the way mentioned above, classical Christian educators believe in mastery of these histories and philosophies. However, in our world, two problems abound. First, we disproportionately emphasize the sciences, giving them more time and attention than we should. Secondly, we spend much less time in science and math studying the 'why' or the philosophy and more time learning 'stuff'--techniques or information. Classical schools should teach science and math with these things in mind.

The advantage of teaching in this way is clear. ACCS student score above any other type of school, including independent preparatory schools, in math. Science isn't tested on these types of tests. Our students

enter STEM related fields. But, as classical educators, we must be careful not to adopt the bad with the good. STEM, like common core, whole word reading, new math, and a myriad of other 'innovations' in populist education has many drawbacks in the way it is promoted and emphasized.

First, with regard to the s'TE'm portion of stem. Technology and engineering are not traditional subjects in classical schools. In some late neoclassical schools and medieval schools, theology, medicine, and law were studied as extensions of the trivium and quadrivium. Therefore, there is precedent to pursue some applied science. But, technology and engineering tend to be subjects that distract and diminish from the classical school. We recommend that schools do these types of activities after school as clubs or not at all.

There is danger that a STEM emphasis can push out other subjects valued in classical Christian schools. Progressives began restructuring the American educational system in the first few years of the 20th century. By 1940, they had replaced most of the Christian content and much of the classical content. But, the typical school in America still studied some of the classics, Latin, and it emphasized a broader understanding of history. When the Soviets threatened American technology with Sputnik in the late 1950's, the remaining vestiges of classical education were pushed out by science and math. This trend continues to this day.

In the final half of the 20th century, classical languages were replaced with more practical modern languages and the last bits of classical education faded out. We must carefully protect against this happening again. While science and math have a place in a classical curriculum, many misunderstand the nature of their study. Some well-meaning classical educators believe that a 'rigor' or 'the trivium' phases, superimposed with a standard populist science or math approach, makes the study of STEM classical. Rather, what tends to happen, is the excessive knowledge base in science and math tends to overwhelm a curriculum and drive most of the homework time to science and math. When this begins to supplant reading time at home, classical education once again falls victim to scientism.

For example, when great classical works like The Republic are abridged or summarized in class because there is too little homework allotted to literature, relative to science and math, we are taking a page from the playbook of the progressives. Consider the importance of a spirited discussion regarding human nature and the nature of government with a class full of students who are well-read. Now, consider the information memorized for a test in geology or physical science. Or worse, we distill The Republic into a textbook page and the 'main points' are learned for a test. The information will be forgotten or it will become obsolete. The formative nature of a discussion will make an imprint on the student's thought-process and worldview that will last a lifetime. This is why we cannot let information reign in our classical classrooms.

Of course, there are ways to teach science that use the information to teach logical principles or train the mind in better thinking. There are certainly ways to teach math in the same manner.

Scientism

One of the greatest adversaries of classical Christian education is the philosophy of scientism. This 'ism' arose from 18th century rationalism which was followed by empiricism and materialism. Rationalism says that the best way, or the only way to know truth is through the senses and reason. A rationalist senses the world around him and uses the universal rules of reason to 'know' things. The materialist takes it a step further and says that only things that are measurable and perceivable through the senses are real. In other words, angels aren't real because we cannot sense them or the worlds in which they live. But, atoms are real because we can use instruments to measure their physical existence in our universe. Empiricism is a related idea that only things that can be measured are real. In combination, these three philosophical ideas are responsible for pushing out a sense of Christian truth from the public square.

For example, in the early 1900's, mainstream Christians who had been trained in materialism and rationalism began to reject the idea that miracles really

happen-- because they do not have a rationalistic or material cause. They rejected the resurrection, though they believed Christ was a real person-- again, because dead people, empirically, don't rise. You can count billions of graves and find not one instance of someone raising from the dead. Therefore, they rejected the inerrancy of scripture. After all, you can't measure God's hand in the creation of scripture, and we've never seen or heard God, so it must not be true.

Rationalism, materialism, and empiricism were negative-- they said what we cannot know or what could not be. Scientism is the positive (affirmative) 'ism' that grows out of these views. Scientism says that through science (in the modern sense), we can come to understand, control, and dominate everything in our universe. With enough time, science can explain everything, and control everything. And, all that exists is under the domain of science.

A few years ago, scientism was put to the test in the world of theoretical physics when 'string theory' was proposed that described, mathematically, dimensions outside of our perception that cannot be proven or disproven by science. Why? Because these dimensions, if they exist, are beyond a human capacity to perceive. Rationalism's god (math) tells us that Empiricist's god (human experiment) is inadequate. While theologians and philosophers may have battled the barrier between the natural and supernatural, the physical and the metaphysical for centuries, scientism was supposed to solve this problem. Their own equations showed them a reality that might conflict with their theory of everything.

Scientism, even by the testimony of its adherents, has cracks. But, it has contributed mightily to the ideas of modernism, postmodernism, and the modern church. Yes, the modern church has been greatly influenced by Scientism. We'll leave this for another position paper.

One primary tenant of scientism is uniformitarianism. This philosophy (they say it is a scientific fact, but they have no means of proving it based on its historical nature) asserts that the physical universe abides by the same laws over time. The speed of light, the decay of carbon 14, gravity, time, and a myriad of other natural physical laws have been the same throughout history. Of course, this philosophy was born before Einstein proved that mass, energy, time, and space were all variable. They quickly adapted the theory to allow for changes that were accounted for by mathematical manipulation of the changes (E=MC2). Then, along came quantum mechanics that upended the previously unquestioned 'cause and effect' law of nature-- that cause must precede effect. While uniformitarianism has serious problems, scientists still use it to 'prove' that things in the past can be explained using today's measurements.

Thus, classical Christian educators should be aware of scientism and it's impact on the classroom. Scientism deeply penetrates every corner of scientific study today. We must be very, very careful about cultivating an affection for scientism in students by premature exposure or overemphasis on the scientific method. The old tools of natural philosophy are as foreign to us today as powdered wigs. But, these tools, unlike the wigs, were essential to helping Christians understand God's whole world, not just the one in the science books.

Suggestions

1) Set a comprehensive curriculum that narrows the study of the sciences and math to fewer but rigorous objectives for graduates. These should provide focus to the program and help make tradeoff decisions.

2) Avoid science texts from non-Christian sources. Often, these are "better" than Christian options (the publishers have much more money), but they embed scientism that is hard to "teach around." More than simplistic references to evolution, which can be easily explained by a Christian teacher, these works often assume "how we know things" and tacitly speak as though "of course, science tells us that…" In the hands of an excellent classical Christian science teacher, any book can be taught from. Just as we teach from Voltaire, Camus, or Darwin, we can teach from secular texts. This is particularly true in the secondary. But only if we have the wisdom to expose the bad ideas. Textbooks tend not to be used as discussion

tools.

What secular texts are the best? We think Chemistry and calculus, by their nature, have the least inherent scientism. Then, physics. Biology and the secondary sciences (modern astronomy, earth science, etc.) are the most permeated with scientism philosophy.

3) If you have the staff that can do it, replace science texts wherever possible with "ad fontes" (primary) sources. These sources from the Greeks, medievals, or even moderns like 18th and 19th century scientists can be valuable in both teaching science, and teaching the ideas that make it work.

4) Avoid using scientific studies of the brain or psychology to explain human activity. While these studies may well show real correlations, they also come from a viewpoint that says that scientism is the primary cause of human behavior. Because scientism's influence can be difficult to discern, many teachers and students are likely to be pointed toward scientism as an explanation instead of the more fully orbed views of humanity available through philosophy and theology.

5) Avoid behavioralism in your discipline policies or other dealings with children. This scientific look at human behavior from psychologists assumes that children are simply biological beings, not that they are created in the image of God. Behavioralism influences our view of discipleship to disembody discipline and make it more like a reward/punishment game. Too many rewards typically result for expected normal behavior and punishment becomes impersonal, not tied to loving Christian discipleship. One system to avoid is "Love and Logic" which is often viewed as Christian but is really based in behavioralism.

6) For high school, focus on the core sciences of Physics, Biology, and Chemistry. Chemistry and physics serve two key purposes. First, they are the closest to classical study. Physics is the study of energy/motion and chemistry the study of matter. Of course, there is overlap. But the classical parallel to the study of motion and the study of the 'smallest discrete thing' gave rise to these sciences. Therefore, the big questions of existence can be addressed through Chemistry and Physics. They are the most classical. Secondly, and not by coincidence, a good, solid course in Chemistry and Physics prepares the secondary student for study in every other science in college. College students in the medical sciences, the hard sciences, engineering, and even the psychological sciences will all need a solid base of Chemistry and Physic. A deeper study of these subjects is better than a study of many subjects. Biology is a good second priority to Chemistry and Physics. It can be taught as an observed study. It purports to be the study of life, so in the hands of a good classical Christian teacher, it can teach students to observe carefully and appreciate the design of the creator.

7) If AP or other concurrent credit options are pursued in SM, be careful not to do too much. These types of courses tend to prescribe a knowledge-based curriculum that will necessarily eat into your classical core.

8) In middle school, more emphasis should be put on logic than on science. Thinking logically is essential to understanding the problems of scientism. If we spend the logic years teaching the scientific method, we may inadvertently convey to students that the scientific method is superior to other logical ways of proving truth. Since the scientific method is based in hypothesis testing through observation and experiment, it necessarily conveys that truth is best arrived at through scientific means. Philosopher's test hypothesis too (called propositions). Socrates used words and logic to make truth known. When we fail to rightly assign the value of the scientific method to one way of many ways to learn truth, we will fail in our mission. Of course, some science at the middle school is expected. But we shouldn't believe that it's essential. Our parents might believe that it is, so we may need to educate them.

9) In grammar-math, emphasize concept understanding and memorized math-facts rather than introducing algebra concepts too early.

10) Do fewer things well. Teaching through Euclid's elements (geometry) or Newtonian calculus/physics will likely not be part of a common science curriculum. But we are certain that a student with mastery of Euclid and Newton will be better scientists than students who amass AP credits.

11) In the grammar school, science should not look anything like science at a public school. At this level, careful observation skills and nature studies have been long practiced in classical Christian education. This study has students working along side nature instead of seeking ways to manipulate or gain control over it. Some classical educators have paired grammar science with hands on shop-like workmanship to better grasp how our physical world works. Charlotte Mason is the best material for nature studies, available through Ambleside Schools.

12) Keep science in check. Science, like sports, is a good thing when done well. But part of doing anything well is keeping it in proportion to other good things (the virtue of temperance). And, both science and sports are given disproportional value in our modern world. Therefore, pressure to over invest in them will come. And pressure to invest in them in wrong ways will certainly come. Classical Christian educators, to be culture influencers rather than tools of our culture, need to push back against these pressures.

Be certain to allow enough time for humanities, art, logic, Latin, and rhetoric homework. These areas are often shortchanged by well-meaning schools that inadvertently add extended science options as 'preparatory'. These options often result in minimizing the student time spent in equal or more important coursework.

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