

# God and the Engineer: An Integration Paper

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## I. INTRODUCTION

Cedarville University exists to equip Christian students for lifelong leadership and service marked by excellence and grounded in biblical truth. So states the mission statement of this great institution. The challenge for her faculty is to flesh out this mission in individual courses, laboratories, and interactions with students across the campus. This is the mandate of “biblical integration”. The challenge for Christian professors is to see the whole realm of knowledge holistically and to teach their students to do the same. Greg Bahnsen describes well the task of integration when he says, “...God’s word demands unreserved allegiance to God and His truth in all our thought and scholarly endeavors [1].” The believing professor then has no choice but to get down to business in the task of integrating. She must show that God is not silent when it comes to her discipline. She must help her students to put the pieces together. The human mind as created by God longs to see unity and coherence in the observed world. James Orr says that such a mind “is not content with fragmentary knowledge, but tends constantly to rise from facts to laws, from laws to higher laws, from these to the highest generalizations possible [2].” To help students to do this and to see God and His glory as the highest generalization is biblical integration as I understand it.

This paper addresses specifically the task of doing biblical integration within the context of the engineering programs within Christ-centered universities. In Section II I briefly defend the idea of Christ-centered higher education. I elaborate on some reasons why parents should desire Christ-centered higher education for their children as opposed to the education that they might receive in a secular uni-

versity. This discussion then leads naturally into a discussion of the epistemological and philosophical underpinnings of engineering within the framework of biblical Christianity in Section III. In Section IV I take up the biblical view of vocation or calling and deal specifically with engineering as a legitimate calling for Christian men and women. In Section V I address the need for a sense of moderation concerning our conception of what engineering and technology can do for mankind in a fallen world. Finally, in Section VI I describe how we may make specific applications in the engineering classroom.

## II. WHY CHRISTIAN HIGHER EDUCATION?

As we enter the 21<sup>st</sup> century, many Christian thinkers are becoming alarmed at the growing number of Christian young people whose thinking is increasingly muddled when it comes to issues of Christian doctrine and the application of such doctrine to life issues. As J. P. Moreland and William Lane Craig so aptly describe, “Our churches are unfortunately overly-populated with people whose minds, as Christians, are going to waste [3].” Immersion in a pluralistic culture with its assumptions that no particular person or group has a corner on truth is partly to blame for this phenomenon as American youth are exposed on all sides to various multimedia outlets that preach the tenants of postmodernism. Those who claim to have a foundation built on absolute truths are labeled as bigots, are called intolerant, and sometimes said to be dogged by so-called “Cartesian Anxiety” [3]. In fact the one group about which it is acceptable to be intolerant is those who claim to have access to absolute truth.

It is in the middle of this theologically chaotic time period in our history that Christian colleges and universities are called to help students to think through what it means to be a Christian living in this

Thesis →

relatively young century. There has perhaps been no time with greater need for thinking, educated Christians to flood the culture with biblical Christianity.

It must be understood here that a Christ-centered university should not merely exist to do “vocational training” although a large part of what we do is to prepare students to assume some vocational role upon entering society. In other words, the primary role of a Christ-centered institution of higher learning should not be to help students to get a “good” job following graduation. Naturally, having a good job is important for the provision for one’s family and we do hope that students will find good jobs. The goal of a Christ-centered college or university is to prepare students for the vocation of life. Listen to these words of former Wheaton College professor Dr. Arthur Holmes, “None of us wants the kind of dehumanized brave new world that manufactures men and women to fill jobs. Our technological society has been indicted for making productivity the purpose of society, rather than people [4].” Our goal at a school like Cedarville should not be simply to make our students productive. Our goal should be to teach them what it means to live and think Christianly and to be as Jesus Himself said, “salt and light”.

We must give to our students something that they could never get if they attended one of the state schools or other secular institutions. We must help them to build a biblical *weltanschauung*<sup>1</sup>, a view of the world that is not fragmented, but whole and tied together by the Lord Jesus Christ, the timeless Author of all truth. According to James Orr, once a student has been taught and has internalized a uniquely Christian *weltanschauung*, “He is committed to a view of God, to a view of man, to a view of sin, to a view of Redemption, to a view of the purpose of God in creation and history, to a view of human destiny, found only in Christianity [2].” It is my belief that if we merely prepare students with techniques that will help them to land a good job following graduation that we have failed them and we have failed to follow through with the integrative mandate given to us by our university and by our Creator.

<sup>1</sup>German for “world view”

### III. THE PHILOSOPHICAL AND EPISTEMOLOGICAL FOUNDATIONS OF ENGINEERING

When we as scholars at Christ-centered institutions are called to perform biblical integration, we are fundamentally being called to find the connections that exist between our respective disciplines and the greater realm of knowledge and truth and especially with truth as it is found in Holy Scriptures. Many times this call is met with disdain from those in engineering and mathematics because it is easy to think that there are few or no connections to our biblical worldview in these disciplines. It is relatively easy for those in the humanities and art to evaluate modern movements in culture in light of biblical truth. Christian biologists have much fertile ground in which to labor when it comes to biblical integration because they can deal with issues of origins and design and creationism in general. It is straight forward for those in the social sciences to apply biblical analysis to the study of history or biblical principles to the development of philosophies in criminal justice or social work.

It is, on the other hand, a more difficult thing to bring biblical worldview thinking to bear on the study of engineering. It seems to me that the reason for this difficulty is that engineering and even mathematics seem at first blush to be amoral and to be built upon easily derived first principles using logic and reason. We are accustomed to thinking about these disciplines autonomously, i.e. apart from God.

Correcting these attitudes requires a fundamental paradigm shift for believers engaged in these fields and teachers within these disciplines. We must begin to realize that engineering and mathematics have their epistemological roots in the Christian worldview. I would like to make a case for this in this section.

The first point to be made is that biblically, Christ is the fountainhead and source of all knowledge. Colossians 2:3 tells us that in Christ “are hidden all the treasures of wisdom and knowledge.” In other words, ultimately anything that is known about anything finds its source in Christ, the  $\mathcal{A}$  and the  $\Omega$ . This implies that both engineering and mathematics and all other disciplines find their epistemological

Basic Question

root *in Christ*. This seems foreign to us at first because we are so accustomed to thinking in terms of the natural and the spiritual, the secular and the sacred and we seldom are wont to bring the two together in our thinking. Francis Schaeffer was well known for using the illustration shown in Figure 1 [5] which shows the divide between the secular and the sacred in the mind of modern man. We tend to view engineering and mathematics as secular callings.

Sacred, Spiritual

Secular, Natural

Fig. 1. Illustration used by Francis Schaeffer.

The critical question to ask at this point has been asked by James Nickel, and that is “Why does mathematics work?” [6]. I would extend this question by asking not only why mathematics works, but why can it be applied so successfully to problems that engineers are so eager to solve? The answers to these questions are epistemological in nature. These are the questions that unbelievers are not eager to answer because their materialistic worldview is not able to account for the order and logic that is present in the universe. A materialistic worldview cannot account for the fact that the constants  $e$  or  $\pi$  won’t change tomorrow thereby rendering many of our engineering designs inoperable. A naturalistic worldview can have no explanation for why Maxwell’s equations predict so accurately all electromagnetic phenomena in the universe that we know of.

Why question  
Glory to God  
& serve  
others

However, as believers, we know why mathematics describes reality and can be used to create marvelous wonders for the betterment of mankind. The reason is that there is a Creator who “calls those things that are not as if they were”. He has created a world of order for us to understand and to use for His glory and for the good of our fellow men.

#### IV. TOWARD A CHRISTIAN VIEW OF VOCATION

The concept of vocation seems to be an idea lost in modern American culture. For most in America, one’s job or one’s profession is simply the means to an end, particularly the end of pursuing one’s own agenda bound up in the notion of the “American Dream”. The “American Dream” drives people to earn as much money as possible so that they may have a nice home in suburbia, drive a nice car, send their children to a good school, and then finally retire well with a moderate nest egg which can be used to pamper themselves in the later years with all of the niceties that the world has to offer. In America, work is seen as a necessary evil that must be endured for a few years if the “greater good” of reaching one’s own material goals is to be reached. This is a completely unbiblical way for Christians to approach their work, but in this day and age, this is the mentality that many Christian students have as they enter college looking for a job that will “pay well”. This is a leading edge at which biblical integration needs to be done in the classroom.

The word vocation comes from the Latin meaning “call” or “calling” and has historically been used to indicate the call of God in a person’s life either in the calling of a lost sinner to himself or as it is intended for this work, the call of God in a person’s life relating to what will be their chief employment in this world.

During the Middle Ages, callings were seen dualistically as either “sacred” or “secular”. Those who were members of the clergy or educated classes were said to be involved in a sacred vocation while all others, particularly the common and uneducated working class were said to have secular vocations or callings. Those in sacred vocations were in work which would count within the kingdom of God, while those involved in secular vocations did work of little or no lasting value within the Kingdom of God.

A fundamental shift in paradigms occurred during the time of the Protestant Reformation. Martin Luther himself contributed significantly to the Christian understanding of the doctrine of vocation. Says Luther,

“From all this it follows that there is really no difference between laymen and priests, princes and

bishops, 'spirituals' and 'temporals,' as they call them, except that of office and work, but not of 'estate'; for they are all of the same estate-true priests, bishops and popes-though they are not all engaged in the same work, just as all priests and monks have not the same work." [7]

Luther raised the status of the so called "temporal" callings to that of spiritual callings. For Luther all callings are spiritual and bring glory to God.

Listen to Luther again,

"A cobbler, a smith, a farmer, each has the work and office of his trade, and yet they are all alike consecrated priests and bishops, and everyone by means of his own work or office must benefit and serve every other, that in this way many kinds of work may be done for the bodily and spiritual welfare of the community, even as all the members of the body serve one another." [7]

We could also list the engineer with Luther's list of consecrated professions. All men and women regardless of their profession are prophets, priests, and kings. Note also the motivation which Luther attaches to professions. The primary motivation is not to earn money, but to serve the society. The worker is to look past her work to see those whom she serves.

John Calvin also elevated the status of "secular" work when he said,

"...the Lord bids each one of us in all life's actions to look to his calling. For he knows with what great restlessness human nature flames, with what fickleness it is borne hither and thither, how its ambition longs to embrace various things at once...Therefore each individual has his own post so that he may not heedlessly wander about throughout life." [8]

The Puritans were also known for their elevation of the "secular" callings. Their great concern was that all people everywhere should be employed in their occupations in a manner that was pleasing unto God. Listen to Cotton Mather,

"A Christian should be able to give a good account, not only what is his occupation, but also what he is in his occupation. It is not enough that a Christian have an occupation; but he must mind his occupation as it becomes a Christian," quoted in [9].

Such doctrine gives new meaning for Christian

professionals such as engineers. Work is no longer seen as simply a way to earn a living, but instead it is seen as a vehicle for service to other human beings. Work is no longer about serving one's own ambitions, but is instead imbued with purpose outside the self. The engineer no longer does her work as unto men but as unto God Himself who sees all men and the work they do. Work done for the Lord is never done in vain.

#### A. The Creation Mandate - The Purpose of Work

A Christian view of work and vocation must find its root in Scripture. Many Christian doctrines have their basis in the Book of Beginnings, Genesis, and the biblical doctrine of vocation is no exception. In Genesis 1:28, before the fall of man, we see God commanding the man and the woman to "Be fruitful and increase in number; fill the earth and subdue it."<sup>2</sup> God later gave the man Adam the task of naming all of the animals in the Garden of Eden (Genesis 2:19-20). This command has come to be known as the Creation Mandate. It consists of two main directives, one of which is that mankind must engage in procreation to populate the world. The second part of the mandate calls on mankind to bring the world and its resources into subjection essentially declaring humans to be the pinnacle of creation who may make use of the world and its resource to further God's end of bringing glory to Himself. Men are God's vice-regents in this world, being given the task of ruling it with and for Him.

Engineers fulfill a special place within God's Creation Mandate. There are few professions whose purpose is more directly involved in subduing creation than engineering. The engineering profession is everywhere concerned with making the world a little better for mankind while extracting and making use of its resources to produce great benefits for people everywhere. In doing so, the engineer is uniquely equipped and positioned to love her neighbor through her profession. Consider briefly two great examples of the ways in which the profession of engineering has benefitted mankind.

One of the engineering marvels of modern times is modern medical imaging. Engineers have also given us the ability to take a look into the human

<sup>2</sup>Emphasis mine



body to identify diseases and other problems previously hidden from our eyes. Computed tomography, ultrasound, and nuclear magnetic resonance all provide different views into the body and facilitate the diagnosis of serious diseases such as cancer, heart disease, and other ailments. God's common grace through the engineering profession is clearly seen as lives are prolonged and the quality of life is improved by devices such as the CT scanner shown in Figure 2.



Fig. 2. Computed Tomography and other medical imaging modalities have allowed us to “see” inside the human body increasing the chances of detecting cancer and other diseases while there is still time.

Another fabulous example of life-saving technology is RADAR imaging. Modern Doppler RADAR imaging allows meteorologists to pin-point the location of tornados prior to their actually touching down. Modern image processing algorithms have been applied to the RADAR data so that tornado warnings may be issued automatically. This has saved numerous lives. An example of this technology is shown in Figure 3 for an actual tornado which occurred in the Oklahoma City area.

These are just two of many examples of how God has placed engineers in a unique position to

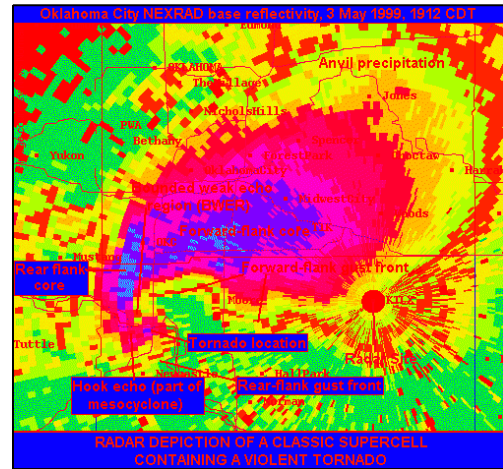


Fig. 3. RADAR imaging allows meteorologists to pinpoint the probable locations of tornados before they touch down in many cases.

wrest the power and secrets of God's creation for the benefit of men and women everywhere. In this way they perform services and create products that allow people to be comfortable, to be safe, and to have longer lives. God in His common grace has provided for the engineering profession and when men and women are called to be engineers, they are in their profession being obedient to God's command to love one's neighbors.

## V. TOWARD A CHRISTIAN VIEW OF TECHNOLOGICAL PROGRESS

Even as men subdue the creation for the glory of God in obedience to the Creation Mandate, a balance must be struck between optimism concerning the good that can be done and pessimism because of the fall of mankind into sin. We read in Genesis 3 that Adam and his wife Eve disobeyed God's command concerning the eating from the Tree of the Knowledge of Good and Evil and all mankind fell into a sinful state in Adam. By the time we read Genesis 11 we see man using technology to rebel against God and to disobey His commands by gathering together in one place and building the Tower of Babel thereby disobeying the Creation Mandate to populate the world. Man's technology then was used for the furtherance of his own ambitions. In this section, I look at the effects of man's sinful

condition upon technology. I first of all seek to show that technology is not neutral. Secondly, I look at the often overblown almost salvific promises made by proponents of unbridled technological progress. Finally I argue for a distinctly Christian view of “doing” technology.

#### A. *Is Technology Neutral?*

To answer this most important question requires looking briefly at the doctrine of sin and studying its affects on man. We need to understand the effects of sin on the mind or the “noetic effects of sin”. The biblical doctrine of sin teaches us that men are in every part and in every way tainted by sin. Sin affects every ability of man including his ability to think and reason concerning technology. In Genesis 6 we read God’s assessment of fallen mankind when He says in verse 6 that “every intent of the thoughts of his heart was only evil continually.” This taint of sin carries over into every aspect of the lives of mankind in this world.

Unfortunately, Thomas Aquinas and others taught that the fall of man was incomplete. According to Aquinas, man’s ability to reason and think remained unaffected by sin. Such teaching has led to the belief that man through reasoning can solve his own problems without God’s help. Such thinking was particularly prevalent during the time of the Renaissance and was a major tenet of Enlightenment thinking. During these periods of time, confidence in man and in his abilities to solve his own problems became the reigning philosophy of the day. We sometimes call this view humanism.

Christians, however, must not succumb to humanistic patterns of thinking and Christian engineers must not fall prey to over-zealous confidence in their creations. Because of the effects of the Fall, I would argue with Monsma *et al.* [10] that technology is not neutral. New technological developments do not occur in a vacuum and many of the driving forces behind new technology are based on sinful and warped ambitions. Mankind develops technology based on perceived needs and desires of consumers and Scripturally, there is certainly nothing neutral about these needs and desires. As Monsma *et al.* put it, when we do technology, we are involved in “valuing” which is always tainted by sin.

Some would argue that many technological innovations are pursued for truly altruistic purposes. Certainly these innovations are good? It is my understanding, however, that even technology pursued out of desire to make the world a better place carry within in them the seed of fallenness that at some point will bring about a host of disturbing, unintended consequences. Consider for a moment the improvement in health care technology. While no one will argue with the fact that the increase in life-expectancy due to improved health care is a wonderful blessing for society, who would have seen the moral struggle now faced at the end of life? We are now able to keep people biologically alive for years while deep inside we know that a loved one has no awareness whatsoever of life and surroundings. This is the fruit of our fallenness being borne out of what may be considered morally upright technologies. This is unavoidable in our best engineering efforts. This thought will never be far from the believing engineer’s mind.

Some technological ambitions of mankind are clearly sinful such as the desire of nations such as Iraq to develop weapons of mass destruction so that they may use them on their neighbors including the nation of Israel. Even as I write this paper, there is grave concern that the fundamentalist Islamic government of Iran is seeking to develop nuclear weapons in defiance of the international community. It is easy to see the grave consequences of the fall in the development of technology in cases like this. We next consider cases that are much more difficult to address and understand.

#### B. *Can Technology Save Us?*

One of the temptations that engineers, scientists, and technologists face is the temptation to put too much faith in the benefits and triumphs of technology. Consider the words of Rufus Dawes, the president of the 1933 Chicago World’s Fair, “Here are gathered the evidences of man’s achievements in the realm of physical science, proofs of his power to prevail over all the perils that beset him,” quoted in [11]. It is easy to make grandiose promises concerning the benefits of technology and at no time has this temptation been more real than today in the so-called Information Age. This “worship” of technology is sometimes called technicism.

One arena in which these claims are made is in the area of modern communications technologies. Quentin Schultze has said, "We are succumbing to informationism: a non-discerning, vacuous faith in the collection and dissemination of information as a route to social progress and personal happiness [12]." We are told that the more ubiquitous communication technologies become, the more enlightened we will become because since we are communicating with one another, we will understand each other better. For example the growth of the Internet is purported to be an unprecedented opportunity for accomplishing world peace as people from around the world can now share ideas. We clamor for government funding so that the public school and library classrooms around the world can be wired for the Internet, claiming that children who have access to the Internet will be better educated than any children ever before. We spend thousands if not millions of dollars to have the Internet piped through the ether to our PDAs and iPhones.

However, we forget the truths that were discussed earlier that the root of man's problem is not that he has access to too little technology or communication. It is rather that his heart is corrupted by the deceitfulness of sin. Wiring all the classrooms in the world with the Internet will not keep children or adults from finding instead more advanced ways to sin. Giving people access to mobile communications such as cellular phones (certainly a modern engineering marvel) does not lead to better relationships between people. E-mail does not lead to more intimacy with others, but usually fosters banal, trivial, and meaningless communications.

Many of the world's leaders are the leading proponents of this religion of technology. Listen to the late President Ronald Reagan, "...as we acquire more and more knowledge from new technologies, we no longer move forward in inches or feet, we begin to leap forward. There's nothing that the United States of America cannot accomplish if the doubting Thomases would just stand aside and get out of our way," quoted in [10].

There have, however, been prophets among those who heralded forth the power of technology. One such prophet who feared technicism was the twentieth century mathematician Norbert Wiener who in his day feared that people were falling "into the

childish error of worshipping the new gadgets which are our own creation as if they were our masters," quoted in [13]. Says Schultze, "Our tendency to adopt every new information technology uncritically - without discerning the options, setting appropriate limits, and establishing humane practices - is simply irresponsible [12]." Hunt says, "Glitzy machines have a way of mesmerizing us so that we do not think about the unintended consequences they create [14]."

We as Christians and especially Christian engineers must take the place of prophets in our time. As our culture hails the powers and soteriological benefits of modern technology, we must be the ones that stand and remind mankind that ultimate salvation is not to be found in the engineering and technological accomplishments of men. In fact we must remind people that in the hands of the unregenerate, technology can in fact lead to ill consequences that none of us can imagine.

## VI. IMPLICATIONS FOR THE ENGINEERING CLASSROOM - DOING BIBLICAL INTEGRATION

In this paper, I have discussed the epistemology of engineering, I have discussed the validity of engineering as a vocation, and I have argued that engineering and technology are not morally neutral.

### A. *Can we teach philosophy in engineering?*

There are a number of topics within specifically electrical engineering which are wonderful opportunities to address the epistemological underpinnings of engineering. These opportunities usually arise within the context of teaching natural (i.e. God given) laws of nature which we exploit in engineering to make the world better for its occupants.

One example that comes to mind occurs within the teaching of electromagnetics when Maxwell's equations are presented. Why is it that Maxwell's set of four integro-differential equations describe all electromagnetic phenomena and predict so many practical applications which we make use of today such as the propagation of radio waves? Is this mere coincidence or is there a God who wants to communicate to us that He is a God of order and beauty? No one who understands Maxwell's equations can look at them without seeing the symmetry and simple beauty that they describe. As believers

we don't just see equations. For us it's as if the one Eternal Omnipotent Creator who told the winds and the waves to be still declared that, "For all time and in all places in the universe,

$$\nabla \cdot \vec{B} = 0, \quad (1)$$

$$\nabla \cdot \vec{D} = \rho, \quad (2)$$

$$\nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}, \quad (3)$$

and

$$\nabla \times \vec{H} = \vec{J} + \frac{\partial \vec{D}}{\partial t}." \quad (4)$$

A second example that I can think of especially in the field of electrical engineering is the Fourier transform. Again, it is difficult to look at the Fourier transform by which almost any signal can be broken down into a linear combination of sine and cosine waves and see anything but the beauty that the Creator "built into" the universe. The same could be said of wavelets by which we decompose functions down into a linear sum of short-time functions. Both the Fourier and wavelet transform have extremely powerful implications without which many modern technologies would not be possible. Duane Litfin expresses similar sentiments when he says, "The Christian scholar shares with the non-Christian all of his fascination with the things in themselves, but she is moved in addition by the impetus of her deepest Christ-centered convictions and loyalties. She wants not only to measure the creation; she wants to celebrate it for what it is and what it does: it is Christ's artistry and it tells us of him [15]."

It is up to the believing engineering professor to grasp these opportunities with passion and to point students beyond the mechanics of equations to the God who imbued His universe with such stunning beauty. Without a professor who is willing to do this, students will simply see the equations and laws as expressions to manipulate to get the right answer and will miss the beauty of the Creator who is the author of the beauty. God is not silent as we study the laws that we apply in engineering. Let's listen.

## *B. Teaching Engineering Students to Value Engineering as a Vocational Calling from God*

It seems to me that the doctrine of Christian vocation carries a number of implications for the engineering classroom. The first and most important of these is that the engineering professor herself must believe passionately that she has been called by God to the field of engineering to help make a better world for others and to subdue creation for the glory of God. This passion should be visible to every student in her classroom and should cause her to pursue excellence in teaching. She should seek to convince the young people in her class that by being engineers they can serve God by serving others.

The second implication follows directly from the first one and that is that if engineering is a legitimate calling for believers, that we should teach our students to be the best engineers that they can be. Mediocrity is not an option for the Christian engineer. Why shouldn't engineers graduating from Cedarville be the cream of the engineering crop? Why shouldn't they be the best available with an uncommon understanding of their respective fields? And we must teach them that they are to be the best they can be not so that they can make a high dollar paycheck when they graduate, but instead because they want to do the dirty work of the creation mandate transforming the world for God's glory and the good of mankind.

A third and final implication for the engineering classroom is that we need to be wary of trying to "sanctify" the classroom by performing perfunctory "spiritual" exercises such as daily prayer or devotionals as if the doing of engineering were not a spiritual activity. While there is certainly nothing wrong with beginning the engineering class or laboratory with prayer, such activities do not make the classroom Christ-centered. We must instead teach our students that the design of a circuit or of a signal processing algorithm are in themselves acts of worship to Almighty God when one proceeds with those activities as unto the Lord. What does a God glorifying circuit look like? It works and it performs the task that the designer intended for it to perform. Students could be challenged early on in a given course to see their work in the course as worship. This could also be the theme of one on one

Attempt integrity  
w/ students



contacts that the professor has with the students in challenging them to do their best. They should do their best because God is the God of engineering.

### *C. Teaching Engineering Students to have a Realistic View of Technology*

Christians are often just as guilty of being extremely pragmatic when it comes to the issues of technology. We assume that just because some new technology can be designed and built that it should be designed and built. Because they are visionaries who thrive on solving unsolved problems, engineers are particularly notorious for this kind of thinking. Engineers seldom do the critical thinking necessary to determine what principles should govern the design of a particular technology. We also often assume that with technology the end justifies the means. We too seem to forget that technology is not neutral. How then do we teach this to young engineering students, the shapers of future technologies?

First we must teach them biblical theology. Of course at Cedarville University, this is something that occurs primarily outside of the engineering classroom in the context of the Bible minor which all students complete. An essential component of the theology which must be taught there is that man's greatest need is to be saved from his sins and to be in right standing with God. This is in sharp contrast to the teachings of our modern technological culture where what man needs is more education, access to more communications technology, and a better health care system to name just a few. We need to be teaching our students that while the development of technology is very helpful and perhaps it could be argued commanded by God in the Creation mandate, technology development cannot make people get along better, love their spouse or children more, or cleanse them from the guilt of sin. Therefore, Cedarville engineering students must be theologically grounded.

We have discussed the role of the Bible minor in giving students a realistic view of engineering. How can the engineering professor foster this realistic viewpoint in the hearts of her students? I think to do so involves exploring with students the boundaries of what engineering should be doing. For example, I teach a communications course at Cedarville. This course exposes students to the fundamental

technologies and theory required to design and build a variety of analog and digital communications devices. Such a class could conceivably explore the advantages and disadvantages of the ubiquity of personal communications such as cellular phones and other modern wireless devices. A couple questions could be asked. Do personal communications systems improve or degrade interpersonal relationships? In other words, do such systems have the tendency to deepen relationships in a biblical sense or to make them more shallow? What about e-mail? What about the Internet? What about the availability of on-demand video to hand-held devices? Is this a good thing or a bad thing? What I am suggesting is that there be a deeper dialog within engineering curriculum concerning these matters. So often, the can-do spirit of engineers trumps the critical thinking of whether or not to design some technological object. Just because we can beam bits over the cellular phone system fast enough to send a movie to a palm device does not imply that such a system should be developed.

What I am really arguing for here is that we as Christian professors teach biblical wisdom to our engineering students. It is so easy for us to be simply about technique in engineering. Certainly we need a lot of technique in an engineering curriculum, but technique in a moral vacuum leads to devices that may in fact do more harm than good in society. Engineering graduates from Christ-centered schools, of all graduates, should be well versed in biblical thinking in order that they might make wise decisions within their vocations.

## VII. CONCLUSION

In this paper, I have tried to articulate my view of teaching engineering in a Christ-centered university. Biblical integration really boils down to one thing and that is...living and teaching before our students to the Glory of God. We must make God and His worth weighty in our classroom. God must be the all consuming sun that brings all of the disciplines into orbit around Himself. There must not be any doubt as I teach and interact with students that God is Who He claims to be. Will my students have a more lofty view of God and His creation through having been in my classroom, in my laboratory, or

"Why" question

theological foundation

Some issues particular to this field

✓

in my office? My prayer in my own teaching career is that they would answer in the affirmative.

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