

# Incorporating Biblical Motivations into a Business Analytics Course

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**ABSTRACT: Business schools have been developing data analytics courses to meet industry demand. However, a main challenge is that business students lack motivations to learn analytics. In this article, we offer suggestions and scriptural examples on how the Bible can be a rich source for Christian faculty to provide motivation for students to master the learning objectives in analytics courses as the development of a sound mind is deeply rooted in the Bible and God’s Truth.**

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## INTRODUCTION

In Matthew 22, a lawyer asked Jesus this question: “Teacher, which is the greatest commandment in the Law?” Jesus answered, “You shall love the Lord your God with all your heart and with all your soul and with all your mind. This is the great and first commandment” (Matthew 22:37-38). It is interesting that Jesus did not merely say that we should love the Lord our God with all our heart, but he said we should love the Lord our God with all our heart and with all our soul and with all our mind. This suggests the necessity of engaging our minds in loving our God. Loving him is not just a heart matter but also involves critical thinking and exercise of our mind. This commandment of loving the Lord with our mind was recorded not only in Matthew but also in Mark (Mark 12:30) and Luke (Luke 10:27).

In fact, we can find the active development of our mind to be a constant theme throughout the Bible; loving the Lord is not merely an emotional matter or a heart matter, but our minds need to be engaged and in concert with the heart as everything we know, think, and feel flows from the heart (Proverbs 4:23). For example, the Apostle Paul says in Romans Chapter 12:

I appeal to you therefore, brothers, by the mercies of God, to present your bodies as a living sacrifice, holy and acceptable to God, which is your spiritual

worship. Do not be conformed to this world, but be transformed by the renewal of your mind, that by testing you may discern what is the will of God, what is good and acceptable and perfect. (Romans 12:1-2)

Insightfully, as Paul instructs us to present our bodies as a living sacrifice as a form of spiritual worship, he does not mention getting our emotions high or being filled with excitement. Rather, he instructs us to be transformed by the renewal of our mind.

The teachings on developing our mind can be found not only in the New Testament but also in the Old Testament. For example, the book of Proverbs provides many instructions on seeking wisdom, understanding, and insight (Dose, 2012). One example is Proverbs 4:5-6, which states, “Get wisdom; get insight; do not forget, and do not turn away from the words of my mouth. Do not forsake her, and she will keep you; love her, and she will guard you.”

Meanwhile, driven by the explosion of business data, the business world today is also eager to gain insight, known as business intelligence and analytics (Chen et al., 2012; Davenport, 2013; Manlapig & Ko, 2019). The increasing use of technologies, such as the internet, smart personal devices, and even the COVID-19 pandemic, have all accelerated the growth of data (Robb, 2021). Firms are eager to gain intelligence from data to help them improve their business functions, such as forming business strategies,

acquiring new customers, and making better business decisions (Grover et al., 2018). All these developments contribute to the growth of the field of business analytics. INFORMS (the Institute for Operations Research and the Management Sciences), a main professional society of analytics, defines analytics as “the scientific process of transforming data into insights for the purpose of making better decisions” (as cited in Tucker, 2015).

To meet the demand from industry for business analytics skills, business schools have been developing analytics curricula (Asamoah et al., 2017; Clayton & Clopton, 2019; Manlapig & Ko, 2019). Analytics curricula can cover various important topics, such as statistics, spreadsheets, databases, data visualization, predictive analytics, and machine learning (Clayton & Clopton, 2019). For example, at our Christian university (in the Southeastern United States), our business school has revised the core business curriculum to now incorporate 10 credit hours of required data analytics courses for all business majors. These 10 credit hours, covered by four courses, cover topics such as Excel®, probability, statistics, databases, data visualization, and predictive modeling. In addition to the required courses, the school has also developed various elective courses, such as Sports Analytics and analytics research projects to help students acquire additional knowledge and skills relevant to their career pursuits imbued with a deeper understanding of data.

However, one important factor influencing students’ achievement in quantitative courses such as analytics and statistics is often their attitude and motivation. Ramos Salazar (2018) articulated this thought when she wrote:

Unfortunately, business undergraduates and alumni perceive business statistical courses that include mathematical applications to be irrelevant to their professional careers and personal lives (Swanson, Meinert, & Swanson, 1994). As a result, students experience low confidence and motivation to learn the mathematical material in business statistics-type courses, which negatively impacts their overall performance in these courses. (Hood, Creed, & Neumann, 2012; Swanson et al., 1994, pp. 140-141)

Similarly, Clayton and Sankar (2009) stated,

[M]otivating students to enjoy learning statistics has been a major challenge for decades in many colleges of business (Bell, 2000; Eom et al., 2006; Kvam & Sokol, 2004). It is a widely held belief that if students enjoy what they are being taught, they will strive to “own” or personalize the material, and the learning of it will be enhanced. (p.10)

Ramos Salazar (2018) also pointed out if a student does enter statistics courses with lower motivation or a

negative attitude (related to a variety of factors, including utility of the course in general), it often can be linked to a devaluation of mathematical learning and quantitative growth (Swanson, Meinert, & Swanson, 1994; Zanakis & Valenzi, 1997). Finally, Ramos Salazar (2018) commented that “students also report feeling a lack of confidence from the feeling of anxiety and fear that they experience in business statistics courses (Hopkins, Hopkins, & Glass, 1996). Because students hold negative attitudes toward business statistics, the learning process is more challenging in this course (Onwuegbuzie & Daley, 1999)” (p. 141).

All the above factors and student feelings, when taken together, can create a more challenging learning process for Christian business faculty seeking to teach analytics and statistics classes that both arouse student interest and, more importantly, point their students intentionally to Jesus Christ and His wisdom and knowledge. As faculty at a Christian business school, we desire students to not only have a love for the Lord and learning about His world (which includes all business disciplines) but also a desire (as God changes hearts) to grow in having their hearts and minds transformed for God’s glory and Kingdom advancement (Romans 12:2; 2 Corinthians 3:18). This transformation (as the Lord works in the hearts and minds of students) would ideally also be facilitated by seeing the importance of understanding analytics and how to use data to ask the right questions and generate actionable, knowledgeable decisions that can lead to human flourishing and reflect the light of Jesus to the world (Matthew 5:14).

This heart desire (as Christian business faculty) for our students is genuine and rooted in a love for them that desires to see them grow in the wisdom, knowledge, love, grace, and mercy of Jesus Christ, but this desire to understand all of God’s world, including the importance of data, does not always translate to immediate results (Romans 11:33-36). We have taught introductory data analytics, intermediate data analytics, and various elective analytics courses in our business school and found often that it can be a challenge (at a liberal arts Christian university, which is not primarily a STEM-focused institution) to help our students see the importance of understanding, using, and implementing data in their business pursuits and vocations. Students in our business school often seem to be confounded, if not daunted, by the thought of taking required data analytics courses. To overcome this challenge, we believe, and have found the Bible to be an invaluable and much-needed source of encouragement, Truth, guidance, direction, and wisdom. God’s Word helps business students overcome the potentially daunting view of learning and implementing data analytics in their business pursuits by showing that all

knowledge comes from the Lord and encouraging the students to see that all wisdom and knowledge points to Jesus (Isaiah 28:29; John 1:1-5).

The purpose of this paper is to suggest that biblical inspirations can be incorporated in a data analytics course to help business students not only stay grounded in God's Truth but also become motivated in learning data analytics (Psalm 1: 2-3). In this article, we explain how biblical insights can be introduced in each step of the data analytics process as students learn how to perform a data analytics project. This paper seeks to contribute to the discussion in the literature about business students' potentially low motivation in analytics courses by proposing that biblical insights can be used at Christian schools and colleges of business to motivate students to learn analytics.

The rest of this article is organized as follows: First, we will provide a review of relevant literature related to data analytics and its education. Then, we will discuss the common steps in data analytics and show how they can be well-grounded in the Word of God. We will also provide biblical examples that could be incorporated in teaching each step of the process of learning, understanding, and incorporating data analytics so that students can see the beauty of the heart and mind changed by the Lord to better understand His world (Psalm 24:1). As these students are changed by the Lord through these intentional teaching and mentoring initiatives, they will be more professionally prepared to engage His world (including using analytics competently) for His glory and the good of others (Matthew 5:13-16).

## LITERATURE REVIEW

### Development of a Christian Mind

In the broad context of Christian faith and spiritual formation, the importance of the development of a Christian mind is a well-discussed topic in the literature. For example, Moreland (2014) suggested that the development of a Christian mind is essential for our faith and for spiritual formation (Job 38:36). Hollinger (2009) suggested the importance of integrating the head (mind) with the heart and one's actions as Christians. Zigarelli (2012) suggested that an important mission of a Christian university is to transform students' minds and help students develop Christian worldviews (Romans 8:6).

### Christian Mind in Business and Business Education

In the specific context of business and business education, the literature has discussed the involvement of Christian minds and worldviews in business and business

education. For example, Saunders and Locke (2020) suggested that a probabilistic decision-making process, e.g., casting lots (Proverbs 16:33), is not the same as gambling, while the use of artificial intelligence does not remove moral responsibility. McMaster (2013) suggested that the development of a Christian mind is a crucial element of leadership development (1 Corinthians 2:16). White and Kirkpatrick (2020) discussed the importance of immersion of one's heart and mind in a Christian worldview within business education. Adams and Schiller (2015) discussed how critical thinking can be integrated into a corporate finance course at a Christian university.

On an organizational level, Dose (2012) discussed how the wisdom offered in the book of Proverbs relates to organizational management. Salgado (2011) suggested that a Christian set of beliefs should help to define organizational strategies.

### Data Analytics Steps

Data Analytics is "the scientific process of transforming data into insights for the purpose of making better decisions" (Tucker, 2015). With the explosion of data, data analytics is becoming increasingly important in the business world; more data is generated each year, increasing the need for businesses to explore new analytics tools, such as artificial intelligence and machine learning (Duan & Da Xu, 2021). As the use of data continues to expand and increase in the business world, 70% of companies expect business analytics to be more important in the next three years than it is now (Davenport et al., 2020). Thus, as business educators, we desire for students to gain a robust understanding of analytics and its functions set within a framework that is grounded in using the mind for the purposes of God and His Kingdom (Matthew 16:23).

To implement this scientific process of data analytics, the literature suggests a sequence of steps. Most of the articles in the literature have similar steps, such as the five steps listed by Pickell (2021) and Erdelyi (2022):

Step 1: Define the objective. In this step, the business team clarifies the objectives and defines the purposes of the analytics project.

Step 2: Collect data. In this step: the business team designs a study and collects the data that will help to achieve the objective defined in Step 1.

Step 3: Clean and organize the data. In this step, the business team removes potentially incorrect or irrelevant data and organizes the data to facilitate data analysis.

Step 4: Analyze the data. In this step, the business team applies analytical thinking and statistical tools to test hypotheses.

Step 5: Interpret the data. In this step, the business team interprets the results and determines a course of action.

There are some minor variations to these steps. For example, Rangaiah (2021) defined Step 4 as interpreting the data and Step 5 as sharing the results. Other authors made some minor modifications and suggested 7 steps, such as Smith (2019) in his work on data project analysis. For consistency in the discussion laid out in this article, we will follow the five steps outlined above.

### Data Analytics Education

Business schools have been incorporating data analytics through various approaches (Dzurainin et al., 2018). The AACSB International (AACSB) includes data analytics as an expectation in curricular content for business schools in their standards (AACSB, 2018). Some business faculty have redesigned existing business curriculum to include data analytics (Clayton & Clopton, 2019; Dzurainin et al., 2018; McLeod et al., 2017). Others have introduced data analytics by adding foundational data analytics course content in their respective business curriculums (Dichev et al., 2016; Frydenberg, 2015). Still another approach is for business schools to develop an entirely new undergraduate major or master's program in analytics (Wymbs, 2016; Zhao and Zhao, 2016).

One of the most important and relevant angles of data analytics education literature is the development of an analytical mindset (Dzurainin et al., 2018; Richardson & Shan, 2019). In the context of Christian business education, Manlapig and Ko (2019) suggested that Christian business schools incorporate data analytics within a biblical framework of human life and include courses that would “develop the human side of decision making” (Proverbs 1:2; Proverbs 4:7; Proverbs 16:9; Proverbs 16:33). This latter suggestion points to the need for Christian business schools to not only provide the same practical skills as non-Christian universities but also help students integrate Christian thinking and living (Psalm 51:10).

This current article extends this discussion in the literature by specifically discussing how faculty can integrate biblical thinking in data analytics courses and point students to Jesus Christ and His Truth, where all wisdom, insight, knowledge, and discernment originate (Psalm 24:1; Matthew 28:19-20). This calling on Christian business faculty is critical in helping students develop an analytical mindset so that the students can solve real-world business problems (Daniel 5:12; Daniel 5:16).

### Attitude and Motivation for Learning Statistics and Analytics

The literature has examined business students' attitudes towards quantitative courses and its relationship with student performance (Ramos Salazar, 2018). Ramos Salazar (2018) found “math self-efficacy was a positive predictor of statistics motivation. Self-compassion was also found to be a partial mediator of the relationship between math self-efficacy and statistics motivation” (p. 140).

The literature also suggests that business students do not universally have a very positive affect towards quantitative courses, such as analytics and statistics. Wang et al. (2018) showed that the business students surveyed in the United States had a neutral affect towards business statistics with a mean of 4.24 and a standard deviation of 0.90 on the scale of 1 to 7 (i.e., 4 = neutral), which implies that many students had an affect of neutral or lower than neutral. Wang et al. (2018) stated the following:

Overall, our empirical findings show that both U.S. and Chinese students hold only slightly positive attitudes toward business statistics. These results are disappointing given the level of attention that has been paid to more effective teaching of statistics in U.S. business school since the mid-1980s (Love & Hildebrand, 2002) and improvements in the quality of undergraduate teaching in Chinese higher education (Yin, Wang, & Han, 2016). Most importantly, it raises serious questions about future employability of business students as companies demand stronger analytical support for decision making. (p. 13)

To help instructors design courses to improve student motivation, Jones (2009) developed the MUSIC Model of academic motivation, which consists of five components: M for empowerment, U for usefulness, S for success, I for interest, and C for caring. More recently, to investigate factors in student motivation for learning analytics, Vaziri et al. (2021) conducted a survey study of students in two business analytics courses (sample size = 150 in the first class and 48 in the second class) using the MUSIC model for motivation (Jones, 2009). Vaziri et al. (2021) found that “interest has a strong relationship with effort” where interest in the MUSIC model means “students need to be interested in the course activities and assignments to be motivated” (pp. 122-125). Singh et al. (2017) found that students' motivation towards learning quantitative subjects is strongly related to learning value, attitude, learning environment, and achievement goals, which connects deeply on a biblical level in that God's Word teaches that the heart produces all our desires, feelings, thoughts, will, and choices (Proverbs 4:23). Thus, for students to be motivated to learn, understand, synthe-



size, and incorporate analytics into their business practices and pursuits, Christian business faculty must present this content and these skills as tools that can be used by God to change the heart (which only He can do), and ultimately help human flourishing in business and in anyone's vocation (Jeremiah 29:7).

This paper contributes to the literature by exploring how biblical inspirations can be integrated into analytics courses to motivate students in the learning of this quantitative, analytical subject (Hebrews 4:12). In the following, we will describe how biblical motivations can be incorporated through the teaching of the five steps of the data analytics process.

### INTEGRATING BIBLICAL INSIGHTS IN ANALYTICS STEPS

As mentioned above, in this section we will provide suggestions on how to integrate biblical insights in teaching the steps of data analytics (Proverbs 30:5). We will use the five steps outlined above (Pickell, 2021).

#### Step 1: Define the Objective

In this first step, the business team needs to clearly define the objective of the data analytics project. This step is also known as "asking the right question" (Erdelyi, 2022). Without defining a clear objective or asking the right question, the data analytics project is going to be meaningless, no matter how much effort is spent in the subsequent step (James 1:5). Students can be tempted to skip this step of defining objectives. While a student may be eager to jump to the subsequent steps, they need to learn how to define the objectives for a data analytics project.

Further, in motivating students to learn analytics, before launching into the "hard skill" topics, such as statistics and computer analysis, students will appreciate knowing the objectives. In other words, thinking through the objectives can help students understand why they are learning what they are learning and, therefore, be more motivated to learn business analytics (Proverbs 1:2).

The Bible provides ample teaching on setting up the right objectives for life. For example, in Luke 12, Jesus told the crowd this parable:

The ground of a certain rich man yielded an abundant harvest. He thought to himself, "What shall I do? I have no place to store my crops." Then he said, "This is what I'll do. I will tear down my barns and build bigger ones, and there I will store my surplus grain. And I'll say to myself, 'You have plenty of grain laid up for many years. Take life easy; eat, drink and be

merry.' But God said to him, 'You fool! This very night your life will be demanded from you. Then who will get what you have prepared for yourself?' This is how it will be with whoever stores up things for themselves but is not rich toward God. (Luke 12:16-21)

This parable provides a warning against incorrect objectives. If one's objectives are to store up things for themselves, whether it is gaining profit or attention, eventually one's life will be demanded from the Lord, and one will have to face the reality that God is not concerned with outward appearance or self-serving endeavors; rather God is focused on the heart, a heart that can be transformed by Him to serve His Kingdom and His purposes (1 Samuel 16:7; Galatians 1:10). Data analytics can be used in a variety of business functions as a tool to gain profits, increase website traffic, and enhance social media engagement. However, biblically, this would be a futile exercise, unless one is using analytics ultimately to serve the Lord by seeking the good of others and desiring to store up treasures in heaven as God is glorified (Galatians 5:13-14; Matthew 6:19-20).

Besides Jesus's parables, there are other Scripture passages that can help students think about defining objectives biblically. For example, the account of King Solomon asking for wisdom is in 1 Kings 3:8-14. Solomon said to the Lord,

"And your servant is in the midst of your people whom you have chosen, a great people, too many to be numbered or counted for multitude. Give your servant therefore an understanding mind to govern your people, that I may discern between good and evil, for who is able to govern this your great people?" It pleased the Lord that Solomon had asked this. And God said to him, "Because you have asked this, and have not asked for yourself long life or riches or the life of your enemies, but have asked for yourself understanding to discern what is right, behold, I now do according to your word. Behold, I give you a wise and discerning mind, so that none like you has been before you and none like you shall arise after you. I give you also what you have not asked, both riches and honor, so that no other king shall compare with you, all your days. And if you will walk in my ways, keeping my statutes and my commandments, as your father David walked, then I will lengthen your days."

This passage suggests that our first objective should be to gain wisdom rather than riches or an edge on our competitors (Proverbs 19:20). Data analytics can in business be thought of as a tool to crush competitors (Ganapathy, 2017). We should not define objectives primarily as ways to gain wealth or notoriety or defeat competitors. The Lord's response to Solomon suggests that these other benefits are

byproducts of seeking wisdom and keeping God's commandments (Deuteronomy 4:2).

Using passages such as Jesus' parables or other teachings, even if there is not enough time in class to discuss each passage in great depth, can help business educators ask students the following questions as we define the objectives of a data analytics project:

- (1) Are we treating data as primarily a way to help us describe the world that God created (Manlapig & Ko, 2019) rather than just a tool to enrich ourselves (Genesis 1:10)?
- (2) Is our objective biblically ethical (2 Thessalonians 2:13)?
- (3) How can we use data analytics as a way to provide better products and services to serve others (Matthew 20:28)?
- (4) How can we use data analytics to be good stewards of God's resources, such as improving operational efficiency (1 Corinthians 4:2; 1 Peter 4:10)?

### Step 2: Collect Data

Once the objective has been defined, the next step is to collect data. Biblically, collecting data to facilitate decision-making is not contradictory to placing faith in God's promises. For example, the Lord promised Joshua and the Israelites to inherit the land that the Lord had sworn to give to the Israelites (Joshua 1:1-6), and yet Joshua sent out two spies into the land, who then brought a report back to Joshua (Joshua 2:1-24). As another example, after the flood abated, Noah sent forth a dove to see if the water had subsided. If the dove found no place to set her foot, then the waters were still on the face of the earth; when the dove came back with a freshly plucked olive leaf, Noah knew that the waters had subsided (Genesis 8:6-12). These biblical examples show that collecting data can be a step of obedience in following God's calling.

To be able to gain meaningful insights from a data analytics project, sufficient data needs to be collected. There is a temptation in this step of the analytical process to get data quickly and move on to analysis. However, statistically, no meaningful analysis can be performed unless sufficient data is collected (Albright, 2020). The Bible calls us to be diligent and not lack in our work; thus by grace we seek to not take shortcuts but rather to be diligent in our pursuits for knowledge and wisdom (Proverbs 21:5).

For example, Ecclesiastes 11:6 states, "In the morning sow your seed, and at evening withhold not your hand, for you do not know which will prosper, this or that, or whether both alike will be good." While the verse speaks of sowing seeds, this principle can be applied to data collection as well.

We need to make sure that we collect data comprehensively because we do not know beforehand which sample might contain statistical errors. The only way to address this reality in business analytics is to collect a large enough sample size with attention to detail and a thorough framework in the data gathering process (Proverbs 20:5).

### Step 3: Organize the Data

After the data is collected and before the data can be analyzed, one needs to organize the data. This step, also known as data preparation or data cleaning, can take much time and involve many steps: removing the outlier data points, ensuring the data is accurate, and formatting the data so that it can be properly analyzed (Woodie, 2020).

This step is further complicated by the need to merge data from multiple sources, and this process is also known as extract, transform, and load (ETL) (DaCosta, 2021). Given the importance of this step, various software tools have been developed to help business professionals prepare data (DaCosta, 2021). Despite the availability of these tools, some data scientists believe this is the most time-consuming step in data analytics but even compare this step to vacuuming dirty places (Jing, 2020).

Given the time-consuming, tedious, and laborious nature of the data cleaning step, students can feel unmotivated and discouraged. However, this is an essential step that will prepare students for work in the workforce. Students need to learn tools such as databases to understand how to organize data and retrieve relevant information. In addition, it is in the often laborious and tedious work tasks where students (and everyone) by God's grace can learn the most about a biblical framework of not working unto man (and unto our own desires) but serving Jesus Christ through the quality, effort, sincerity, and consistency of our work (Colossians 3:23-24). There are often no better moments that the Lord can kindly teach this biblical reality than through hard, tedious, and often arduous work. This is often true in that when one sees even the most challenging work circumstances as having Kingdom value for the Lord's glory, then one's heart and mind can have a different attitude and motivation even in the midst of stretching circumstances (Matthew 6:33).

In these moments in class, the instructor can also introduce biblical concepts of patience and perseverance to the students. For example, in James 5:7-9 he writes,

Be patient, therefore, brothers, until the coming of the Lord. See how the farmer waits for the precious fruit of the earth, being patient about it, until it receives the early and the late rains. You also, be patient. Establish your hearts, for the coming of the Lord is at hand.

Do not grumble against one another, brothers, so that you may not be judged; behold, the Judge is standing at the door.

The Lord wants us to be patient in our work. Data cleaning can take much patience, but we will see the fruit only if we are patient. Only after data is thoroughly cleansed and organized can the rest of the data project be useful. Our impatience in any step will render our data project useless. Further, the Bible teaches us not to grumble or complain (Philippians 2:14). It is easy to complain about how boring data cleaning is. And yet, we need to keep a Kingdom perspective and know that our work serves the Lord as stated in Step 1 above; our analytics project's objective is ultimately to glorify the Lord and serve His purposes (Psalm 22:23; Romans 15:6; 1 Corinthians 6:20).

#### **Step 4: Analyze the Data**

After the data is collected and organized, we can now finally start to analyze the data. This step can involve many important forms of analysis, such as exploratory analysis, hypothesis testing, and predictive modeling and can involve skills such as quantitative analysis, statistical analysis, data mining, and machine learning (Pickell, 2021).

This is the step that much of data analytics textbooks are focused on, including topics such as probability, statistics, data visualization, regression analysis, and other modeling techniques (Albright, 2020). In our experience, many students are daunted by the mathematical nature of this step.

One important aspect of learning is that students need to apply critical thinking and discernment (Adams & Schiller, 2015; Manlapig & Ko, 2019). Statistical calculations are only meaningful if analytical thinking and careful human discernment ("soft skills") are applied (Proverbs 14:8; Philippians 1:9; Hebrews 5:14). However, there is simply no replacement for mastering the "hard skills." Students need to master statistics and computer skills to be able to contribute and add value to the business world. Proverbs 22:29 states, "Do you see a man skillful in his work? He will stand before kings; he will not stand before obscure men." Students need to learn to be skillful in data analysis to be effective workers as skillful work provides a platform for effective witnessing in the world. Matthew 5:16 states, "In the same way, let your light shine before others, so that they may see your good works and give glory to your Father who is in heaven." By God's grace, when students (and anyone) can start to see their work as an act of worship unto the Lord and a witness to the world, then hearts can be changed by the Lord to see these skills and skill sets as ways to shine brightly for Jesus and give Him the credit in one's vocation (and life).

As we mentioned in the introduction, the Bible provides much exhortation for sharpening our mind as Christians (Matthew 22:37; Romans 8:6; Romans 12:2). The book of Proverbs provides much teaching on seeking wisdom (Dose, 2012). For example, Proverb 4:5-9 states,

Get wisdom; get insight; do not forget, and do not turn away from the words of my mouth. Do not forsake her, and she will keep you; love her, and she will guard you. The beginning of wisdom is this: Get wisdom, and whatever you get, get insight. Prize her highly, and she will exalt you; she will honor you if you embrace her. She will place on your head a graceful garland; she will bestow on you a beautiful crown.

In the New Testament, while the term "critical thinking" or "analytical thinking" is not used, there are various passages that explain the idea of thinking critically and testing ideas. For example, 1 John 4:1 encourages Christians by stating, "Beloved, do not believe every spirit, but test the spirits to see whether they are from God, for many false prophets have gone out into the world."

In Ephesians 4:11-14, the Apostle Paul writes to Christians in Ephesus,

And he gave the apostles, the prophets, the evangelists, the shepherds and teachers, to equip the saints for the work of ministry, for building up the body of Christ, until we all attain to the unity of the faith and of the knowledge of the Son of God, to mature manhood, to the measure of the stature of the fullness of Christ, so that we may no longer be children, tossed to and fro by the waves and carried about by every wind of doctrine, by human cunning, by craftiness in deceitful schemes.

Learning logical thinking and statistical analysis is a way to help us discern the lies created by human cunning and deceitful schemes (Psalm 7:14; Psalm 58:3; Proverbs 19:5; 1 John 5:19). By God's grace and supernatural, transforming power in Christ Jesus, Christians (and business students in Christian business classes) need to be able to stand firm in a testable Truth rather than being carried about by people's words (Daniel 11:32; 1 Corinthians 16:13; 2 Corinthians 1:24; Galatians 5:1; Philippians 4:1; 2 Thessalonians 2:15; 1 Peter 5:12).

Acts 17:11 also commends the Jews in Berea by stating, "Now these Jews were more noble than those in Thessalonica; they received the word with all eagerness, examining the Scriptures daily to see if these things were so." This is yet another example in the Bible that Christians (and Christian business students) should seek and test the truth and not fall victim to sayings that cannot be supported by data (Galatians 6:4).

### Step 5: Interpret the Data

Interpreting data analysis results correctly leads to sound conclusions, whereas incorrect interpretation of the results can lead to disastrous results. Students through biblically based mentoring in understanding data analytics can find biblical motivations for learning correct interpretation of data.

For example, in Numbers 13, the Lord told Moses to send a man from each tribe to spy out the land of Canaan. While these 12 men went on the same journey and were given the same “data,” Caleb came to a very different interpretation from the other spies. Caleb concluded that they should go into the promised land, and yet the other spies told the Israelites not to go because of the people dwelling there (Numbers 13:25-33). In other words, while Caleb made the correct interpretation of the data, the other spies did not. As a result, the Lord let the other Israelites wander in the wilderness for forty years without possessing the promised land but brought Caleb into the promised land to possess it (Numbers 14:22-24, Joshua 14:6-13).

Such biblical examples should motivate students to carefully consider data interpretation. This process encompasses a series of thoughtful steps, ending with evaluating the analysis results to determine a course of action. Sometimes, the results support the decision that was hoped for or sought after. Other times, insufficient data needs to be corrected or problems arise with data collection, data cleaning, or data analysis, and one would need to repeat or correct these steps. Further, sometimes the data could even show the opposite of what one would like to achieve.

For example: if one’s objective is to use data to show that a marketing campaign has enhanced fan engagement, then first, data would be collected before and after the campaign to better understand both fan expectations and fan experiences. There are several possible outcomes with such a data analytics project: 1) The analysis shows statistical significance in the improvement of fan engagement after the marketing campaign. The interpretation would be that the marketing campaign is effective. 2) The analysis result is inconclusive. This could be due to the sample size, incorrect data cleaning, or simply that the marketing campaign makes no difference. 3) The result could show the opposite of what one hoped for; fan engagement in fact decreased after the campaign.

While data analytics projects could be used to bring about good news, such as the first outcome, in a broken, fallen world, the latter two outcomes can occur often (John 1:10). In the case of inconclusive results, it may mean one needs to repeat steps two through four of the data analytics project, collect more data, and conduct more thorough

cleaning and analysis. In the case of opposite results, it could mean that the objective was incorrect; thus there is the need to redesign the marketing campaign itself.

Students do not always like these latter outcomes; they feel like they don’t accomplish “clean” wrapped up results for their projects, but it is an exercise of humility (James 4:6). By God’s Grace, we all (students, faculty, business professionals) need to present our results and receive feedback with humility. The Bible provides much teaching on humility. For instance, 1 Peter 5:5-6 says, “God opposes the proud but gives grace to the humble. Humble yourselves, therefore, under the mighty hand of God so that at the proper time he may exalt you.” Matthew 23:12 says, “Whoever exalts himself will be humbled, and whoever humbles himself will be exalted.”

Ultimately, data analytics is not a tool to make us proud of ourselves but to help us receive truth in humility (Psalm 86:11; John 14:6). Our preconceived notions could be proved wrong by the data, and this is often a great and humbling process for faculty, students, and business professionals to go through as one learns, grows, and ultimately looks to God for His wisdom (Proverbs 2:6; Daniel 2:21). It is, therefore, not only the learning of data analytics that is critical for business students at Christian higher education schools and colleges of business but also the personal development of Christ-like character through the data analytics research and analysis processes as God uses these vehicles and actions to truly change hearts and refine character (Psalm 33:15; Proverbs 17:3; Ezekiel 36:26).

### CONCLUSION

Data analytics is becoming increasingly important in both the business and higher education worlds. Christian business education (and its students) needs to embrace data analytics as an essential element in the curriculum so that students can be well-versed in understanding analytics and its business applications. However, a challenge is that students often lack motivation to learn statistics, analytics, and quantitative analysis.

Our approach to address this lack of motivation is to incorporate biblical inspirations, applications, and connections to the learning and using of data analytics (1 Corinthians 1:5; 2 Timothy 3:16). While the Bible does not explicitly teach mathematical formulas or computer skills, the Bible provides a plethora of exhortations to love the Lord our God with our mind and to develop our minds as Christ followers (Psalm 26:2; Proverbs 28:26; Jeremiah 17:10; Matthew 22:37; Romans 8:6; 1 Corinthians 14:15).



In addition to critical thinking and seeking insight (and teaching these subjects and grounding them in God's Word), other crucial characteristics in mastering data analytics include diligence, patience, perseverance, and humility (Ephesians 6:18). The Bible provides the best and only true source for Christian business educators in helping students stay motivated to learn and to grow in their hearts, minds, and ultimately in their love for Jesus Christ (2 Peter 3:18). None of these things happen without God first changing the heart and mind, and as Christian business educators, data analytics can be a vehicle used by God in Christian schools and colleges of business to teach the minds of students while shaping and forming their hearts for His Kingdom and glory (Isaiah 6:3; Romans 9:23; 2 Corinthians 1:20).

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