

“Without Compulsory Means”

STEPHEN W. LIDDLE

I was born in Mountain View, California, the second of (eventually) eleven children. We settled in a relatively quiet neighborhood on the east side of San Jose, not far from the rolling foothills that are crowned by the imposing Mount Hamilton, home to the Lick Observatory, “the first permanently occupied mountaintop observatory in the world.”¹ The weather was usually pleasant, even during the warm, sunny days of summer. As spring yielded to summer, the foothills would turn from a verdant green to a cozy, warm brown. But even on hot days, a cool breeze would flow off the bay every afternoon just as temperatures were peaking for the day.

Our subdivision consisted of a single principal street with four cul-de-sacs branching off toward the east. To the south was a walnut orchard that, in a child’s mind, seemed dark and foreboding—the stuff of fairy tales by the Brothers Grimm. To the east was a large strawberry field. One day Mom sent my older brother, Jim, and me out to pick strawberries. I remember doing a lot of picking and eating; I don’t remember bringing much home in the bowl she gave us.

Shortly thereafter, bulldozers and earth-movers took over as Interstate 680 came to our neighborhood. The walnut orchard also gave

way to construction. “Silicon Valley” had to be built, and it seemed we were in the middle of it.

When I was fourteen years old, my father decided to purchase a microcomputer kit. This seemed like a sensible activity for a systems analyst in Silicon Valley. He chose the Heathkit H-89, and it was as amazing in 1979 as an iPad is today! I am sorry to get a little nerdy here, but I need to paint the picture properly. The H-89 was an all-in-one model with a keyboard and a twelve-inch display built right in. Its brain was an eight-bit Zilog brand Z80 CPU² that ran at more than two megahertz (that is more than two million clock cycles per second). The kit came standard with 16K of RAM,³ but since Dad bought three expansion packs over time, we eventually had an entire 56K of RAM in which to lose ourselves. (In contrast, a typical smartphone today has billions of bytes of RAM and executes billions of clock cycles each second.)

Dad let us older boys help build the thing, but, as I recall, I was the most zealous deputy

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in the bunch. We had to bolt and solder all sorts of parts together, and soon enough there was this box—a true marvel of engineering and a testament to not only mankind’s creativity but also our ability to follow complex instructions and manipulate tiny parts. There it was, sitting on our kitchen table with its fan purring, enthusiastically waiting for that next instruction to come in from its mass storage device, a cassette tape recorder. (Yes, it took another upgrade before we could use modern, high-capacity floppy disk technology.⁴)

The computer was built, so what next? I had to learn how to program it. I knew how it was assembled, but I didn’t know how it worked. And I couldn’t leave it alone. My brother Jim was a year ahead of me in school, and he was already attending the digital computer programming class at our high school, Independence High. I was a lowly freshman and hadn’t yet risen to those lofty ranks in which you could get into Mr. McKell’s class and learn the secrets to life, the universe, and digital computers. So I pestered Jim with questions, trying to absorb everything I could about the art of computer programming. Eventually I learned to program in BASIC, then FORTRAN, and then in the Z80 CPU’s assembly language. Ah, those were halcyon days!

My teenage fascination with software development grew into a lifelong love affair. I had found my calling in life: computer science was the discipline for me, and I knew it! I love the process of creating software. You start essentially with a blank canvas and order the universe the way *you* want to order it. You create a computer program very literally as Isaiah described it: “line upon line, line upon line; here a little, and there a little.”⁵ And then, when you run your program, that faithful computer companion does *exactly* what you have told it to do. Absent a hardware failure or other unusual event, the computer exhibits a remarkable trait: in it there “is no variableness, neither shadow of turning”⁶ or “changing.”⁷

The computer reminds me of the amazing stripling warriors in the Book of Mormon. Helaman reported that in battle “they did obey and observe to perform every word of command with exactness.”⁸ The results of that obedience were astonishing, even miraculous.⁹

To an older brother with lots of younger siblings, this was all the more incredible. Have you ever tried to get your younger brothers or sisters to follow your instructions primarily on the strength of your status as the older sibling? It is hard—and not particularly successful, in my experience. I had experienced an epiphany, a revelation: here was this device ready and willing—even eager—to do my bidding to the letter. I could be king, absolute ruler, and sovereign in this kingdom of the H-89. Later, when I read section 88 of the Doctrine and Covenants, something resonated with me:

*All kingdoms have a law given;
And there are many kingdoms; for there is no space in the which there is no kingdom; . . . either a greater or a lesser kingdom.*

*And unto every kingdom is given a law; and unto every law there are certain bounds also and conditions.*¹⁰

Software development is a kingdom, albeit a “lesser kingdom,” and thus it “is given a law,” and to that law we find “certain bounds also and conditions.” There is in some sense a finiteness to the laws of this lesser kingdom. As a PhD student I learned that a simple language with just three particular types of statements is sufficient to write any computable function.¹¹ Certainly for software development, “out of small things proceedeth that which is great.”¹² I have a hope of being able to master those laws and thus have dominion over this kingdom.

Stewardship and Dominion

Dominion, which means sovereignty or control, is a dangerous word in the modern context. Certainly we tend to think of those

who are domineering in a negative light, and we read about “unrighteous dominion”¹³ in the scriptures. No Latter-day Saint wants to be labeled as someone who exercises unrighteous dominion.

But there is also a kind of righteous dominion. The first place in the scriptures that we see the word *dominion* used is in the Creation account:

*And God said, Let us make man in our image, after our likeness: and let them have **dominion** over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth, and over every creeping thing that creepeth upon the earth.*¹⁴

Righteous dominion is more akin to the concept of stewardship, not dominance. There are many positive references to dominion in the scriptures. The psalmist declared of the Lord, “He shall have dominion also from sea to sea, and from the river unto the ends of the earth,”¹⁵ and, “Thy kingdom is an everlasting kingdom, and thy dominion endureth throughout all generations.”¹⁶

The Prophet Joseph Smith and Sidney Rigdon, who saw in vision the kingdoms of glory, noted that dominion increased in the higher kingdoms. For example, “We saw the glory of the terrestrial which excels in all things the glory of the telestial, even in glory, and in power, and in might, and in dominion.”¹⁷ They went on to note that those who dwell in the celestial kingdom inherit glory that exceeds all and that they are “equal in power, and in might, and in dominion.”¹⁸ This is the kind of dominion we want.

Dominion will be our inheritance in the next life to the extent that we are true to our covenants and obey the laws, bounds, and conditions that lead to exaltation. I love the way Doctrine and Covenants 121 describes this process: “No power or influence can or ought to be maintained by virtue of the priesthood,”¹⁹ or, in other words, by virtue of a statement of

some authority or status—“because I said so.” Instead, we acquire power and exert influence

by persuasion, by long-suffering, by gentleness and meekness, and by love unfeigned;

*By kindness, and pure knowledge, which shall greatly enlarge the soul without hypocrisy, and without guile.*²⁰

Something interesting happens as we walk this path and behave according to these principles:

Let thy bowels also be full of charity towards all men, and to the household of faith, and let virtue garnish thy thoughts unceasingly; then shall thy confidence wax strong in the presence of God; and the doctrine of the priesthood shall distil upon thy soul as the dews from heaven.

*The Holy Ghost shall be thy constant companion, and thy scepter an unchanging scepter of righteousness and truth; and thy dominion shall be an everlasting dominion, and without compulsory means it shall flow unto thee forever and ever.*²¹

We want to have influence, or, in other words, power. We are here at Brigham Young University to learn how to become more influential. Each one of us wants to change and bless the world in some way. To do that we need knowledge, skills, and connections to opportunities.

How do we acquire this influence? By becoming more like the Savior—in gentle and meek ways, with genuine love and kindness. We need pure knowledge, an authentic genuineness, and charity, “the pure love of Christ.”²²

Striving for these attributes can at times be difficult to remember to do, such as when project deadlines are approaching or it is final exams week. Pressures build. Sometimes we cram and try to force the required knowledge into our brains or we try to find a quick and easy solution on the web. The fact that we are taking a college course does not entitle us to a

particular set of knowledge. Rather, we must earn it the same way everyone else must: by walking the path of long-suffering patience. Rather than try to force our way, we should instead seek for that distilling “as the dews from heaven” that leads to a condition in which we don’t need to try to force it because “without compulsory means” it comes naturally.

Agency: Thou Mayest

My mother taught me to love the writings of John Steinbeck. There was a copy of *The Grapes of Wrath* in our bookcase, and when I was old enough, not only was I enriched by reading it, but I actually enjoyed it. Eventually I found my way to *East of Eden*, the work that Steinbeck apparently considered his magnum opus. I was fascinated by the novel and its exploration of the universal story of Cain and Abel, set in nineteenth- and twentieth-century America among families any of us might recognize—people who could be us or our neighbors.

In chapter 24 Steinbeck had a character named Lee give an account of studying the Cain and Abel story. He focused in particular on Genesis 4:7, which the King James Version of the Bible translates as “If thou doest well, shalt thou not be accepted? and if thou doest not well, sin lieth at the door. And unto thee shall be his desire, and thou shalt rule over him.”

However, in the American Standard Version, the last phrase is rendered “but do thou rule over [him]” instead of “thou shalt.” The underlying Hebrew word that leads to the differences in translation is rendered by Steinbeck as *timshel*, and it means, essentially, “you may.”²³

The character Lee explained all this in the following key passage from *East of Eden*:

“Don’t you see?” he cried. “The American Standard translation orders men to triumph over sin. . . . The King James translation makes a promise in ‘Thou shalt,’ meaning that men will surely triumph over sin. But the Hebrew word, the word timshel—‘Thou

*mayest’—that gives a choice. It might be the most important word in the world. That says the way is open. That throws it right back on a man. For if ‘Thou mayest’—it is also true that ‘Thou mayest not.’ Don’t you see?”*²⁴

Lee continued:

*“‘Thou mayest’! Why, that makes a man great, that gives him stature with the gods, for in his weakness and his filth . . . he has still the great choice. He can choose his course and fight it through and win.”*²⁵

Steinbeck wove this concept masterfully throughout the story of the families in *East of Eden*. But this is our story too. For each one of us this statement is true: “thou mayest” or “thou mayest not.” The choice is ours.

Father Lehi told his son Jacob that we “are free to choose.”²⁶ In modern revelation, the Lord declared that men and women

should be anxiously engaged in a good cause, and do many things of their own free will, and bring to pass much righteousness;

*For the power is in them, wherein they are agents unto themselves.*²⁷

Within us lies the power of choice. Unlike that trusty H-89 computer, we do not merely mechanically perform whatever is commanded of us. Rather, like my siblings, we choose and then do according to our choice. Because of the Savior’s Atonement, we “are redeemed from the fall” and thus “have become free forever, knowing good from evil; to act for [ourselves] and not to be acted upon.”²⁸

What will you and I do with our agency? Will we learn, improve, and develop our talents?

Agency and Learning

We hope that every member of the BYU community will experience the Aims of a BYU Education:

*A BYU education should be (1) spiritually strengthening, (2) intellectually enlarging, and (3) character building, leading to (4) lifelong learning and service.*²⁹

My question to you is, Will these aims be achieved regardless of your agency? Of course the answer is no! You must choose to accomplish them. None of us who serve as faculty members can impose these aims upon you, nor can any external force. “Thou mayest!” We can encourage, entice, engage, and invite, but whether you experience these outcomes depends significantly on what you are willing to invest in this quest for an education.

Will your testimony and spiritual preparation grow as a result of the things you learn? It is your choice.

Will you dig in and really learn, or will you just get far enough into the material to do well enough on the exams and earn the grade you want? It is your choice.

Will you expand upon what your instructors teach and explore on your own outside of class and independent of course requirements, or will you simply accept what they present and be done with it? It is your choice.

At the Marriott School, Dean Lee Perry often reminds us that we should be “difference makers.” Is that what you will become—a difference maker—or will you be satisfied simply with making it through? Again, it is your choice.

We faculty members are pleased to see the majority of students making the most of their BYU experience.

The Lord taught His Latter-day Saints that we are to actively “seek learning” and indeed that we are collectively to seek this learning. He declared:

*And as all have not faith, seek ye diligently and teach one another words of wisdom; yea, seek ye out of the best books words of wisdom; seek learning, even by study and also by faith.*³⁰

The Lord invited us to employ our agency in learning and in helping others to learn. Is that not a primary purpose of mortality? For “whatever principle of intelligence we attain unto in this life, it will rise with us in the resurrection.”³¹

The Savior repeatedly invited us to learn: “Take my yoke upon you, and learn of me; for I am meek and lowly in heart: and ye shall find rest unto your souls.”³² That sounds to me like experiential learning. The Lord also said, “Learn of me, and listen to my words; walk in the meekness of my Spirit, and you shall have peace in me.”³³

Have you ever asked, “What should my major be?” Shall we read what the Lord wants us to study? He gave a list. The commandment is to learn

*of things both in heaven and in the earth, and under the earth; things which have been, things which are, things which must shortly come to pass; things which are at home, things which are abroad; the wars and the perplexities of the nations . . . ; and a knowledge also of countries and of kingdoms.*³⁴

Okay, maybe that doesn’t answer your question about a major, but whether it is astronomy, geography, geology, history, political science, nursing, computer science, information systems, or any other subject, we are under a divine mandate to acquire a broad and deep education so that we can magnify our callings and fulfill our missions.³⁵

“To be learned is good,” Jacob taught, when we “hearken unto the counsels of God.”³⁶ We are to exercise our agency, take control of our educational agenda, and learn what we decide we will need for our particular mission. “Thou mayest!”

Faculty members have significant degrees of freedom in selecting the research projects they wish to undertake. More than a decade ago a colleague from another college, Richard C. Galbraith, approached me with a scripture

citation index he wanted to share with others. He had indexed the general conference talks from 1942 to the present, and he had also gone through the *Journal of Discourses* and *Teachings of the Prophet Joseph Smith*³⁷ to annotate those materials with scriptures that were used or cited by the authors.

My colleague's key insight was that indexing the conference talks by the scriptures they cited tied the words of ancient and modern prophets together in a way that helps us learn effectively. Dick had typed up this citation index in several different WordPerfect files, and he wanted my help to distribute his work.

As I recall the conversation, it went something like this:

"Steve, would you help me put these on CD-ROM so I can share them with my friends?"

My answer: "No." Then, after a pause, I said, "Let's make a website instead!"

Over the years I have had the help of many students—including, most recently, my own daughter, Rosie, who just graduated with her master of information systems management degree—as we have created multiple versions of the LDS Scripture Citation Index for the web and for mobile devices. Currently, the iOS version is the easiest to use, and the web version is the most feature rich. You can find it at scriptures.byu.edu.³⁸

This project has made a huge impact in my work and in my life. I have been able to study web and mobile software-development techniques because of this work. Thousands of people, including me, have been able to use the citation index over the years to enhance their learning.

We live in a world in which knowledge of all kinds is readily available. Ancient prophets saw a day when "the earth shall be full of the knowledge of the Lord, as the waters cover the sea."³⁹ It is my sincere hope that the citation index contributes to this vision in some small way. I am a better researcher and teacher because of my choice to develop this software,

and this is just one of many useful and interesting projects in which I have been able to participate during my career.

Most of the BYU faculty members I know feel this same way. What a joy it is to exercise our agency in the advancement of knowledge and to build our students in accordance with the Aims of a BYU Education! My PhD advisor, David Embley, retired from BYU not long ago and is now serving a Church service mission at FamilySearch with the goal of applying our data-extraction research⁴⁰ to the task of making family history texts more accessible. He is having so much fun that he reminds me of a kid in a candy store.

And not only faculty members feel this way. As academic director of the Rollins Center for Entrepreneurship and Technology,⁴¹ I have the privilege of working with many successful entrepreneurs who support the center and have joined what we call our Founders Organization. These men and women mentor BYU students because they want to give back and help build the kingdom. I often receive emails reporting how one of our entrepreneur mentors has touched the life of a student in a deep and significant way, changing the mind-set and career direction of a student whose imagination they have opened to new vistas.

I know that this is a real experience for our students because it has also happened to me. Dear friends among the Founders have changed my life, taught me, and helped me better achieve my potential. The Founders are eager learners who want to create, build, and grow. They use their agency to marshal all kinds of resources to build BYU students.

An entrepreneur identifies an important pain that people are experiencing in their lives, explores possible solutions, and then delivers a sustainable solution to eliminate it. Entrepreneurs don't let anything stand in their way. As I see it, entrepreneurship is all about exercising agency to learn how to do good and then using that learning to make the world a better place.

President Thomas S. Monson recently reminded us of another aspect that relates agency, learning, and faith. He said:

*May we choose to build up within ourselves a great and powerful faith which will be our most effective defense against the designs of the adversary—a real faith, the kind of faith which will sustain us and will bolster our desire to choose the right. Without such faith, we go nowhere. With it, we can accomplish our goals.*⁴²

Faith is a choice we make: we can choose to build up faith. We can learn by faith and we can also live in true joy by faith, guided by the Holy Spirit, through whose power we “may know the truth of all things.”⁴³

In Gethsemane, Jesus Christ was faced with a choice: whether to partake of the bitter cup or to shirk this most difficult of responsibilities. To our everlasting benefit, He yielded to the Father’s will.⁴⁴ When He made this singularly momentous choice—this hinge upon which the entire plan of salvation turned—He learned how to accomplish the Atonement, and, as Isaiah expressed it, “by his *knowledge* [this] righteous servant justif[ied] many,”⁴⁵ and, we are told, “with his stripes we are healed.”⁴⁶

President Dieter F. Uchtdorf recently taught:

If you will only lift up your heart to the Savior of the world, He will find you.

He will rescue you.

He will lift you up and place you on His shoulders.

*He will carry you home.*⁴⁷

This power came from knowledge, from learning, and from the righteous exercise of agency.

What will you and I learn with our agency? What will we do with that learning?

“Without Compulsory Means”

The Lick Observatory that I admired from afar as a child sits at an elevation of 4,209 feet (1,283 meters). The elevation of my home in Orem is nearly 4,900 feet (1,494 meters). Literally and symbolically, I start my day well above the tallest thing I could see as a child. Likewise, I have grown and have learned a tremendous amount since those days. My agency has increased, and at the same time I know so very much more than I did decades ago. Perhaps that is saying the same thing. By exercise of agency we learn, and by learning we increase our capability to act, which is agency.

Let me return to the H-89 computer of my youth. I had wanted to control my younger siblings but found that not to be in keeping with the eternal principle of agency—they were not things “to be acted upon.”⁴⁸ However, the computer was. But it was also a spark that ignited a fire within me to learn the laws of software development. Because I was driven by the desire to learn, the effort did not feel strenuous; rather, it was a joy to learn. And that fire burns today. I have a commitment to lifelong learning in this my chosen discipline⁴⁹ and also in the gospel.

Have you ever been absorbed by a project? Have you ever been driven internally by a goal you wished to accomplish? I believe that when we exercise our agency to learn, grow, and accomplish good in this world and when we apply “the principles of righteousness,”⁵⁰ our influence will naturally increase. As we continue on this path, one day we will look back and see that our “dominion [has become] an everlasting dominion, and *without compulsory means* it shall flow unto [us] forever and ever.”⁵¹ I pray that each one of us will be able to find joy in learning “without compulsory means.”

I testify that the power of the Atonement is real. Jesus Christ is our Lord and God, the Redeemer of the world. He can heal us in all things, and He has marked the path for us.⁵²

May each of us follow our Savior as we work to achieve the aims of this unique university and carry out the special mission with which we, individually and collectively, have been commissioned.⁵³ And may Heavenly Father bless each of us, guided by faith and by the Spirit, to find joy in that process. The power is in you.⁵⁴ In the name of Jesus Christ, amen.

Notes

1. Anthony Misch and Remington Stone, “Building the Observatory,” The Lick Observatory Historical Collections, collections.ucolick.org/archives_on_line/bldg_the_obs.html.

2. CPU stands for central processing unit, and a CPU is the computational brain at the core of a modern computer. A CPU executes instructions, each of which take one or more clock cycles to perform.

3. RAM is random-access memory, and 16K is 16,384 bytes of storage. When a computer is powered off, the contents of RAM are typically lost, so RAM is only used to store instructions and data associated with computer programs that are currently running while the computer is on. RAM is much faster than most durable storage technologies, such as hard drives, which do not typically lose data when powered off. See, for example, “Random-Access Memory,” en.wikipedia.org/wiki/Random-access_memory, for a more thorough discussion.

4. *High-capacity*, of course, is a relative term. One of those 5.25-inch floppy diskettes could hold 102K. A standard thumb drive today can hold more than 102,000 of those 102K diskettes. But compared to cassette tape storage, the floppy disk drive was a true delight.

5. Isaiah 28:10; see also Isaiah 28:13; 2 Nephi 28:30; D&C 98:12; D&C 128:21.

6. James 1:17.

7. Mormon 9:9.

8. Alma 57:21. This is the only time the word *exactness* is used in the scriptures.

9. See Alma 57:25–27.

10. D&C 88:36–38.

11. See Martin D. Davis and Elaine J. Weyuker, *Computability, Complexity, and Languages: Fundamentals of Theoretical Computer Science* (New York: Academic Press, 1983). The language is denoted “script S” (S set in a script typeface). It has variables that hold integer values, and each variable starts with the value of 0. The three statements are (1) increment variable by one, (2) decrement by one, and (3) if variable is nonzero, go to a specific location in the program. From these primitive operations we can build any computable function.

12. D&C 64:33.

13. D&C 121:39; see also verse 37.

14. Genesis 1:26; emphasis added.

15. Psalm 72:8; see also Zechariah 9:10.

16. Psalm 145:13.

17. D&C 76:91.

18. D&C 76:95; see also verses 92 and 94.

Compare with D&C 84:33–38.

19. D&C 121:41.

20. D&C 121:41–42.

21. D&C 121:45–46.

22. Moroni 7:47.

23. See John Steinbeck, *East of Eden* (1952), chapter 24, part 2.

24. Steinbeck, *East of Eden*, chapter 24, part 2; emphasis in original.

25. Steinbeck, *East of Eden*, chapter 24, part 2.

26. 2 Nephi 2:27.

27. D&C 58:27–28.

28. 2 Nephi 2:26; see also verse 27.

29. *The Mission of Brigham Young University and The Aims of a BYU Education* (Provo: BYU, 2014), 5.

30. D&C 88:118.

31. D&C 130:18.

32. Matthew 11:29.

33. D&C 19:23. Notice in this verse how learning is accompanied by feelings of peace that we know as “the fruit of the Spirit” (Galatians 5:22; see also Ephesians 5:9).

34. D&C 88:79; see also verses 78–82. Note especially how verse 82 reinforces the concept

of agency. We will have no “excuse” but rather will assume responsibility for our own choices.

35. See D&C 84:33; also D&C 88:80.

36. 2 Nephi 9:29.

37. Deseret Book published this latter work as *Scriptural Teachings of the Prophet Joseph Smith* in 1993.

38. See Stephen W. Liddle and Richard C. Galbraith, LDS Scripture Citation Index, scriptures.byu.edu. The LDS Scripture Citation Index app is available at no charge in Apple’s App Store; see itunes.apple.com/us/app/lds-scripture-citation-index/id380114655.

39. Isaiah 11:9; see also Habakkuk 2:14.

40. See Data Extraction Research Group, deg.byu.edu, for links to many of our papers and presentations.

41. See Rollins Center for Entrepreneurship and Technology, marriottschool.byu.edu/cet, for more information.

42. Thomas S. Monson, “Choices,” *Ensign*, May 2016.

43. Moroni 10:5.

44. See D&C 19:18–19; 3 Nephi 11:11; Matthew 26:39; Mark 14:36; Luke 22:42.

45. Isaiah 53:11; emphasis added.

46. Isaiah 53:5.

47. Dieter F. Uchtdorf, “He Will Place You on His Shoulders and Carry You Home,” *Ensign*, May 2016.

48. 2 Nephi 2:13, 14, 26.

49. One could argue that to be successful in my profession, such a commitment is required.

50. D&C 121:36.

51. D&C 121:46; emphasis added.

52. See “How Great the Wisdom and the Love,” *Hymns*, 2002, no. 195, verse 4.

53. See D&C 88:80.

54. See D&C 58:28.