



A Liberal Education Matters: A Comprehensive Look at the Hidden Truth on the Value of
Liberal Arts and Sciences Degrees and Why It Will Always Be Needed

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Abstract

To understand the issue with the liberal arts and sciences debate, this paper gives a brief overview of the origin of liberal arts. The paper goes into the history of classical education and explains the transition to applied sciences education. Before delving into the significance of STEM, the paper explains why liberal arts and sciences degrees are important and why such fields are needed to compete successfully in a global and innovative economy. Then the paper goes into explaining how STEM came to make its presence in education, the value of STEM to society, and why there is such a push from federal and state government to fund STEM programs. The next few sections of the paper discusses the earning potentials of liberal arts graduates, the relationship between a college major and occupations, and a summary of employers' viewpoint, illustrating the weight many employers place on a liberal education.

Finally, this paper discusses the urgent need for students to possess broader skills and how students can benefit from receiving both a STEM education and a liberal arts and sciences education. The paper explains the danger of students being half-educated, and provides examples of how collaboration between the two types of education produces positive results. To that effect, many college presidents and business leaders have fully supported this collaboration, saying that having both a STEM *and* a liberal education will greatly help students achieve long-term personal and professional success. Changes in society, resulting from globalization and technological advances, have improved the standard of living and have subsequently paved the way for the fields of science, technology, engineering, and mathematics (STEM) education to overshadow a liberal education. But a liberal education still matters because of the knowledge, skills, and abilities students can gain from such a broad education—an education that will undoubtedly help students succeed in the changing and unpredicted world.

Introduction

There is an ongoing debate in higher education regarding the value of liberal arts and sciences degrees and the value of a liberal education. As college tuition continues to rise and student debt continues to be a problem, the question of whether a liberal education is still relevant becomes a legitimate concern among current and prospective students. It seems now, more than ever, that liberal arts and sciences advocates continually have to defend their field of studies from the so-called “important and useful” fields making up STEM¹ (science, technology, engineering, and mathematics). There are several reasons why liberal arts and sciences degrees are heavily criticized. Reasons include, but are not limited to, salaries, unemployment rate, and demand for workers with applied (i.e., technical) skills. In addition to these reasons, STEM majors are constantly receiving praise and approval from society, which, as a byproduct, may explain why liberal arts and sciences majors are negatively portrayed in numerous media platforms (e.g., Huffington Post, NY Times, school newspapers, etc.).

Yet contrary to popular beliefs about the diminishing value of liberal arts and sciences degrees, research results compiled by notable organizations (such as the American Academy and NEF: The Innovation Institute) and notable leaders (such as Colorado College President Jill Tiefenthaler and Duke University President Richard Brodhead) have led researchers to a different conclusion. Based on the research, a liberal education is the type of education that will help students achieve life-long success, both personally and professionally, because of the knowledge, skills, and abilities that students will gain (AAC&U, 2013, para. 1). The biggest challenge facing the liberal arts and sciences advocates is why this message is not getting

¹ Under the STEM Education Act, passed in February 2015, the definition of STEM has expanded to include computer science. For purposes of this research paper, STEM is restricted only to mean science, technology, engineering, and mathematics (Smith & Esty, 2015, para. 2).

through to critics. Presently, an abundant amount of data and anecdotes support the claim that students with a liberal education have skills that employers are seeking. On top of that claim, research studies also show that liberal arts and sciences graduates do earn more money over the course of their career and are more likely to get promotions. Despite these benefits, there are still critics (e.g., Pres. Barack Obama and Gov. Rick Scott) who continue to push for STEM programs at the cost of the liberal arts and sciences programs.

The reality is that students need to have training in both the liberal arts *and* training on the technical side (derived from a STEM education) in order to make them more marketable and more valuable to employers. The job market changes frequently, and thus colleges and universities should avoid preparing their students for a specific job. The unpredictability of the future is a key reason why students need to have general skills that can be transfer to any job. Collaboration between STEM and the liberal arts and sciences will provide countless opportunities, not just for advancement in a person's career, but also for helping the United States maintain its competitive edge and deliver results that will improve society's standard of living. In essence, this paper is intended for the general public and it will highlight the value of a liberal education, dispel myths about the usefulness of liberal arts and sciences degrees, and provide evidence detailing why a liberal education is needed (and will always be needed) in the changing world.

Definitions and the Origin of Liberal Arts

The term *liberal arts* is sometime used interchangeably with words such as *liberal arts and sciences* and *liberal education*. While such words may appear similar in meaning, the denotation separates the set of words into distinct categories. The Association of American Colleges and

Universities has defined some of the commonly confused words associated with liberal arts to point out the nuances:

- **Liberal Arts:** While this term is sometimes used to describe all the arts and sciences disciplines, the term refers only to disciplines in the humanities and social sciences;
- **Liberal Arts and Sciences:** Disciplines spanning the humanities, sciences, and social sciences. For example, humanities disciplines include such fields as literature and philosophy; sciences include such fields as biology and physics; and social sciences include such fields as political science and sociology;
- **Liberal Education:** An approach to college learning that empowers individuals and prepares them to deal with change, complexity, and diversity. This approach emphasizes broad knowledge of the wider world as well as in-depth achievement in a specific field of interest. It helps students develop a sense of social responsibility, strong intellectual, and practical skills that span all major fields of study (such as analytical, communication, and problem-solving skills), and the demonstrated ability to apply knowledge and skills in a real-world settings. This approach to education can apply to the full range of majors, including not only humanities and social sciences, but also sciences, engineering, and professional fields;
- **General Education:** The part of a liberal education curriculum that is shared by all students. General education provides broad exposure to multiple disciplines, and forms the basis for developing essential civic, intellectual, and practical capacities. It can take many forms, and increasingly includes introductory, advanced, and integrative forms of learning. (AAC&U, 2013)

It is equally important to be acquainted with the origin of the term *liberal arts*. “Liberal” from *liberal arts* originally meant “appropriate for free men,” which was a proper education for the social and political elite during the classical period (Kids.Net.Au, 2014, para. 1). To put it another way, a liberal arts education was intended to help distinguish free people from slaves; it was seen as an education that was suitable for individuals in order to engage in civic life. For centuries, the liberal arts have represented the opposite of professional or vocational training, i.e., the study of liberal arts was devoted to the classics and steered clear of study for a particular trade (Kids.Net.Au, 2014, para. 1). The original purpose for studying the liberal arts was to shape individuals to a higher order of thinking and to develop their intellectual skills, which would then allow individuals to make well-informed decisions in the public sphere. Yet, even as society continues to progress to a more advanced and technological world, this liberal arts purpose still holds true in the modern age.

The Ancient Greeks understood the interrelationship between the classics and the trades. By the Middle Ages, the liberal arts had solidified into seven arts, organized into two groups. The first group, the trivium (or “the three roads”), consist of grammar, logic, and rhetoric. This group focused on thought and communications. The second group, the quadrivim (or “the four roads”), consist of arithmetic, geometry, astronomy, and music. And this group focused in the sciences of the time (Bevins, 2011, p. 75). Though the focus of the two groups differs, the trivium and quadrivium have a symbiotic relationship: the trivium prepared students to study the subjects contained in the quadrivium and in turn, the quadrivium prepared students for the ultimate pursuit: studying philosophy and theology, the pinnacle of educational studies (Courtney, 2011, para. 3). Author Jennifer Courtney reminds us that the Ancient Greeks believed in fully educating and preparing individuals to be life-long learners and leaders in their

community. For the Greeks, a classical education was seen as a logical progression in a student's academic studies, with students mastering each art before advancing to the next order of study. The Greeks understood that students must work through the trivium and quadrivium and study the arts in collaboration as preparation for their intellectual and moral developments.

Moreover, in the 1984 book *Politics*, Aristotle emphasizes that the study of the liberal arts is vital for individuals to know, both because of the nature of the disciplines and because of its relationship to other learning. Educational institutions customarily teach students four subjects: letters, drawings, gymnastics, and music (p. 230). He believes that these subjects are capable of more than just being useful for society. The liberal arts subjects were viewed beyond its intended use that promoted excellence, to subjects that individuals can study for their own intellectual enjoyment. Aside from studying these subjects for their utility, Aristotle believes that other sorts of learning are made possible through the liberal arts (pp. 231–232). He did not believe that a person could understand certain aspects of life (e.g., different disciplines in academics) without first understanding the liberal arts. The Ancient Greeks saw education as a long-term commitment and understood the importance of life-long learning. They did not view the liberal arts, or an individual's education, to be for the short-term.

Largely, the Ancient Greeks understood the role that education plays in shaping individuals for life after their schooling days are complete. Their focus was on educating individuals for the end goal, which is to teach and pass on the individual's knowledge to other learners. Today, the goal of studying the liberal arts is to prepare students for that end goal as well, but also to cultivate general skills that apply to all studies. In "The Public Value of the Liberal Arts" John Agresto (1999), former president of St. John's College, writes, "Liberal arts

do not aim at production and they do not aim at producing producers, as the servile arts² do” (p. 40). Said differently, the liberal arts aim is to produce individuals who can think and make informed decisions for themselves. The goal is not to produce workers whose main motive is to make money through their profession. In James Daniels’s (2009) article “Liberal Arts and Servile Arts,” he concurs with Agresto’s view on the goals of studying the liberal arts. While the servile arts goal is to cultivate skills for a given trade, the goal of liberal arts is to develop general skills that can be applied on a universal scale (para. 2). In short, the study of liberal arts is about more than just teaching students what they need to know for a specific job or trade. Rather, this kind of liberal arts study is fixated on skills that are needed beyond a vocation.

The evidence presented so far implies that a liberal arts education is technically referred to as a liberal education.³ As stated by Robert Balmer, a liberal education has historically referred to the “arts, humanities, and the sciences” (as cited in Bevins, 2011, p. 10). Since the time of Aristotle and Plato, “Higher education was built on the foundation of a liberal education—a broad curriculum spanning art, history, literature, mathematics, philosophy, sciences, and social sciences—that is intended to prepare an individual to think critically participate in civic life, and continue to be life-long learners” (Sandeem, 2013, para. 2). Agresto (1999) note that a liberal education is seen as a *freeing* education, as a movement from opinions handed down by the community, to knowledge based on one’s research. A liberal education teaches individuals to overturn unfounded opinion and to establish their own position (p. 40) by taking multiple viewpoints, conducting research, and coming to a sounded conclusion based on

² “The servile arts represented specialized tradesman skills and knowledge needed by persons who were employed by the elite; the liberal arts thus initially represented the kinds of skills and general knowledge needed by the elite echelon of society” (Masonic Council, 2005).

³ When used in this paper, liberal education and liberal arts education are used interchangeably, but mean the same thing.

in-depth analysis. Hence, the term *liberal* is thought of in the sense of liberating the mind, i.e., freeing the mind from bias, prejudices, and unjustified assumption, and to encourage individuals to not just rely on what they are told, but instead to discover the truth for themselves.

Why Education has Shifted from the Classics to Applied Sciences

As technology progressed, the purpose of education has slowly shifted from the classical studies to applied studies as a way to support the economic development. This shift in education away from the classics (i.e., the liberal arts) is in part because of America's thirst for profit. American philosopher Martha Nussbaum (2010) agrees with this shift: "Indeed, what we might call the humanistic aspects of science and social science—the imaginative, creative aspect, and the aspect of rigorous critical thought—are also losing ground as nations prefer to pursue short-term profit by the cultivation of the useful and highly applied skills suited to profit-making" (p. 2). She concedes that the field of STEM is the driving force behind the economic development. And it is because of America's thirst for this economic development that we are seeing less and less financial and moral support for the liberal arts and sciences. Echoing Nussbaum's stance is the American Academy of Arts and Sciences. In its report, *The Heart of the Matter*, the authors confirm this profit motive: "America is in a time period where economic anxiety is driving the public toward a narrow concept of education focused on short-term payoffs provided by a STEM education" (American Academy of Arts and Sciences, 2013, p. 32). America's education system is focus on subjects that will help sustain and support the country's economic development. There is no place for the liberal arts and sciences if no tangible benefits results that can help the country economically. As a result, the liberal arts and sciences are being overshadowed tremendously in favor of the STEM fields.

STEM is a program of study that is endorsed by the federal government and other higher educational institutions. The origin of the STEM movement can be traced back to as early as 2006. In the fall of 2006, the U.S. Department of Education's Commission on the Future of Higher Education released a report that showed a critique of unequal access to higher education. Titled *A Test of Leadership: Charting the Future of U.S. Higher Education*, the report's subject matter focused on education for national economic gain. The Department of Education (DOE) concentrated on the deficiency presented in the science, technology, and engineering—only highly applied learning that can quickly generate profit. The DOE did not examine the humanities or the arts (Nussbaum, 2010, p. 3), suggesting that these disciplines, according to the U.S. Department of Education, are generally not associated with helping society achieve national economic gain. Compared with STEM, the federal government sees no economic benefits in supporting the liberal arts and sciences. Thus, the absence of the liberal arts and humanities field in the report is a sign that the government wants to direct federal dollars to fueling only the type of education that, according to their beliefs, will help society economically.

Even though the shift in education has moved toward applied sciences, a liberal education has been able to retain its presence in universities. In her article "Confronting the Liberal Arts Conundrum," Cathy Sandeen (2013), vice president of education attainment and innovation for American Council on Education, explains how a liberal education has been able to survive in universities' curriculum originally. Before the Morrill Act of 1862, education was built on a liberal arts foundation. After the Act was passed, it helped create land grant universities. To provide support for the growing economy, U.S. higher education expanded its capacity in the applied sciences to provide citizens with more specialized and technical education (para. 7); the Morrill Act was set up to establish institutions that would educate people in areas deemed

practical at the time (e.g., agriculture, home economics, mechanical arts, etc.) (Bremer, 2008, para. 4). Arguably, universities did not eliminate the liberal arts programs because there is still a need for a general education: “By requiring a four-year curriculum with broad foundational general education requirements, the liberal arts tradition lived on in these programs and produced professionals with both specialized vocational knowledge, combined with broad contextual understanding” (Sandeen, 2013, para. 7). Some colleges and universities see non-monetary value in studying the liberal arts and sciences, including its broad-based application. The essence of Sandeen’s article is to emphasize the point that even as economic development occurs, the role of higher education has stretched to accommodate (e.g., by incorporating STEM into the curriculum) the changing demands brought on by society, even while keeping the liberal arts intact because of its usefulness in individuals’ learning and careers.

Unfortunately, this liberal arts tradition has been losing its place in the minds of administration at colleges and universities across the nation. Generally, schools in the higher education sector have at least three goals in mind when they are altering their curriculum: helping students get a particular career immediately post-graduation, increasing job placement rates, and preparing students to add their knowledge, skills, and abilities to help the economy prosper in beneficial ways. An article in *Liberal Education* followed up on a 1990 study in which a group of researchers examined whether 212 liberal arts colleges still meet David Breneman’s criteria to be defined as liberal arts institutions.⁴ The researchers determined that only 130 of

⁴ David Breneman’s methodology for classifying liberal arts colleges included Liberal Arts I institutions (now Baccalaureate Arts and Sciences, as defined by the Carnegie Foundation) and Liberal Arts II institutions (now Baccalaureate Diverse Fields, as defined by the Carnegie Foundation). Liberal Arts I institutions award more than half their undergraduate degrees in the arts and sciences. Liberal Arts II institutions are less selective and award less than half of their degrees in arts and sciences, but are too small to be categorized as comprehensive colleges as defined by the Carnegie Foundation classification system used by Breneman. In addition, when categorizing Liberal Arts I institutions, the researchers removed any liberal arts college that was a mini-university or a “liberal plus” as described by Breneman. These institutions offer an array of graduate programs, sometimes including law and even

those colleges, in the year 2000, still meet the criteria of a liberal arts college—a 39 percent decline. Only a handful of those liberal arts colleges have closed, and the rest have adopted a more pre-professional or vocational curriculum while still calling themselves liberal arts colleges (Baker, Baldwin, & Makker, 2012, pp. 50–51). These changes in liberal arts colleges have resulted in a 29.1 percent rise in students studying vocational majors during 2007–2008, as Victor Ferrell acknowledges in his book *Liberal Arts at the Brink* (Chopp, 2012, para. 20). Administrators at these traditionally focused liberal arts institutions are responding to the market demand by redefining the school’s mission. In effect, this growing vocational orientation has eroded the core mission of liberal arts colleges. But even with liberal arts colleges evolving into institutions that have increasingly focused its attention on professional programs, some liberal arts colleges still cling to its root of what it means to be a liberal arts college: small class size, close faculty-student interaction, service learning and community engagement, and a rich and diverse co-curricular life. These liberal arts colleges do not want to lose the battle to STEM, and thus, they are tightly holding onto the characteristics that give them their liberal arts identity.

To maintain a competitive edge in the real world, colleges and universities should be preparing students to use their knowledge, skills, and abilities in a variety of circumstances, as it requires. Sandeen (2013) recognizes the changing environment in the work world and firmly believes that a liberal education equips students with the proper skill set to keep up with the changes:

We need people who have both specialized knowledge and underlying competencies such as communication and critical thinking skills, analytical ability, creative problem solving,

doctoral programs. When classifying Liberal Arts II institutions, the researchers used Breneman’s 60 percent rule, meaning that any institution that awarded 60 percent or more of its degrees in professional fields was removed from the list of liberal arts colleges entirely (Baker, Baldwin, & Makker, 2012, p. 50).

teamwork and global cultural awareness, all of which allows a person to continue learning and adapt over time. That is a crucial ability in a world where most good jobs will constantly change as technologies continue to evolve. (para. 3)

The concern of students to want to major in a field and to concentrate on courses designed to increase their competencies (and by extension, their financial gain) in a given area has disadvantaged the U.S. as innovative countries begin to adopt a broad-based knowledge learning style. Carol Christ (2012), former president of Smith College, reveals that surveys in China and Japan have shown that employers are not happy with their workforce. The workforce is entering into organizations untrained on creativity and problem solving, and to fix this gap, schools in these countries are turning to a broader education (para. 5). The lack of creativity and problem solving is troublesome, not just for those innovative countries, but also for the United States. Colleges and universities are under pressure from employers worldwide to graduate a generation ready to work, and consequently, one way to accomplish this task is to adopt an education that is more broad-based.

At a time when America is slowly turning its attention away from a liberal education, some of America's competitors (e.g., competitors located in Asia) are considering adopting a liberal education as its key ingredient to boost its economy and drive innovations. America is not alone when it comes to groundbreaking innovations. Universities in Asia, for instance, are turning toward a liberal arts education as a necessary tool to help their economy (Christ, 2012, para. 5). Jack Ma, the founder of China's Internet behemoth Alibaba, held that "the Chinese are not as innovative as Westerners because China's educational system, which teaches the basics very well, does not nourish a student's complete intelligence, allowing her to range freely, experiment and enjoy herself while learning" (Zakaria, 2015, para. 11). Asian countries are

known for their technical, skilled workforce. But countries like Japan and South Korea are learning that having a technical workforce is not enough to help the country with innovation and economic success (Zakaria, 2015, para. 10). As thriving nations begin to turn toward a liberal education to give them an advantage over their competitors, colleges and universities in America need to recognize the global significance of this type of education. The American education system needs to shift their focus back to incorporating the arts and sciences in their academic curriculum if they want to have the upper hand in the competitive market.

Despite the push to study the liberal arts and sciences from individuals such as Cathy Sandeen and Carol Christ, some liberal arts and sciences programs have been eliminated from colleges and universities as society continues to move to a more capitalistic world. Part of the reason for the elimination of these programs, and perhaps the biggest one, has to do with lack of funding. During 2010 and 2013, the appropriation for the National Endowment for the Humanities was slashed by more than 16 percent (Brodhead, 2013, para. 12). These kinds of major cuts in funding spell bad news for liberal arts programs, as they continuously struggle to maintain its existence in a STEM-dominated world. In a *New York Times* article by Tamar Lewin (2013), she presents an example of the effect that lack of funding has on the survival of the liberal arts: “At some public universities, where funding is eroding, humanities are being pared. In September, for example, Edinboro University of Pennsylvania announced that it was closing its sparsely populated degree programs in German, philosophy, and world languages and culture” (p. 1). In a technological-driven world, many students see no value in investing their time and money studying fields they find worthless. They want classes in engineering and business, classes that can prepare them to get jobs. But this kind of mindset is dangerous for the liberal arts. Student enrollment is the lifeblood of liberal arts programs. Without student enrollment in

liberal arts programs, federal and state governments have no basis for providing funding. Without financial support, some liberal colleges are forced to redefine their identity, or face closure. For example, in March of 2015, Mary Baldwin College, a small, private college in Virginia, announced its strategic decision to create new colleges of education and health professions to stabilize the financial state of the school and to attract more students (Jacobs, 2015, para. 6). Other colleges have merged with other colleges as their strategic approach; for instance, Tennessee Temple University announced in March of 2015 its merger plan with nearby college Piedmont International University (Bidwell, 2015, para. 2). But there are some colleges that are unable to meet its financial obligations and have to resort to closing the school. Financial challenges, along with declining enrollment, has resulted in Sweet Briar College, a 114-year-old small, private college, to make the administrative decision to close the school⁵ (Bidwell, 2015, para. 2). Other liberal arts colleges who are facing similar challenges may soon follow in its steps. These prime examples illustrate the negative effect that lack of funding can have on the survival of some liberal arts and humanities degree programs. Lack of academic funding is not only hurting higher educational institutions in general, but also is hurting student's intellectual growth by depriving them of a liberal education.

The liberal arts tradition may not be able to survive long in universities' curriculum without enough financial support. But there is a growing consensus among schools to require students to take liberal arts and sciences classes, regardless of their major. It is difficult, however, for university administrators to offer a mix of liberal arts classes alongside STEM classes if there is an imbalance in outside funding (i.e., more money is going toward STEM

⁵ At the writing of this paper, Amherst County Attorney Ellen Bowyer filed a lawsuit on behalf of the Commonwealth of Virginia seeking an injunction to stop the closure of the school (Eanes & Weingast, 2015, para. 1).

programs, and very little, if any, are going toward the liberal arts and sciences programs). But this imbalance in funding exists for specific reasons. John Tresch, a historian of science at the University of Pennsylvania, said, “There’s an overwhelming push from the administration at most universities to build up the STEM fields, both because national productivity depends in part on scientific productivity and because there’s so much federal funding for science” (as cited in Lewin, 2013, p. 2). For instance, in July of 2014, Jacksonville University received a grant for \$625,273 from the National Science Foundation to help fund the school’s STEM Degree Programs (Burr, 2014, para. 1). From this case, it is reasonable to conclude that it is not just the federal government that supports STEM programs, but also national organizations whose aim is to encourage students to take a STEM path. As Tresch points out, STEM fields have provided significant contribution to society, which is why there are an outpouring number of supporters to increase the study of STEM and continuous dollars being spent to fund such programs, leaving no means to help the liberal arts and sciences programs.

Contributions to society, such as economic productivity and improved standard of living, are not the result of STEM fields alone. The liberal arts and sciences play an instrumental role as well. Regardless of the research and studies supporting the liberal arts and sciences, not all leaders are convinced of its importance to society. For instance, the governor of Florida, North Carolina, and Texas has all announced that they do not intend to spend taxpayer money subsidizing the liberal arts. Even President Obama has told students that a technical training could be more valuable than a degree in art history (Zakaria, 2014, para.2). As STEM critics continue to sound the alarm for more scientists and engineers, the liberal arts and sciences fields will continue to be scrutinized by educational institutions, governmental leaders, and stakeholders who see more value in STEM programs. The current attention of America is on

what STEM fields have done so far and what it can potentially do for society, leaving little room to appreciate the world of the liberal arts and sciences beyond its perceived monetary value.

The shift in education (from the classics to applied sciences) has also been the result of students' demands and preferences, and to an extent, the result of society's demands and preferences. In a *New York Times* article, national reporter Kate Zernike (2009) describes the dramatic changes in students' perspectives over the last 40 years: "Consider the change captured in the annual survey by the University of California, Los Angeles, of more than 400,000 incoming freshmen. In 1971, 37 percent responded that it was essential or very important to be 'very well-off financially,' while 73 percent said the same about 'developing a meaningful philosophy of life'" (para. 7). Decades later, in 2009, the values were nearly reversed: "78 percent identified wealth as a goal, while 48 percent were after a meaningful philosophy" (para. 8). Zernike observes that the shift in students' attitudes is reflected in a shift in schools' curriculum. Colleges and universities have to answer to students and parents who want to know what the return on investment is for an education, especially as the cost of education rises and student debt soar exponentially. It is understandable that schools need to adapt to the demands of their time, but that does not mean that schools should abandon one type of education (i.e., a liberal education) in favor of another (i.e., STEM) because of its growing demand and popularity. Colleges and universities needs to get the correct message out there that students, in order to be successful in the long run, need to be fully educated in their studies by taking courses in both liberal arts and sciences *and* STEM fields.

The Importance of Liberal Arts and Sciences Degrees and a Liberal Education

Some individuals caution the danger of getting rid of liberal arts programs. In Martha Nussbaum's (2010) book *Why Democracy Needs the Humanities*, she outlines a worldwide crisis in education. According to her, the study of liberal arts helps produce virtuous, whole citizens. But rather than focus on the long term future of America, the current focus is on producing national profits and being ahead of other countries in innovations (p. 2). This focus of trying to be at the fore front of producing a generation of STEM leaders to bolster the economy has inevitably led some colleges and universities to cut funding and slash liberal arts and sciences programs—programs that produce virtuous, whole citizens who are needed to help keep democracies (i.e., society) functioning well. As Nussbaum (2010) writes, “If this trend continues, nations all over the world will soon be producing generations of useful machines, rather than complete citizens who can think for themselves, criticize tradition, and understand the significance of another person's sufferings and achievements” (p. 2). America's narrow focus on immediate profits and its failure to consider the long-term benefits of having workers with a liberal arts and sciences training will result in workers incapable of creativity or independent thought. Such a clouded perspective will hurt future generations and the future health of the nation.

Nussbaum's implication that colleges and universities are producing “useful machines” is not far from the truth. Studying STEM produces stock skills, skills that are common and shared among other STEM graduates. Stock skills gained from studying STEM include the following:

Analytical skills to research a topic, develop a project plan and timeline, and draw conclusions from research results; science skills to break down a complex scientific

system into smaller parts, recognize cause and effect relationships, and defend opinions using facts; mathematic skills for calculations and measurements; attention to detail to follow a standard blueprint, record data accurately, or write instructions; technical skills to troubleshoot the source of a problem, repair a machine or debug an operating system, and computer capabilities to stay current on appropriate software and equipment. (iseek, 2014, para.1)

These types of stock skills can be taught on the job. What is blatantly missing from this list is any mention of soft skills, like creativity and critical thinking. When students only take STEM courses, it deprives them of the soft skills training that is needed in today's workforce. Acquiring soft skills is best achieved through liberal arts and sciences courses. While having the skills gained from STEM courses is desirable—and most definitely needed by society— individuals with stock skills have a set of skills that is narrowed to a specific profession, and without access to a liberal education, these STEM graduates will experience limited opportunities for growth and advancement. Schools are producing “machines,” but society need individuals with soft skills that make them unique and stand out from the crowd. In effect, society needs individuals with a liberal arts and sciences background, not another machine that can make widgets.

In addition to educators advising students to study the liberal arts, employers, too, prefer candidates with some liberal arts training. In Kathleen Haney's (2013) article “The Liberal Arts and the End of Education,” she adds that studying the liberal arts produces a well-rounded individual, a trait many employers look for in their candidates. This type of well-rounded individuals that results from a liberal arts training is the key reasons employers want them: “Training in the liberal arts produces a free and thoughtful person who can read anything written, understand anything spoken, and communicate clearly what he or she wants to say. Education in

the liberal arts is not directed toward a specific goal, but to the development of the human powers, which could be turned to any intellectual endeavor” (para. 8). With individuals switching careers frequently over the course of his or her lifetime (e.g., 6–10 times), the liberal arts route is the most ideal way to ensure employability and marketability. The fact that a liberal arts education does not have a direct occupation linked to it works in favor of the person who underwent such training, because such individual is not restricted to seek employment in a given industry with his or her limited stock skills. For those with a liberal arts training, they have a better chance at adapting to different careers in different industries than those with STEM training. The ability to think and speak clearly, correctly, and critically is both essential to any of the endeavors which students most commonly pursue, and also is a common set of skills favored by many organizations.

Though some individuals have already begun to recognize the value of liberal arts and sciences degrees, not everyone has fully appreciated its role in society. Many students, for example, do not grasp the concept that the study of liberal arts and sciences offers helpful skills that will help them sort out values, handle conflicting issues, and answer fundamental complex questions, among other facets of life that Haney described in her article. In addition, some educators (presumably those who are pro-STEM education) also do not see value in studying the liberal arts and sciences, and as a result have acted upon their attitude. According to the American Council of Trustees and Alumni, a non-profit organization committed to academic excellence, “Fewer than two in five colleges require a single literature course, fewer than one in five require American history or government, less than 14 percent have an intermediate-level foreign language requirement, and less than 5 percent require basic economics” (Riley, 2013, p. 27). These data help confirm the reality that colleges and universities have already responded to

the STEM movement by requiring students to take fewer liberal arts courses, which would in turn add room on students' schedule to take STEM-related courses. Leon Bostein, president of Bard College, said, "We have failed to make the case that those skills [skills gained from studying the liberal arts and sciences] are as essential to engineers and scientists and businessmen as to philosophy professors" (as cited in Lewin, 2013, p. 2). Partly because of the government and partly because of the media, the significance of the liberal arts and sciences degrees are still not made clear. The focus of higher education is being driven by the high demand and popularity of STEM, and as a result, the liberal arts and sciences degrees have taken a back seat. It needs to be established that the value of a liberal education and the value of liberal arts and sciences degrees extends well beyond its earning and employment prospects.

It is safe to assume that the federal government is too single-mindedly focused on the pursuit of economic growth and providing jobs that they have failed to understand the purpose of colleges and universities (i.e., college is a time where students can explore different majors, and in the process, discover themselves). This narrowed focus is evident by President Obama push to graduate more STEM students (Robinson, 2014b, para. 3). This push by President Obama is in response to the low number of people in the technical fields, though. There are not enough qualified people working in such technical fields. According to the National Center for Education Statistics, of the 1,791,000 bachelor's degree conferred in 2011–2012, 84 percent of those degrees were non-STEM fields (Jawaharlal, 2015, para 11). It is understandable why President Obama wants more STEM graduates. Consequently, the present focus of most colleges and universities is to train students for a job to fill the needs of society. But a college education must be about more than simply preparing students for a job after graduation—it needs to be about developing students' minds so that they can use their education to pass wisdom to others

and help society in areas of pressing concerns. For example, students studying sociology can work in government relations to help the U.S. understand foreigners' culture so that a meaningful and enriching relationship can develop for the parties' benefits. To achieve these kinds of societal goals, students need to have a proper education in the liberal arts and sciences, and schools play a major role in providing this type of education to students.

In concurrence with Nussbaum, Haney, and Bostein on the need to study the liberal arts is Richard Brodhead (2013), president of Duke University. Brodhead sees the liberal arts as an essential training to undergo. He declares that if quality higher education is richly available, then America will be prepared for any future: "A liberal arts education aims to engage multiple forms of intelligence to create deep and enduring habits of mind, an active, integrative, versatile spirit that's naturally disposed, when it comes upon a new fact or situation, to use existing knowledge to try to grasp it, while updating preexisting understandings in this new light" (para. 10).

Brodhead, like many other liberal arts advocates, understands the contributing value that students can receive from a liberal arts education. He does not attach a dollar value to liberal arts and sciences degrees, but instead celebrates the aims of what a liberal arts education can do for students and society. Brodhead speaks about an education that aims to do more than teach students specialized skills. The knowledge, skills, and abilities students can gain from studying the liberal arts are there for the long run and will always have its place in society, allowing students to seize opportunities when the time calls for it.

Seizing opportunities will come best to those with a liberal arts background, though. In her article "The Value of a Liberal Arts Education," Jill Tiefenthaler (2013), president of Colorado College, asserts that universities need to keep liberal arts programs, especially in a rapidly changing world where students need to consider different perspectives and be open to

collaboration and communication. To be prepared for the future, for jobs that do not yet exist, students need to have a willingness to learn, to have cultural awareness, and to be able to effectively communicate. These are skills that a liberal arts education can help students develop (para. 3). She complains that many people falsely hold the belief that universities are places where students get trained for a particular line of work. To help dismiss that belief, she draws a distinction between education and training. According to Tiefenthaler (2013), “The idea that colleges should simply be factories for producing graduates focused exclusively in STEM fields is shortsighted. A liberal arts education teaches the whole person, prepares students to excel in a range of careers, and live a life that is rich with meaning and purpose. A liberal arts education teaches students to learn how to learn, and inspires them to go on learning throughout their lives” (para. 4–5). The main goal of a STEM education, however, is to train students to be job ready. While this goal is important to many students and parents, the labor market changes with globalization and technology. It is best for students to prepare themselves for the changing world, and there is no better way than with a liberal arts education. With its broad-based and long-term goals, a liberal arts education can help students assimilate to varying situations in their professional life. It is imperative that colleges and universities continue to prepare their students to think with thoroughness and creativity, to help them be learners, and to help them become independent workers. In her line of reasoning, she demonstrates the power of a liberal arts education and the role it plays in individuals’ life. Unlike a STEM education, where the focus is on workplace skills, she shy away from the liberal arts as being a training ground for a student’s professional career, and points out that a liberal education is intended to do more for the individual, including crafting and fine tuning their soft skills.

There is much support advocating that students take advantage of learning soft skills deemed crucial for success in the workplace. Elaborating more on the usefulness and practicality of soft skills developed from the liberal arts are the commission members in *The Heart of the Matter* report. The commission members of the American Academy calls for a deepened commitment to literacy: “Reading and writing are the building blocks of learning, making possible all the rest of our education and development. From being able to sound out words on a page, we advance to be able to analyze, interpret, ask questions, make connections, and express our thoughts in words . . . Even in a digital age, the spoken and written word remains the most basic unit of our interactions, the very basis of our humanity” (Brodhead, 2013, para. 22). A liberal education has been frequently cited as a channel where students will hone soft skills—adaptability, oral and verbal skills, problem-solving capabilities—which have been identified as a key component in every line of work. And generally, a STEM education leans on hard skills, such as how to operate machinery and software programs, and how to analyze research data. Author Jose Romero (2011) holds that hard skills alone will not make an individual stand out among job applicants, because employers want individuals with soft skills more than they want individuals with hard skills; it is easier to teach hard skills then it is to teach soft skills (para. 8–10). His point is clear: acquiring soft skills is a difficult task, which is why students need to spend the time in college to acquire those skills, rather than to narrow their learning to skills that can be taught on the job. To support Romero’s point, Harris Poll conducted a national survey composed of 2,138 hiring managers and human resource professionals across industries and company size and found that 77 percent of employers believe that soft skills are as important as hard skills (Grasz, 2014, para. 1). Unfortunately, soft skills are undervalued. Hard skills, i.e., technical skills, may initially get a person in the door, but it is the soft skills, i.e., the non-

technical skills (such as people skills, positive attitude, team player, communication, etc.), that opens up most of the doors to come. Although there is still less training for soft skills, soft skills are increasingly becoming the hard skills. It is not enough to be highly trained in technical skills without developing the non-technical, soft skills that employers need for their organizations.

With the urgent need for soft skills, the members of the American Academy implore colleges and universities to make a far greater effort to communicate the usefulness of a liberal education to their students. The commission members firmly believe that “American strength in higher education is based on a plan that opens minds in multiple directions, engages their curiosity in a variety of ways, and puts them in a position to synthesize bits of knowledge to form new insights. This broad, integrative training that reaches across the arts and sciences is the American alternative to the early specialization that many countries require, and it is widely perceived to support the nimbleness, innovativeness, and creative versatility that give the American economy its dynamism” (Brodhead, 2013, para. 25). The commission members’ view on the prominence of studying liberal arts and sciences in higher education coincides with that of college president Brodhead and Tiefenthaler, and others alike, speaking volume as to the weight notable individuals and organizations place on a particular type of education. The message of why students need the liberal arts and sciences has been made available through the media and through research studies presented within the past decade. This liberal education value proposition has been widely available to students, parents, government, and other stakeholders. Nevertheless, there is still a disconnect regarding why this message is not getting across in people’s minds. Why is there still this heated discussion about the need for students to avoid the liberal arts and sciences? The answer can be summed up in one word: STEM.

Background of STEM

After the U.S. DOE's Commission on the Future of Higher Education released its report indicating a deficiency in some of highly applied learning areas, STEM has been on the government's mind. To address the deficiency, 43rd president George W. Bush, during his State of the Union Address in 2006, announced the American Competitiveness Initiative (AIC). The AIC is a proposed initiative that addresses the shortfalls of federal government support in the STEM fields. It calls for the government to provide federal funding for advanced research and development programs and calls for an increase of graduates within STEM disciplines (Estrella Mountain Community College, 2013). This initiative arguably helped launched the presence of the acronym "STEM" in education. Since the introduction of the STEM acronym in 2006, there has been a mass of educational development designed to escalate STEM academic interest (e.g., sponsored outreach activities, scholarships, and science competitions), and to encourage students to study STEM fields in college. The STEM bill, officially known as the America Competes Act, was signed into law a bill in 2007. The bill "authorized \$151 million to help students earn a bachelor's degree, math and science teachers to get teaching credentials, and provide additional money to help align kindergarten through grade 12 math and science curricula to better prepare students for college" (Eger, 2013, para. 8). As it stands, the federal government understands the pivotal role that STEM graduates play in improving society's standard of living, and thus will pour financial support to those fields.

But what academic fields are consider STEM? After all, science is included in both the STEM acronym and the liberal arts and sciences definition. Understanding what field qualifies as STEM is dependent on the agency (or organization) doing the defining. Under the America Competes Reauthorization Act of 2010, the term *STEM* means the academic and professional

disciplines of science, technology, engineering, and mathematics (U.S. Government Publishing Office, 2011, p. 4). Other agencies provide some examples of what STEM means. For example, “some federal agencies, such as the National Science Foundation, use a broader definition of STEM that includes psychology and the social sciences (e.g., political science, economics) as well as the so-called core sciences and engineering (e.g., physics, chemistry, mathematics). Others, including the Department of Homeland Security, U.S. Immigration and Customs Enforcement, use a narrower definition that generally excludes social sciences and focuses on mathematics, chemistry, physics, computer and information sciences, and engineering. Some analysts argue that field-specific definitions such as these are too static and that definitions of STEM should focus on ‘an assemblage of practices and processes that transcend disciplinary lines and from which knowledge and learning of a particular kind emerges’” (Congressional Research Service, 2012, p. 2). The definition of STEM⁶ varies considerably, depending on the objectives of such agency or organization.

Besides the federal government supporting STEM programs, state government, too, also understands the pivotal role of STEM and has provided support for STEM programs in higher education. For example, Florida Gov. Rick Scott says students need to focus on studying subjects that can get them jobs: “I want to spend our dollars giving people science, technology, engineering, math degrees. That’s what our kids need to focus all their time and attention on. So when they get out of school, they can get a job. My job is to keep building jobs each and every day. If I’m going to take money from a citizen to put into education then I’m going to take that money to create jobs” (Koebler, 2013, para. 5). Though the main reason Governor Scott supports

⁶ For purposes of this paper, the science component in STEM in the educational context means life sciences, geosciences, physics, and astronomy, and does not commonly refer to the social sciences. The science in liberal arts and sciences includes those same disciplines as well.

STEM is because of its employability aspect, Scott also acknowledges the value of STEM degrees. He recognizes that many jobs are in the technology and engineering sector, which invariably are the fields that are of most value to society. Governor Scott's position is similar to those advocating for STEM, and it is no surprise that he is devoting his time and energy into promoting STEM fields and pushing students to study those fields in college. At the cost of liberal arts and sciences programs, he wants to use taxpayers' money for STEM programs, because he believes that there are not enough students studying those "important and valuable" fields and he wants to change that situation.

Governor Scott is not alone on his position to deliver more STEM graduates into the workforce. On January 30, 2014, President Obama delivered the same message to Wisconsin citizens: "I promise you, folks can make a lot more, potentially, with skilled manufacturing or the trades than they might with an art history degree" (as cited in Strum, 2014, para. 1). As part of his "Educate to Innovate" initiative, President Obama gave \$3 billion to STEM education. The increase in federal funding is part of a broader mission to produce a generation of engineers, scientists, and mathematicians to help the economy of the United States (Strum, 2014, para. 5). The Obama administration wants to produce 1 million additional STEM undergraduate degree holders by 2022 (Robinson, 2014b, para. 3). Scott's opinion, and at large, the federal government's opinion (i.e., President Obama), warrants the idea that students should only go to college and study fields that can help them land a job (i.e., a high-paying job). But the federal and state government are making a leap of an assumption. They think that the only reason students go to college is to get a high-paying job. While some students may go to college for that very reason, other students may go to college to see what college is about or figure out what they want to do with the rest of their life, among other reasons. Not every student wants a STEM job,

and not every STEM students wants a STEM job. There are students who may want to be historians, teachers, and writers. Scott and Obama's narrowed view of why students should go to college or how students should go about getting a job is unjustified. What they fail to understand is that students need to attain both soft skills and hard skills to be employable, and obtaining these skills cannot be acquired through studying STEM fields alone.

Overflow of STEM Graduates in the Marketplace

There seems to be this false belief held by the government that presumes there is a demand for STEM graduates. Contrary to popular beliefs about the need for more STEM workers, multiple studies challenge this notion. The data instead shows a surplus of STEM workers competing for jobs (Vasquez, 2012, para. 10). Because the government believes society needs more STEM graduates, it arguably has led some students to believe that same notion as well, and as a result, some students have shown a keen interest in studying those technical fields. For instance, science and engineering bachelor's degree has grown by 19 percent from 2009 to 2013 (National Student Clearinghouse, 2013). In Michael Vasquez's (2012) article "More STEM Degrees May Not Equal More Jobs," he quotes Elizabeth Berman, an assistant professor of sociology at the University of Albany, whose research countered Governor Scott's statement. In her study, she found that even though science and innovation do create jobs and drive growth, not all STEM graduates could get a job: Landing a job is "largely dependent upon a student's particular major. Petroleum engineering majors are doing very well these days; biologists and chemists are not" (para. 9). Berman's finding illustrates the fact that even STEM graduates, like liberal arts and sciences graduates, struggle with obtaining employment. Studying a particular major does not equal a guarantee job post-college. Therefore, while there is inevitably an increase in students

studying STEM fields, there are not enough available technical jobs to meet the number of students graduating with a STEM degree, leading to a market saturated with jobless STEM graduates.

Additionally, a study by the Florida Department of Education found that a student's ability to find a job is largely dependent on his or her major. The statistics from the study are as followed: "Among 2009–2010 school year graduates, only 49 percent of those with a bachelor's in biology were employed; for a bachelor's in biomedical engineering, the number rose to 83 percent. In the social sciences, anthropology graduates reported a 49 percent employment rate, while 60 percent of psychology graduates said they were employed" (Vasquez, 2012, para. 33–34). In Vasquez's article, he adds an interesting statement that suggests one reason why STEM online job postings in Florida were up 10 percent over a year ago. According to a report by the Florida's Department of Economic Opportunity, those job postings were heavily characterized by healthcare-related jobs—an area not always categorized as STEM. For instance, nursing jobs accounted for more than 1 in 4 of the total STEM jobs identified. Additionally, a generally pro-STEM report produced by Change the Equation (an organization advocating improved science education) found that when healthcare was not counted, "Florida was one of six states with more unemployed STEM workers than available STEM jobs; of those six states, Florida had the biggest oversupply of STEM workers" (Vasquez, 2012, para. 22–23). A more recent study by the U.S. Census Bureau found that STEM jobs make up less than 6 percent of employment (Robinson, 2014a, para. 9). These reports disprove the myth that there is a STEM shortage, which goes against the federal and state government's position that we need more STEM graduates. Those in favor of funding STEM programs are simply exaggerating society's need for more STEM workers. The truth is that we do not need any more STEM graduates than we do

need students majoring in the liberal arts and sciences. What we do need is more students being educated in both fields of STEM and liberal arts and sciences. Having a whole education will definitely help students find the kind of success one generally looks for in a professional career.

Earning Potential of Liberal Arts Graduates

There is a consensus among individuals and organizations who perceive STEM degrees as a pathway to financial security and others who see liberal arts and sciences degrees as a pathway to the unemployment line. As many job seekers can attest to, having a college degree does not guarantee instant success in getting a job. Many students select majors based on which will help them get jobs—more so than what they are passionate about. Figure 1 list reasons why students choose to major in a STEM field rather than major in other fields. It is no surprise that “Good salary out of school” was the number one reason. A 2011 book, *The Coming Jobs War*, by Jim Clifton, the CEO of Gallup, notes that having a good job is the number one social value for everyone. It outranks having a family, peace, freedom, religion, democracy, and numerous other societal goods (Kiley, 2012, para. 38). Financial security is a legitimate reason for getting a college education, but students should not be educated just to get rich. Columbia University professor Andrew Delbanco offers another explanation why students choose STEM fields over the liberal arts: “Both inside the humanities and outside, people feel that the intellectual firepower in the universities is in the sciences, that the important issues that people of all sorts care about, like inequality and climate change, are being addressed not in the English departments” (as cited in Lewin, 2013, p. 1). Delbanco insists that students’ attitude about what they consider important and what society as a whole considers important are some of the driving forces behind their major selection. It becomes obvious, then, that going to college, for some

students, is about choosing the field that they can see real, tangible benefits (e.g., their individual contributions to society, earning potential, and employability).

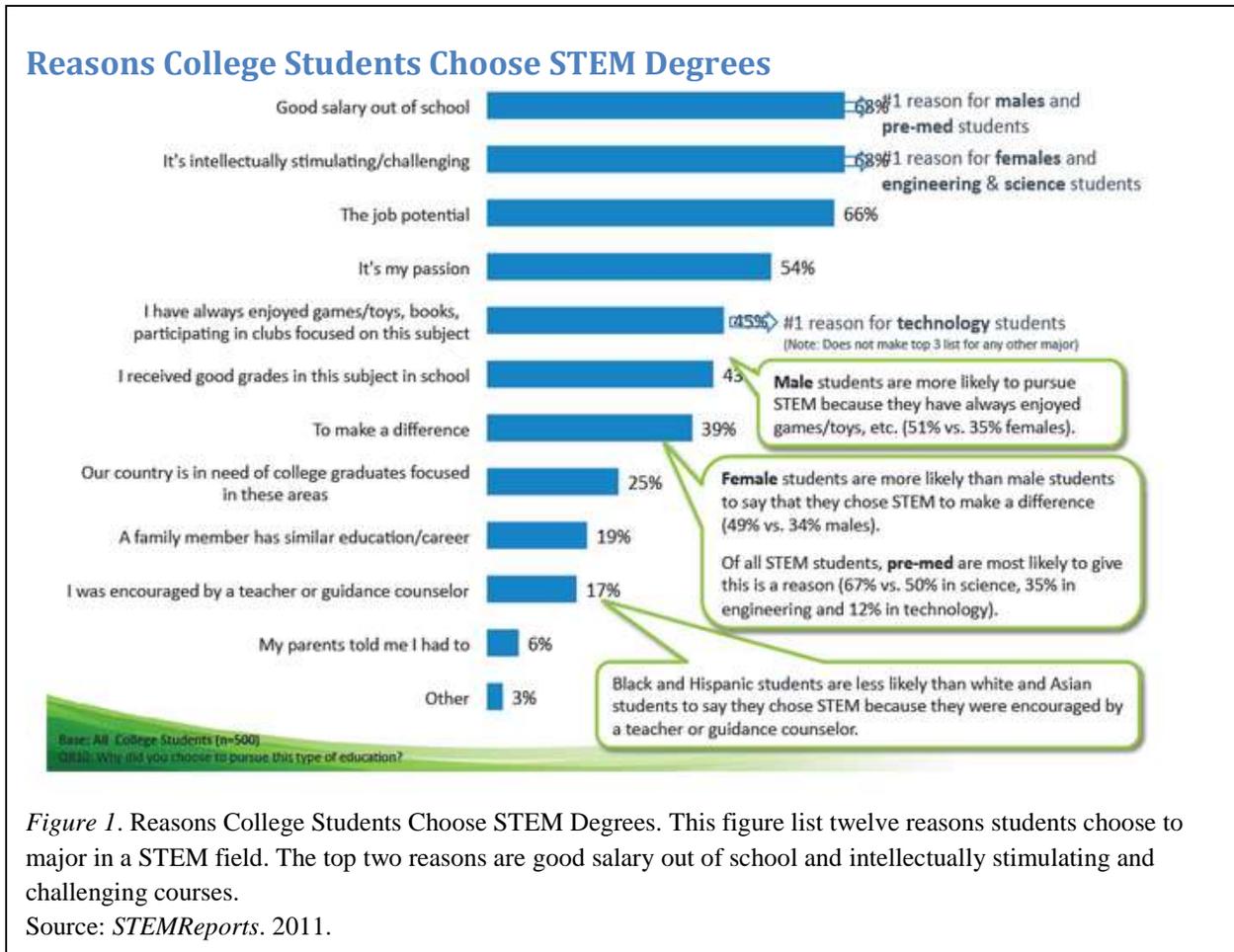
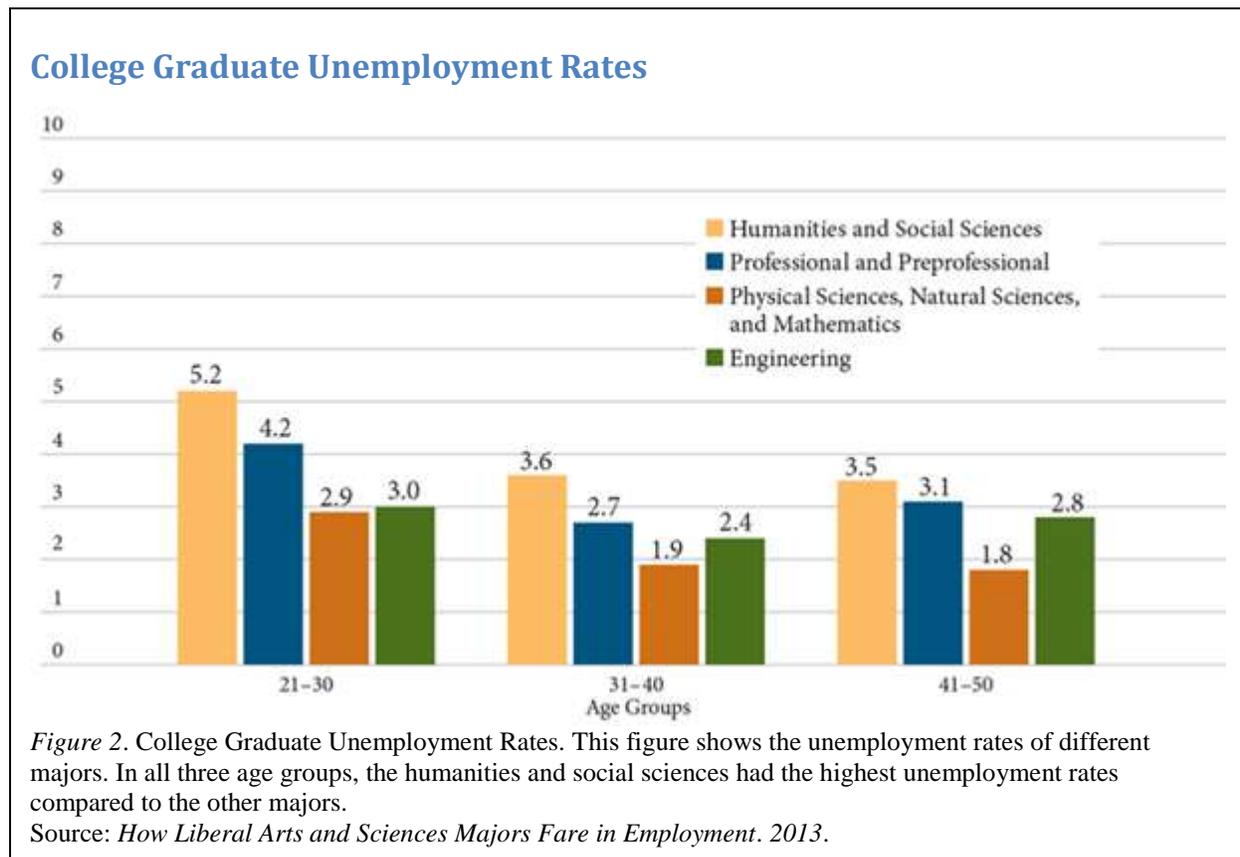


Figure 1. Reasons College Students Choose STEM Degrees. This figure list twelve reasons students choose to major in a STEM field. The top two reasons are good salary out of school and intellectually stimulating and challenging courses.
 Source: *STEMReports*. 2011.

The conception that college graduates are facing such steep employment challenges because of their choice of major is unsupported. The most prevalent reason for why individuals face a stagnant job market, and as a result, endure the unemployment crisis, is inadequate aggregate market demand. For example, a report by the Georgetown University Center on Education and the Workforce shows that, in comparison to other technical majors, non-technical majors, including the humanities and arts, suffered higher levels of unemployment in the recent recession (Sandeen, 2013, para. 10). This unemployment rate is largely the result of the boom in

technology, resulting in fewer needs for the humanities and art graduates. Many of the in-demand jobs are in the science, technology, engineering, and healthcare sector. While that may not be good news for the liberal arts and sciences graduates, the good news is that as the economy recovers, the unemployment rate does decrease with work experience (Carnevale, Cheah, & Strohl, 2012, p. 5). Based on figure 2, 5.2 percent of liberal arts degree holders are unemployed from 21–30 years of ages, but that rate drops to 3.5 percent when they are between 41-to-51 years of age. A surface level reading of figure 2 indicates that while liberal arts graduates may find a harder time getting a job at first, they can expect their employability to rise over time. More work experiences helps liberal arts graduates with employability compared with recent college graduates (Johnson, 2014, para. 7), a fact students should keep in mind.



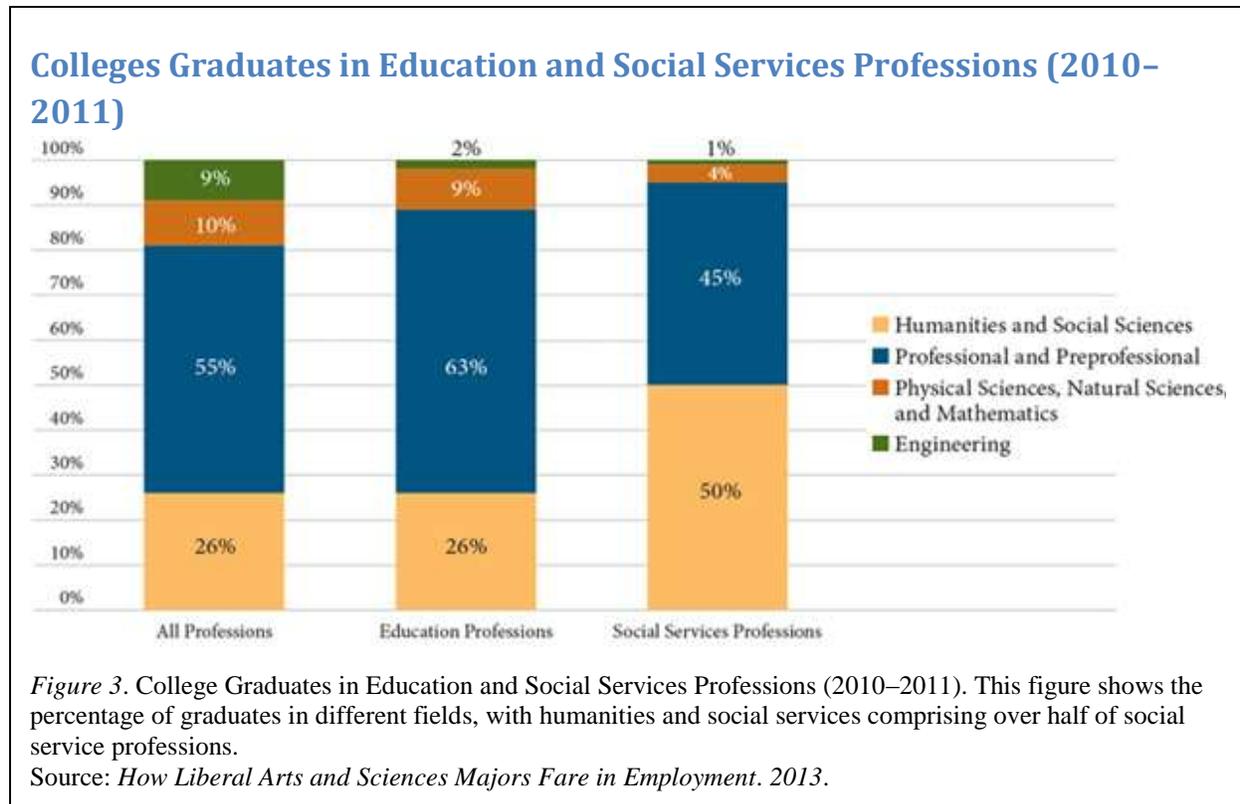
Beside students not wanting to major in unemployment, some students avoid the liberal arts and sciences majors because of perceived low earning potential. Yet research by the National Center for Educational Statistics found that based on income, liberal arts and sciences majors eventually make similar earning wages as their engineering peers a decade after graduation. This ability of liberal arts and sciences majors to close the income gap has to do with the skills gained from a liberal education, which over time become more valuable in many different types of careers (Patnaik, 2012, para. 4). There is consistent evidence that the highest salaries apply to positions that requires skills gained from a liberal education, including inductive and deductive reasoning, judgment and decision making, originality, problem solving, social and interpersonal skills, and writing skills (Schneider, 2011). It is because of these invaluable skills that liberal arts and sciences graduates are able to close the income gap that is seen early on with their income as recent graduates.

While the idea of a liberal education thrive in the minds of all students and educators, the skills learned from a liberal education are useful in all industries, placing significant weight to the broad-based application. As stated by Donald Asher, an internationally acclaimed author and speaker specializing in professional development and higher education, “A general college degree is the major entry-level credential you need. Employers are looking for the skills a candidate has to offer” (as cited in Gehlhaus, 2008, p. 4). In making his comment, Asher encourages students to look pass a specific college major as the sure-fire way to make money, much less land a job. Students should select a major that can teach them skills that will make them an asset to any organization. Indeed, many successful leaders do not even possess a STEM degree: “A survey of 652 domestic chief executive officers at 502 technology companies found that only 39 percent held degrees in engineering, computer technology, or mathematics”

(Patnaik, 2012, para. 4). This survey tells us that most CEOs found success from earning non-technical degrees, which speaks volume as to the type of education that has helped individuals be victorious in their professional career. This survey also tells us that a student's college major does not determine the kind of job he or she is suited to do, much less determine his or her likelihood of success. As long as students receive some kind of liberal arts and sciences training during their college career, they will find success in the end, a concept that confirms the early philosopher's point that a liberal arts education is the foundation that makes individuals' pursuits possible.

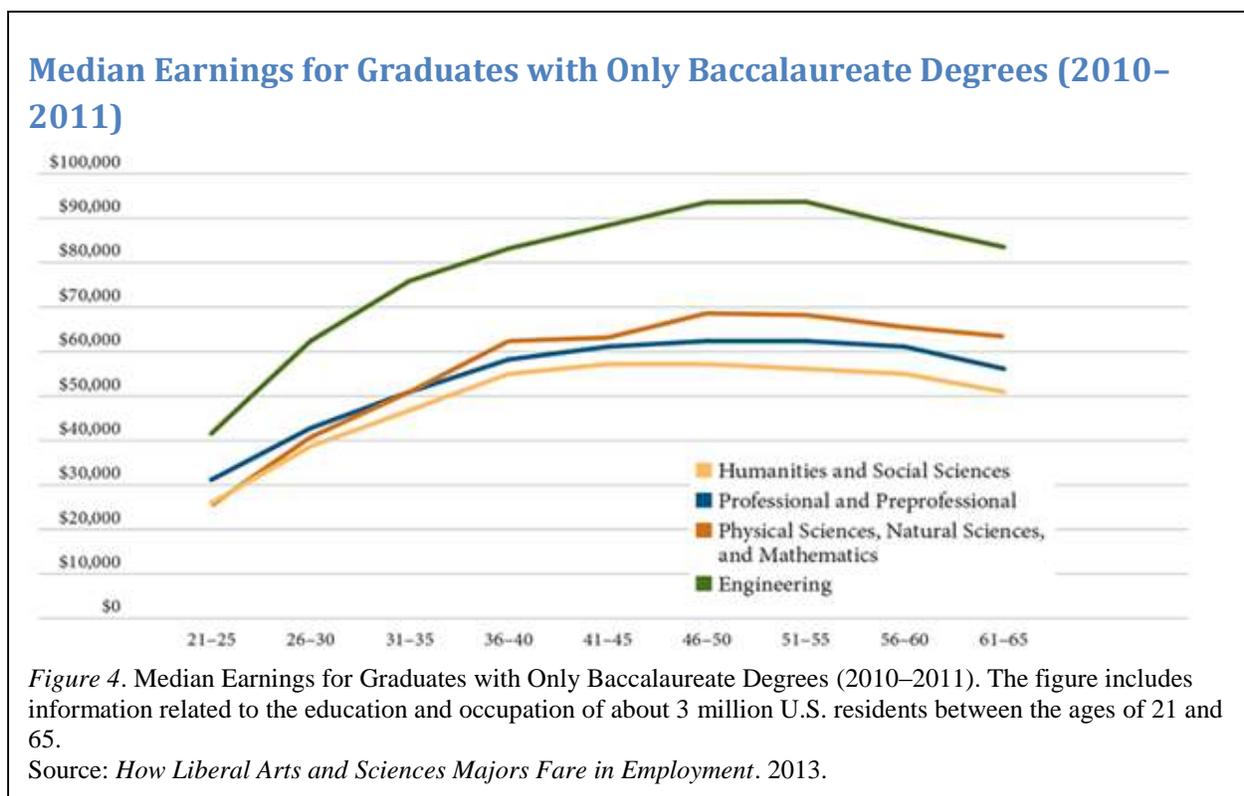
That is not to say, however, that success will always equate a high-paying salary. Typically, a good salary is associated with highly-skill positions (e.g., computer scientists, petroleum engineers, statisticians, etc.). That is not always the case for those graduating with a liberal arts degree, though. A plausible explanation for the low-paying salaries of these graduates has to do with the type of job they have. As figure 3 shows, people with liberal arts degrees generally find themselves working in social service jobs, such as counselors, religious, social, and community service workers; and these types of jobs tend to pay lower salaries (Johnson, 2014, para. 8). Many liberal arts graduates, however, know the type of jobs they are eligible to do, including the average salaries of those jobs. The benefit of having a general education is the wide range of career options it gives to students, though. In a 2007 survey by the National Association of Colleges and Employers, liberal arts graduates found themselves dispersed in a variety of industries and career fields, including retail trade, social assistance, sales, and graphic arts (Gehlhaus, 2008, p. 4). It is unclear whether these data tell us if the graduates work in these social service jobs because that is what they want to do, those are the types of jobs they are qualified or, or if those are the only available jobs suited for them. One fact is clear: a liberal

education allow individuals to have multiple career options, which allows for multiple salary options.

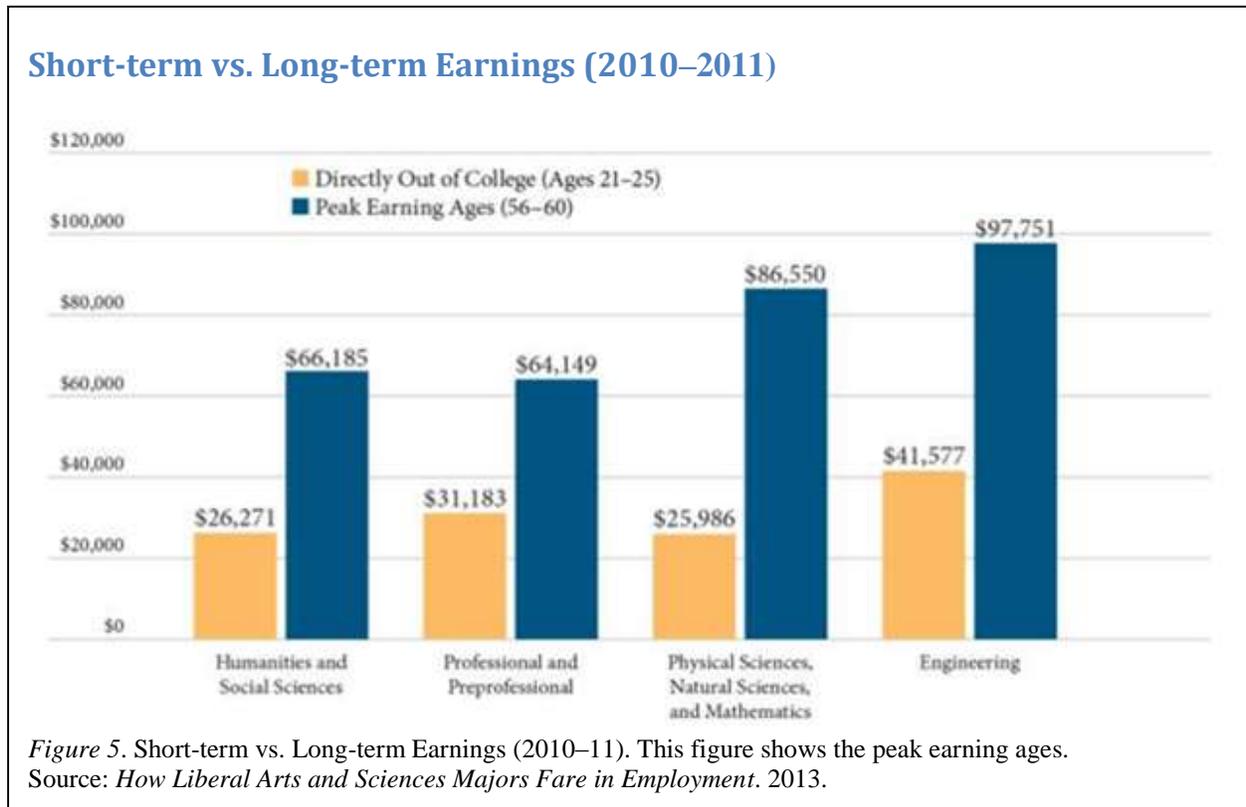


Fortunately, liberal arts and sciences graduates will not always earn a low salary compared with STEM graduates. Recent liberal arts and sciences graduates typically start their career with a lower salary (which is typical of any college graduates in their profession). Over time, as these graduates gained more work experiences and strengthen their knowledge, skills, and abilities, eventually they can earn a higher wage, placing liberal arts and sciences graduates on similar wages as STEM graduates in similar situations. Part of the reason for the increase in wages has to do with work experiences. As individuals gains enough experiences, they find themselves qualify for promotions or find themselves qualify to work in a more skilled-level position that pays more. Figure 4 shows “College graduates with four-year degrees in a

humanities or social science field (e.g., history, philosophy, or sociology) and compared the median earnings of these individuals with that of three other groups: those with degrees in a professional or pre-professional field (e.g., nursing or business), those with a degree in science or mathematics (e.g., chemistry or biology), and those with a degree in engineering” (Johnson, 2014, para. 13). The figure illustrates that the humanities and social sciences graduates begin their salary in the \$20,000 to \$30,000 range, a range lower than the other fields. But their earnings steadily increase as they reach their peak earning ages (56–60), the ages where, presumably, such graduates have accumulated enough experiences to warrant an increase in salary. This steady increase in salary gives hope to those students who are contemplating whether they should major in the liberal arts and sciences fields. The potential to earn more money also provides a rebuttal to naysayers and critics who believe that students should not major in the liberal arts because of the low salary.

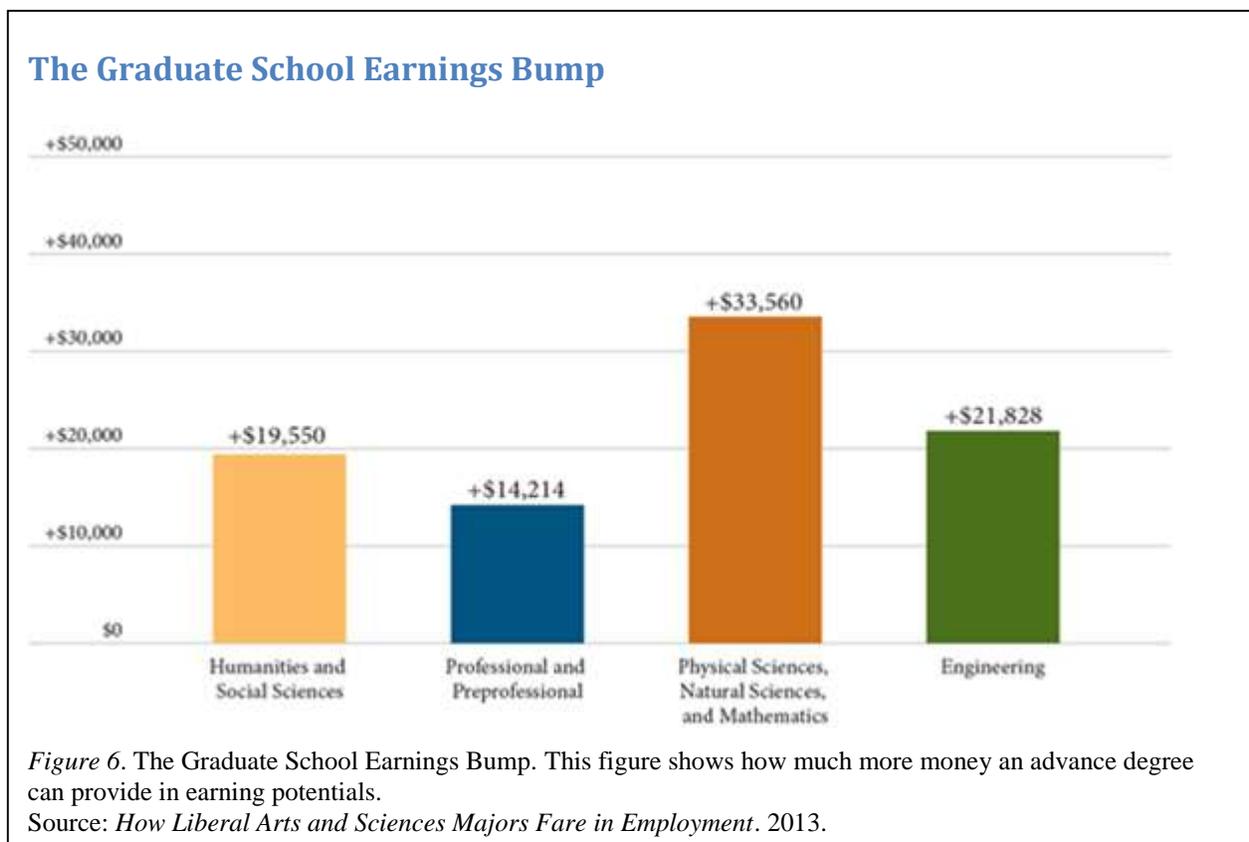


There are substantial data that supports the claim that liberal arts graduates do have the potential to earn higher salaries. When liberal arts majors reach their peak earning ages, they can earn up to \$2,000 more. Figure 4 shows that humanities and social sciences graduates come close to earning as much money as their professional and pre-professional peers. In figure 5, the graph shows that individuals at peak earning ages (56–60) with a bachelor degree in a humanities or social science field make up to \$40,000 more than they did when they were recent graduates (Johnson, 2014, para. 6). While it is a known fact that STEM workers do earn more money overall (up to 26% more) than liberal arts workers, the greatest earning difference is seen mainly in the low-level jobs. When individuals possess advanced degrees, leading to a high-level job, there are minimal differences in the earnings. Of the 9.6 million bachelor degree holders in humanities or social science fields, approximately 4 million of these individuals also hold a graduate or professional degree (Johnson, 2014, para. 9). Pursuing additional education post-bachelor degree raises earnings across the board. For those students who major in the liberal arts and sciences and want to make slightly more money as recent graduates, they should consider graduate or professional school in order to boost their earning potentials.



To reiterate the previous point, earning disparity do not necessarily exist because liberal arts graduates hold different jobs (low skill vs. high skill), but because they have different levels of education (bachelor vs. master). The more advance a degree is, the more money the degree holder can expect to make. Thus, liberal arts graduates do not make as much money when they possess just an undergraduate degree. Nevertheless, they do make more money than a high school graduate with no college education would. Figure 6 shows that graduates, whether it is in humanities or engineering, with an advanced degree, experience an average yearly boost in earnings of nearly \$20,000 (Johnson, 2014, para. 9). This earning difference has perhaps prompted some individuals to go back to school to further their education with the expectation of earning a higher wage: “Social science, liberal arts, and education majors are more likely than business majors to say they will return to school or ‘maybe’ will go back (40% “yes” vs. 23%

“maybe”). Approximately 28 percent of science and engineering majors say they are definitely or maybe planning to return to school” (Taylor, Fry, & Oates, 2014, p. 35). While it is the liberal arts graduates who are more likely to return to school for an advanced degree, this move to obtain further education does not indicate that they believe their undergraduate degrees to be worthless (as the common notion is among those who do not see value in the liberal arts). These students perhaps have a desire to continue their education, i.e., to keep on learning to learn—one of the many goals of a liberal education.



The relationship between income and education runs deeper than what figure 6 initially shows. It has already been established that liberal arts and sciences graduates have high earning potentials. Their earning potential is due largely to the skills they learn as students. In a study by the Organization for Economic Cooperation and Development, it emphasizes the weight that

some countries place on literacy skills to determine wages; the organization highlights literacy skills as the key component that pays off in any job. Some of the literacy skills include “the ability to understand and use prose, to analyze documents, and to work with numbers” (Sigurdson, 2005, para. 13). The report, *Literacy Skills for the Knowledge Society*, contains data comparing the literacy skills of people in twelve countries. The organization became aware that in some countries (e.g., Canada and the United States), the ability to comprehend and use words and figures plays a strong role in determining wages. Countries that place such high weight on literacy skills understand that workers with these skills can easily adapt to their changing environment—an important ability to have in a rapidly changing world (Sigurdson, 2005, para. 13). The report concludes by stressing that educational credentials alone, without the accompanying literacy skills (gained from a liberal education), will stunt an individual’s ability to reach their full potential to succeed in their professional life. This point echoes a similar point made earlier: technical skills may get individuals in the door, but it is the non-technical skills (i.e., the literacy skills) that give individuals more opportunities to advance their profession.

The Linkage Between Majors and Related Jobs

Does a college major really dictate the type of job a student can get? If a student decides to study English, are they doomed for unemployment for eternity? If a student graduates with a mechanical engineering degree, do they have to have an engineering job? These sorts of questions gets to the heart of a larger question students often have about their college education: What can students do with their degree? It is expected that studying a particular major should prepare students to do the kind of work they desire. More often than not, students may ultimately work in a field entirely outside of their college major or related career choice.

Students who elect to graduate with a major that have a direct occupation and industry link to it (i.e., STEM) generally receive a higher salary and experience lower unemployment rate. While majorities of science and engineering majors do end up working in a field related to their course of study, research by the Economic Policy Initiative revealed that some STEM graduates work in fields outside their major, not because they necessarily choose to do so, but because employers do not hire them. Salzman, Kuehn, and Lowell (2013) discovered that for every two students that U.S. colleges graduate with STEM degrees, only one is hired into a STEM job (p. 2). Figure 7 shows the percentage of employed STEM graduates who are in STEM jobs one year after graduation: “For STEM graduates, the supply exceeds the number of hired each year by nearly two to one, depending on the field of study. Even in engineering, U.S. colleges have historically produced nearly 50 percent more engineering graduates than are hired into engineering jobs each year; in all disciplines, health is the only field that stands out as having the vast majority of graduates hired into the field” (Salzman, Kuehn, & Lowell, 2013, p. 7). The evidence from numerous sources, on top of this evidence by the Economic Policy Initiative, charges that there are too many skilled STEM workers chasing too few STEM jobs. This surplus of STEM workers provides one explanation as to why some STEM graduates work in fields outside their major. It is evident that there are a sufficient number of U.S. students entering STEM fields over the past decade. Along that same line, the number of U.S. graduates with STEM degrees appears to be responsive to changes in employment levels and wages. Nevertheless, as a caveat, it is important to remember that employment into a STEM job is dependent on society’s demand for those particular skills, so having a STEM degree does not guarantee a job, much less a high-paying one.

Occupational Field of STEM College Majors One Year After Graduation, 2009

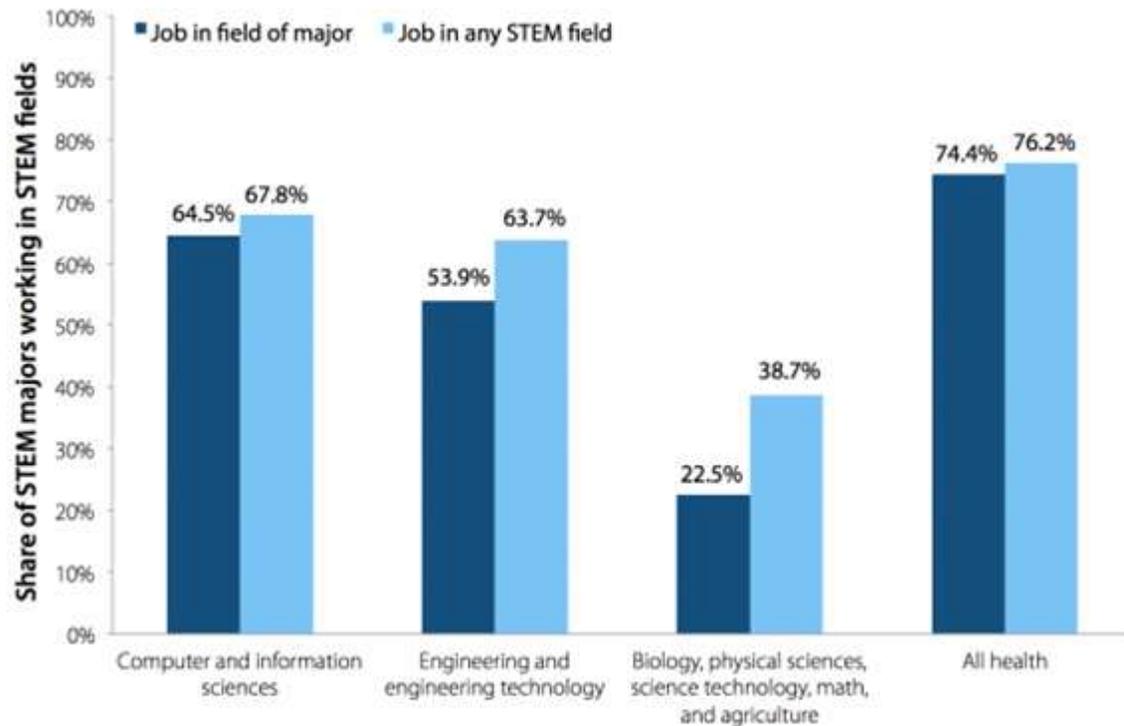


Figure 7. Occupational Field of STEM College Majors One Year After Graduation, 2009. This figure shows the number of STEM graduates, either in a job in any STEM field or in any job in field of major. Source: *National Center for Education Statistics*. 2013.

The U.S. Census Bureau cites another reason why STEM graduates work in fields outside their major. Based on its study, the organization found that there is a demand for individuals with the right skills, though such skills may not be used in a field related to the individual's major. Liana Landivar (2014), a sociologist with the Census Bureau, says that STEM degrees provide a range of skill-leveled career options because of the technical skills students learn. For example, STEM students are working in supply-chain management, inventory control, and quality control (Robinson, 2014a, para. 7–9); these jobs require technical skills and rely less on non-technical skills that students can get from a liberal education. Only half of those with STEM degrees get

STEM jobs and 75 percent of all bachelor's degree holders in STEM disciplines work outside of STEM occupations (Robinson, 2014a, para. 2). With the overwhelming majority of STEM graduates unable to find work in their fields, it just adds more support to the idea that U.S. colleges are graduating more STEM graduates than there are STEM jobs available.

This hiring freeze by some industries is another reason why students often go back to school and study a different major, hoping to increase their chances of employment or better prepare them for their work. On October 7–27, 2013, Pew Research Center conducted a survey to see how students' college education has prepared them for their professional life. With a nationally representative sample of 2,002 adults, age 18 and older, the results of the survey are as followed: “A third (33%) of all liberal arts, social science, and education majors said they should have selected another field of study to better prepare them for their ideal job. In contrast, only about a quarter (24%) of science and engineering majors express a similar regret” (Taylor, Fry, & Oates, 2014, p. 30). While this finding supports the claim made earlier that some social science and liberal arts graduates contemplate returning to school, it does not necessarily follow that these individuals want to return to school because they could not find professional success with their college major; reasons for returning to school could be a desire to continue forth with their learning pursuits.

Personal and professional success⁷ is relative and measured differently by different individuals. The data collected by organizations to figure out how many students of certain majors found success is not indicative that an entire discipline has failed just because majorities

⁷ Millennials (or Generation Y, born 1977–1994) define success as more about living a healthy and fulfilling life, and not so much about wealth. But, “[m]illennials who describe themselves as successful—whatever that may mean to them as individuals—report more healthy finances across the board than those who do not, new research shows. For example, 31% of millennials who say they are satisfied with their current lifestyle report annual income over \$75,000, while just 24% of all millennials earn that much” (Kadlesc, 2015).

of those graduates are not as successful as others in terms of finding employment and earning a high salary. But generally, many graduates believe they have succeeded by having a career, even though some graduates may not work in a field related to their college major. The results of Pew Research Center's survey shows that nearly "70 percent of college graduates say their work is 'very closely' (49%) or 'somewhat closely' (20%) tied to their undergraduate or graduate degree. Science and engineering majors . . . are more likely than those who majored in the liberal arts, social science, or education to say their current job is closely related to their college majors. Overall, about 78 percent of science and engineering majors say they have a job related to their field of study, including 60 percent who say it is very closely linked to their major. Only 59 percent of social science, liberal arts, or education majors say their job is related to their degree, with 43 percent saying it is very closely related" (Taylor, Fry, & Oates, 2014, pp. 41–42). Admittedly, the percentages for the liberal arts and social science majors pales in comparison to the science and engineering majors, but the 59 percent is evidence that demonstrates that a majority of the liberal arts and social science graduates have found professional success. At the same time, the data shows that these graduates have options when it comes to their job choices. Graduates of specific disciplines are not obligated to work in the same field as their major. The very same students who reported that their degree was slightly related to their job may have selected a career that has nothing to do with their educational background for personal reasons. Even though only 43 percent said their degree was closely related to their job does not mean that their education was not useful to them. We must keep in mind that success is relative and is defined differently by different individuals. The fact is that American economy historically changed so quickly that the nature of work and the requirements for success tended to shift from one generation to the next (Zakaria, 2015, para. 4). So while studying the liberal arts and

sciences does not have a direct occupation linked to it, these graduates will have choices when it comes to their line of work, and success can be arguably found in this approach with the number of options they have.

Researchers Taylor, Fry, and Oates explored some of the reasons why some graduates' jobs were "not very closely related" or "not at all related" to their field of study. The results of the survey revealed the following information: "About a quarter (26%) blamed the bad economy or say they were unable to find work in their field. A similar share of them wanted a change or found that the work was not for them (23%), while 16 percent say they are happy with their current job. For others, life got in the way: about one-in-ten say they had children or other life circumstances interfered (9%), and 8 percent say their major was too general or it was useless, they lacked the experience or qualifications to find work in their field, or they chose a non-related job for financial reason" (Taylor, Fry, & Oates, 2014, pp. 46–47). Their research led them to uncover some common reasons that we see today regarding why some individuals are unemployed, why some graduates are employed in sectors entirely unrelated to their college majors, and why some individuals go back to school. The ultimate takeaway from their study is that we should not be quick to conclude that the primary reason some graduates do not have jobs is because of their degree. There is a multitude of reason not linked to the major or degree.

In spite of the research conducted by the Economic Policy Initiative, the U.S. Census Bureau, and the Pew Research Center, some individuals do see a link between liberal arts and sciences majors and related jobs, confirming the view that these majors do have value. For example, research by the Bureau of Labor Statistics found that "anthropology students know how to conduct ethnographic interviews and studies—skills that can aid them in marketing work when they analyze customers. In addition, English majors have editing and writing skills, which

is useful for media, public relations, and publishing occupations. And geography majors are well suited to location-based urban planning” (Gehlhaus, 2008, p. 5). Additionally, in 2001 the National Center for Education Statistics Baccalaureate and Beyond Longitudinal Survey noted “that 41 percent of humanities majors reported a direct link between their jobs and their majors one year after graduation. For psychology majors, it was 37 percent; for social sciences majors, it was 25 percent. Moreover, 60 percent of liberal arts majors said they were in jobs that were the start of their career” (Gehlhaus, 2008, p. 6). There are varying reasons why some individuals are in a job related to their major, and others reasons why they are in a completely different field. Most common among these results is that students, who graduated from college, whether they had a liberal arts and sciences degree or a STEM degree, do find some kind of professional success. It is unclear, however, whether the students who found success in the survey were successful because of their major and skills training. There are students who find success (i.e., a job) through networking, and others who find success through a family business; such avenues may not be necessarily accessible to everyone, and so this is an unfair, objective measurement of success for everyone. A critical question has yet to be answered: Can students find even greater career success if they had training in both STEM and the liberal arts and sciences (assuming such student only had one type of training)? In other words, what potential success can students hope to achieve (or expect to achieve) by having training that expands their learning and knowledge in a broader sense (i.e., by having a liberal education on top of a STEM education)?

What Employers Think About a Liberal Education: A Summary of the Research Data

Aside from having a balanced college education, achieving success in the job market is also partly a result of employers hiring the right candidates. Because employers are the ones seeking

specific candidates who meet the organization's qualifications, employers are in a position to voice their opinions on what type of education they believe will best suit students in the changing job market. As part of *The Heart of the Matter* report, the members of the Commission on the Humanities and Social Sciences performed a survey asking what employers thought about a liberal education. Employers were given the following definition of a liberal education:

This approach to a college education provides both broad knowledge in a variety of areas of study and knowledge in a specific major or field of interest. It also helps students develop a sense of social responsibility, as well as intellectual and practical skills that span all areas of study, such as communication, analytical, and problem-solving skills, and a demonstrated ability to apply knowledge and skills in real-world setting. (p. 33)

In one survey, employers were asked this question: "How important is it for today's colleges to provide this type of [liberal] education? The results revealed the following information: 6 percent answered somewhat important, 43 percent answered fairly important, and 51 percent answered very important. Out of the 318 participating employers, 94 percent believe that a liberal education has some importance for students" (American Academy of Arts and Sciences, 2013, p. 33). Students, therefore, should not ignore the broad knowledge and practical skills that a liberal education offers, because employers value this type of education in their employees.

In January of 2013, Hart Research Associates (2013) led another online survey, which they distributed to 318 employers, asking what type of learning (liberal or STEM) employers valued. The report provides two analyses: one shows employers' priorities for the kinds of learning college students need to know in order to succeed in today's changing economy. And the other shows the educational and assessment practices that employers recommend (p. 1). After employers read the description of a liberal education, "nearly all consider this kind of learning

very or fairly important for students to be exposed to. Moreover, nearly three in four employers (74%) say they would recommend that their own child or a young person they know pursue a liberal education in order to achieve professional and career success in the current global economy”; only 7 percent advised against this approach, and 19 percent were initially noncommittal (p. 14). But the numbers changed dramatically when employers had to choose which approach they recommended without the “depends” option: “89 percent would recommend the described approach to a young person seeking advice on the type of college education they should pursue and only 11 percent would not” (p. 14). For many employers, a liberal education is the gateway to a successful and professional life in the current job market. With the current economic state, the advances in technology, and the global market, employers recognize how important it is for colleges and universities to provide the next generation of leaders with a liberal education.

Additionally, employers are aware that most individuals (and the next generation of leaders) want to achieve long-term career success. It is not enough for students to have a technical, narrowed education. It is time for students to broaden their knowledge and skills. To achieve this kind of long-term career success, a majority of employers agrees that having field-specific knowledge and skills *and* a broad range of skills and knowledge are most important for recent college graduates to possess. Hart Research Associates’ (2013) survey revealed that few employers think that having field-specific knowledge and skills alone can provide individuals with the career success they are seeking. Over half (55%) of employers say that having both field-specific knowledge and a broad range of skills is most important to achieving long-term career success. Even among those employers who chose just one category, 29 percent agree that having a broad range of skills and knowledge is important for career advancement, and only 16

percent of the employers agree that possessing knowledge and skills for a specific field or profession is most important for college graduates' long-term success (p. 5). It is safe to assume that employers see that a liberal education does provide students with tangible, practical skills that employers value highly. The world is changing rapidly, and it can be both costly and risky for colleges and universities to prepare individuals too narrowly to fit a certain career position that may not even exist by the time they graduate and enter the job market.

On top of acquiring field-specific knowledge and skills and a broad range of skills and knowledge, students should focus on several key learning outcomes that employers strongly feel are crucial for the real world. A majority of employers—more than three in four—believe that two-year and four-year colleges and universities should place more emphasis on a variety of key learning outcomes in order to increase graduates' success in today's global economy. Of the seventeen learning outcomes tested, most believe that schools should spend more time on eleven of them, including seven for which more than 7 in 10 employers say colleges should increase their focus. According to the employers, most emphasis should be placed on the following learning outcomes:

- Critical thinking and analytical reasoning skills (82% more emphasis, 7% less);
- The ability to analyze and solve complex problems (81% more emphasis, 6% less);
- The ability to effectively communicate orally (80% more emphasis, 8% less);
- The ability to effectively communicate in writing (80% more emphasis, 8% less);
- The ability to apply knowledge and skills to real-world settings (78% more emphasis, 6% less);
- The ability to locate, organize, and evaluate information from multiple sources (72% more emphasis, 9% less); and

- The ability to innovate and be creative (71% more emphasis, 9% less). (Hart Research Associates, 2013, p. 7–8)

On top of those seven outcomes, there are other key learning outcomes that many employers believe students should master by the time they graduate. For instance, 91 percent of employers agree that all students should be exposed to experiences in college that teaches them how to solve problems with people whose views are different from their own. Similarly, 82 percent believes (27% strongly) that every student should learn about societies and cultures outside of America and take classes that build civic capacity (78% total agree; 26% strongly). Furthermore, colleges and universities should teach students about ethical issues and public debates that are considered important to their field (87% total agree; 43% strongly). Other areas that earn high levels of agreement include ensuring college students gain experience working with others to solve important problems in their community (86% total agree; 41% strongly) (Hart Research Associates, 2013, p. 9). All of these learning outcomes identified in the survey can undoubtedly be achieved more from a liberal education than from a STEM education, because STEM education focuses more on the quantitative and qualitative approaches to research, rather than helping students become well rounded. In fact, four in five of the employers agree (32% strongly) that all students should have broad knowledge in the liberal arts and sciences, regardless of their chosen field of study (Hart Research Associates, 2013, p. 9). This consensus speaks truth to the belief that a student's undergraduate degree is not as important as the knowledge, skills, and abilities they develop through their college experiences and learning.

Concurring with the results of Hart Research Associates' survey are authors Oxtoby and Holt, who also believe that the undergraduate major is not as important as it is led to believe. In their article "False Choice Fuels Global Debate Over Liberal Arts Education," they learned that

95 percent of U.S. employers report that “a candidate’s demonstrated capacity to think critically, communicate clearly, and solve complex problems is more important than their undergraduate major” (Oxtoby & Holt, 2014, para. 8). Thinking critically, communicating clearly, and solving complex problems are standard objectives of a liberal education. Many students assume that their college major is the key selling point for them getting a job. Contrary to that false assumption are studies that have revealed that regardless of a student’s chosen major, they need to have a liberal education that teaches them fundamental skills that most employers want to see in their candidates in today’s knowledge economy.⁸

Because of America’s knowledge-based economy, employers have raised their standard of qualifications and expectations. Employees are expected to know more about their field and other related fields more so now than they were expected a decade ago. This increase in expectations is due in part because organizations are facing driving forces, such as globalization and information technology, that are affecting the way business is conducted. We are seeing more organizations merge with other organizations and form partnerships. It is common for one department to operate with several other departments in an organization to get work done: 90 percent of employers in Hart Research Associates’ survey expect their employees to work harder to coordinate with other departments (Hart Research Associates, 2010, p. 5). A large majority of the employers want more from their employees than what they usually required of their employees in the past. These employers report that they take priority over candidates who possess a broader set of skills and have higher levels of learning and knowledge. The report disclosed that “nearly 88 percent of employers agree that the challenges their employees face

⁸ Knowledge economy is defined “as production and services based on knowledge-intensive activities that contribute to an accelerated pace of technological and scientific advance as well as equally rapid obsolescence. The key components of a knowledge economy include a greater reliance on intellectual capabilities . . .” (Powell & Snellman, 2004, p. 201).

within their organization are more complex today than they were before, and a similar proportion say that to succeed in their organization, employees need higher levels of learning and knowledge today than they did in the past” (Hart Research Associates, 2010, p. 5). Moreover, nine in ten (91%) employers admit that they are asking their employees to handle far greater responsibilities and to use a broader range of skills (Hart Research Associates, 2010, p. 5). Because of the driving forces put in place, employers across the board are experiencing a more complex and challenging work environment. Thus, not only do the employers have to adapt and make changes in response to these driving forces, but also employees have to be able to change with their environment. The best preparation to respond to these changes, as cited by survey studies, is to receive a liberal education.

The bottom line is that U.S. liberal arts institutions have traditionally led the world in providing these types of broad, general skills recommended by employers and organizations across the board. With growing support from educators, employers, business leaders, and liberal arts advocates demanding a liberal education, it is highly unlikely that the liberal arts and sciences programs will be eliminated from educational institutions altogether. The research results from the American Academy of Arts and Science and Hart Research Associates provides indispensable insights that informs colleges and universities about the type of learning and expectations employers know students will need to have if they are to be successful in the changing work world. The surveyed employers spoke highly of a liberal education, and there was no mention of STEM anywhere. Employers know what kind of skills are in demand by their industry, and so when they make these recommendations, colleges and universities (as well as students and stakeholders) need to listen and take their message seriously.

How Globalization is Changing the Work Force Needs for Broader Skills

In the same way that economic development has shifted education from the classics to the applied sciences, so too has globalization, a byproduct of economic development, triggered a shift in the need for professional skills. As detailed by Michael S. McPherson (1998), former president of Macalester College, he acknowledges that in order to keep up with the rapid changes in the technological advanced world, our workforce must learn how to learn (i.e., learn how to be flexible). Technical skills become obsolete quickly with changes in technology. It becomes clear, then, that training is needed in the area of education. Education for the changing economy includes the ability to respond to new situations and challenges—a key skill needed today and for the future. Moreover, this type of education includes cultivating the ability to form independent thought and be able to handle new ideas and changes (p. 14). McPherson's position argues for the necessity of a broader education, i.e., a liberal education. The type of education he calls for in order to keep up with technology is exactly what a liberal education is all about. There is no longer a safety net, where skills for a trade or a certain vocation are the pathway to a job with financial security. With increased labor competition and limited job availability, people need to separate themselves from their competitors, and one way they can do this is through their human capital.

Besides learning to cope with technological changes, our society must learn how to deal with globalization through communication. Communication in a global sense entails knowing and understanding different foreign languages and having worldwide perspectives. It is well understood that the economic strength of any nations depends on international specialization and trade (McPherson, 1998, p. 14). America is one of the biggest players in the domestic market, and in order for America to continue to succeed as economic actors globally, we need to learn to

deal with our foreign competitor as well as learn to deal effectively and comfortably with a diverse society at home. In short, globalization depends on learning to communicate with people in their own language and understanding their customs. This ability to communicate across the different language and cultural boundaries is one of the hallmarks of a liberal education.

The impact of globalization on the workforce also means that individuals need to have more than just technical skills, because technical skills are not as adaptable as general skills in a global economy. Carol Christ (2012), former president of Smith College, listed the general skills she sees as critical for success in the modern age and for the future: flexibility, creativity, critical thinking, and strong communication skills (para. 2). Along the same line, Haney (2013) agrees with Christ's view when she writes, "The world is too complex to be training specialists, and the human potential is too broad to limit it by teaching any particular field as if it summed up the facets of the person" (para. 18). In other words, Haney questions whether a STEM education can fully provide the education and training that students need to have to be an asset to society in the 21st century. It is not enough for students to define their knowledge, skills, and abilities to the technical side alone. Through several liberal arts and sciences courses, students will be better prepared to enter the global market, because students will learn how to understand, to interpret, and to respect the commonalities and differences found in the community, both at home and abroad.

In agreement with Christ and Haney's viewpoint on the essentials of a liberal education is the American Academy of Arts and Sciences (2013), who writes that "the need for international cooperation, the promotion of trade and foreign investment, the requirements of international diplomacy, and even the enhancement of national security depend in some measure on an American citizenry trained in humanistic and social scientific disciplines, including global ethics,

international relations, languages, moral and political philosophy, and transnational studies” (p. 57). The number of supporters that calls for individuals to receive training in the humanistic and social scientific disciplines confirms how crucial human capital is for society. The success of an organization depends on its employees’ productivity. Employees must continue to add to their knowledge, skills, and abilities to keep up with not only their organization’s needs, but also society’s needs. Equally important to keep in mind is that individuals cannot rely solely on specialized, technical skills for their education or job training, because skills needed today might not be needed tomorrow (i.e., some skills may become obsolete); so employees need to possess broader skills that can be apply in multiple circumstances. It is immaterial whether society is changing more because of technology or because of globalization. The key point is that a liberal education affords students the foundation to assimilate to the changing environment—a point that a STEM education does not address in its curriculum because of its narrow focus.

Globalization does not just have an impact on the United States. Countries worldwide have also considered the value of a liberal education. To illustrate the impact that a liberal education has in a global context, India, a country whose top universities emphasizes science and technology, is now considering integrating the liberal arts in its curriculum. A parallel debate about the value of a broad-based, liberal arts education versus a narrow, technical training has become prevalent at various Indian institutions in recent years. Authors Oxtoby and Holt (2014) assert that the technical approach at these Indian institutions presents a counterexample to the broad-based training offered at some U.S. schools. Conversely, there is a growing sentiment in India that technical degrees alone may not be the answer to rising unemployment. At a time when the U.S. is arguably reducing its emphasis on a liberal arts education, India is experiencing a push for greater investment in the liberal arts. Nandan Nilekani, former CEO of Infosys,

summed up the importance of this shift in educational preferences at a conference co-sponsored by Yale University and Pomona College on the future of liberal arts education in India. Nilekani remarked that higher education “should not just provide jobs but ways of thinking . . . Liberal arts education provides the ability to walk into new, uncomfortable situations, whether in politics, sociology, or technology” (para. 5). Oxtoby and Holt refute the claim that colleges and universities should be a place restricted to training students for a job. They urge colleges and universities to look at why other innovative countries are viewing a liberal education as critical for students to undergo at a time when American institutions wants to reduce its emphasis on that type of education.

That is not to say, however, that all U.S. colleges and universities are forgoing the liberal arts and sciences in favor of STEM. Some schools have recognized the merits of the liberal arts and sciences fields. With this revelation, school administrators want its students to have a balanced, whole education. Embedded within a STEM curriculum are liberal arts and sciences courses intended to help students be better prepared for the job market. For instance, chemical engineering majors at the University of Massachusetts Amherst must take courses in writing, literature, and history. The school says these courses are “necessary to understand the impact of chemical engineering systems in a global and societal context” (Oxtoby & Holt, 2014, para. 4). Liberal arts play an instrumental role in helping individuals understand the big picture and the small picture of simple and complex concepts. Aside from understanding how one scheme of things fits into a larger scheme of the whole, students must learn how to adapt to their situation and to their organization’s situation. Adaptability is a crucial skill that businesses need to have in order to survive in the competitive market. In Andrew Benett’s (2014) article “In Defense of A Liberal Arts Degree,” he understands that businesses have to continually reinvent themselves or

risk getting left behind in their industry. And since businesses are composed of employees, he is alluding to the fact that employees must learn how to reinvent themselves, i.e., learn how to use their knowledge, skills, and abilities in new, but similar situations (para.7). Students and employees have a responsibility to educate and train themselves to be ready for any changes in the labor and job market. Students who are a product of a liberal education are in the best position to reinvent themselves. The overarching point of Benett's article is that some colleges and universities are modifying their teaching style in response to the technological and globalized atmosphere of the new era. Some educators are integrating more key learning outcomes⁹ that are gain from a liberal education in their technically focused courses. While some colleges and universities, whether national or international, are slowly seeing the usefulness of a liberal education, if America, as a whole, does not recognize the role that a liberal education plays in educating a workforce that can do more than just master a particular skill, then America is doomed to fall behind its competitors.

Addressing Some of the Shortfalls of Liberal Arts and Sciences Majors

There is an overwhelming amount of research that supports the value of a liberal education, along with supporters that advocates for students to major in the liberal arts and sciences. Regardless of those supporting evidence, some individuals and groups still consider the liberal arts to be an impractical field. These groups include Millennial Branding, a Gen Y research and consulting firm, and Beyond.com, the career network focused on helping people grow and succeed professionally. The purpose of Millennial Branding is to help companies understand the emerging Gen Y employee and the purpose of Beyond.com is to connect job seekers with

⁹ Key learning outcomes refer to the seven learning outcomes discussed in the section *What Employers Think About a Liberal Education: A Summary of the Research Data*.

employers. Their study revealed how personality can influence hiring and long-term career prospects. Entitled “The Multi-Generational Job Search,” the study discloses what employers look for in their ideal candidate and what they think about job prospects for those with liberal arts majors. Following a national survey of job seekers and HR professionals, “43 percent of the 2,978 respondents said that ‘cultural fit’ was the single most important determining factor when making a new hire” (Schawbel, 2014, para. 1). The top three attributes that companies are currently seeking include the following: “A positive attitude (84%), communication skills (83%), and an ability to work as a team (74%)” (Schawbel, 2014, para. 2). These top attributes are gained from a liberal education more so than from a STEM education. Despite employers seeking these top attributes, and for which liberal arts and sciences graduates do possess, these graduates were shown to be the least likely to land a job, with only 2 percent of companies actively recruiting those graduates, versus 27 percent for engineering and computer information systems and 18 percent for business (Schawbel, 2014, para. 2). Students who graduated having undergone a liberal arts and sciences training do achieve those attributes that companies want. Even with a number of supporters that advocates for the liberal arts and sciences, why then do we still see few jobs offers for those particular graduates?

Not only are there few hires for liberal arts and sciences graduates, but many people do not believe these graduates have a future career. Based on Millennial Branding’s study, 49 percent of all baby boomers (ages 50–68), Gen X (ages 33–49), Gen Y (ages 21–32), and Gen Z (ages 20 or younger) responded that they believe there are no jobs for those with a liberal arts degree (Schawbel, 2014, para. 2). Given this high response rate, is it still a good idea (or even practical) for students to consider the liberal arts and sciences as a possible college major? Absolutely. To solve this unemployment rate, liberal arts and sciences students can add some

STEM courses to their liberal education. Often times STEM courses are taught in isolation from the liberal arts and sciences, giving students one set of skills and not both; this approach to education will not only hinder students' ability to reach their full learning potential, but also put America at a disadvantage in the global market with a half-educated workforce. The world is too interconnected to avoid the liberal arts and sciences altogether. For those liberal arts and sciences students, they need to combine their broad-based training with technical courses. This approach to learning will help ensure that these students possess similar skill sets as those of their STEM peers, but also that they will have a liberal arts background, making them more valuable and useful to employers.

But combining such broad-based training with technical training is not as easy as it is for some students, namely engineering students. In fact, naysayers would rebut such a combined educational approach and say that engineering students do not have the time to take liberal arts and sciences courses. Typically, most undergraduate degrees take approximately four years to complete. Engineering is the exception—it takes approximately five years to complete. Why is this so? Author Sebastian Alamo (2014) explains that an engineering student's curriculum is jammed pack with so many required classes that students are not able to take liberal arts and sciences courses, much less electives, and thus are deprived of the broad-based learning (para. 3). This jammed-pack curriculum for engineering students is a valid point to consider, and it raises several critical questions: How can STEM students, particularly engineering students, receive some form of a liberal education when their degree audit leaves no room to accommodate additional classes? How can STEM students, particularly engineering students, acquire those soft skills that employers value in employees? Several proposed solutions can help solve these issues. For example, STEM students can study abroad one semester; this route will

allow students to immerse themselves in a new culture, expose them to a new perspective on life, and provide countless opportunities to test their people and communication skills with a diverse audience. Another solution is for STEM students to join student organizations that relates to the liberal arts and sciences (e.g., language clubs, poetry clubs, service clubs, etc.). This route will allow students to interact with individuals outside their disciplines, enter new discussions that they might not otherwise be engaged in through their regular classes, and participate in civic projects for the benefit of the community. These are just some proposed solutions that allow STEM students to have some exposure to the world of the liberal arts and sciences without the added burden of such formal training in a traditional classroom setting.

Unfortunately, the shortfall for why the liberal arts and sciences majors are considered impractical does not stop there. As long as STEM programs continue to be at the center of technological breakthroughs and scientific discoveries, students would think less about majoring in the liberal arts and sciences and more about which majors will allow them to contribute to the breakthroughs and discoveries. With federal dollars constantly supporting STEM programs, students would see the weight the government places on these fields. Moreover, the rising cost of tuition, along with the economic state of the country, has led students, parents, and stakeholders demanding a better return on investment. Not all college majors are created equally, and thus not all college degrees are equally good investments. Figure 8 shows data from the 2012 American Community Survey that estimate the rate of return for thirteen college majors. The rate of return to college varies across the different majors. In general, majors with a more technical focus training—(a) engineering and (b) math and computers—earned the highest return, 21 and 18 percent, respectively. Majors that do not have a focus on quantitative and analytical skills—i.e., liberal arts—have below-average returns (Abel & Deitz, 2014, pp. 7–8). The figure shows that

the rate of return is lower for the liberal arts, but typically, students who majored in these fields are not vocationally oriented, and consequently are not so concerned with being well off financially. Nonetheless, a college education, no matter whether students are STEM major or liberal arts and sciences major, is still a good investment overall. The rate of return on the thirteen listed majors exceeds 9 percent, which is undoubtedly higher than a high school diploma or no degree at all.

Return to Bachelor's Degree, by Major 2012

| | College Graduates Overall (Percent) | Underemployed College Graduates (Percent) |
|-----------------------------------|---|---|
| Total, all majors | 15 | 12 |
| Engineering | 21 | 17 |
| Math and computers | 18 | 14 |
| Health | 18 | 13 |
| Business | 17 | 14 |
| Communications | 15 | 13 |
| Technologies | 15 | 12 |
| Social sciences | 15 | 12 |
| Sciences | 14 | 12 |
| Architecture | 14 | 8 |
| Liberal arts | 12 | 9 |
| Agriculture and natural resources | 11 | 9 |
| Leisure and hospitality | 11 | 9 |
| Education | 9 | 7 |

Figure 8. Return on Bachelor's Degree, by Major 2012. This figure shows what the return on investment is for bachelor degree holders in 2012.

Source: U.S. Census Bureau, American Community Survey; U.S. Department of Labor, O*NET; U.S. Department of Education, Digest of Education Statistics 2012; The College Board, Trends in College Pricing 2013 and Trends in Student Aid 2013.

The return on investment for college degrees has become increasingly important, particularly as the employment rate for graduates remains relatively low. The scrutiny of unemployment rates is compounded by concerns of rising tuition costs and student-debt level, leaving administration at liberal arts colleges with the task of proving the value of liberal arts programs to critics. Even though studies have shown that liberal arts degrees pay off over time and that the skills provided by a liberal education are highly desirable in the workforce, the value of higher education is repeatedly questioned, especially in recent decades with the prominence of STEM degrees in the media. These factors have led some students to choose a practical education (i.e., STEM majors). Yet a practical education is void of the necessary training that helps make individuals well rounded. And nowadays with increased competition for jobs and more and more students graduating from college, it is vital that students have a broad-based training that can give them additional knowledge, skills, and abilities that will help make them an asset for employers, and not just become another “machine.”

The reality is that most successful individuals have typically benefited from such broad-based training, with early experiences often paying off in surprising ways. In *The Heart of the Matter* report, the authors note that “the ability to adapt and thrive in a world certain to keep changing is based not on instruction in the specific jobs of today, but in the developing of long-term qualities of the mind: inquisitiveness, perceptiveness, the ability to put a received idea to a new purpose, and the ability to share and build ideas with a diverse world of others” (American Academy of Arts and Sciences, 2013, p. 32). These long-term qualities of the mind are the cornerstones of a liberal education. It is these long-term qualities of the mind that make liberal arts and sciences degrees distinct—not the earning potential. Associate professor at Western Washington University Johann Neem holds that “the liberal arts and sciences have no economic

value . . .” (Goldman, 2012, para. 4). However, this absence of economic value is not grounds to abandon the liberal arts and sciences altogether. Proponents against the liberal arts and sciences need to look at these “useless and impractical” degrees beyond an economic standpoint. Neem concedes that the skills cultivated by the liberal arts and sciences do not make students richer, more productive, or more innovative. At the same time, however, the liberal arts and sciences is not a waste of time. In truth, liberal arts and sciences programs provide indispensable training for responsible citizenship, a point that corresponds closely to the classical understanding of the liberal arts as the studies worthy of a free man with the leisure to participate in his community (Goldman, 2012, para. 5). Studying the liberal arts and sciences give students perspective and an understanding of the world around them. Most students who choose to study the liberal arts and sciences are in the program for the love of the subject. These students understand (and accept) that they will not make as much money as an engineer. The true value of their liberal arts and science degree is the type of long-term skills and virtues they will develop and use for the rest of their life.

A sector that appreciates these long-term skills and virtues is the technology sector, an area dominated by individuals with technical skills. Many of the in-demand jobs are technology-related jobs. At first, liberal arts and sciences graduates do not seem to be the ideal candidate because most technology jobs require technical skills. In actuality, many CEOs of tech companies, according to Dr. Segran, want candidates with a liberal arts background. One of the reasons for this preference includes individuals bringing alternative point of views in many every day decisions. However, a more persuasive reason for studying the liberal arts is that many tech CEOs prefer to hire candidates who have similar educational backgrounds as themselves. In other words, tech CEOs are generally inclined to hire individuals trained in the liberal arts,

because a large proportion of CEOs have liberal arts background themselves; a third of all Fortune 500 CEOs have liberal arts degrees (Segran, 2014, para. 14). Tech CEOs strongly believe that liberal arts graduates bring value to their companies. For instance, “Steve Yi, CEO of web advertising platform MediaAlpha, says that studying the liberal arts train students to thrive in subjectivity and ambiguity, a necessary skill in the tech world where few things are black and white, and where there is generally more than one right decisions” (Segran, 2014, para. 4). Likewise, Danielle Sheer, vice president at Carbonite, a cloud backup service, agrees with Yi’s position. Sheer studied existential philosophy at George Washington University, where her college major distinguished herself from her technically trained colleagues. Her academic background gave her an edge because she always considers a number of different options and outcome in every situation, compared to her co-workers who are trained to assume there is always one correct answer (Segran, 2014, para. 6). From these examples, it can be inferred that being only technically trained limits individuals’ ability to think critically and creatively, and survey research points out that critical thinking and creativity is vital to the success of businesses. Candidates that have a technical *and* a liberal arts background are highly desirable to tech companies and to other companies across the sectors.

Knowledge is the new building block of success. Thinking critically and creatively are skills that are needed to fuel innovations to help build and maintain a successful society. It is true that STEM graduates drive innovations and help create jobs. It is also true that some can think critically and creatively. But these skills are useless without the ability to communicate their ideas effectively and without the ability to think ahead to the future. In Andrew Benett’s article “In Defense of a Liberal Arts Degree,” he illustrates how the liberal arts fill in the gaps in cases where students choose only to have a technical, narrow education. Innovation is on the rise

thanks to the fields of STEM. Yet STEM courses do not concentrate heavily on effectively communicating ideas (though schools are slowly changing their curriculum to reflect this change). People with ideas need to be able to work with others, develop the idea into a tangible form, and be able to sell it to a wide range of audiences. According to Benett (2014), a liberal education tends to impart the ability to write well and to use language in a persuasive manner. Beyond communication though, a liberal education does more to help students in their professional careers. For example, humanities and social sciences provide a context that helps students understand not only what is happening in the world, but also what is likely to happen and why. The ability to think ahead is crucial, as industries are rapidly changing, so businesses need people who can anticipate what is coming and what effects will result. Businesses filled with individuals who are unmindful of the past will operate with only a partial, incomplete vision of the future (para. 10–12). The fields of liberal arts and sciences are being called on to demonstrate the tangible economic benefits of its programs, and based on research studies and statements from college educators and business leaders, it is clear that the economic benefits of such a program is a whole and completely educated individual.

But how different are the knowledge, skills, and abilities of students who graduated from a liberal arts program compared with those who graduated from a STEM program? To measure some of the most wanted skills by a majority of employers, which students develop through a liberal education, two professors conducted a study to measure college students' academic gains. The authors of the study, Richard Arum, a professor of sociology and education at New York University, and Josipa Roksa, an assistant professor of sociology at the University of Virginia, tested 2,300 traditional college-aged students to track their academic gains. The students took the Collegiate Learning Assessment, a test designed to measure gains in critical thinking, analytic

reasoning, and other “higher level” skills taught in college (Jaschik, 2011, para 2). The professors found that students majoring in liberal arts fields see “significantly higher gains in critical thinking, complex reasoning, and writing skills over time than students in other fields of study” (Jaschik, 2011, para. 14). Some of the reasons for these significantly higher gains are attributed to the reading materials, writing assignments, and classroom discussions. The results of the study suggest a relationship between the rigor of the curriculum and the level of gains in learning. Supporters of the liberal arts disciplines firmly believe that students in other non-liberal arts majors are not challenged in the same way and therefore do not develop the same kinds of skills as the liberal arts graduates.

The Need for a STEM Collaboration with the Liberal Arts and Sciences

The number of supporters pushing for a liberal education has been growing in recent years. As colleges and universities begin to consider a liberal education as complementary to a student’s overall college education, schools should not avoid the STEM disciplines in the process. Rather, students need to develop a liberal arts and sciences foundation no matter what major they choose. The best way to prepare the next generation of workers and leaders is to ensure that liberal arts and sciences students have both a liberal education and a technical education. Along the same line, STEM workers should have some form of liberal arts and sciences training, which can provide them with more job opportunities, career advancement, and higher earning potentials. Douglas Wartzok, provost at Florida International University, said that a broad liberal arts education prepares students for a lifetime of occupations by developing critical thinking, quantitative reasoning, and effective oral and written communication: “Most of the jobs our students are taking upon graduation didn’t exist when they started high school, he wrote. ‘Hence

if we focus them on the career needs of today without giving them a strong liberal arts foundation, they will be trained for jobs that won't exist when they graduate” (as cited in Vasquez, 2012, para. 31–32). There is no better preparation than a broad education to accommodate people's frequent career changes and to prepare them to take on jobs that have yet to be invented. Having a background in the liberal arts and sciences helps individual learn to become life-long learners, a necessary skill for the new millennium and the emerging workforce.

Many state governors view science, technology, engineering, and mathematics majors as the key to economic growth and innovation. The National Governors Association, along with many state governors, is producing legislation and initiatives intended to increase the production of STEM degrees at public institutions of higher education. Dr. Scott Bevins (2011), former Director of Institutional Research at the University of Virginia's College at Wise, admits the importance of the STEM disciplines, but points out that the liberal arts should not be studied independently from STEM. New discoveries, breakthroughs, and innovations have generated higher living standards and improved quality of life (p. 12). The resource most vital to attaining this higher living standards and this improved quality of life has been, and continues to be, labor, specifically human capital. Dr. Bevins believes in a working relationship between the two disciplines. The liberal arts serve to aid human comprehension, while STEM has the ability to solve real-world challenges. It is foolish to think that STEM graduates can sustain economic growth and innovation without a liberal arts background or soliciting help from the liberal arts and sciences graduates. A STEM education has its advantages, but it is not as conducive to problem solving or creativity as a liberal education. There are knowledge, skills, and abilities that STEM graduates do not possess because of a lack of a complete training (i.e., no liberal education), and for which liberal arts and sciences graduates can fill the gaps.

These gaps refer to certain learning and skills that STEM students most likely will not acquire through their chosen disciplines, but which can be fulfilled through a liberal education. In the article “Why Study the Liberal Arts?” by Richard Sigurdson (2005), former Acting Dean of Arts for the University College of the Cariboo, he offers sound reasons why students need to study the liberal arts and why businesses today respect this type of degree. A liberal arts degree “teaches many of the skills and abilities that are needed in the contemporary workplace. That is why businesses appreciate the value of an arts degree in potential employees. Employers recognize the importance of what are often called ‘employability skills’—reading, writing, listening, speaking effectively, knowledge of language, critical thinking, problem solving, basic numeracy, information literacy and the capacity to continue to learn for life—and know that university liberal arts programs have always concentrated on just these skills” (para. 11). Scientists are beginning to appreciate the liberal arts training specifically for the writing component. Cornell President David Skorton points out that “many of us never received the education in the humanities or social sciences that would allow us to explain to nonscientists what we do and why it is important” (Jackson-Hayes, 2015, para. 7). Scientists trained in the liberal arts are able to communicate their findings as professionals in their field. They are able to speak effectively at conferences and contribute as authors to journal articles (para. 7). Current and prospective college students, who are thinking of avoiding the liberal arts because the discipline is viewed as useless, need to reconsider this baseless thought. There is an inherent danger in preparing students too narrowly to fit a job, because that particular job may not exist when they get into the job market or they may not be qualified for jobs that rely heavily on soft skills. Growing evidence indicate that a liberal education provides individuals with tangible, practical skills that are not only desirable to employers, but will never become obsolete.

At the same time, however, liberal arts and sciences graduates cannot succeed in a global economy without the help of STEM graduates. Indeed, the president of Duke University, Richard Brodhead, acknowledges that America needs STEM education and STEM graduates for economic prosperity. But he questions whether the nation's needs could be successfully met through STEM alone. Brodhead offers compelling examples on why this sort of collaboration between STEM and liberal arts is necessary more than ever:

- James McNerney, the CEO of Boeing, said that high-tech manufacturing requires skilled engineers, but that beyond a certain level, people will not advance if they do not have a broader array of skills, especially skills at communication and interacting with culturally diverse others—liberal arts training par excellence;
- General and Ambassador Karl Eikenberry, who headed military and diplomatic efforts in Afghanistan, testified that in the globalized modern world, weapons can only do so much to protect national security. Equally essential are the understanding of foreign languages, foreign histories and cultures, and beliefs and ethical systems different from our own—classic humanities fields within a liberal arts education;
- Norm Augustine, longtime head of Lockheed Martin and the principal force behind the *Gathering Storm* report, argued that collecting evidence, weighing interpretations, and making arguments are core skills for creative workers and good citizens, and that these require broad training across the arts and sciences. (Brodhead, 2013, para. 16–18)

Additionally, author Ronit Patnaik offers a more noteworthy example of the significance of collaboration between STEM disciplines and the liberal arts and sciences. According to the late Steve Jobs, former CEO of Apple Inc., ““It’s in Apple’s DNA that technology alone is not enough—it’s technology married with liberal arts, married with the humanities, that yields us the

result that makes our heart sing, and nowhere is that more true than in these post-PC devices” (as cited in Patnaik, 2012, para. 5). There is a deep, intertwined relationship between the liberal arts and sciences and the functioning of society. Colleges and universities are constantly being called upon to connect a college education with the needs of the economy. The examples illustrated reveal how the two disciplines, when they complement each other, can address the needs of the economy. Without the liberal arts and sciences “marrying” STEM, society will be disadvantaged in more ways than we can imagine.

Additional examples of the complementary relationship between STEM and the liberal arts and sciences is presented by Ravi Sharma (2014), who offers more evidence on why STEM alone is insufficient to understanding matters outside the fields of STEM and how the liberal arts and sciences play a harmonizing role to the other fields:

- America’s government system requires its citizens to have a sufficient political and social understanding to elect officials in an educated and intelligent manner. The rational and systematic science curriculum is inadequate at accomplishing citizens to make well-informed choices without some understanding of how the government system works (an education provided by courses in history and political science);
- Also, science alone cannot resolve the cultural and religious disputes around the world. For example, it would be futile to address the territorial conflicts in the Middle East without first having a thorough understanding of how such contention formed (i.e., the history behind the conflict);
- In addition, the demand for specialists in Islam and Arabic skyrocketed after terrorism became problematic in 2011; the research and training done in the humanities to meet this rapid call took place over years of liberal arts scholarship (e.g., training in foreign

language and sociology, to name a few). With the U.S. establishing stronger relationships with regions such as Brazil and Pakistan, the nations' humanists must be competent and ready for any challenges. (para. 5)

Here, these examples illustrate how courses in science, technology, engineering, and mathematics do not prepare individuals to assist in political matters and foreign affairs, two areas that have a great impact on the shape of America's economy. The pressing need for more STEM graduates emanates from their usefulness in producing the products, systems, and designs that are coveted by society. This misguided perspective, however, is particularly influential in our current economic state, as the U.S. struggles for instant and tangible results from college graduates. The examples introduced explains the underlying benefits of the liberal arts and sciences in combination with STEM—a relationship that is not meant to be separated. This sort of a blended learning is beneficial to students on both sides of the divide.

What are the consequences of this broken STEM and liberal arts and sciences relationship? What are the drawbacks to having just technical skills in a predominately STEM organization? In other words, can students be successful in a STEM-focused organization without the need for a liberal education? The answer is no, and this answer is supported by research conducted by chief executive of NEF: The Innovation Institute¹⁰ and a lead author of *Inventing the Future: transforming Stem economies*. In professor Sa'ad Medhat's (2014) article "Stem Skills: Colleges Are Failing to Meet Industry Needs," he urges colleges and universities to rethink the STEM curriculum for the future of society. After consulting with more than 100 Stem-based companies (i.e., organizations heavily reliant on science, technology,

¹⁰ NEF stands for New Engineering Foundation. "NEF: The Innovation Institute is a professional body and a leading provider of SciTech innovation and growth services to business, education and government. Guided by its Innovation Council, NEF: The Innovation Institute influences policy and supports its members, partners and stakeholders to achieve performance excellence and stimulate innovation" (NEF, 2014).

engineering, and mathematics), he discovered a growing disconnect between the types of competencies sought by industry and the learning focus of most colleges. Many colleges' STEM curriculum was not fit-for-purpose with the needs of the industries: up to 80 percent of college courses were misaligned with industry needs (para. 1–2). This misalignment is attributed to a lack of long-term vision and essential skills. Liberal arts and sciences programs excel in teaching students perspective, critical thinking, effective communication, and more—skills that can be used in the present and future state of the economy. But STEM-based colleges and universities are focused on training students to have the skills that are currently in-demand in many growing sectors at a particular point in time, and thus these schools are not thinking past a particular period. With the aid of liberal arts and sciences classes, these STEM students will be trained to apply their technical skills in a more general sense in order to meet the industry's needs, both for the short term and for the long term, and therefore remedy the disconnect found in some STEM industries.

Extending Medhat's point further, he indirectly argues that schools, in developing its department's curriculum, have lens focused on what society needs currently and what will benefit the economy at a specific point in time. Many colleges and universities do not have a vision focused on the future that allows them to create a curriculum to make sure their students are adequately prepare for any changes that may occur in the marketplace. So when students go in the work world, they are left dumb-founded about how to apply what they learned in the classroom to real-world applications in new, unfamiliar territory, especially when circumstances changes. Consequently, there is a skill crisis that is plaguing society, and the speed at which technological changes occur (and with that, new job roles) is causing major disruption in many sectors, leading new skills to be learned, and traditional skills to be discarded (para. 3–4). The

speed at which skills can be outdated lends compelling support for why students need to be well rounded and be trained to possess a wider array of skills. It is common for individuals to change jobs often in their lifetime. These job transitions call for transferrable skills (or soft skills). According to Medhat, “The best help that we can give students is to encourage them to be flexible and entrepreneurial by innovating and embracing new technology, and moving in and out of sectors in response to changing industry trends. Students should no longer prepare for one role or train in a single discipline. They need to develop collaborative skills and understand that they may have many different jobs over the course of their career” (para. 5). This quote sums up perfectly why students are highly encouraged to have a liberal education, and why this type of education is beneficial for everyone.

The Movement Toward STEAM

While STEM exist to support the nation’s readiness for global innovation and leadership, the government is learning that adding “arts” into the acronym will lead to economic prosperity that may not be otherwise possible without bringing the artistic side into the STEM equation. Society is realizing that the arts cannot be separated from education. Nowhere is this concept truer than in the sciences. On a surface level, artists and scientists do not seem to have any common denominators. But the two disciplines are not polar opposites, as Stephen Beal, president of California College of the Arts, points out. Both fields involve research, observation, experimentation, discovery, collaboration, innovation, and most importantly, creativity (Beal, 2013, para. 6). Beal provides examples that illustrate the deep connection between art and science: “Physicist Niels Borg was inspired by Cubism and the principle of simultaneity when seeking to understand electrons; neuroscientists study the works of Samuel Beckett to decipher

how the brain works; and technology that was imagined in science fiction decades ago is now science fact” (para. 9). Organizations across a range of industries are seeking individuals who can bring a different and unique approach to solving problems. But this unique approach is hard to reach because the arts, a key ingredient, is missing from the current STEM curriculum (para. 12). Innovation is not just reserved for engineers and scientists. There must be room for artists, designer, and creative individuals alike to collaborate to bring solutions to societal and global issues. An art education will help bring in the next wave of innovators, inventors, and entrepreneurs.

Priorities in education are shifting. More emphasis needs to be placed in helping students think more creatively. No longer is it enough for students to approach a problem by thinking too narrowly or thinking from inside the box. In a study titled “Creativity and Education: Why it Matters,” researchers discovered that 85 percent of respondents agree that creative thinking is critical for problem solving in their career, and 68 percent believe that creativity is a skill that can be learned (Janus & Weede, 2012, para. 1). This study brings to light the idea that creativity¹¹ is a skill that cannot be replicated or outsourced, but rather taught in the classroom. The respondents in the survey believe that creativity is a key area of their career (78%) and for economic growth (96%), and 78 percent of them wished they had more creative ability (para. 4). The study highlights a growing concern in educational curricula: students are focusing too much on learning subject materials (para. 5). While it is essential that students are educated in the core subjects such as math, reading, and science, the reality is that students need to be able to balance out their academic study with skills taught in areas that get their creative juices flowing.

¹¹ As defined by 66 percent of the respondents in the study “Creativity and Education: Why it Matters,” creativity is thinking out of the box or the ability to come up with innovative ideas (Janus & Weede, 2012, para.4).

The STEAM (science, technology, engineering, arts and mathematics) movement has been picking up traction in the government circle, in addition to schools around the world. John Maeda is a pioneer in the STEAM movement. As former president of Rhode Island School for Design, he has been instrumental in pushing for the arts in education (Brady, 2014, para. 6). Maeda believes that artists and designers ask questions that scientists and engineers might not be apt to ask. Artists and designers help provide that innovative edge that society needs to lead the world in innovation, and organizations are seeing this vision too: “Industry leaders such as Boeing, Nike, Apple, Intel, 3M, and many more cite design and/or creativity to be a priority for their companies when seeking innovative solutions” (para. 15). With the help of Maeda and other advocates for the STEAM movement, the federal government is listening to the message. Representative Jim Langevin introduced House Resolution 319, which “expresses the sense of the House of Representatives that adding art and design into federal programs that target Science, Technology, Engineering and Math (STEM) fields encourages innovation and economic growth in the United States” (Allina, 2013, para. 4). Educators, business leaders, and now, governmental leaders, know that the challenges of the future will require creative problem solvers and unconventional solutions. Lately, science, technology, engineering, and mathematics are not sufficient anymore without the arts.

The arts in STEAM do not refer to the liberal arts and sciences. Rather, the arts¹² refer to literary arts, performing arts, visual arts, and design. But the art and the liberal arts and sciences do go hand-in-hand. The important lesson regarding STEAM is the idea that creativity and innovation is drawn from being creative in itself. Courses in liberal arts and sciences help foster

¹² For a description of what the Arts mean in STEAM, see Anne Jolly “STEM vs. STEAM: Do the Arts Belong,” <http://www.edweek.org/tm/articles/2014/11/18/ctq-jolly-stem-vs-steam.html>; see also Barbara Prey “The Value and Importance of the Arts and the Humanities in Education and in Life,” http://www.huffingtonpost.com/barbara-ernst-prey/the-value-and-importance-_b_5788116.html.

the right side of the brain that supports creativity. Exposure to writing assignments, classical novels, art history, etc. will help students develop the critical and innovative thinking they need to thrive in a rapidly changing and highly competitive world: “Like the liberal arts in general, training in the arts improves our ability to pull together and synthesize seemingly disparate ideas and information into a coherent and meaningful whole. Further, taking a studio art course or studying art history helps build an aesthetic sensibility that can influence other areas of thinking” (Prey, 2014, para. 16). The arts positively affect the brain in terms of learning. In a 2008 study, the DANA Arts and Cognition Consortium, a philanthropic organization that supports brain research, found that training in the arts improve attention, cognition, working memory, and reading fluency (Pomeroy, 2012, para. 8). According to Dr. Jerome Kagan, an emeritus professor at Harvard University, the arts combine the motor skills, perceptual knowledge, and language, which, in combination, contribute to several areas of learning (Pomeroy, 2012, para. 9). The focus of STEM needs to be expanded to include an equal emphasis on the arts. The pedagogy needs to promote interdisciplinary and multidisciplinary teaching and learning. As Dr. Mitchell Reiss, former president of Washington College puts it, “We need to understand the interconnections between and among the science, the arts and humanities (Prey, 2014, para. 12). One of the goals of a liberal education is to graduate well-rounded students who have a whole education. By integrating the arts, students will use both sides of their brain: STEM is based on skills using the left half of the brain, and activities based on art uses the right side of the brain (White, 2010, para. 2). Similar to the debate that the liberal arts and sciences should not be separated from STEM education, arts, too, should not be separated from STEM itself.

More importantly, the United States is not just a knowledge-based economy anymore. The United States is morphing into a creative economy.¹³ Thus, the need for the arts. U.S. Secretary of Education Arne Duncan says, “The Arts can no longer be treated as a frill. Arts education is essential to stimulating the creativity and innovation that will prove critical for young Americans competing in a global economy” (Eger, 2011b, para. 2). It is vital that federal and state government consider incorporating the arts into students’ education. The nation will be at a serious disadvantage to those countries that require their students to study the arts in combination with STEM fields. For example, competitors in Asia and Europe have a rigorous arts curriculum as a national priority in their school system (White, 2010, para. 3). The United States is in no position to let its competitors take the lead in innovation and leadership. Countries worldwide understand the pivotal role that the arts play in providing their workforce with the necessary skill sets that help them thrive as professionals, and the United States must follow in suit.

Creativity skills have been proven to be fostered through a liberal arts education. Because a liberal arts education involves learning across multiple disciplines (e.g., natural sciences, social sciences, humanities, arts), the ability to draw connections between the disciplines significantly helps students with getting in touch with their imaginative and artistic side. As the world continues to become more complex, more interconnected, and involve more governmental regulations, among other major shifts, creativity holds the key to handling such volatile changes. In a 2010 IBM study of over 1,500 CEOs across 60 countries and 33 industries worldwide, CEOs “believe that—more than rigor, management discipline, integrity or even vision—successfully navigating an increasing complex world will require creativity” (Tomasco, 2010, para. 1). The

¹³ Creative economy is defined as either the creative industries (film television, graphic design, publishing, etc.) or all businesses, not just those directly associated with the arts (Eger, 2011a, para. 5).

IBM study revealed that less than half of global CEOs believe their companies are equipped to handle industry transformation in the business environment (para. 2). Students educated in the arts, along with other STEM fields, can adequately prepare themselves to become competent employees that can assist their organizations in a volatile, uncertain, and complex environment. Sandra Ruppert, president of Art Education Partnership, believes “[a]rts learning experiences play a vital role in developing students’ capacities for critical thinking, creativity, imagination, and innovation. These capacities are increasingly recognized as core skills and competencies all students need as part of a high-quality and complete 21st-century education” (Eger, 2011b, para. 13). An education in the liberal arts challenges students to be curious about a number of things and to ask analytical and philosophical questions. This kind of curiosity is substantially similar to how artists and designers think, and will be a major factor in helping organizations successfully compete in the dynamic and ever-changing marketplace.

A World Without the Liberal Arts and Sciences is Not an Option

Our world cannot function to our fullest potential if it is deprived of the liberal arts and sciences. As Martha Nussbaum mentions, a world without the humanities (and by extension, the liberal arts) is a world in which democracy fails to operate efficiently and effectively. The issue regarding the liberal arts and sciences can be traced back to society’s reliance on education to help the economy. Because society is too focused on economic productivity, the direction of education has been distorted, and this distortion is hurting us. As she puts it, “The trend in education is to teach students to be economically productive rather than to think critically and become knowledgeable citizens. This shortsighted focus on profitable skills has eroded our ability to criticize authority, reduced our sympathy with the marginalized and different, and

damaged our competence to deal with complex global problems. And the loss of these basic capacities jeopardizes the health of democracies and the hope of a decent world” (Nussbaum, 2010, back cover). Students are not being taught how to think critically nor are they being shaped to become competent, knowledgeable citizens. What we see instead are schools graduating “machines,” a product incapable of leading a meaningful and considered life.

Since the economic crisis of 2008, the direction that higher education has been heading in is one towards accountability from students, families, legislators, governmental officials, and other stakeholders. This demand has inevitably resulted in the clear-cut notion of colleges and universities being at the forefront for training students for a profession. Possibly because of the recession, and possibly because of the fear of being unemployed, students do not want to take a chance on their professional future. As such, these fears play a strong role in why a majority of students attend college. Earlier on in figure 1, we learned that the top reason students study STEM is to make a good salary. In figure 9, the graph echoes that top reason. Figure 9 shows a trend from 2010–2012 that reveals the reasons first-year students decided to attend college was to be able to make money when they graduate. That reasoning has been the same for students entering college in 2011 and 2012. It is that reason that continues to shaped students’ decision to shy away from the liberal arts and sciences and move toward the STEM fields, with the hopes of getting a job that pays well upon their leaving college.

“Very Important” Reasons First-Year Students Decided To Attend College, Overtime

“VERY IMPORTANT” REASONS FIRST-YEAR STUDENTS DECIDED TO ATTEND COLLEGE, OVER TIME

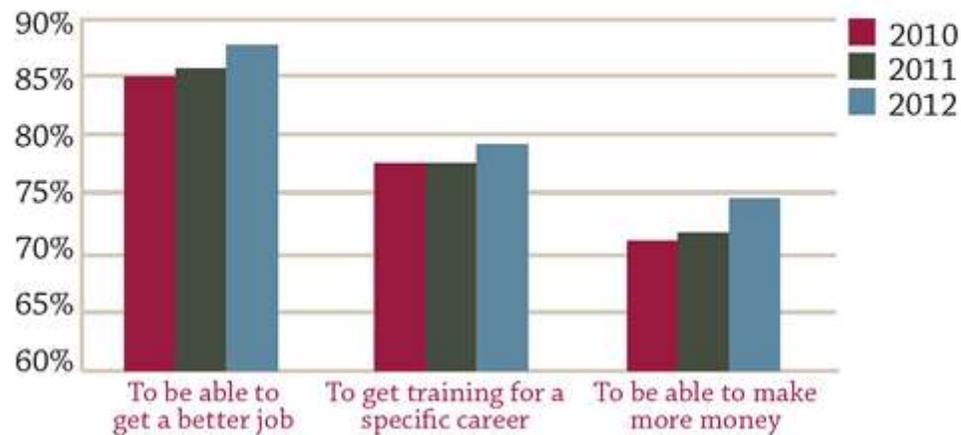


Figure 9. “Very Important” Reasons First-Year Students Decided to Attend College, Overtime. This figure shows an increasing trend, where students are seeing college as a place to prepare them for a job.

Source: *The Lawlor Group*. 2014

But encouraging these economic, profit-motive reasons to attend college is short-sighted. Students should not just select a major and take classes to help them prepare for their vocationally oriented life post-graduation. Sure, getting a job and making money is important. But there is a lot at stake if STEM programs get widely implemented. For example, what is at lost is reading classic novels, such as *Gulliver’s Travels*, *Little Women*, and *Paradise Lost*. Students should have some background knowledge about some of the greatest authors of our time and read why their work is highly regarded by scholars in academia. In addition, as educated citizens, students need to have some foundation for how the American government system works. For example, students should have some idea about how Congress operates, how bills are passed, and how the federal government system works overall. And learning about these

topics can be easily accomplished from taking a history or a political science course. We need individuals who are informed, engaged citizens of their community and the world at large. These kinds of individuals are the ones that a liberal education can foster. Students can only be a well-informed and well-rounded individual by having a complete education, and this completion cannot be done without the liberal arts and sciences.

Moreover, if students continue to perceive colleges and universities as a place that will help them prepare for their dream job, then liberal arts schools are at risk for readjustment (i.e., redefining the school's mission and school type) or face closure. Currently, there are over 200 identified liberal arts institutions. Lately, a rise in STEM programs have affected some liberal arts institutions, as these schools have seen (and will see) a decline in student enrollment, faculty layoffs, and job cuts. Some liberal arts schools are in small towns and major cities, and if there is a reduction in students deciding to study the liberal arts, these distinguished liberal arts institutions and community will face setbacks in the social, economic, and civic life. Many of these college towns benefit from an educated, skilled workforce, and as such, these towns need the liberal arts to keep it stable.

Even as I argue in favor for the liberal arts and sciences, we should not dismiss the importance of STEM and other related fields. Dr. Watson (2014), a professor at East Tennessee State University, commented that STEM disciplines have proven to be paramount to society, and as long as STEM disciplines continues to break technology barriers and improve society's standard of living, they will always have society's support. As a caveat though, students should not be only proficient in one area, such as a trade or profession, much less proficient in one area of study, because without a solid grounding in critical thinking skills provided by a liberal arts and sciences education, students will only be partially educated (para. 12). Employers want

individuals who have a complete framework of concepts. As stakeholders, we want individuals who can think critically, but also have specific skills that make them useful. Studying the liberal arts and sciences fields are the cornerstone of any complete education, which helps produce individuals highly treasured by society. In “Why America’s Obsession with STEM Education is Dangerous,” Zakaria assert that “innovation is not simply a technical matter but rather one of understanding how people and societies work, what they need and want. America will not dominate the 21st century by making cheaper computer chips but instead by constantly reimagining how computers and other new technologies interact with human beings” (Zakaria, 2015, para. 3). No matter how far society evolves though, there is still that human interaction component that is vital. Yet despite the immense value of a liberal education, liberal arts and sciences programs continue to feel threatened by critics who want to invest in degree programs that generate tangible and immediate impact that society can dwell on. Society needs to stop equating an undergraduate education with work-force training and focus on the concept of education to cultivate individuals to live in a world with purpose and to contribute their knowledge for the common, public good. It becomes clear, then, that as society continues its path toward being a giant melting pot enhanced with diversity and human flourishing, the liberal arts and sciences fields are the fuel that is needed to keep society on its feet.

Concluding Remarks on STEM & Liberal Arts and Sciences

Students are entering into an era of unprecedented changes and uncertainty. Colleges and universities must prepare students to tackle problems that have not yet become problems and to take on jobs that are not yet available. This is where the liberal arts and sciences broad education comes in hand. At the same time, however, we need STEM programs to compete successfully in

a global and innovative economy. There is no either/or when it comes to deciding between the two types of education. STEM graduates are valuable to our society, but the obsession with having only STEM graduates will only lead to a workforce that all serve the same purpose. There is room to have both STEM and liberal arts and sciences workers. Students need both types of education. Higher education needs to be aligned with the future job market, not just developing skills for specific career paths. We should be cautious of only looking at the economic value of an education. Christopher Nelson, president of St. John's College, declared that when we have a narrowed view of education in a purely economical way, it distorts our judgment about the true worth of higher education. College is a place where students are molded into mature, analytical thinkers. When students graduate, they are expected to be independent learners, be able to seek out answers to whatever questions arise, and able to direct their own learning in accordance with the challenges that life presents (Douglas-Gabriel, 2014, para. 8–9). As it stands, we are conveying the wrong message about the purpose of a college education. Students worry too much about how their college major will translate into a job. When students are focused on finding the “perfect” major, they do not have time for self-discovery or self-development, and this is a disservice to students and to society.

The movement away from a liberal education is partly because there is no visible impact that otherwise would be noticeable in STEM degrees. As John Nehauser, president of St. Michael's College, says, “There's no immediate impact, that's the problem. The humanities tend to educate people much farther out. They're looking for an impact that lasts over decades, not just when you're 22” (as cited in Zernike, 2009, para. 17). Nehauser's statement speaks volume as to one of the reasons students are opting to study the STEM fields. But students should not fall prey to the notion that they must choose between a broad-based education and an education

geared toward job preparedness. When students choose to have a liberal education, they are making an investment in their selves. The value of these liberal arts and sciences degrees is measured over the course of the individual's lifetime and the endeavors he or she pursues. Oxtoby and Holt (2014) emphasizes that "a liberal arts course of study offers a foundation for long-term success by providing students with proficiency in critical thinking, problem solving, teamwork, and cultural awareness. As people change jobs more than ever and the pace of technological change accelerates, it's these skills that will translate into a lifetime of success" (para. 3). It cannot be highlighted enough that employers are seeking candidates who can think critically and write effectively—skills that are not adequately taught in STEM courses. But more importantly, students need to be aware that jobs today can be gone tomorrow. It is in the students' best interest to equip themselves with transferrable skills that will help them find other jobs without any additional training or education; and these transferrable skills are provided through a liberal education. Many students falsely believe that STEM degrees guarantee a good income and job security. While there is research data to support that notion, it is impossible to say with confidence that every student who studies a specific major will have that kind of success. Not every engineer is successful and not every English graduate is unemployed. It cannot be stressed enough, but one's major is not indicative of one's future. It is not the major specification that is applied in the workforce, but it is the work experiences, work ethics, and the hard and soft skills gained in earning the degree that helps shape an individual's future.

Furthermore, instead of continuing to pour out so many STEM graduates with stock knowledge, skills, and abilities to help them get a job and remedy the STEM "shortage," colleges and universities need to inform STEM students on the need for a liberal arts and sciences training. Schools need to integrate a fully balanced curriculum so that students can be steered in

the right direction to give them opportunities for engagement in the real world from a practical and personal perspective. It is crucial for students to have this balanced curriculum because “a fully balanced curriculum provides opportunities for integrative thinking and imagination, for creativity and discovery, and for good citizenship” (American Academy of Arts and Sciences, 2013, p. 13). This type of learning helps individuals become more valuable to all organizations. With a liberal education, students will not just be qualified for any job, but a high-paying job. As it stands though, America’s dependence on science, technology, engineering, and mathematics to improve society’s standard of living has overshadowed the purpose of this liberal education. There is a growing trend where many U.S. colleges and universities have turned their undergraduate focus to preparing their students for a specific profession (e.g., law, medicine, engineering, etc.). Traditionally, the purpose of college is to learn. It is to immerse students in subjects in the humanities, social sciences, and natural sciences. Schools have drifted away from this purpose on its quest for global dominance, a costly mistake that needs to be corrected. If schools continue on this path, not only will they slowly morph into being vocational trainers, but they will just be producing an ill-educated society.

Society needs STEM graduates, but what society needs more is STEM graduates trained in the liberal arts and sciences. While STEM graduates are prized by society because of their contributions, the liberal arts and sciences are prized, too. Keep in mind, though, that it is the liberal arts and sciences, especially, that will keep civilization going and democracy alive. Colleges and universities are expected to send into the world exceptional teachers, scientists, engineers, and professionals alike. We do not need to keep sending into the world “machines” trained to make widgets. According to Nussbaum (2010), “When we meet in society, if we have not learned to see both self and other in that way, imagining in one another inner faculties of

thought and emotion, democracy is bound to fail, because democracy is built upon respect and concern, and these in turn are built upon the ability to see other people as human beings, not simply as objects” (p. 6). Colleges and universities need to step back from their STEM-focused initiatives, because if we keep generating “machines,” society is bound to encounter broad societal ramifications. But by combining liberal arts and sciences with STEM training, we can create societal benefits. For example, liberal arts and sciences graduates who have exposure to science, technology, engineering, and math can help shape the world in many ways by learning how to use their creative mind to help researchers figure out the best solution to create innovations that can solve problems and improve our standard of living.

Although a STEM education produces a more refined individual, without a liberal education, he or she is just useless for the changing world. A liberal education is the foundation that advances student’s intellectual capacity to enable them to be lifelong learners beyond basic job training. Based on UCLA take on a liberal education, it expresses that “a liberal education is designed to help students develop a range of intellectual capacities that can be transferred to solve problems in a multitude of areas. At the same time, a liberal education enable students to think on their own and to generate creative, independent thoughts needed to participate effectively as a citizen in a free society. Moreover, a liberal education helps individuals contemplate issues of ethics and morality, to respect the rights of others in a diverse society, and to become appreciative of the many forms of artistic beauty and to enjoy a full life in all its aspects” (UCLA, 2015). In a global economy, these are powerful assets. We need highly skilled and trained individuals, but we also need individual who possess a breadth of knowledge in many fields. All this is not to say that STEM programs do not teach students how to live a life beyond a salary. STEM fields are just more focused on training students to be knowledgeable in

particular areas for their career development, which do not exercise the mind beyond a broader horizon. A liberal education helps students develop strength of mind that enables them to enhance their intellectual skills. It is this type of broad education that teaches students to live a life that is rich with meaning and with purpose.

It will not be long, however, before STEAM becomes the new STEM. The arts are being seen as crucial for students to have. According to some leaders from well-known corporations, creativity is now considered one of top skills to have. Creativity is best derived from not just any arts education, but from a liberal arts education. Dr. Jordan, president of St. Mary's College of Maryland, states that an education in the liberal arts "teaches you to ask not just whether something is, but why it is, and what it means. It teaches you to look to the larger world and to figure out how something fits into the greater patterns of human life. It helps you figure out how things work. And making things work—and work well—for a world full of imprecise, passionate, artistic humans is the best job skill of all" (Jordan, 2015, para. 9). We also need to keep in mind that post-secondary education and job training are actually separate concepts and conflating them can be dangerous for our economy and for our students. We do not exactly know what the jobs of the future will look like. Specialized technical training that looks like a sure thing now may be useless in only a few years. Yet we can be sure of this: no matter the economic landscape, everyone will need to have a broad knowledge base and have the ability to think across different disciplines and make informed decisions, often outside an area of expertise (Jordan, 2015, para. 6). That kind of intellectual capacity and thinking is a skill coveted by society.

In the end, it comes down to striking a balance between filling vacant jobs and planning for the future. Employers, having been in the industry and seeing how education has helped their

companies expand, know what skills are needed and which skills are not needed. With compelling evidence offered by research studies, colleges and universities are aware of how critical it is for students to have a liberal education. Society is part of a global knowledge economy, where knowledge, skills, and abilities are the main currency. Technical skills can only do so much, but there is greater potential in combining technical skills with those fashioned by the liberal arts and sciences. Education programs do not always have to be aligned with the needs of the labor market. This sort of philosophy is why colleges and universities are pushing for more STEM programs at the expense of the liberal arts and sciences. It is imperative that students, parents, governmental leaders, and all stakeholders be reminded that higher education is about developing a person's capacity as a citizen, not just about getting a job, or making money. Therefore, federal and state government must provide more funding to the liberal arts and sciences programs to ensure that current students are fully educated, and that future generation of students benefit from this type of education as well. Colleges and universities are in a unique position to ensure that the purpose of college is met by instilling in their students a balanced STEM and liberal education. It is bad public policy to eliminate the liberal arts and sciences, because an advanced, innovative, and global society is composed of intellectual individuals who have a passion for learning and who can apply their knowledge, skills, and abilities to practically any situations to improve our standard of living. It is in the public interest to have a trained and skilled workforce, because education is not just an individual good, but also a public good. Simply put, we cannot make do without these types of whole, educated individuals. Unless we can build a case that studying the liberal arts and sciences will help students find and succeed in a rewarding career, there will always be critics. The bottom line is that a liberal education matters.

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