How Much Education is Really Necessary?

The measures by which college admission is granted have very little to do with what success in college requires. High school, conventionally conceived, does not prepare students for college. At best it prepares students to apply to college.

This so-called "preparation" is worse than neutral. It exerts a significant and damaging influence upon the way students learn to think about their education, about themselves and about one another. They contort themselves into the narrowest possible definitions of success, believing they must stand out from the crowd by excelling at normalcy and banality. These feverish competitors can be forgiven if, in the long term, they begin to distrust the enterprise of education as a series of false hurdles without meaningful reward. Ian Bickford, Provost of Bard College at Simon's Rock

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Applied Education Foundation
Promoting Education in the Useful Arts & Sciences

[1] In this and all my other essays, I will periodically add applicable supplemental information as new information becomes available. Therefore, this published year refers to its first release to the public.

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Introduction

The amount of education required by each individual can vary widely. However, a centralized collectivist type system run by a bureaucracy – as we have it in the U.S – seeks efficiencies convenient to the bureaucracy above all else and therefore sacrifices the interest of individuals for "the greater good." Collectivists also seek to indoctrinate youth in political views that serve their purposes, thereby requiring a significant amount of time to accomplish this. Individual and social costs are hard to measure, but there can be no doubt that upon proper reflection on the subject, we must ask the question: Can a cost-benefit analysis justify the current system we labor under? One example may help shed light on this analysis, and that is teenage pregnancy, which, today, is synonymous with out-of-wedlock births.

While it is too early for primary school children to pursue a career, it is not too early for adolescents, as current European nations demonstrate. We have a tendency to prolong childhood and adolescence for as long as we can, which manifests in maladjustment and all kinds of social dysfunctional behavior – some subtle, some not so subtle.

College students, typically graduating around age 24 (59% take 6 years to achieve a bachelor's), are still, in many cases, behaving like adolescents and, amongst other dysfunctional types of behavior, are having difficulty in forming meaningful relationships. Is this due to being captives of our educational system during their formative years, when they should have been developing meaningful love relationships; and, perhaps, by the mid-20s it's a bit on the late side? After all, history is dominated by marriages having taken place during the mid to late teens because the time clock of the human body rang the alarm to procreate. Even the early Christian church fathers pointed this problem out with the resolution being: Marry them as soon as the drive arises! Older literature was filled with romance stories to promote the dream of finding one's true love in the teenage years – think of Romeo and Juliet. It is said Shakespeare borrowed heavily from earlier works, which demonstrates how common such perspectives were.

This reveals that the current rate of teenage pregnancies may not be the problem as much as our culture's attitude toward marriage in the teenage years. Since most adults discourage teen marriage, out-of-wedlock births have been skyrocketing for decades when teenage pregnancy really is quite a natural thing. It used to be resolved by the so-called "shotgun marriage"[2] if pregnancy occurred prior to marriage. This is not to say that we should necessarily encourage teenage marriage, but then we should not discourage it either, as we currently do.

The discouragement of teenage marriage is directly correlated with our mistaken belief that the current educational system is so important and so superior that young people must forego all else since the means to success can only be seen through the lens of formal education that is overly extended to serve the educational establishment. We are so blinded by the current misguided and irrational institutional structure that we are almost incapable of considering alternative routes that will provide superior results.

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[2] See Akerlof and Yellen, *An Analysis of Out-of-Wedlock Births in the Unitied States*, Brookings Policy Brief Series #4, August 1996.

The sexual urges come to the fore in the teens simultaneously with the urges to mentally and emotionally bond with a mate; perhaps providing a level of emotional bonding potential at the highest level in one's lifetime. It's as if such passions fuse lovers to the core which becomes hard to break. In this time frame, such passion can be overwhelming, and it is not exclusively or predominately based on sexual drives.

Could our efforts to extend youth way beyond the time the procreation alarm rang be the cause of so much divorce since bonding to someone becomes more difficult as people age? (See Appendix I for some general data on out-of-wedlock pregnancy, along with other family related data.) Think about the memories of your first lover or your first very best friend – these relationships are deeply ingrained in most people.

And could our push for young people to think only of a career, before anything else, cause irreconcilable differences between couples since if a career opportunity arises, either one of them might be willing to abandon the other for the opportunity? Marriages in later years frequently have the appearance of *friends with benefits* and *domestic business partners* more than dedicated lovers willing to sacrifice for the well being of the other.

Loved ones must come before careers but so many people have been indoctrinated by the educational establishment to think exclusively in selfish terms. Academics relish the opportunity to refer to capitalists as greedy self-centered individuals, but considering what academics promote, it is quite obvious they are no different, since they wish to monopolize people's lives regardless of individual or social costs.

This would make an interesting study, and I believe it will lead us to the realization that there is far too much superfluous information in education and that we spend far too much time pursuing it to the detriment of individuals and society. We need to take into consideration what Marrou (1956) reflects on regarding the thoughts of certain Greeks of antiquity: "philosophy is a good thing, but within limits, only to the extent that it helps to form the mind and leads to a proper education. … If a young mind is made a slave to science and treated merely as an instrument in furthering scientific progress, its education suffers, becomes narrow and short-sighted. But if on the other hand too much emphasis is laid on the open mind, on a purely humanistic culture, there is a danger of superficiality and unreality. This problem has still not been settled…." (p. 57) This is also true of every other subject covered in school. The old adage *everything in moderation* is old and still remembered for good reason.

Since this essay was first written, Pew Research Center published a paper revealing demographic trends in the U.S. that might prove useful to further research into marriage and family changes over the decades. See *How Millennials Today Compare With Their Grandparents 50 Years Ago*, by Fry, Igielnik and Patten, March 16, 2018: http://www.pewresearch.org/fact-tank/2018/03/16/how-millennials-compare-with-their-grandparents/. Pew also published another good report: *The Skills Americans Say Kids Need to Succeed in Life*, http://www.pewresearch.org/fact-tank/2015/02/19/skills-for-success/

What Constitutes Subjects Worthy of Study?

What is worthy of an individual's time and what constitutes knowledge that has substantive value to individuals? Herbert Spencer (1860) addresses this question:

> **The question which we contend is of such transcendent moment, is, not whether such or such knowledge is of worth, but what is its *relative* worth?** When they have named certain advantages which a given course of study has secured them, persons are apt to assume that they have justified themselves: quite forgetting that the adequateness of the advantages is the point to be judged. There is, perhaps, not a subject to which men devote attention that has not *some* value. [*Spencer proceeds to demonstrate examples of relatively useless learning.*] … But in these cases, every one would admit that there was no proportion between the required labor and the probable benefit. No one would tolerate the proposal to devote some years of a boy's time to getting such information, at the cost of much more valuable information which he might else have got. And if here the test of relative value is appealed to and held conclusive, then should it be appealed to and held conclusive throughout? Had we time to master all subjects we need not be particular. … Before devoting years to some subject which fashion or fancy suggests, it is surely wise to weigh with great care the worth of the results, as compared with the worth of various alternative results which the same years might bring if otherwise applied. (pp. 13-14) (Emphasis added)
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> [W]hile every one is ready to endorse the abstract proposition that instruction fitting youths for the business of life is of high importance, or even to consider it of supreme importance; yet scarcely any inquire what instruction will so fit them. … While the great bulk of what else is acquired has no bearing on the industrial activities, an immensity of information that has a direct bearing on the industrial activities is entirely passed over. (p. 32)

Besides what subjects to teach, let's consider the depth at which a discipline needs to be delved into through the idea of *the cascade affect*: The way to determine what depth of knowledge is required by individuals on a given subject or discipline is to consider the level of understanding required by all citizens first and then by individuals as they decide on an economic sector to focus at some point in their years of education. *Stages* of development and individual *choices* – correlated with their talents/abilities – will determine this. It makes no sense for an individual to invest a great deal of time into a realm where talent and ability are absent.

There is a false adage that circulates amongst us that individuals can be anything they put their mind to. This might be true as it relates to hobbies or avocations, but not vocations. Can everyone be a master of mathematics or of physics or of chemistry? Certainly not, but educators spread this falsehood amongst us so that they might attract "customers" to their schools. Applied studies goes a long way in observing abilities in individuals that disconnected abstract studies struggle to identify.

Stages are related to age and requirements of future stages. Stages will end when it is understood individuals will have no need of delving into a subject any further based on chosen paths. However, some subjects may incorporate other subjects as further support.

For example: Someone pursuing finance requires further math instruction, but not necessarily in a formal math class after a certain level of math has been achieved. Certainly a financier has no need of trigonometry other than to understand its purpose in the world. That is, to have respect and appreciation but without mastery of it.

Choices are based on the talents of individuals and the resources available in a community. The cascade affect takes into account that on any given subject, we can go as far as current science on the subject allows or only to the level that is useful to individual's personal and social needs so that time and resources are not wasted on learning concepts not in the realm of relative worth. An example of the cascade affect can be shown by considering meteorology: When we teach the subject of clouds, we can identify their names, how they were formed, how they may help predict patterns in forecasting weather conditions, and the effects of weather patterns on our lives. However, do we want to explain to students a depth of understanding that only meteorologists will use when developing models with which to forecast weather used by the National Oceanic and Atmospheric Administration? Obviously not, so discernment must be used when formulating curriculum.

With these thoughts in mind, let us proceed to analyze the state of education to determine priorities versus superfluous learning.

Tracking for Careers in Academia Has Been Optimized

Tyler (1949) sheds some light on the problem of our poorly designed educational system, and by providing this insight in 1949 – based on the Committee of Ten's 1894 report – it reveals this is an old problem that is deeply ingrained in the academic community and would be very hard to overcome if we were to attempt to change this within that community alone. He provides:

> Many people have criticized the use of subject specialists on the grounds that the objectives they propose are too technical, too specialized, or in other ways are inappropriate for a large number of the school students. Probably the inadequacy of many previous lists of objectives suggested by subject specialists grows out of the fact that these specialists have not been asked the right questions. It seems quite clear that the Committee of Ten thought it was answering the question: What should be the elementary instruction for students who are later to carry on much more advanced work in the field? Hence, the report in History, for example, seems to present objectives for the beginning courses for persons who are training to be historians. Similarly the report in Mathematics outlines objectives for the beginning courses in the training of a mathematician. Apparently each committee viewed its job as outlining the elementary courses with the idea that these students taking these courses would go on for more and more advanced work, culminating in major specialization at the college or university level. This is obviously not the question that subject specialists should generally be asked regarding the secondary school curriculum. The question which they should be asked runs somewhat like this: What can your subject contribute to the education of young people who are not going to be specialists in your field; what can your subject

> contribute to the layman…? If subject specialists can present answers to this question, they can make an important contribution…. (p. 26)

In short, abstract and/or academic specialized studies should be a career choice for post secondary education; not a primary pursuit at public expense at the secondary level. Let students receive a purely abstract education at the school of their choice after high school. Even students with very high GPAs would prefer choices offered to them rather than the narrowly focused, highly tracked advanced placement courses presently, and incorrectly, being promoted as necessary for success. Besides, much of what is taught in high school, in the way of abstract and specialized studies, is repeated in universities as general education requirements. Why repeat them? The use of public money under the current regime is extremely inefficient, which is typical of bureaucratically controlled systems. Let students receive a practical education at the public's expense, since it contributes a great deal to society, and let purely abstract and academic specialized education be at their own expense since it tends to benefit the individual in a personal way more than it benefits society – it's an issue of relative worth. The millions who are annually harmed by the current system, demonstrates the truth of this proposition.

Tyler discusses overwhelming students with too much information:

> A smaller number of consistent highly important objectives need to be selected. A small number rather than many should be aimed at since it requires time to attain educational objectives; that is, time is required to [absorb information]…. An educational program is not effective if so much is attempted that little is accomplished. It is essential therefore to select the number of objectives that can actually be attained in significant degree in the time available, and that these be really important ones. Furthermore, this group of objectives should be highly consistent so that the student is not torn by contradictory patterns…. (p. 33)

It is apparent that since academic types dominate the educational system, they steer it toward their biases and then optimize it to serve those biases. Any deviation from this will be attacked as being harmful to our children, when in reality, change is harmful to the status quo they have developed as well as disrupting their comfort zones.

Again Tyler reveals another deep-seated bias against an education based on utility:

> Let me illustrate the way in which an educational and social philosophy can actually operate as a screen for selecting and eliminating educational objectives. An adequate formulation of an educational and social philosophy will include the answers to several important questions. In essence the statement of philosophy attempts to define the nature of a good life and a good society. One section of an educational philosophy would outline the values that are deemed essential to a satisfying an effective life. Quite commonly, educational philosophies in a democratic society are likely to emphasize strongly democratic values. For example, one such statement of philosophy emphasizes four democratic values as important to effective and satisfying personal and social life. These four values are (1) the recognition of the importance of every individual human being as a human being regardless of his race, national, social, or economic status; (2)

> opportunity for wide participation in all phases of activities in the social groups in the society; (3) encouragement of variability rather than demanding a single type of personality; (4) faith in [individual] intelligence as a method of dealing with important problems rather than depending upon the authority of an autocratic or aristocratic group. (pp. 34-35)
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> When a school accepts these values as basic, the implication is that these are values to be aimed at in the educational program of the school….
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> The school's philosophy will undoubtedly by implication deal with two other types of values widely acclaimed in contemporary life outside the school; namely, material values and success. Many schools are likely to state in their philosophy that they do not accept the contemporary emphasis on materialism and that they do not believe financial, personal or social success as usually defined are desirable educational values.[3] Again, such a decision immediately has implications in the selection of educational objectives. Suggestions that are made implying that this or that skill or this or that habit or practice will contribute to material rewards or will make for this kind of success are likely to be eliminated, whereas objectives that lead toward spiritual values … will be given higher rank. In this way that section of the school's philosophy which formulates the values it holds high can be used directly as a means for selecting and eliminating educational objectives.

It is evident that academic biases run wide and deep, which causes great harm to those not part of this very small faction. By denying the objective of material rewards, educators are a primary contributor to the development of a caste system. Perhaps most importantly, this is not for educators to decide. This is a decision for individuals to make, and educators must serve the interests of citizens.

ManpowerGroup informs us that globally "education and training systems are generally failing to supply enough skilled individuals to sustain … growth. The result of these trends is a global skills shortage and talent mismatch." This demonstrates a conflict of interest. Academics use academia to shape the world more to their liking, whereas economies around the world are demanding individuals be trained for the real world. Hence the "skills shortage and talent mismatch." Talents based on purely abstract and specialized academic pursuits are inappropriate for the real world of work, but academics typically cannot see this because they don't know what the real world demands of individuals since they tend to isolate themselves from it.[4] Therefore, the mismatch with real world needs begins with academics themselves. The phrase *the blind leading the blind* is certainly fitting.

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[3] Perhaps this is due to the inability of many academics to be successful in the practical and economic realm; therefore they have a bias against it. They wish to remake society in a manner more comfortable to their talents so that they may dominate, which has come to pass when we reflect on Murray and Herrnstein's *The Bell Curve* (1994) and its reference to stratification of the "cognitive elite."

[4] The academic culture has its origins in aristocratic societies where the aristocrats were educated primarily for ruling but not for working. We have not yet fully relinquished this cultural influence.

ManpowerGroup continues:

> Even amid high unemployment, employers are struggling to find people with the … skills or combination of skills they need. ManpowerGroup research indicates that 34 percent of employers worldwide are having trouble filling key positions. As the economy continues to recover, it will only get harder to put the right people with the right skills in the right place at the right time. As Jean Charest, Premier of Quebec, has put it, "We are entering the era of unparalleled talent scarcity, which, if left unaddressed, will put a brake on economic growth around the world, and will fundamentally change the way we approach workforce challenges."

ManpowerGroup closes with:

> Over the long term, governments should work with business to address the imbalance in supply and demand of skills in a sustainable way. This starts with analysis of the skills needed, now and in the future. Common competency definitions are important here for both analysis and certification. A national skills registry would be invaluable in measuring supply and demand, and more broadly, businesses, governments and educational institutions – the key stakeholders – need to agree on common global standards on skills and availability to facilitate movement across borders. Finally, stakeholders need to invest in the right kind of training. Business should be granted incentives and credits to invest in developing talent locally and should collaborate with academic institutions to make sure schools are providing the taining the marketplace needs. (ManpowerGroup, 2011)

An Analysis of What is Currently Taught

First let it be understood that numeracy and literacy are the primary subjects needed to be mastered early on. The various subjects addressed below can be used to support this goal, but nothing must be sacrificed for individuals to become proficient in these two foundational subjects in order to achieve prosperity in society. Academic evaluation and assessment placement tests for college entrance reveals that if these two subjects are mastered sufficiently, one may be admitted to a college and participate in college level courses in spite of every other subject studied in secondary years. If an individual does not demonstrate proficiency in a placement test, remedial courses must be completed, which focuses on these two disciplines; however they have dismal returns on an individual's investment[5] because the foundation was not laid properly early on when it really mattered.

All of this demonstrates that most other subjects are somewhat arbitrary, and certainly of secondary importance (think of what Spencer provides above regarding *relative worth*), to the mastery of literacy and numeracy abilities. After all, if these two subjects are mastered, people can learn the vast majority of other subjects completely on their own[6]

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[5] See Morris, *Group Calls Remedial Education 'Bridge to Nowhere'*, Diverse Issues In Higher Education, March 29, 2016. http://diverseeducation.com/article/82884/

[6] See Horrigan, John, *Lifelong Learning and Technology*, Pew Research Center, March 22, 2016.

since a highly formalized institution is neither the only nor the best place to learn. Therefore, assessing students' memorization of secondary subjects is, typically, irrelevant and harmful to those with poor recall abilities. What needs to be assessed, therefore, are students' abilities to communicate summaries and findings of learning experiences, whether abstract or applied.

To start, we need to analyze how algebra, trigonometry, and calculus are currently taught since they are almost exclusively safeguarded in arbitrary abstract arrangements for college preparation rather than for real world application, where the rubber meets the road. The curricula for these disciplines are arranged primarily to prepare theoretical scientists for research-oriented work – a **very** small minority of the population. Those destined for engineering careers indirectly benefit by such curricula, but they would be far better served had they received math instruction in an applied manner, learning the abstract side when it supports comprehension and application.

Math as well as science curricula are still living under the shadow of Sputnik when the Space Race began. Playing catch-up with the Soviets, it was asserted, required a shift in educational efforts in order to produce more engineers and scientists. The Federal government became far more involved thereafter. Curricula changed with greater focus on math and science. This uncovers one of the many fundamental flaws with centralized bureaucratic systems: All within that system must adopt whatever is in vogue at the moment. The mass of students must be pushed in the direction policymakers feel is "right," regardless of individual ability, interest, or future professional destiny. In essence, dictatorial characteristics become apparent since individual choice to freely pursue alternative paths is restricted by the power of accreditation institutions, which dictate educational requirements, that are tied to government funding. It's a closed loop protectionist system.

Math and science need to be taught in an applied manner (what was once referred to as the useful arts and sciences) so that transfer of learning can take place naturally and individuals can utilize what's been taught in a variety of career settings geared toward the needs of all citizens versus its current focus on a minority who possess the academic skills contemporaneously in vogue. This requires far more custom designed curricula for every individual, with electronic delivery systems providing one of the primary means.

The Teaching Company[7] provides an example of how lectures can be delivered where they are appropriate to use. Award winning professors deliver lectures on subjects they are renowned for. This ensures higher quality lectures are being offered. Being prerecorded allows for all kinds of creative graphics being added to lectures that support different types of learning methods.

Compare contemporary physics and chemistry high school textbooks to applied physics and chemical engineering introductory textbooks used in engineering schools to get an idea how dramatic the difference is between material covered. Such a comparison answers anyone's question: What's the difference between the 'pure/abstract' versus 'useful/applied' sciences?

[7] http://www.thegreatcourses.com/courses

For a contrast between applied math and abstract math, compare two books of a twelve-book series for sheet metal work[8] to current high school and college math textbooks. The sheet metal books demonstrate the usefulness and depth of understanding these skilled craftsmen possessed regarding geometry and trigonometry. Such mathematical understanding shows that the trades are far from being simple, as academics would have us believe. I would even wager that most current academic oriented mathematicians would really struggle trying to accurately layout complex sheet metal patterns that could be efficiently and effectively made into their intended uses seen in these books.

Leonardo Da Vinci, who was trained in the useful arts and sciences in the typical Florentine apprenticed fashion,[9] provides an excellent contrast to the objections expressed by academics to applied sciences. Granted, Leonardo continued informal education on his own after his apprenticeship in order to achieve the level of such brilliance, but this speaks volumes of the type of training he received. He was obviously not discouraged by his educational experience (as the majority of people are today who either quit school or achieve only a high school diploma), but rather was extremely motivated to continue with his learning. His education obviously motivated him. No one would say that Leonardo was exposed to "mere vocationalism" in his educational experience, yet keep in mind he was not trained in the "pure" arts and sciences at a university. However, he surpassed most "learned professors" from universities then as well as today. So to demean applied arts and sciences demonstrates an arrogance and ignorance – two human attributes that do not go well together – that stifles innovation and progress.

Language arts also need to be designed for application starting in middle school and continuing on through high school for the majority of students. There are few employed creative writers but most people are required to communicate in practical ways – comprehending what they read and effectively communicating what needs to be said, both written and oral. However, there are outstanding literary classics found in the classical era as well as during the Renaissance that have much to offer in the ways of virtue. These need to be revisited as a means of developing eloquence as well as moral instruction for those with linguistic talents, though most need an abridged version. Ever since Western Civilization has been under attack by the Progressives, such historic literary classics have been in large part forsaken or at least marginalized since it is "hip" in academia to denigrate our Western heritage because "it is not perfect." If perfection is required for any culture to be considered good, then we need to tear down civilization and resort to a condition of war of everyone against everyone, as Thomas Hobbes stated was the condition of man.

The subject of history has serious flaws in that in order to remain politically correct, subject matter must not be taught in such a way that we can learn from past mistakes and from wise decisions. In other words, we are not allowed to judge and therefore the subject has been so watered down, the only alternative left standing is to teach names,

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[8] *Sheet Metal Work & Demonstrated Patterns, Vol. I*, by Teschmacher, J. Henry, Jr., Ed., David Williams Company, 1910; and *Volume IX*, 1911.

[9] See *The Guilds of Florence*, by Edgcumbe Staley, Methuen & Co., 1906 to learn more about how the great Florentine Renaissance craftsmen were trained.

dates, and events and to assess students' abilities to memorize and recall such trivial and, for the most part, useless data.

However, at the graduate level, everything changes. In response to the debate raging around Confederate monuments in the summer of 2017, Tucker (2017) reflects on the responsibility of history teachers:

> ## Teaching History in Troubled Times
> What is the obligation of a history teacher in these troubled times? Once, long ago, when I was a professor of public policy, I asked my students in a graduate seminar to pretend that they were advisors to a superintendent of schools and to brief the superintendent on a controversial topic, describing the attitudes and beliefs of the opposing sides clearly so that the superintendent could understand the arguments being presented by both sides. Some of the teachers in the room refused to do the assignment I had given them. They thought, they said, that it was immoral to do that. The only morally defensible posture was to take the side they thought was morally right and present the arguments for that position. To present the arguments for any other position, they said, would be immoral.
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> I was astounded. How, I asked, were their students supposed to live in a world of endless conflict, among people with any number of views on the issues of the day, when there was only one point of view that was legitimate and that point of view was presented by fiat? Wasn't this a democracy? Weren't we supposed to argue for our positions in the public arena, present evidence for our positions, be prepared to hear the other side, see what evidence they had and listen to logic of their position before finally making up our mind? Isn't that what a democracy is all about? The answer I got was no. The morally right thing was obvious. Our obligation was simply to advocate for that position. Any attempt to understand another person's view, if it differed from your own, might legitimate that view. Period.

To exemplify Tucker's point, we can consider one side in this debate which argues that the Confederacy was a secession movement based exclusively on defending slavery and that "States' rights" was code for the love of slavery. Of course, nothing in society is ever as simplistic as this. The other side maintains the South was underrepresented in Congress and therefore had unfair laws that benefited the North at the expense of the South – in particular trade practices protecting Northern manufacturing interests. This was an argument that had been raging since the days before Alexander Hamilton was killed in the infamous duel and before the issue of slavery escalated to **one** of several hot topics that led to secession.

Then there was the issue of secession itself. The Founders and ratifiers of the Constitution understood the document as a contract between the States and that if the contract was not respected and upheld by the parties that composed it, the contract could be considered null and void which would allow those harmed by substantive violations to withdraw from the Union. This was discussed and perfectly understood at the time of ratification. Who in their right mind would enter into an agreement that could be turned

against their interests but with no right to withdraw from the contract if their interests were being abused and no remedy was found? Only fools or sheep would do such a thing.

In war, to the victors go the spoils and the platform from which to write history based on their biased perspective. The South's arguments mentioned above have been barred from public discussion and any who do not adopt the Northern platform are labeled as the lovers of slavery, which is a logical fallacy used to prevent debate on issues of State's rights.

I provide this discussion to reinforce Tucker's point that all sides need to be heard and that historians need to be careful in presenting only one side of public controversies.

Will history be interpreted "perfectly"? Certainly not, but again, perfection cannot be the deciding factor. A suitable saying I heard in my youth demonstrates the ridiculousness of *perfection* being the measure of utility: "Practice makes perfect; but no one's perfect so why practice?" The argument for perfection determining utility is a convenient mechanism to discredit any position that does not suit the sophist – it is an illusion that most people cannot see through. As it relates to individuals, the argument goes something like this: Since you are not perfect, you should not criticize or judge others. In other words, each of us must accept, without question, immoral behavior from everyone else since none of us is perfect. At least this is the way history is taught prior to entering postsecondary culture. Once students have absorbed this relativistic approach, it is thereafter easier to assert the prevailing *moral perspective* couched in *relativistic arguments* – which is a contradiction since relativism has no room for morality, but it has been an effective tactic.

The use of relativism reflects the decay that permeates much of academia, especially as it relates to history and civics. Relativism is literally a poison that is destructive of civilization as history reveals. Carroll Quigley's *The Evolution of Civilizations* (1961/1979, Liberty Fund) provides an outstanding analysis of such social decay.

Civics is an all but forgotten subject for most schools. However, in order to teach political philosophy that our system of government is based on, we need to include highlights of works written by the Founding Fathers as well as the works they read which prepared them for self-government (e.g., Grotius, Puffendorf, Montesquieu, Locke, Burlamaqui, and many from the Scottish Enlightenment, etc.[10]). How much will be required to study and learn will depend upon a student's capacity to absorb it. Students should be evaluated through a variety of projects and papers accomplished by them rather than by current assessment test methodologies. Written essays will further contribute to the refinement of communicative abilities. The quantity of information taught and absorbed by students is not as important as the quality. The comprehension of a small amount of philosophical gems is worth a multitude of shallow information, most of which will not be retained or ever used.

[10] See Liberty Fund books for many of the classics of Natural Law the Founders referenced when organizing our system of free government: http://www.libertyfund.org

High School Attendance and Completion Rates – Historical and Contemporary

Miao and Haney (2004) discuss the expansion of high school attendance throughout the 20th century:

> According to the 2002 Digest of Education Statistics, only 10% of 14- to 17-year-olds were enrolled in either public or private high schools in 1899-1900 school year. By the fall of 1963, high school enrollment had increased to 90% for the same age group, and the high school enrollment rate for fall 2000 was projected to be 93.4%. At the turn of the twentieth century, 6.4% of 17-year-olds graduated from high school, including both public and private schools. By the 1962-63 school year, the percentage exceeded 70% and stabilized at this level until the present. As a result, it is fair to conclude that high school attendance and graduation have become normative expectations for teenagers in the United States. (Emphasis added)

Interesting how the U.S. economy was not hampered by the "lack of education" throughout the first half of the 20th century, but actually expanded dramatically. It was not until graduation rates were maximized that we saw a decline in our economic prowess and the expansion of other nations' economies begin to chip away at our industries. It would be an interesting study to see if this correlation reveals causation.

> Early on, the rarity of a high school diploma assured high school graduates better opportunities in the job market. "Until about the 1970s, a high school diploma was generally viewed as a credential that would ensure a reasonably secure and well-paying job." With the expansion of higher education, the value of a high school diploma in the labor market diminished significantly. (Miao and Haney, 2004)

Is this due to a decline in the quality of a high school education; a mismatch of school offerings versus student needs; an increase in the complexity of society and technology; or simply a public perception based on status and prestige that a higher contemporaneous education provides the credential holder, regardless of the actual knowledge and ability the individual acquired? Or perhaps, it is due to the saturation of high schools with non-academically oriented individuals in an academically optimized system: i.e. trying to fit a square peg in a round hole. We are seeing the same dynamics playing out in colleges as more non-academically talented people enroll in college.

> High school graduates fare better than dropouts in terms of employment opportunities and earnings. For the civilian non-institutional population ages 25 years and over, the average monthly unemployment rate was 5.35% for high school graduates for the period of September 2002 through September 2003. This compares to 8.78% for those without a high school diploma for the same period (Bureau of Labor Statistics). (Miao and Haney, 2004)

If those without a high school diploma had graduated from high school and were still somehow identified in such a study in a different manner, would their unemployment numbers still be around 8.78%? That is, is the cause of this higher unemployment number

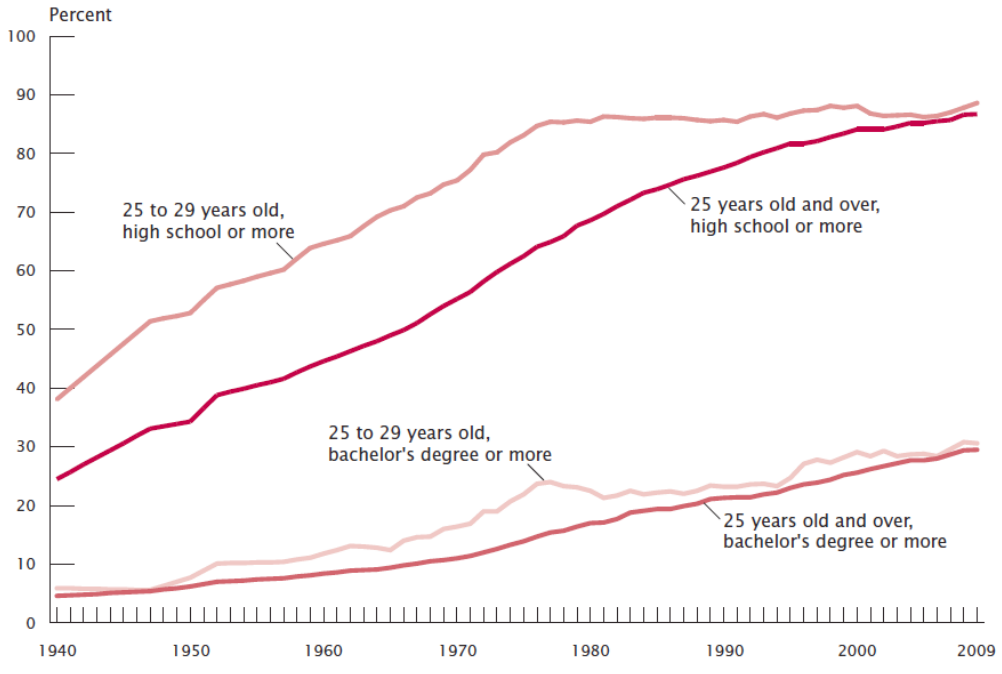
due to the lack of a high school degree or some other force such as ambition, motivation, abilities, socioeconomic factors, our culture's expectations, etc.? Correlation and causation must be distinguished.

> There is also plenty of evidence that earnings of high school graduates are consistently higher than those without high school credentials. For individuals 25 years old and over, the median income for high school graduates (including GED diploma holders) was $24,656 compared to $18,445 for non-graduates, as of March 2002. (Miao and Haney, 2004)

Again, is the correlation and causation linked appropriately? Also, could cultural status of credentials, regardless of abilities, drive the difference? Status is a fleeting faddish belief system, which frequently intimidates many into submissive and insecure self-perspectives that may also contribute to the income and employment discrepancies. However, status certainly has a profound influence on perceptions and decisions people make regardless of its real merit.

Ryan and Siebens (2009) reflect on "more than a three-fold increase in high school attainment and more than a five-fold increase in college attainment since the Census Bureau first collected educational attainment data in 1940. … Figure 1 plots educational attainment for the population aged 25 and over from 1940 to 2009…."

Figure 1.
Percentage of the Population 25 Years and Over Who Have Completed High School or College: Selected Years 1940–2009

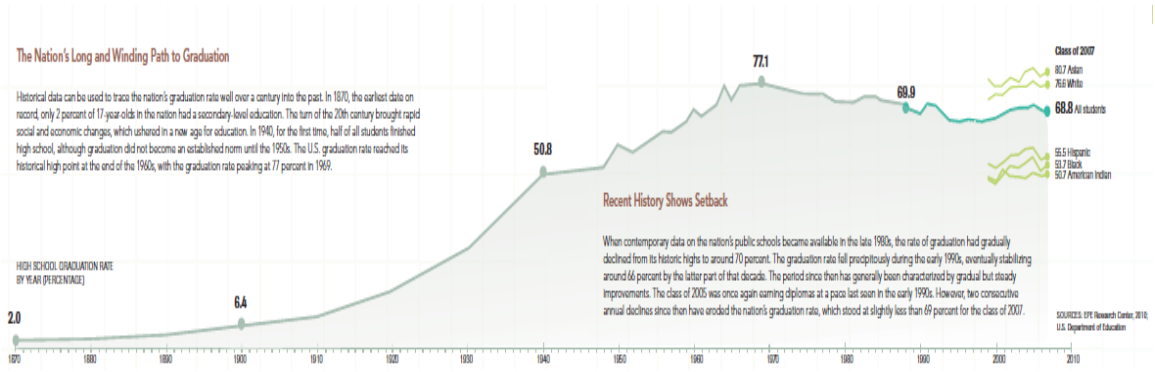


Source: U.S. Census Bureau, Current Population Survey and decennial censuses.

The percentage of the population aged 25 and over with a bachelor's degree or higher also increased steadily from 1940 to 2009. In 1940, 5% of the population aged 25 and older held at least a bachelor's degree. By 2009, this percentage had increased more than five-fold to 30 percent.

In 1947, 51% of the population 25 to 29 years old had completed high school compared to 33 percent of the total population 25 years old and over.

Note: Advance CTE (an organization dedicated to career technical education) reports, "the high school graduation rate for CTE concentrators is about 90% – 15 percentage points higher than the national average." (https://www.careertech.org/cte) ACTE reports, "The average high school graduation rate for students concentrating in CTE programs is 93 percent…." (https://www.acteonline.org/aboutcte/#.WF1IokssrwI) Obviously, there is something to be said for giving students a sense of purpose. Motivation is critical for individuals, and a concrete return on one's investment is an important motivator.



High School Graduation Rates: 1870-2007
U.S. Dept. of Education
This graph provides a quick birds-eye view of the growth of high school graduation rates.

Postsecondary Completion Rates

Graf (2017) shows the steady increase in bachelor's degrees attained by generation:

Percent of Employed 25- to 29-Year-Olds With a Bachelor's Degree or More

Millennials in 2016 = 40

Gen Xers in 2000 = 32

Boomers in 1985 = 26

Silents in 1964 = 16

Source: Pew Research Center analysis of 1964, 1985, 2000 and 2016 Current Population Survey Annual Social and Economic Supplements; *this data came from the Census Bureau*

In their *A Stronger Nation Through Higher Education* annual report,[11] Lumina Foundation provides a picture of our present educational attainment rates. This is important to know since such information must help guide our decisions on how best to serve our youth and future citizens. Understanding market demand and available supply allows all stakeholders to steer their resources in productive rather than in idyllic ways as the "college for all" advocates invest their faith in.

Lumina's report begins by displaying the trends of college completion rates (associate's and above) over a 6-year period (2008-13), showing there is a nice and steady increase of numbers of those pursuing some form of higher education. While we may see this as a positive trend, there are negatives that are not discussed often enough.

Tracking the Trend
Percentage of the country's working-age population (25-64) with at least an associate degree

2008 – 37.9%

2009 – 38.1%

2010 – 38.3%

2011 – 38.7%

2012 – 39.4%

2013 – 40.0%

As the percentage of those with postsecondary credentials rise, those without some form of credential are further marginalized with real income on a steady decline ***on average***, though averages hide much which should bring the skeptic out of everyone. During slow economic periods, employers will hire those with the higher credentials (though they will not pay more than market prices in spite of the educational investment made by individuals) in order to, hopefully, get more *bang for their buck*. Hence a trend has developed to pursue higher education simply to be more attractive to employers rather than to learn skills that add value to both individuals' and employers' economic needs. If we make the analogy to a coin: We are looking at one side of the coin, but not the other. Higher education is supposed to provide greater skills, but, frequently, this is not the case.

Our academic culture promotes this trend and therefore encourages the extension of childhood well beyond anything that is natural, and many shortsighted people see this as a positive situation, unfortunately, seeing college as the best years of one's life. When young adults should start thinking about their political and economic place in society and starting a family, they are thinking primarily of self-interests. Academics previously criticized "rugged individualism" but now this community appears to be promoting an indefinite self-centered adolescence by encouraging students to stay in college for as long

[11] http://www.luminafoundation.org/files/publications/A_stronger_nation_through_higher_education-2015.pdf

as possible, which most academics have done themselves. They are attempting to assert their own lifestyle choices on others, and the results are anything but positive. Many graduates are coming out of college in their mid-twenties, in many respects, not much different than those in their mid-teens – that is, immature, self-centered, and totally unprepared for an adult life.

While I appreciate much of the work Lumina is doing, I take issue with their goal in seeing the U.S. achieve a 60% postsecondary completion rate of working age Americans by 2025. It is my opinion that they are not seeing the proper means of remedying our educational problems. Given the need for postsecondary degrees (as opposed to certificates) is expected to hover around 27% through 2022 as reported by the BLS (see below, page 17), the 60% goal Lumina is advocating would lead to significant numbers of credentialed individuals underemployed in jobs not requiring a credential. In addition those without such credentials – a large percentage of whom come from lower socioeconomic backgrounds – would experience significantly higher unemployment since they would simply be passed over for those with higher credentials regardless of what those credentials offer. This is not the proper way to address the growing wage gap disparities, especially amongst disadvantaged youth who face the greatest challenges.

We seem to have lost sight of the prize, which is, secondary education. Far more can and should be done here than most in academia think is possible or will even consider – probably due to intense hurtles that appear insurmountable plus colleges' loss of prestige that would naturally occur if high schools took on the responsibility for many career credentials. In addition, less time, which equates to less investment, is required of individuals to achieve sufficient levels of education (dual-enrollment programs at community colleges are excellent ways to address this dilemma). In addition, their lifetime earnings will improve due to more years being dedicated to time on-the-job as opposed to the pursuit of college degrees that require approximately half the individual's investment in superfluous general education requirements that provide no return on investment. However, it provides jobs for educators and revenue to education institutions, revealing who really benefits by general education requirements.

The dropout rate of college students provides evidence of just how dysfunctional the educational system has become in providing effective and efficient pathways to a healthy participation in society. Strada, Gallup, and Lumina (2021) provide data in two different reports that shed light on this subject: "Students Continue to Weigh College Costs vs. Career Goals" Feb. 1, 2021 and "Some College and No Degree" June 2021.

The June report shows that 52% quit the pursuit of associate degree programs, while 47% quit the pursuit of bachelor's degree programs. Only monopolies can survive failures at these levels.

The following tables, regarding the barriers to completion for U.S. adults who obtained some college education but did not complete their degrees, are from their February report:

Reasons for Dropping Out of Postsecondary Program

Which of the following describe why you are not currently pursuing a degree/credential? Select all that apply.

	Unenrolled adults with some postsecondary education
	%
Cost of attendance	25
Emotional stress	18
Childcare responsibilities	13
You got a new job	11
Health-related reasons	10
You did not believe the degree/credentialwould help you achieve your personal goals	10
COVID-19/Coronavirus	9
You did not believe the degree/credentialwould help you achieve your career goals	8
The courses you took were notrelevant to your future career	7
Care for a family member or friend	7
Completing the degree/credentialwas taking longer than you expected	6
You lost your job	5
The coursework was too difficult	5
The education you were receiving was low quality	3

LUMINA-GALLUP STUDENT STUDY, SEPT. 22-OCT. 5, 2020

These reasons for dropping out reveal that time to completion of a credential is critical. The longer it takes individuals to complete their education, the less chance they have of reaching the finish line. Life's challenges and barriers are a constant threat; therefore, efficiencies combined with an analysis of *relative worth* of teaching materials, must be the footing of educational structures. Taken to this logical conclusion, most individuals' education can be completed in the secondary education period.

Interesting to note, the following table does not correlate with academics' belief system in the reasons people should be pursuing postsecondary education. They typically find educational utilitarianism to be abhorrent, yet students' reasons appear to be strictly utilitarian. This is a prime example of where the economic/public service being offered is largely disconnected from the market it is meant to serve. This explains why it is so inefficient and ineffective in what it provides.

Unenrolled Adults' Reasons for Getting Degree

Which of the following comes closest to why you chose to get your degree? Select all that apply.

	Not enrolled
	%
To obtain knowledge or skills	47
It would help get higher-paying job	41
It would help in pursuing more fulfilling career	39
Become more competitive job candidate	32
Family or society's expectations	18
It would help get salary increase in current job	16
Opportunity to advance in current job	14
Unable to find good job without degree/credential	7
Employer was helping pay for degree/credential	5
You had recently lost your job	2

LUMINA-GALLUP STUDENT STUDY, SEPT. 22-OCT. 5, 2020

Something else that is not typically considered: What are the effects of too much education? Many people, especially those in academia, will think this a blasphemous question: "There can never be too much education." However, as it relates to any other human endeavor, the old maxim "everything in moderation" is the accepted rule. Why is education seen through a totally different lens? Is it because academics have done an incredible job of selling their brand? Whatever the origin, it is an obsession amongst some. The pursuit of academic credentials and distinctions has become an end in itself instead of a means to an end. It has become a form of currency but not necessarily tied to any real function other than perceived value – i.e. status and infatuation for "intellectualism." It has become "the great secular faith of our age." This is a subject that requires further inquiry that I will leave for another day. However, one more important point needs to be considered before closing this section.

To compare brain development to excessive education, The National Academies of Sciences, Engineering, and Medicine (2018) report an extremely important finding on how the brain is shaped by experiences.

> The prenatal period is marked by an astounding rate of formation of new neurons, synapses, and myelinated axons – with the result that the brain has more of these structural elements than it needs. This development continues after birth…. Beginning in early childhood, this explosion in growth, which continues until adolescence, is the result of the dramatic increase in synaptic connections among neurons … and the myelination of nerve fibers….
>
> Although vigorous growth continues, the synapses and neurons are also pruned, a process that continues until after puberty. This pruning occurs in a specific way: the synapses that are continually used during this period are retained, while those that are not used are eliminated. The removal of unnecessary or unused synapses and neurons improves the "networking" capacity of the brain and the efficiency of the cortex. Because this pruning is influenced by environmental factors, the developing child's experiences determine which synapses will be strengthened and which will not, laying a critical foundation for future development and learning. Just as strategic placement and pruning of plants yields a healthy garden, a balance between strengthening of some connections and pruning of others fosters healthy brain development: having more neurons left alive is not a better outcome. (p. 56)

Given the pruning of unused synapses and neurons, what are the consequences of excessive education? The National Academies continues with a discussion of real world experiences:

> Environmental stimulation and training can affect brain development throughout the life span. The organization of cortical and subcortical signaling circuits, which are integrated into networks with similar functions, also occurs during [the formative years]. In other words, as the learner acquires new knowledge, regions of the cortex develop specialization of function. This is known as experience-dependent learning. These structures and associated circuits underlie the neural

> systems for complex cognitive and socioemotional functions such as learning and memory, self-regulatory control, and social relatedness…. (p. 58)

In addressing brain adaptation in response to learning, the National Academies provides:

> [L]earners dynamically and actively construct their own brain's networks as they navigate through social, cognitive, and physical contexts. It has been assumed that brain development always leads the way in cognitive development and learning, but in fact the brain both shapes and is shaped by experience, including opportunities the individual has for cognitive development and social interaction. The reciprocal interactions in learning between the dynamically changing brain and culturally situated experience form a fascinating developmental dance, the nuances of which are not yet fully understood. A person's brain will develop differently depending on his experiences, interpretations, needs, culture, and thought patterns. In addition, features internal to the brain's development and structure will constrain the way a person engages with the world. (p. 59)

Denying individuals experiences in the real world – in particular, experiences in developing career oriented skills during the formative years – in contrast to the compulsory, artificial, institutional world of public education that is not found outside the halls of academia, is bound to have negative ramifications for individuals and by extension, upon society. This potential requires serious investigation to determine just how bad the consequences are.

Supply vs. Demand of Credentials

Murray (2007) addresses IQ,[12] college success, and interest in what colleges offer versus alternatives:

> … There is no magic point at which a genuine college-level education becomes an option, but anything below an IQ of 110 is problematic. If you want to do well, you should have an IQ of 115 or higher. Put another way, it makes sense for only about 15% of the population, 25% if one stretches it, to get a college education. And yet more than 45% of recent high school graduates enroll in four-year colleges. Adjust that percentage to account for high-school dropouts, and more than 40% of all persons in their late teens are trying to go to a four-year college – enough people to absorb everyone down through an IQ of 104.
>
> No data that I have been able to find tell us what proportion of those students really want four years of college-level courses, but it is safe to say that few people who are intellectually unqualified yearn for the experience, any more than someone who is athletically unqualified for a college varsity wants to have his shortcomings exposed at practice every day. They are in college to improve their chances of making a good living. What they really need is vocational training. But

[12] The level of IQ and success in college have a strong correlation due to the system having been optimized for certain talent sets that IQ assessments test for. Should other talent sets be taken into consideration, test results would have very different outcomes and take on new meaning.

> nobody will say so, because 'vocational training' is second class. 'College' is first class.
>
> Large numbers of those who are intellectually qualified for college also do not yearn for four years of college-level courses. … They may have the ability to understand the material in Economics 1 but they do not want to. They too, need to learn to make a living – and would do better in vocational training.
>
> Combine those who are unqualified with those who are qualified but not interested, and some large proportion of students on today's college campuses – probably a majority of them – are looking for something that the four-year college was not designed to provide. … [M]ost of the practical specialties do not really require four years of training, and the best way to teach those specialties is not through a residential institution with the staff and infrastructure of a college.
>
> … The demand for college is market-driven, because a college degree does, in fact, open up access to jobs that are closed to people without one. The fault lies in the false premium that our culture has put on a college degree.
>
> … Even if foregoing college becomes economically attractive, the social cachet of a college degree remains. That will erode only when large numbers of high-status, high-income people do not have a college degree and don't care. … The ability to present an employer with evidence that you are good at something, without benefit of a college degree will continue to increase, and so will the number of skills to which that evidence can be attached. Every time that happens, the false premium attached to the college degree will diminish.
>
> … [R]ightly understood, college is appropriate for a small minority of young adults – perhaps even a minority of the people who have IQs high enough that they could do college-level work if they wished. People who go to college are not better or worse people than anyone else; they are merely different in certain interests and abilities. That is the way college should be seen. There is reason to hope that eventually it will be.

An important point needs to be made about IQ since our society has historically loaded IQ as the primary measure of intelligence – which is simply not true.

> The public's attention on varying academic performances among schools may be overlooking other important matters. Research on what leads to financial success shows that IQ accounts for less than one-third of the total. The other two-thirds of success come from social skills and ambition type skills. Unlike IQ, there does not appear to be significant racial differences in these other success skills. Schools could benefit their students in many ways with a more rounded attention to ALL the skills that lead to success.[13]

[13] http://www.sq.4mg.com/IQrace.htm

The "less than one-third" mentioned above may have much to do with the social cachet Murray mentions regarding the benefit a college degree offers. If this cachet were removed, what would the percentage look like? One-quarter? One-tenth? Or perhaps even less, as it was at the turn of the last century. Remove the perceived, versus real, value and what is left?: a group of people who can memorize and recall data for tests, but had never been taught how to apply what they've memorized. This is not something that is likely to contribute to financial success since the real world looks for application of knowledge, not the parroting of information to satisfy some academic's assessment regime, or the erection of barriers established by a large institution's human resource department. Therefore, causation of financial success is weakly linked with correlation in possessing a college degree. It hangs by the thread of status acquisition. Cut the thread and the entire system comes tumbling down.

To demonstrate this point, Selingo (2017) discusses the "myth," as he calls it, that "choice of major matters more than choice of college." He states,

> [S]tudents who graduate from more selective schools tend to make more money. After all, the better the college, the better the professional network opportunities, through alumni, parents of classmates and eventually classmates themselves. These undergraduates are more able to pursue majors in lower paying fields because their networks help them land good jobs.

This speaks to biases, not knowledge and skills developed at "more selective" universities. If what Selingo says is true, it's not about knowledge, skill acquisition, or academic ability that contributes significantly to economic success. Rather it is the cachet that society buys into that prejudices employers' choices. This means that employers are passing over real potential talent and hiring candidates who simply won the socioeconomic lottery which allows them to reap dividends regardless of talent or skill.

* * *

Let us consider what the Bureau of Labor Statistics determines the economy needs from education in producing credentialed individuals:

As the chart below demonstrates, the difference between 2012 and 2022 is insignificant in the demand for postsecondary degrees, yet we hear clarion calls that **everyone** must possess a postsecondary credential. If everyone possessed one, the primary thing that would change is the volume of people in jobs not requiring their credential – i.e. overqualified people. These people are likely to be very angry after expending time and money on credentials that are not in demand – i.e. supply will far exceed demand which will drive labor prices down for college graduates or increase labor costs of companies. This is not sound economic reasoning, but then we rarely see such economic reasoning emanating from the halls of academia since the culture tends to deride market forces.

We can see from the BLS's numbers[14] that 66.1% of the population (the *less than high school* up to *some college, no degree* sectors) is provided with little to no education

[14] http://www.bls.gov/emp/ep_table_education_summary.htm 2014 employment, wages, and projected 2014–24 change in employment by typical 2014 entry-level education

useful to the working world other than, hopefully, literacy and numeracy skills, but evidence shows this population is severely lacking in these skills. This segment of society needs secondary education to better serve them so they become fully prepared to fit into society – benefiting by it and contributing to it.

Employment 2012 and projected 2022, by typical entry-level education and training assignment

Employment by summary education and training assignment, 2012 and projected 2022 (Numbers in thousands)

Education, work experience, and on-the-job training	Employment			
	Number		Percent distribution	
	2012	2022	2012	2022
Typical entry-level education				
Total, all occupations	145,355.8	160,983.7	100.0	100.00
Doctoral or professional degree	4,002.4		2.8	2.9
Master's degree	2,432.2		1.7	1.8
Bachelor's degree	26,033.0		17.9	18.1
Associate's degree	5,954.9		4.1	4.3
Postsecondary non-degree award	8,554.2		5.9	6.1
Some college, no degree	1,987.2		1.4	1.4
High school diploma or equivalent	58,264.4		40.1	39.1
Less than high school	38,127.6		26.2	26.3

Bureau of Labor Statistics, Employment Projections. See the full chart at: http://www.bls.gov/emp/ep_table_education_summary.htm

In his paper on the surplus of college degreed individuals in the U.S. work force, Rose (2017) cites the claims of educational researchers:

> [M]any college-educated people are in jobs for which they are overqualified (I use *overqualified* in this report; other researchers have used terms such as *underemployed*, *overeducated*, and even *mal-employed*). The most cited reference is a study from the New York Federal Reserve Bank, which found that 33% of college graduates are overqualified; if graduate degree holders are excluded, the share of those with just a BA who are overqualified for their current positions is 43%. In two other prominent studies, the estimates of overqualification ranged from 48% to 28%. (p. 2) [However, based on Rose's research parameters, such as what defines overqualification, he asserts that only "25% of college-educated workers were overqualified for their jobs" in 2014. (p. 3)]

Rose then provides examples of degreed individuals being underutilized given the credentials possessed:

> Table 1 lists the specific occupations with the largest numbers of BA workers that fall into this category, that is, low-paying occupations with high concentrations of BA workers outside of the intellectual and caring professions. With the exception of recreation and fitness workers, these occupations are part of the office economy, so they *may* provide opportunities or contacts to move up to more professional office jobs.

TABLE 1

Occupations with Many BA Workers but Low Pay

Occupation	Number	Median pay	BA group share
Office and administrative support	68,106	$37,000	39%
Secretaries and administrative assistants	46,851	$33,000	37%
Recreation and fitness workers	41,504	$30,000	38%
Bookkeeping, accounting, and auditing clerks	40,526	$39,000	34%
Paralegals and legal assistants	28,764	$43,000	66%
Insurance claims and policy processing clerks	24,992	$41,500	44%
Meeting and convention planners	24,237	$45,400	64%

Source: American Community Survey, 2014.
Note: BA = bachelor of arts or science degree. Data are for male BA workers.

> …The next task was to determine whether any niches existed in occupations with a low BA group concentration that provided BA workers with earnings opportunities that mirrored what they would get in good-fit jobs. … These occupations consisted mainly of managers and supervisors who probably earn more than workers with less education in these jobs because they have larger operations to manage or supervise (table 2). (p. 8)

TABLE 2

Occupations with Relatively Few BA Workers but High Pay

Occupation	Number	Median pay	BA group share	BA premium
With BA premium				
Transportation, storage, and distribution managers	37,644	$65,000	28%	35%
First-line supervisors of production and operating workers	88,875	$65,000	15%	18%
Aircraft mechanics and service technicians	10,947	$65,000	10%	16%
Supervisors, protective service workers, all other	11,390	$62,000	31%	38%
Industrial and refractory machinery mechanics	18,227	$60,000	6%	20%
First-line supervisors of correctional officers	7,286	$59,000	21%	18%
Supervisors of transportation and material-moving workers	27,461	$52,000	19%	16%
First-line supervisors of landscaping, lawn service, and grounds-keeping workers	15,499	$48,000	17%	17%
Food service and lodging managers	120,579	$47,000	29%	31%
Without BA premium				
Firefighters	50,207	$65,000	19%	5%
Diagnostic-related technologists and technicians	22,265	$60,000	30%	5%
Postal service mail carriers	27,440	$56,000	18%	0%
First-line supervisors of construction trades and extraction workers	62,571	$60,000	12%	0%
Postal service clerks	13,044	$56,000	19%	2%
Engineering technicians, except drafters	46,542	$50,000	16%	0%
Pipelayers, plumbers, pipefitters, and steamfitters	17,398	$48,000	4%	0%
Sheriffs, bailiffs, correctional officers, and jailers	40,286	$47,000	14%	4%

Source: American Community Survey, 2014.
Note: BA = bachelor of arts or science degree. Data are for male BA workers.

In my introductory paper to the applied education concept (*Applied Education Foundation: Introduction of the Concept*), I reference Hsu's (2016) work in analyzing Korea. He shows how Korea's college attendance rate is the highest in the world. The term *college education inflation* is used to denote the illusion that "college for everyone"

is what we should be striving for. They have an oversupply of college-educated people relative to the economic demands of the country. This has led to overqualification and underemployment by many. Obviously, college is not the answer to social challenges. It is simply one of various choices citizens should consider in making career decisions and societies must provide ample choices for them to choose from.

Fuller and Raman (2017) speak to the American phenomenon of *degree inflation*. They point to Burning Glass Technologies' analysis of millions of job postings in a multitude of occupations and found "employers were posting jobs with a requirement for a four-year college degree, when previously those jobs had not required such a credential. Burning Glass reported: 'Employers are seeking a bachelor's degree for jobs that formerly required less education, even when the actual skills required haven't changed or when this makes the position harder to fill.'" In their Executive Summary, the authors state,

> Degree inflation – the rising demand for a four-year college degree for jobs that previously did not require one – is a substantive and widespread phenomenon that is making the U.S. labor market more inefficient. Postings for many jobs traditionally viewed as middle-skills jobs (those that require employees with more than a high school diploma but less than a college degree) in the United States now stipulate a college degree as a minimum education requirement, while only a third of the adult population possesses this credential.
>
> This phenomenon hampers companies from finding the talent they need to grow and prosper and hinders Americans from accessing jobs that provide the basis for a decent standard of living. In an analysis of more than 26 million job postings, we found that the degree gap (the discrepancy between the demand for a college degree in job postings and the employees who are currently in that job who have a college degree) is significant. For example, in 2015, 67% of production supervisor job postings asked for a college degree, while only 16% of employed production supervisors had one. Our analysis indicates that more than 6 million jobs are currently at risk of degree inflation.
>
> A survey of 600 business and human resource leaders shows that degree inflation is driven by two key factors: the fast-changing nature of many middle-skills jobs and employers' misperceptions of the economics of investing in quality talent at the non-graduate level. As more middle-skills jobs require mastery of one or more technologies, employers find it difficult to hire non-graduate talent with the requisite skills.
>
> … Over time, employers defaulted to using college degrees as a proxy for a candidate's range and depth of skills. That caused degree inflation to spread to more and more middle-skills jobs. That has had negative repercussions on aspiring workers, as well as experienced workers seeking a new position but who lack a degree. More important, our survey indicates that most employers incur substantial, often hidden, costs by inflating degree requirements, while enjoying few of the benefits they were seeking.

> The results of our survey were consistent across many industries – employers pay more, often significantly more, for college graduates to do jobs also filled by non-degree holders without getting any material improvement in productivity. While a majority of employers pay between 11% and 30% more for college graduates, many employers also report that non-graduates with experience perform nearly or equally well on critical dimensions like time to reach full productivity, time to promotion, level of productivity, or amount of oversight required.
>
> Moreover, employers incur significant indirect costs. Seeking college graduates makes many middle-skills jobs harder to fill, and once hired, college graduates demonstrate higher turnover rates and lower engagement levels. A systemic view of the total economics of hiring college graduates shows that companies should be extraordinarily cautious before raising credential requirements for middle-skill positions and should not gravitate toward college graduates based only on a vague notion that it might improve the quality of their workforce.
>
> Degree inflation hurts the average American's ability to enter and stay in the workforce. Many middle-skills jobs synonymous with middle-class lifestyles and upward mobility – such as supervisors, support specialists, sales representatives, inspectors and testers, clerks, and secretaries and administrative assistants – are now considered hard-to-fill jobs because employers prefer candidates who are college graduates. Even workers who have relevant experience are excluded from consideration by automated tools that weed out candidates who do not have a college degree. In our survey, two-thirds of companies acknowledge that stipulating a four-year degree excludes qualified candidates from consideration.
>
> … Companies that insist only on a college degree deny themselves the untapped potential of eager to work young adults as well as experienced, older workers as pools of affordable talent.

Nguyen (2014)[15] sheds light on the fallacy that possession of a college degree is the only way to minimize exposure to unemployment.

> … Germany, Austria and Switzerland are the three countries where an apprenticeship system is the most prevalent.

The relationship between education level and unemployment

> So, can the adage that higher education leads to a better chance of being employed be verified when comparing countries? If that were the case, countries with more university graduates would have less youth unemployment….

Nguyen provides a chart, *Youth Unemployment vs. University Education*, comparing unemployment levels as it relates to those with a college degree.

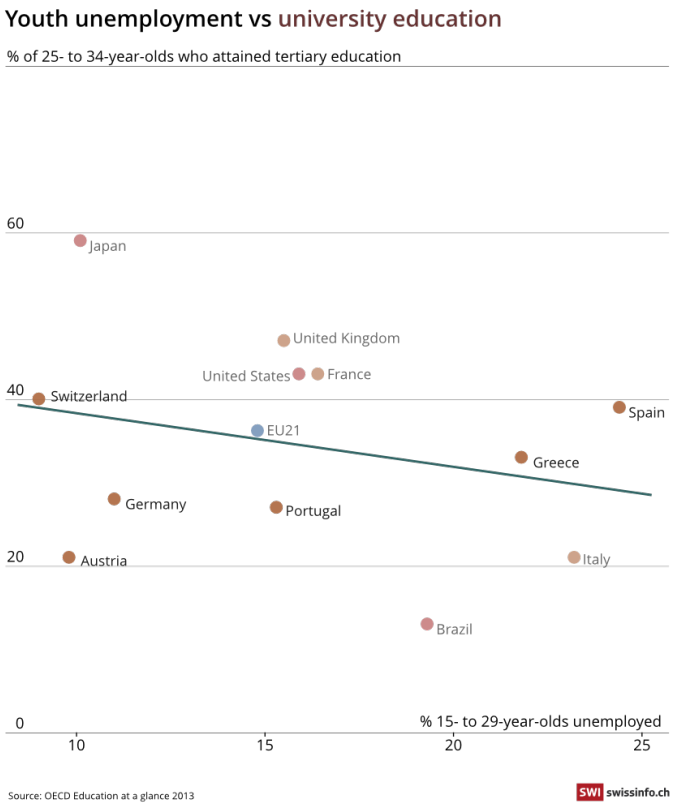
[15] See http://www.swissinfo.ch/eng/by-the-numbers_young-and-jobless--the-solution-isn-t-always-university/40518378

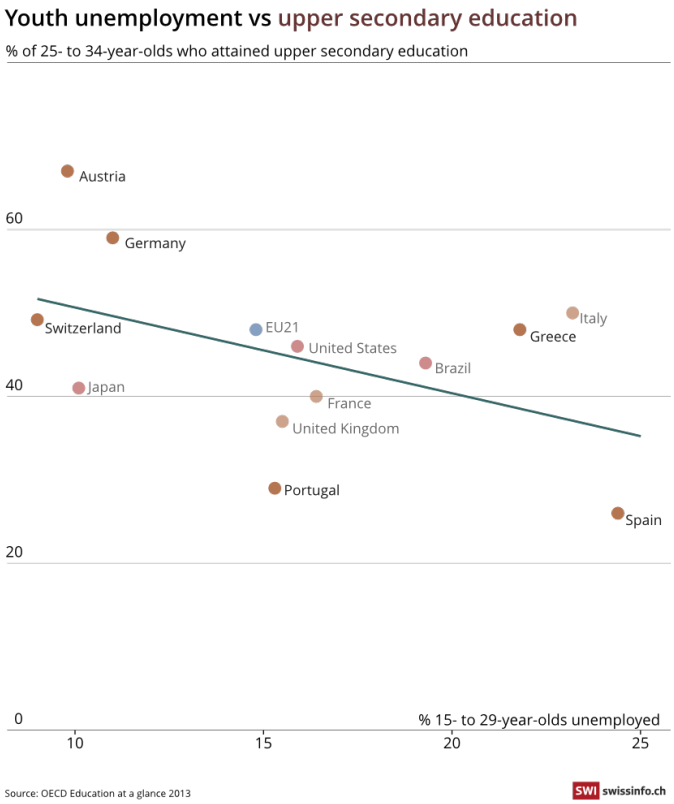
The chart below shows no clear correlation between the number of young people with a university degree and overall youth unemployment. Quite the opposite, actually: Germany and Austria are among the European countries with the least number of university-educated youth but they boast a very low youth unemployment rate. (Emphasis added.)

… [Nguyen reflects on the World Bank's input:] "In cross-country comparisons it is generally found that countries maintaining a substantial dual apprenticeship system, i.e. Austria, Denmark, Germany and Switzerland, exhibit a much smoother transition from school to work … low youth unemployment and below average repeated unemployment spells than other countries"….

So are apprenticeships the answer, given that countries like Germany, Austria and Switzerland have been relatively immune to spikes in youth unemployment and are also the places with the most developed apprenticeship systems?

From a first glance at the chart below, it may seem that upper secondary education (i.e. apprenticeships or general studies to prepare for higher education) shows a weak correlation with youth unemployment. In Austria, Germany and Switzerland, half or more of all young people reached that level of education. However in Italy and Greece, upper secondary education is also widespread, but youth unemployment is still elevated.





> Upper secondary education could involve general studies preparing for university as well as apprenticeship, and it is unfortunately impossible to separate these two paths from the data. But, according to the OECD in 2009, about three-quarters of the graduates whose highest level of education was upper secondary in Switzerland and Austria followed the apprenticeship route instead of the general academically based education. In Greece, a similar figure came in at around 30% and in the United States, close to 0%. In those countries, the apprenticeship system is less valued in the workplace than in the Austrian, German and Swiss labour markets.

As long as college degrees are inappropriately seen as symbols of status and prestige, as if we still had a caste type system, many parents would not tolerate their children possessing anything less. This social evil needs to be remedied. Perhaps one way to begin this process is to fuse the high school and college degrees into one and make them career oriented degrees for the vast majority of students which should end no later than by the age of 20 on average – depending on the career requirements. Graduate level work or "professional" degrees can be pursued afterward, which will need to be modified, based on competencies, to fit a new system such as this.

* * *

To answer the question "How much education is really necessary?" in its most fundamental terms, we would have to conclude, "It depends on the individual." Is a

secondary level degree coupled with a certificate of some sort sufficient or will a Ph.D. be required? That depends on what the individual wishes to pursue, tied with types of abilities the individual possesses and resources available to take advantage of.

Of course, foundational literacy and numeracy capabilities are needed by everyone in our society (which is the purpose and responsibility of the primary school level). But up to what level? For the moment, let's just say "Enough to pass a placement test" through colleges' evaluation and assessment measurements (not to be confused with SAT or ACT type testing). However, do college assessments truly reflect the wants of individuals and society as it relates to literacy and numeracy needs? Such tests should be analyzed for real world application rather than academic desires to separate themselves from the rest of society by erecting high barriers.

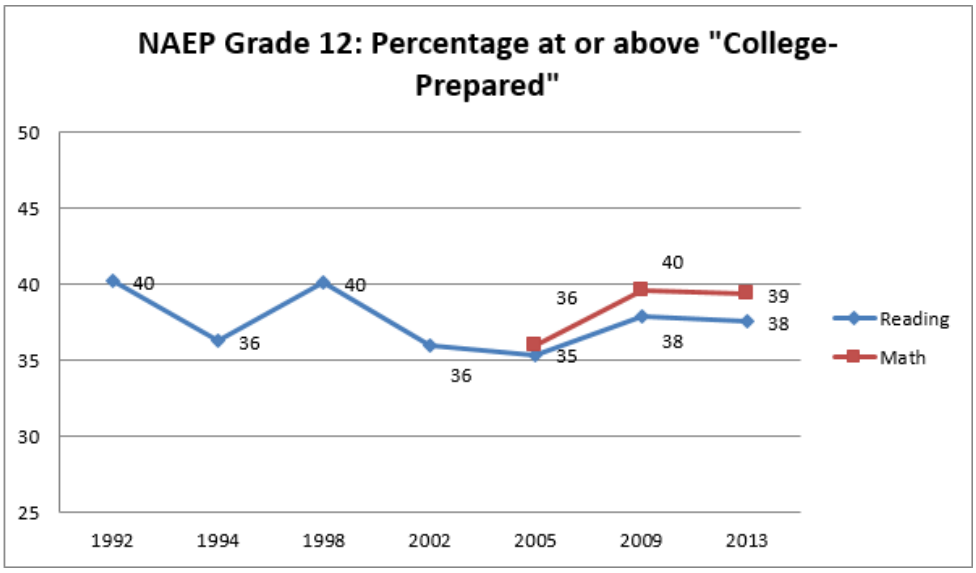
The requisite level of competence needed in literacy and numeracy should be acquired just before or sometime during the middle school years. However, secondary education must also be used to ingrain literacy and numeracy by applying them in the various disciplines that will be studied.

The Optimization of College for Certain Abilities

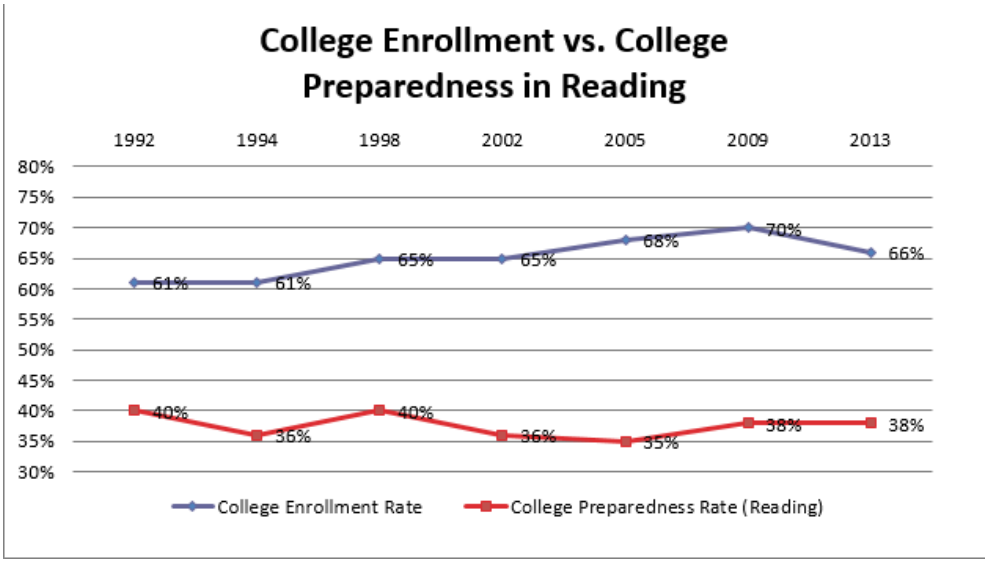
Petrilli and Finn (2015) reported on the findings of the National Assessment Governing Board (NAGB) in their determinations on estimating "the percentage of U.S. students who 'possess the knowledge, skills, and abilities in reading and mathematics that would make them academically prepared for college.' … When the 2013 test results came out last year, NAGB reported the results against these benchmarks for the first time, finding that 39 percent of students in the twelfth-grade assessment sample met the preparedness standard for math and 38 percent did so for reading." The authors point out that ACT shows similar results. However, it needs to be made perfectly clear that college preparedness and preparation for an economic life are two very different things. Colleges are primarily concerned with one's abilities to learn subjects in a classroom setting; whereas employers, besides needing employees with sufficient literacy and numeracy abilities, also require skills that will contribute to an organization's success. This is where secondary schools fall flat on their face unless they have a well-developed CTE/vocational program.

Of course, the 39% and 38% figures do not take into consideration the 25% or more who do not make it through the 12th grade (many quit or opt for the GED option). If we use 75% as the percentage of those who made it to 12th grade (this being a generous figure in spite of the recent and incorrect report of an 80% high school graduation rate) and then multiply this by 38.5% (loosely combining the math and reading scores), we arrive at approximately 29% who are prepared for college in this age cohort. Of this 29%, many of them find that universities have nothing that interest them, but feel compelled, nonetheless, to follow the college track since credentialing options are limited or are marginalized by negative reputations. Then when we consider that we can predict college success by using the IQ measurement system, with an IQ of 115 and above being the optimum range, this narrows the playing field down to education being fully optimized for 15% of the population (Murray, 2007) – not the "most intelligent" 15% mind you, but that portion of the population academia has been optimized for.

Those who do not fit the optimized system are relegated to the margins of society. This has become readily apparent since our society has become so enamored with the educational system's highly protected "professional" credentials. If any other institution attempted this type of protectionism of its interests, antitrust laws would come barreling down upon it.



The graph above is what the research found the trend to be since 1992. As can be seen, the percentages are relatively consistent. Such consistency demonstrates optimization of a system to a narrow set of talents.



"(Note: The college enrollment numbers come from Census Bureau table 276 - College Enrollment of Recent High School Completers, defined as: 'persons 16 to 24 years old who graduated from high school in the preceding 12 months. Includes persons receiving GEDs.')"

The authors make an important observation regarding percentage of students ready for college compared to the increased number of students enrolling in college (shown in the graph above, *College Enrollment vs. College Preparedness in Reading*). The percentage of high school students prepared for college has not really changed (demonstrating that it has in fact been optimized given the current instructional regimen – regardless of how much money we throw at it), but the percentage of high school graduates enrolling in college has increased. The increased number of enrollees means there will be an increase in the number of students ill prepared for college and who will need remedial instruction, which adds to postsecondary costs. Therefore, more students will struggle with college level work and many will quit college – after expending substantial time and money on it – due to the poor fit of those students with an extremely limited product offering of universities.

By any measuring standard, this is beyond a dismal failure; it is downright scary! It shows how the system benefits a small minority and is utterly destructive to the interests of the large majority since credentialism is directly tied and controlled by the academic community. Most who do not make it through the academic maze are socially and economically marginalized for the remainder of their lives; hence the perceived need for a political party that justifies its Robin Hood behavior of stealing from the rich.

Given the nature of systems that have been optimized, a point of diminishing returns will be realized. Further investment into improving numbers will have marginal effects. This reveals that the dilemma we face in providing improved educational experiences and outcomes is not related to the current "college for all" regime. Rather, what's needed is a paradigm shift in what is offered and how it is taught to the large majority of the population. Secondary school must be the primary provider of quality education, during the formative years, with postsecondary institutions understood as necessary when the secondary system cannot provide the number of years a career path requires, but not because of superfluous time-consuming instruction being the cause.

Many in the academic community oppose individuals discovering a sense of direction in this period of their lives believing extending adolescence for as long as possible is best, but this is a recent and misguided approach. Historically, adolescence was the time to discover one's path whether it was an apprenticeship or college training. Even those who went to college prior to the 20th century – before centralizing bureaucracies became the fashion – were typically finished by age 20,[16] demonstrating how academia has been expanding its market by increasing requirements to achieve its credentials.

The Business Roundtable Workforce Committee published some highly revealing graphs[17] showing three data points that further supports Petrilli and Finn's findings that the educational system has been optimized. These three graphs uncover that somewhere around 40% of the population is benefiting by the current educational system at three different stages of life: fourth grade, 12th grade, and college completion.

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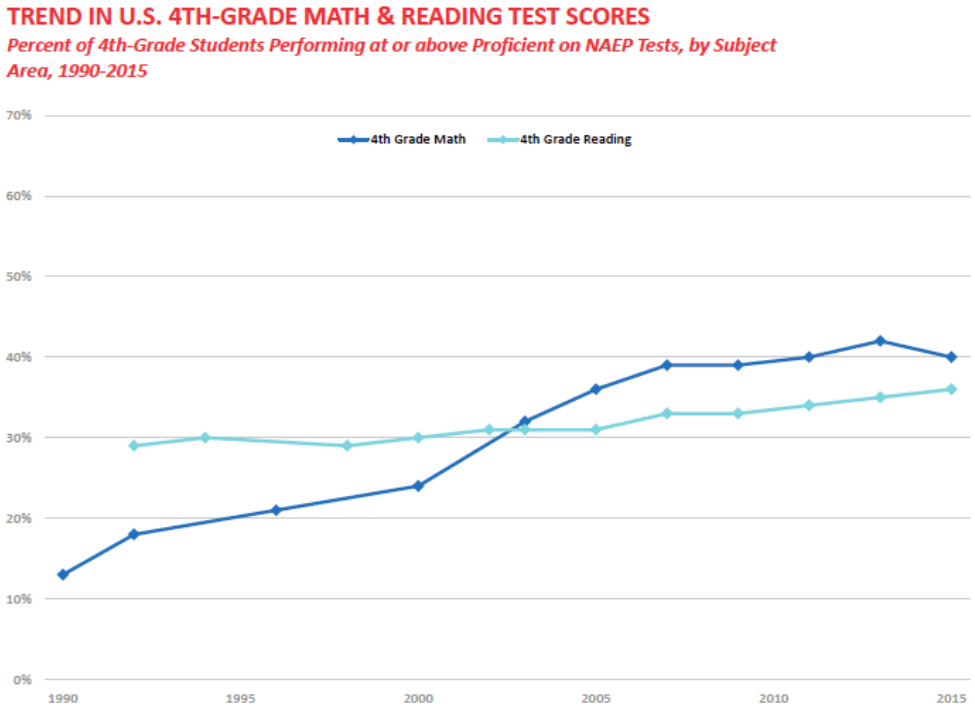
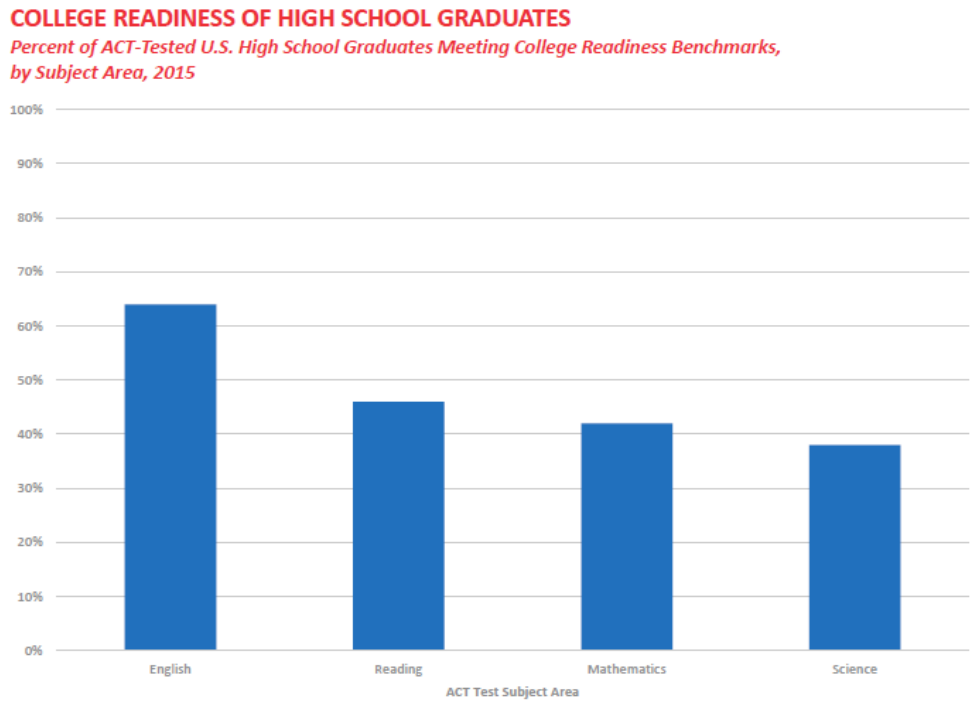
[16] See Hammond, Ruth, *When 16-Year-Olds Go to College*, The Chronicle of Higher Education, April 20, 2016. This article shows that there are still some in academia who are wise.

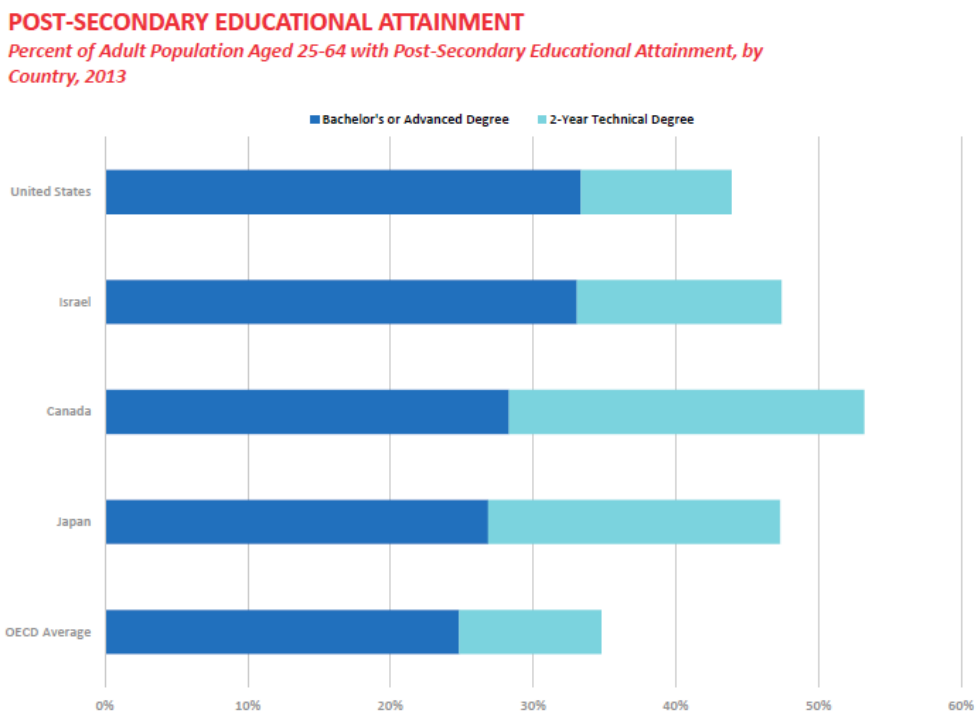
[17] http://businessroundtable.org/sites/default/files/surveys/Dashboard_40.pdf

The first graph – *Trend in U.S. 4th-Grade Math & Reading Test Scores* – demonstrates that approximately 40% of this cohort is "Performing at or above Proficient on NAEP Tests" for Math and Reading. The second graph shows the percentage ready for college.





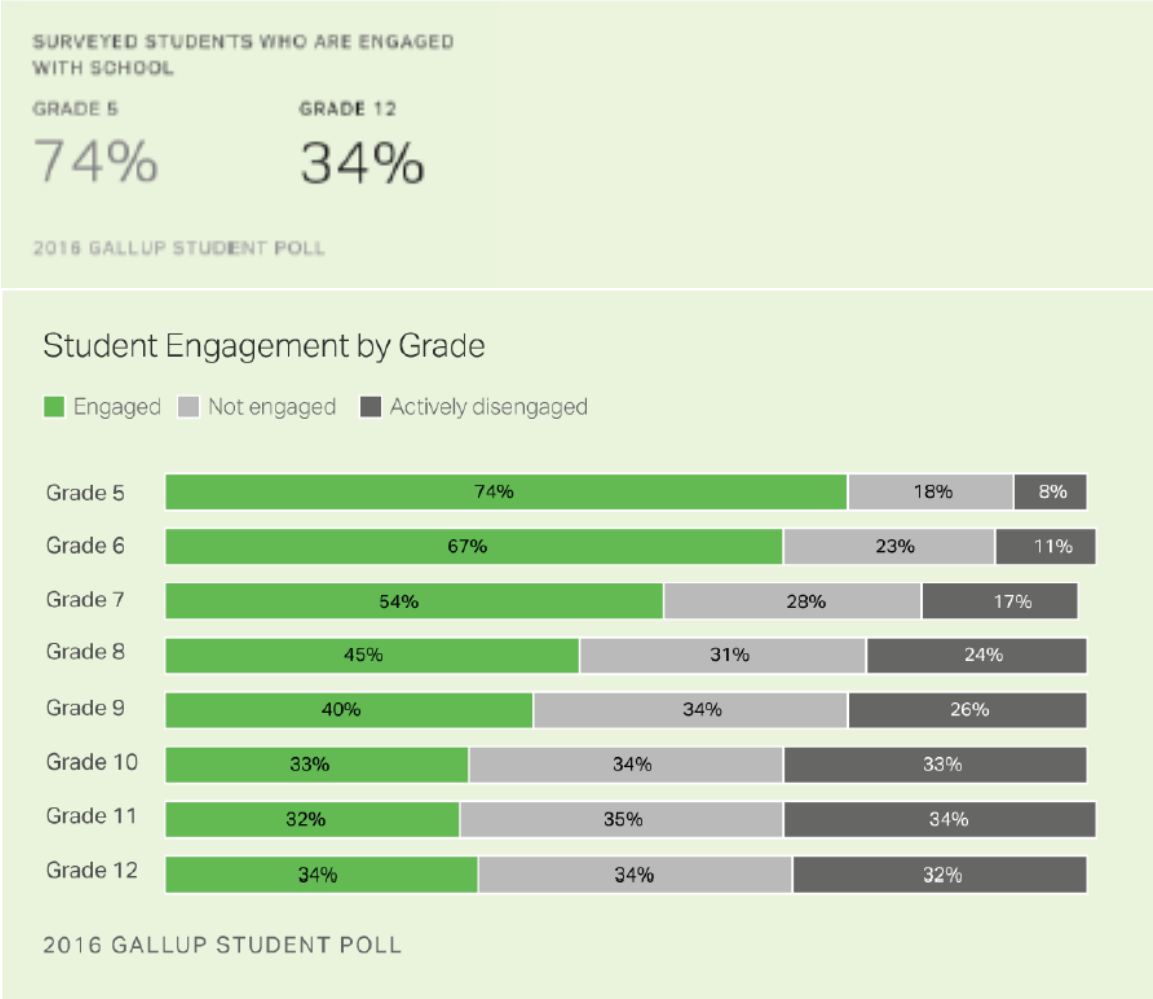
The final graph shows the percentage of adults aged 25-64 who have attained a college degree.



These graphs do not show to what degree individuals benefit by the educational system as it relates to the real world. Therefore, we must assume that there are those within the 40% populations who experience tremendous benefit by it at one extreme and there are those who experience very little benefit by it at the other. It would be interesting to see research on this cohort divided into four or five groups with a summary of each group's economic standing after the attainment of a college credential. I would wager that approximately half of the cohort would see very nice returns on their investment and the other half experiencing marginal returns that did not warrant the investment of college.

Gallup (2017) reveals the disconnect between elementary school and secondary school by showing the percentages of students engaged versus disengaged from school. They state:

> The closer students get to graduating from high school and entering the world of work, the less enthusiastic they feel about school. In fact, older students are engaged with school at much lower rates than younger students, according to the 2016 Gallup Student Poll survey of fifth through twelfth grade students from about 3000 schools….
>
> Gallup defines the engagement of students as students' involvement and enthusiasm with school.



Gallup's findings uncover the educational establishment's disconnect with students' needs and the real world's requirements. As education progresses from 5th through 12th grades, the entrenched academic biases gradually drive a wedge between the vast majority of students and their needs and aspirations. It is amazing that such a state of affairs is tolerated by society.

In closing their article, Petrilli and Finn provide the appropriate perspective:

> Another way to make sure that more freshmen are ready for college is to encourage young people who *aren't* ready for college to head in different directions. As Charles Murray recently wrote in the *Wall Street Journal*, "What we need is an educational system that brings children with all combinations of assets and deficits to adulthood having identified things they enjoy doing and having learned how to do them well."

Education Levels Achieved by Americans & Demand for Credentials

Lumina provides a nice graph entitled "Levels of Education for United States Residents, Ages 25-64" citing the U.S. Census Bureau, 2013 American Community Survey. I added

the BLS *Employment by summary education and training assignment, 2012 and projected 2022* (*supra*) showing the demand for employees that fall in the various educational attainment levels, which I identify as "BLS Percent Distribution":

	Lumina's Numbers	BLS Percent Distribution
Less than ninth grade:	4.72%	Not provided
Ninth to 12th grade, no diploma:	7.19%	26.3%
High school graduate (including equivalency):	26.37%	40.1%
Postsecondary certificate award:	Not provided	5.9%
Some college, no degree:	21.76%	1.4%
Associate Degree:	8.85%	4.1%
Bachelor's degree:	19.83%	17.9%
Graduate or professional degree:	11.27%	4.5%

Comparing credentials attained versus what is in demand shows a significant disconnect: 60.04% of the cohort has no college degree yet the demand is 73.7%; versus 39.95% who possess a college degree at some level yet the demand is only 26.5%. Let's break these numbers down further to understand the significance of them.

As the BLS reveals, approximately 26.3% of jobs do not require a high school degree (for both 2012 and 2022) yet 11.91% of the population does not have a high school degree after age 25 – a shortage of 14.39% of labor at this level of education. This shows that at least one-quarter of the jobs have no use for what high school diplomas offer. This is not necessarily saying that employers do not need educated employees. What it shows is that high school curricula is too narrowly tailored for a certain segment of the population and therefore employees with a high school degree will not receive compensation for the time spent in high school for jobs not requiring this type of degree. Since the educational establishment offers little, and in some cases nothing, for this segment of society, these people must find other means to increase their economic value.

The demand for high school degrees is approximately 40% yet we have only 26.37% who possess this degree exclusively – a shortage of 13.63%. This means that many of these jobs, plus the jobs that do not require a high school degree, will have to be filled by over-credentialed people who will not be compensated for their level of education.

The trend reverses as people attend college. With the exception of bachelor's degrees experiencing close to supply and demand parity, a huge disconnect becomes obvious here as well. The amount of people with higher-level credentials far exceeds the demand. This means they will have to settle for jobs they are over-qualified for. During slow economic periods, they have the advantage, but during good economic periods, they will be passed

over for lower credentialed individuals since wise employers know over-credentialed individuals will quit as soon as a job is found better suited to their credential level. I have yet to see this point cited in the literature, but as a businessman myself, I have excluded over-qualified job applicants from consideration for this very reason.

When the categories of *postsecondary non-degree award*, *high school degree*, and *less than high school degree* classifications are delved into (60.04% based on what Lumina cites above), the demand for radical educational change becomes apparent. CTE and applied studies type of programs suit this population beautifully. They don't need a high school degree per se; they need high quality education and training that works toward competency type of credentials that must be provided during the secondary education period (the Swiss, Austrian and German systems provide examples to get ideas from). This does not mean the quality of education is reduced (after all, it would be hard to get much worse than what this sector currently experiences); it is simply shifted to the world of the useful arts and sciences versus the current abstract and theoretical world of academia that was previously referred to as the "pure" arts and sciences.

Which Individual Attributes Are In Demand?

Herk, (2015) provides:

> The "skills gap" – the idea that the U.S. is not producing enough workers with sufficient skills for future jobs – is a staple of business reports and business organizations. …
>
> I've written before about key competencies that are important across a wide range of jobs and the promise of competency-based education and hiring to address the skills gap as well as the challenges of burgeoning college price tags and student loan debt.
>
> One big question is just what those essential competencies are. Is it a short list of 5 to 10 general skills? Or is it a longer list of very specific "technical" skills, each tied to a relatively small number of jobs – like the ability to program in Python or to operate metal fabricating machinery?
>
> CED [Committee for Economic Development] recently surveyed our membership to explore which skills and knowledge were most important to being hired by their organizations and which skill sets were hardest to hire for.
>
> Here are preliminary results based on the responses we received through September 18.
>
> **Which Skills are Most Important for Being Hired?**
>
> For a variety of competencies, we asked our Members how important the applicant's knowledge and skills in that area were when their organization was deciding whether to hire the applicant. …
>
> For those of us with children, these are the skills that you want to make sure your

child develops – and the skills you should lose sleep over if they don't.

Chart 1 shows these "must have" skills rank-ordered by the percentage of CED Members who called the competency "essential" to being hired at their organization.

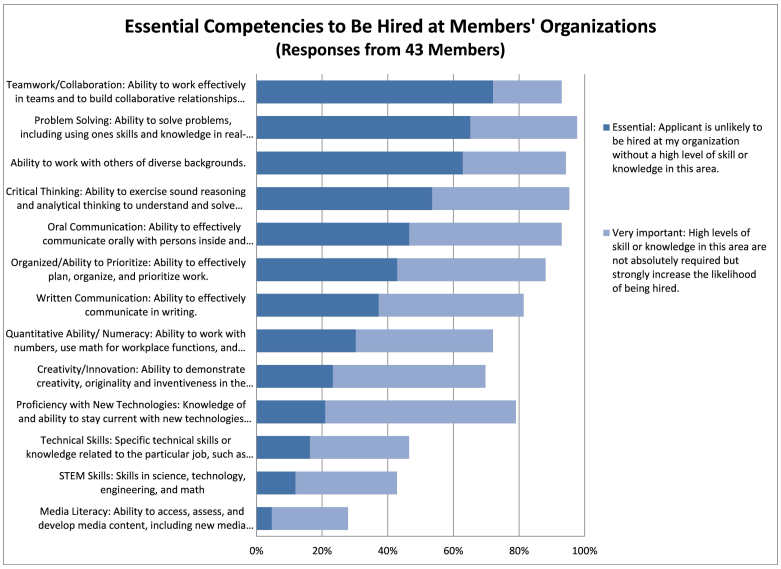
The top three skills – ***teamwork, problem solving,*** and ***ability to work with others of diverse backgrounds*** – will not be surprising to anyone familiar with lists of 21st century skills. More surprising are some of the competencies that our executives rated relatively inessential to being hired, including STEM skills (science, technology, engineering, and math) and specific technical skills related to the particular job, such as knowing a specific programming language. The three competencies that fell to the bottom of the "essential" list – that is, STEM skills, technical skills, and media literacy – all scored highly on being "Desirable" or "Important for some but not all positions."

However, we were interested not just in which competencies were essential on the job, but also which ones our Members' organizations had trouble hiring for. After all, something can be essential – like oxygen – but if it's easily obtained at low cost, we don't worry about it.

Which Skills are in Shortest Supply?

Being aware of the debate over where the "gap" in the "skills gap" really lies – i.e., is it a gap between applicants' *skills* and the skills required, or is it a gap between the *wages* workers demand and the wages employers are willing to pay for those skills? … Chart 2 shows which essential or important competencies our Members' organizations had difficulty hiring for. The skills are rank-ordered in terms of the percentage of respondents who said that their organization experienced large or moderate shortages of applicants with sufficient skills and knowledge in these areas (which they had previously listed as essential or important).

Chart 1

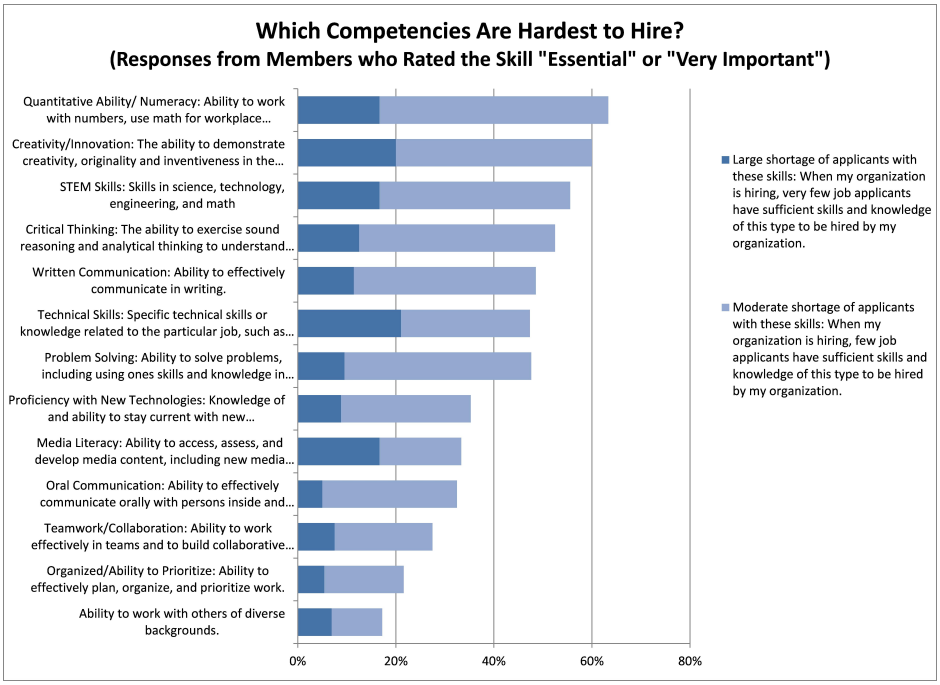


Perhaps surprisingly, the ranking of the competencies in Chart 2 is generally reversed compared to Chart 1. **Quantitative skills** and **creativity,** which ranked towards the middle of on-the-job-importance in Chart 1, top the hard-to-hire list, ranking first and second. **STEM skills,** which ranked near the bottom in terms of importance for most jobs[18] in Chart 1, comes in third on the hard- to-hire list.

In most organizations, quantitative skills, creativity, and STEM skills apparently are not essential for every position (see Chart 1). But the individuals who have these skills are apparently in scarcer supply. So, for the jobs that require these skills, individuals who have them can demand a higher premium in the labor market. Which is exactly what we see in wage data.

What does this all add up to? It seems that one of the reasons the skills and training debate becomes confused is that we're talking about two different aspects of job skills. One dimension is the skills that will be widely needed in most jobs in the future (and today!), and the other is the skills that are in short supply. … Chart 3 lays out all the competencies in the survey along both dimensions.

Chart 2



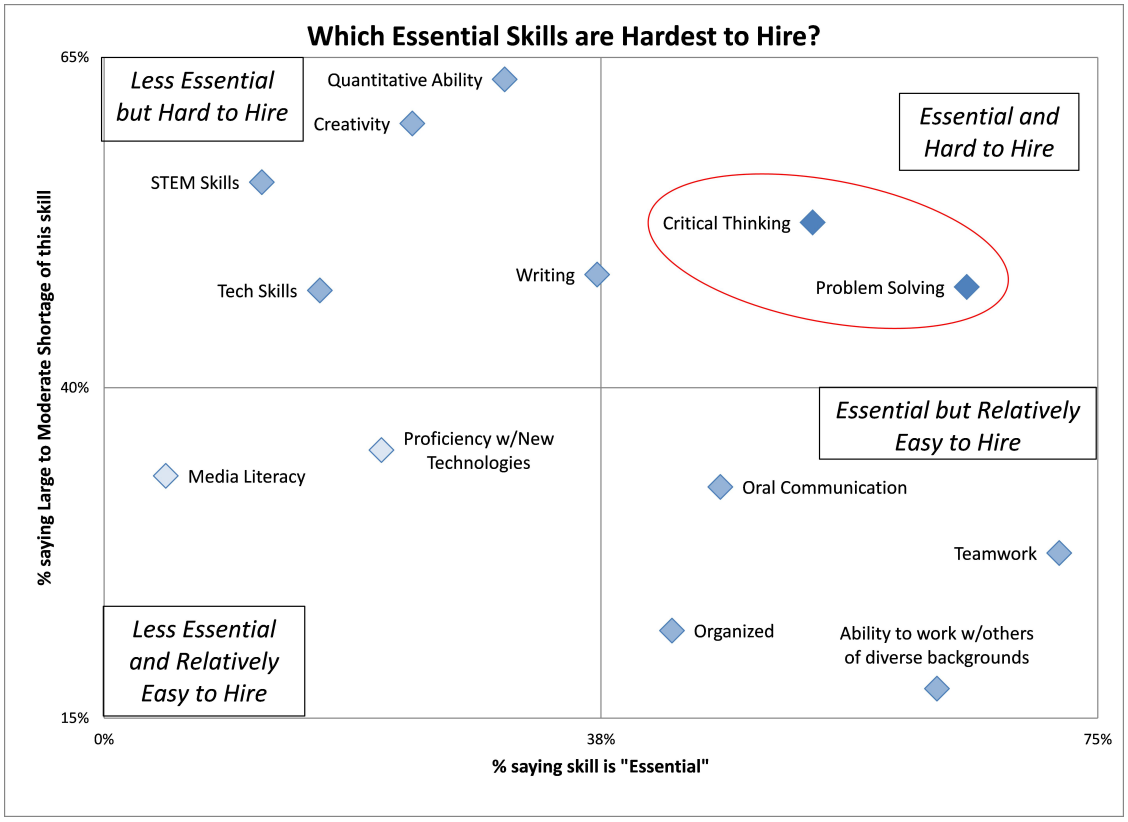
Analyzed in this way, **critical thinking** ("the ability to exercise sound reasoning and analytical thinking to understand and solve work place problems") and **problem solving** ("the ability to solve problems using one's skills and knowledge in real-world settings to solve problems that have not been encountered before") stand out as the

[18] Yet math and science are the two subjects our educational establishment has decided that individuals and society need most. This demonstrates just how out of touch educators are when it comes to real world needs.

skills that are deemed essential to most jobs and are in relatively short supply. These perhaps are the competencies that our educational system and institutions should be focusing their improvement efforts on.

Our educational establishment does little to develop these attributes due to its almost exclusive fixation on abstract concepts that are difficult to transfer, rather than applied instruction that teaches for transfer of learning. It must be kept in mind that educators themselves were not taught in the applied realm; therefore, they don't know how to teach for transfer, yet critical thinking and problem solving are all about transfer.

Chart 3



Metsker (2019) surveyed the top 10 U.S. companies to explore "which skills they mention most frequently in their job postings." The top 10 skills at the top 10 companies mentioned were:

1. Management
2. Communications
3. Leadership
4. Operations
5. Customer service
6. Innovation
7. Sales
8. Architecture
9. Merchandising
10. Mentorship

11. Problem solving
12. Selling techniques
13. Warehousing

Since the report did not specify the definition of the "architecture" category, we cannot know what exactly is meant by it other than to conclude that it incorporates some forms of design abilities. Apple, Amazon and General Motors were the three companies that listed "architecture" as a necessary skill for posted jobs.

The author continues: "When we explored the most frequently mentioned skills in jobs postings, we found that management, communications, sales, and customer service showed up the most. So not only are these skills important to the top dogs in the U.S. economy, but they're also important across the board."

The report concludes that "soft skills matter." The author points out the largest U.S. companies "are looking for a lot of soft (or core) skills mixed with hard (or technical) skills. This mirrors the trend we're seeing in the rest of the market. Yes, these large companies need workers with skills related to their specific products and services. But they also value the skills more commonly associated with the non-STEM degrees.

"It's important not to discount the importance of soft skills like management, communication leadership, operations and innovation. If the job postings from these Fortune 500 Top 10 tell us anything, it's that these skills are timeless, transferable, and valuable." (Also, see Cormier et al., 2022)

Though our education community believes "soft skills" development is what its core competency is in, this is incorrect. It is a system of institutional indoctrination that teaches to literacy and numeracy abilities in order to make good worker bees in large institutional environments such as bureaucracies (in particular, it prepares students for a career in the educational bureaucracy) and the military. It does not teach to the transfer of learning; it does not teach to inductive reasoning; it does not teach foundational math and scientific principles and their interconnectedness and application to real-world settings; it does not teach innovation; it does not teach management abilities; it does not teach resourcefulness; it does not teach team efforts (though most educators think it does); and it does not teach individuals to think for themselves but, rather, it does teach individuals to obey orders. It teaches students to be absorbing sponges and to regurgitate memorized data. These are not the soft skills innovative companies are looking for. In addition, it tends to teach division amongst differing groups, which falls under the designation "competition," with the negative consequences being social division and confrontational behavior. These can hardly be called *soft skills*. Perhaps a better term that fits our education system would be *statist skills*.

Is the GED a High School Degree or Not?

Heckman and LaFontaine (2010) analyze high school graduation rates. The General Educational Development (GED) certificate creates discrepancies in the actual high school graduation rate by their inclusion in determining these rates. Depending on many factors, "the U.S. graduation rate is claimed to be anywhere from 66 to 88 percent in

recent years – a wide range for such a basic educational statistic." If GED recipients are excluded from measures of high school completion rates, some studies have found that "the true rate in recent years was closer to 70 percent." Black and Hispanic rates "were often calculated to be as low as 50 percent nationally." In Table VI of this report, the authors provide an analysis of the growth of GED recipients starting in 1957: "The percentage of GEDs among reported high school graduates increases from 9% to 20%. The percentage of dropouts who receive a GED increases from 38% to 60%."[19] Granted, such growth can partially be attributed to the growth of high school participation rates of that period, but it reveals that the public education system had been optimized for a given talent set, and individuals without those talents, were being marginalized, as they are still marginalized today.

If we compare the 70% graduation rate (i.e., those who actually graduate from a high school) to grade point averages, this is equivalent to a 2.0 GPA, the lowest point of a C average. If we correlate this to an individual's likelihood of success in college, this is an insufficient level of aptitude to graduate without substantial intervention. The 50% rate of blacks and Hispanics would be graded as an F or a 0.0 GPA. So while academia demands that individuals live up to high standards they set (based on their own narrowly tailored talents of course), they are given a pass when it comes to their own performance and results. These "grade point averages" demonstrate that the system is not sufficiently designed to perform for real world demands.

Though high school graduates (who do not attend college) and GED recipients have the same measured academic capabilities on average, the economic and social outcomes of the GED population is similar to that of high school non-completers who are not GED certified. "GED recipients lack non-cognitive skills such as perseverance and motivation that are essential to success in school and in life." This indicates that academic type of cognitive abilities play only one part in an individual's prospects for success in life and that much of the differences between citizens' educational levels and their socioeconomic standing, has far more to do with non-cognitive skills than with them. We can probably safely assume that credentials acquired by many, demonstrate non-cognitive abilities, such as ambition, more than anything else. So the person with higher levels of education may simply be demonstrating ambition and endurance qualities more than anything else, as the following paragraph reveals.

The authors of this report point out that GED recipients typically do not finish many of the things they start – similar to high school non-completers – such as training opportunities. In addition, attrition rates from the military are similar for GED recipients as for high school non-completers. Perhaps this demonstrates a number of forces at

[19] Again, in Table VI, the authors provide an analysis of the "college-high school gaps in earnings…. A bias arises from measuring college-high school gaps when high school completers and GED recipients are lumped into one category…. The bias is the difference in the estimated college-high school gap between a procedure that aggregates GED recipients into the high school category and a procedure that disaggregates them." If annual earning gaps are compared between high school and college graduates, the difference between the exclusion versus inclusion of GED recipients increases from 6.1% to 9.5% respectively. Therefore, by including GED credentials as part of the high school completion rate, the earnings, as well as employment rates, of high school graduates appears lower than they otherwise would be. Here is another example of broad statistics painting the wrong picture for parents, the education community, and policy makers to base decisions upon. We must dig deeper into data and measure the more qualitative aspects.

play.[20] However, one important force may be the lack of social-ability talents such as Gardner's (1983) interpersonal abilities/intelligences. If one is somewhat inept socially, institutional settings such as schools and military life may prove exceptionally challenging. In addition, some people are far too distracted by people and find it hard to concentrate with such diversions. Such challenges would tend to marginalize this segment and therefore might appear as though they lack certain attributes that determine career success, which would explain why "GED recipients lack non-cognitive skills such as perseverance and motivation that are essential to success in school and in life." This requires a look at alternative environments to prepare this segment for social/economic life, such as home schooling for the earlier years and possibly online MOOC courses, or correspondence courses for later years.

I think Thomas' (2015) hypothesis on differences between introverts and extroverts provides another angle to better understand the point made above regarding how some people can be far too distracted by other people in a learning environment:

> In a very nondescript generalization, introverts have a highly aroused/active nervous system; extroverts have a low level of arousal acting in their nervous system. That is, introverts don't NEED the stimulation of constant attention that extroverts desire. This explains why introverts are content to being alone or in small groups, and why they feel like they're being overloaded with extended exposure to large crowds. The cognitive activity that extroverts experience in crowds is always happening in the nervous system of introverts. Introverts do, in fact, need to get away and be alone to suppress their neuronal activity brought on by action, attention, and crowds. Extroverts, however, need that stimulation – like a drug addict seeking a "fix" – to gain equal arousal.

From all of this, it becomes evident that more effort must be expended in the other human qualities and characteristics that contribute to individual success. One example is what the book *The Game of Life: College Sports & Educational Values* demonstrates: Those who partook in various sports during the high school and college years, tended to perform better, in economic terms after graduation, than those who did not participate – regardless of grades, generally speaking.

The authors add gender issues: The growing discrepancy between male and female college graduation rates is due in large part to the decline in the male high school graduation rates and an increase in female rates. "Men now graduate from high school at substantially lower rates than women. For recent birth cohorts, the gap in college attendance between males and females is roughly 10 percent." A decline in male rates indicates the public system is not geared toward their needs, but may possibly be better optimized for the needs of females.

However, Perry (2017) offers a table (see below) he acquired from the Department of Education, which ranks females by field of study as a percentage of bachelors degree recipients for 2015. This shows that while females may be receiving the lion's share of

[20] A good report that addresses the mental challenges students experience in college is surely just as applicable to students in high school: *Today's Anguished Students—and How to Help Them* http://chronicle.com/article/Todays-Anguished/233171

bachelor's degrees, they do not pursue degrees that are as economically rewarding as the ones pursued by males. This demonstrates that there is no "female bias" on the part of society, but, rather, there are individual female biases that are based upon free will rather than the dictates of Progressive social engineers.

Bachelor's Degrees by Field of Study, Class of 2015, Ranked by Percent Female	Male	Female	Total	Female %
Family and consumer sciences	3,012	21,572	24,584	87.75%
Health professions and related programs	33,658	182,570	216,228	84.43%
Public administration and social services	6,145	28,218	34,363	82.12%
Education	18,473	73,150	91,623	79.84%
Psychology	26,802	90,755	117,557	77.20%
Area, ethnic, cultural, gender, and group studies	2,293	5,489	7,782	70.53%
Legal professions and studies	1,348	3,072	4,420	69.50%
English language and literature/letters	14,053	31,794	45,847	69.35%
Foreign languages, literatures, and linguistics	6,067	13,426	19,493	68.88%
Multi/interdisciplinary studies	15,930	31,626	47,556	66.50%
Communication, journalism, and related programs	31,851	58,799	90,650	64.86%
Liberal arts, general studies, humanities	16,136	27,511	43,647	63.03%
Visual and performing arts	38,020	57,812	95,832	60.33%
Biological and biomedical sciences	45,102	64,794	109,896	58.96%
Agriculture and natural resources	17,585	18,692	36,277	51.53%
Social sciences	68,692	70,214	138,906	50.55%
Business	191,310	172,489	363,799	47.41%
Parks, recreation, leisure, and fitness studies	25,948	23,058	49,006	47.05%
Homeland security, law enforcement, and firefighting	33,640	29,083	62,723	46.37%
Architecture and related services	5,116	3,974	9,090	43.72%
Mathematics and statistics	12,462	9,391	21,853	42.97%
History	16,786	11,252	28,038	40.13%
Physical sciences and science technologies	18,478	11,560	30,038	38.48%
Philosophy and religious studies	7,004	4,068	11,072	36.74%
Communications technologies	3,367	1,768	5,135	34.43%
Theology and religious vocations	6,612	3,096	9,708	31.89%
Engineering	78,255	19,603	97,858	20.03%
Military technologies and applied sciences	225	51	276	18.48%
Computer and information sciences	48,840	10,741	59,581	18.03%
Transportation and materials moving	4,133	578	4,711	12.27%
Engineering technologies and engineering-related fields	14,693	1,918	16,611	11.55%
Construction trades	229	18	247	7.29%
Mechanic and repair technologies/technicians	355	25	380	6.58%
TOTALS	812,620	1,082,167	1,894,787	**56.44%**

Source: Department of Education

A team of cognitive psychologists is needed to analyze some of the fundamental differences between the needs of the two genders and provide recommendations to better serve our youth.[21]

An important point mentioned has to do with the establishment of increased educational standards in order to prepare everyone for postsecondary education. However, the authors believe that as standards rise, non-college bound students opt out of the college prep program that dominates high schools, and instead, choose the easier path of pursuing a GED credential. This is a very sensible economic decision given the lack of professional preparedness individuals acquire from high schools, plus the loss of income individuals experience when so much time is taken up in classrooms and studying information useless to their futures.

The authors conclude: "The most important source of bias in estimating high school graduation rates comes from the inclusion of GED recipients as high school graduates. In recent years, this practice has biased graduation rates upwards of 7-8 percentage points." Given the differences in social and economic outcomes between GED recipients and high school graduates, it is an extremely important dynamic to understand given its tendency to uncover weaknesses in non-cognitive attributes that can have such a profound effect on individual lives. The same can be said of high school non-completers. Understanding the shortcomings of our public system as it relates to non-completers, GED recipients, and high school graduates, helps us design a system that is far more flexible for the various interests that pass through our public schools.

We need to keep in mind that graduation requirements are an arbitrary social construct designed by educators whose interest was education itself along with outcomes for social engineering purposes – not for individuals who need to be well prepared for life. I would venture to say that the poor economic outcome of non-high school graduates is an issue of social stigma and feelings of inadequacy more than individual abilities.

Reasons for the Argument Against the "College for All" Movement

In the essay *The Path Least Taken: A quest to learn more about high school graduates who don't go on to college* (2014), the reasons for not going to college were considered:

- "23% can't afford to go on to college
- 20% [gave] "other" [as reasons, which] combines the responses of pregnancy/child care/marriage, taking a break, undecided, military, and other infrequently cited reasons such as incarceration.
- 16% has a job

[21] Perhaps a few good pieces to review for this effort are: Why Women (Like Me) Choose Lower-Paying Jobs, by Lisa Chow, September 11, 2013, http://www.npr.org/blogs/money/2013/09/11/220748057/why-women-like-me-choose-lower-paying-jobs; and On Pay Gap, Millennial Women Near Parity – For Now, Pew Research Center, December 11, 2013, http://www.pewsocialtrends.org/files/2013/12/gender-and-work_final.pdf. Also, see a Jordan Peterson interview, with Stephen Blackwood and Heather Mac Donald, *What Is The "Higher" in "Higher Education"?* https://www.youtube.com/watch?v=Tsuhfsfk6Kk starting at 50 minutes 30 seconds into the interview. Besides Peterson's incredible insights, he references a study that dispels the gender bias theory.

- 16% rather work and make money
- 11% need to help support family
- 3% grades not high enough
- 2% career doesn't require more education"

"On average, they took three fewer academic courses [in high school] than college-goers. They took less rigorous courses. They earned lower grades. GPA 2.5 or lower. They spend fewer hours on homework per week in high school. And ultimately performed poorer on math and reading assessments."

Individuals and parents need to analyze this list of reasons for not going to college and seriously consider if a college degree is the right path before wasting time and money on a dead-end road, as so many people have done. College is not the only place where learning can occur. There are many options including studying on one's own (think of Abraham Lincoln and how he was self-educated).

Policymakers and educators need to take a serious look at this list as well since these are cold hard facts that are not about to change in the near future. What will we provide for this majority of citizens? Will we continue to ignore them until they grow up and become a social nuisance and require intervention after the fact? Or will we be proactive and clear a path that is not filled with brambles as we do for the college bound?

Scott et al. (2015) studied the lives of those who did not complete high school, but instead decided to work, noting that little research has ever been done for this segment of society – a revealing negligence. In my mind, this is quite a revelation given all the rhetoric emanating from academia and certain political circles about the needs of those from challenging socioeconomic backgrounds. It's disingenuous to give such lip service to their needs and yet offer nothing but the college path as ***the*** one and only remedy. This is a con being perpetrated upon society, which must be rejected with extreme prejudice.

The authors start the paper off with the statement that high school and college completion are worthy goals, not only for career success, but also due to the fact that it "decreases involvement with the criminal justice system." This is a topic worthy of its own essay.

The authors wanted to "describe how young people who leave school to work differ from others who leave school early, what employment means for these youth, and how they contribute to their households." This is a population that is not going to disappear. In addition, the authors note, "youth earnings may take the place of public benefits for many families … [with] one-tenth contribut[ing] more than 50%" of household income.[22] What are we going to do for them from an educational perspective, and what are we going to do to eliminate the disgusting attitude we have toward those who choose not to continue on with a college prep high school program?

[22] And yet we do nothing for these individuals who sacrifice themselves for their families. They should be honored by our society for their love and devotion to family. Instead, we look down upon them as scum of the earth. This is a perfect demonstration of a decaying culture; i.e. when the sacrifice for one's family is considered irrelevant, or inconvenient for educational statistical purposes, moral deterioration will result.

If they are not college bound, we may consider non-completers wiser than those who stay in school and waste their time with a dead-end scenario when they could be acquiring skills and time on the job, which Andrew Carnegie addresses in his book *The Empire of Business*, (pp. 109-114, 1902).

Andrew Carnegie pointed out that all the great captains of industry started work around age 14 but did not continue with education beyond this and to have done so would have weakened their abilities to be so successful. (See Appendix II) Besides the fundamentals, their education was the real world. What has changed since then? Public perception in the pursuit of status. Therefore, public perception and status-seeking drive current educational structures as well as business hiring practices in many cases.

For example, in larger corporations, human resource (HR) departments screen job-seeking candidates by requiring postsecondary degrees from applicants before applying for many jobs that really don't require one. Without the credential, candidates are eliminated from consideration without ever knowing their potential to contribute to a company's success. HR personnel believe establishing such benchmarks justify their positions in companies. They believe they are screening for "the best" candidates when they frequently have no idea what a job entails or what a good candidate may look like.

Carnevale (2016) helps reveal the illusionary forces of the college-for-all, college completion agenda that academia is so focused on – in my opinion, to the point of fanaticism – in their assertion that it is the cure for all social evils. He points out that the public would disagree with academia and that academics' infatuation with completion is "an insider's agenda" that is based on institutional interests at the expense of individual citizens – in particular, at the expense of those from lower socioeconomic classes. He states:

> Individual institutional selectivity is the basic dynamic that sorts students in the higher education system. Selectivity is based on test scores and other educational metrics that launder profound … class inequality. The selectivity dynamic operating at the institutional level in higher education underwrites K-12 inequity and subsequently magnifies it in labor markets. It also results in a growing disproportionate representation of … affluent students in selective colleges exacerbating inequality in spending per student, graduation rates, access to graduate school and access to general education. Altogether these inequities make the higher education system complicit in the intergenerational reproduction of … class privilege.
>
> … We need to recognize that the elitist aspirational pathway from high school to Harvard … has become a minor narrative in the modern American experience. As such, it is no longer the appropriate frame for institutional change or policy in the broader public interest.

Carnevale reveals that the system is rigged for particular attributes that are best correlated, in essence, to winning the socioeconomic lottery; though I would add that the talents of memorization and recall must be included in this "lottery" scenario. Neither of these "lottery" scenarios, however, have anything to do with intelligence or real world

abilities. This, therefore, leads us to the idea that most of the postsecondary cultural perspective is an illusion grounded in status and prestige that needs to be dispelled and for society to embrace the idea of quality over quantity, with most of the educational needs of individuals and society needing to be accomplished in the secondary years of education when the most profound accomplishments, in **all** of their manifestations, can be realized.

* * *

To conclude this chapter, Eddy et al. (2024) offer the report, *Launchpad Jobs: Achieving Career and Economic Success Without a Degree*, that dispels the college-for-all chant. In their Executive Summary, they state:

> It's a mantra that's been drilled into every high school student for generations: "Go to college or you'll never amount to anything." But that doesn't have to be how things turn out for those who go straight to work after high school.
>
> **Here's the reality: Almost one in five workers without degrees out-earn the median college graduate annual wage of $70,000. Indeed, around 2 million nondegree workers are currently pulling in six figures a year.**
>
> These aren't just the exceptions that prove the rule. Numbers that huge make it clear: you don't need a degree to succeed. (Emphasis provided.)

Andrew Carnegie – *The Empire of Business*

Let us consider Carnegie's own words. Having been one of the most successful businessmen and philanthropists in U.S. history, his opinion carries a lot of weight. Carnegie wrote the book *The Empire of Business* showing what it takes to be successful. Since he does such an excellent job of explaining education as it relates to business, I'll quote an extended portion of his book to help us better understand what is required of entrepreneurs.

> **Where is the College-Made Man?**
>
> I asked a city banker to give me a few names of presidents and vice-presidents and cashiers of our great New York City banks who had begun as boys or clerks. He sent me thirty-six names, and wrote he would send me more next day. … [*Carnegie provides some of the most prominent banker names of his time*.]
>
> The absence of the college graduate in this list should be deeply weighed. I have inquired and searched everywhere in all quarters, but find small trace of him as the leader in affairs, although not seldom occupying positions of trust in financial institutions. Nor is this surprising. **The prize-takers have too many years the start of the graduate; they have entered for the race invariably in their teens – in the most valuable of all the years for learning – from fourteen to**

twenty;[23] while the college student has been learning a little about the barbarous and petty squabbles of a far-distant past, or trying to master languages which are dead, such knowledge as seems adapted for life upon another planet than this, as far as business affairs are concerned – the future captain of industry is hotly engaged in the school of experience, obtaining the very knowledge required for his future triumphs. (Emphasis added.)

I do not speak of the effect of college education upon young men training for the learned professions, for which it is, up to a certain point, almost indispensable in our day for the average youth, but the almost total absence of the graduate from high position in the business world seems to justify the conclusion that college education as it exists seems almost fatal to success in that domain.[24] It is to be noted that salaried officials are not in a strict sense in business – a captain of industry is one who makes his all in his business and depends upon success for compensation. It is in this field that the graduate has little chance, entering at twenty, against the boy who swept the office, or who begins as shipping clerk at fourteen.[25] The facts prove this. There are some instances of the sons of business men, graduates of colleges, who address themselves to a business life and succeed in managing a business already created, but even these are few compared with those who fail in keeping the fortune received.[26]

There has come, however, in recent years, the polytechnic and scientific school, or course of study, for boys, which is beginning to show most valuable fruits in the manufacturing branch.[27] The trained mechanic of the past,[28] who has, as we have seen, hitherto carried off most of the honors in our industrial works, is now to meet a rival in the scientifically educated youth, who will push him hard – very hard indeed. Three of the largest steel manufacturing concerns in the world are already under the management of three young educated men – students of these schools who left theory at school for practice in the works while yet in their teens. Walker, Illinois Steel Company, Chicago; Schwab, Edgar Thomson Works; Potter, Homestead Steel Works, Pittsburg, are types of the new product – not one of them yet thirty. Most of the chiefs of departments under them are of the same class. Such young educated men have one important advantage over the apprenticed mechanic – they are open-minded and without prejudice. The

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[23] The formative years that are commandeered – never to be recovered once lost – by an abstract, academically oriented educational establishment.

[24] Of course, much has changed since Carnegie's day. However, his point about the teenage years being critical to learning what is required in a career cannot be underestimated or ignored.

[25] To our demise, we ignore the importance of menial labor in the formative years to teach work ethics and self-discipline. We discount manual labor and domestic duties, foolishly believing an academic education is the only thing that has value. Hence the reason we rely so much on immigrants to supply our unskilled labor needs rather than taking advantage of such labor as a school for adolescents and young adults in its own right.

[26] Fukuyama addresses this in his book *Trust* (1995) where successful businesses need to be handed over to competent managers outside of the family once the entrepreneur departs from the scene.

[27] This is due to the manual arts movement that swept Europe and America in the 19th century and contributed greatly to economic success in the West.

[28] "Mechanic" was a very generic term, typically signifying someone who had passed through the apprenticeship system during the cottage industry era – i.e. pre-Industrial Revolution.

> scientific attitude of mind, that of the searcher after truth, renders them receptive of new ideas. Great and invaluable as the working mechanic has been, and is, and will always be, yet he is disposed to adopt narrow views of affairs, for he is generally well up in years before he comes into power. It is different with the scientifically trained boy; he has no prejudices, and goes in for the latest invention or newest method, no matter if another has discovered it. He adopts the plan that will beat the record and discards his own devices or ideas, which the working mechanic superintendent can rarely be induced to do. Let no one, therefore, underrate the advantage of education; only it must be education adapted to the end in view, and must give instruction bearing upon a man's career if he is to make his way to fortune. …
>
> In the industrial department the trained mechanic is the founder and manager of famous concerns. In the mercantile, commercial and financial it is the poor office-boy who has proved to be the merchant prince in disguise, who surely comes into his heritage. They are the winning classes. It is the poor clerk and the working mechanic who finally rule in every branch of affairs, without capital, without family influence, and without college education. It is they who have risen to the top and taken command, who have abandoned salaried positions and boldly risked all in the founding of a business. College graduates will usually be found under salaries, trusted subordinates. Neither capital, nor influence, nor college learning, nor all combined have proved able to contend in business successfully against the energy and indomitable will which spring from all-conquering poverty.[29] Lest anything here said may be construed as tending to decry or disparage university education let me clearly state that those addressed are the fortunate poor young men who have to earn a living; for such as can afford to obtain a university degree and have means sufficient to insure a livelihood the writer is the last man to advise its rejection … but for poor youth the earning of a competence is a duty and duty done is worth even more than university education, precious as that is. Liberal education gives a man who really absorbs it higher tastes and aims than the acquisition of wealth, and a world to enjoy, into which the mere millionaire cannot enter; to find therefore that it is not the best training for business is to prove its claim to a higher domain. True education can be obtained outside of the schools; genius is not an indigenous plant in the groves academic – a wild flower found in the woods all by itself, needing no care from society – but average man needs universities. (Carnegie, 1902, pp. 109-14)

Carnegie provides insight into human dynamics prior to our mesmerization of all things academic. It becomes difficult to see the forest for the trees when a culture has become so immersed in a way of thinking. It can't imagine any other way of existing. I offer Carnegie's perspective, not as something we should necessarily aspire to go back to, but, rather, as a viewpoint to analyze what has been forgotten and to possibly recovery some aspects that should not have been discarded from the past. The saying "Throw the baby out with the bathwater" is fitting here.

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[29] Those from impoverished socioeconomic backgrounds are not the only ones who succeed in business, but they are most certainly not excluded from it either, as Carnegie stresses here.

High School Non-Completers' Family Roles

Back to what Scott et al. provided in their work on high school non-completers, they state:

> This analysis sheds light on an important group of youth who have typically been left out of discussions about disconnected youth: those who are working and not in school. They have characteristics different from disconnected youth, they make substantial contributions to their households, and they have work experiences that diverge from our traditional assumptions about youth employment. …
>
> First, this analysis opens up new questions about why some students might leave school. Most of the literature on dropouts in recent years focuses on academic performance, parental support, students' personal ambition or expectations, or conditions within schools. These kinds of factors may explain very well why many young people drop out, but for some low-income students there may be a missing piece: their potential role in making ends meet for their families and themselves. …
>
> Second, the limited literature on the effects of early employment in both the short and long term leaves policymakers and practitioners unsure of whether to incentivize or discourage early labor-market experiences. Studies using nationally representative samples usually associate employment of high school-age youth with negative outcomes, including increased risky behavior and low academic achievement. But studies focusing on low-income youth often suggest that working can help keep them on track in school. In addition to these mixed results, virtually no research examines how early work experiences affect long-term outcomes for young people who have dropped out of school.

Around the turn of the last century, when the manual arts movement was really picking up steam, there was a great deal of discussion in the educational community regarding the contributions youth made to their families after 8th grade and how there was need to continue allowing youth to contribute to their families while still acquiring knowledge and skills necessary to prosper in a free society over their lifetime. However, over time, credentialism, increasing compulsory education ages, minimum wage laws, and "child" labor laws marginalized this issue. Currently we turn a blind-eye to this problem as though it were a 19th century Industrial Revolution phenomenon that has been relegated to the dustbin of history.

The authors reveal a startling find:

> The household characteristic most important to earnings is the highest level of educational attainment among members. Working youth tend to earn significantly more in households whose members have lower overall levels of education. Compared with youth in households in which the highest level of education is at least some college, youth in households with less than a ninth-grade education earn 65 percent more, youth in households with some high school education earn 34 percent more, and youth in households with a high school diploma or GED certificate earn 23 percent more.

Could this be uncovering some of the negative effects of education? Does public education sedate students into complacent and apathetic citizens? Does it teach them to be passive, compliant, subservient, and obedient? These are qualities suited for big corporate or government jobs, but not for ambitious hard working people.

It is very interesting to consider that youth make more money in households with less overall education. This may disclose the lack of influence the educational system had on the parents since they left the system before too much negativity could have taken effect; which correlates with Carnegie's position that too much education is not beneficial to ambitious businessmen since it teaches people to be followers rather than leaders. Too much predominately abstract education, for those not suited to it, tends to cause people to despise real work. It promotes the taste for the *finer things in life* even when they are not destined for them.

The concepts of psychologist Jean Piaget on life experiences during the formative years (stages of cognitive development) may provide insight into what the lack of a high school experience reveals. To do so, let's consider what happens to an individual forced into a poorly fitted program: If a non-academic individual who is not destined for college is forced to sit through a general education secondary program (i.e. a watered down college prep curricula) until age 18 – thereby missing out on discovering and developing his true potential – will that individual's mental capacity be stunted since the majority of time was dedicated to disciplines outside his talents and on a useless program rather than learning in a suitable environment, such as what one's parents would provide if they had the wherewithal? I would hypothesize that the answer is an unequivocal yes! Multiply this stunted outcome by the millions annually and the source of so many social ills becomes apparent.

The authors conclude: "Understanding young people's role in their families' economic support-system is important to designing effective programs and policies."

The Covid-19 Pandemic exacerbated the challenges students and their families experienced. Loss of income by parents required their high school aged children to assist in making up for the loss; thereby affecting students' GPAs. See Newberry, *Sleepless Nights. Double Shifts. Covid-19 is Forcing High School Students to Help Support Families*, Los Angeles Times, Feb. 5, 2021. I beg the reader not to dismiss this reality as an anomaly. Granted, this pandemic is extreme and not a constant phenomenon. However, it reveals a problem that ebbs and flows as time progresses; but one thing is for sure, the problem continues regardless of severity.

In *Creating Stackable Credential Programs* (2020), The Bell Policy Center provides:

> Today, too many students face barriers that make it difficult to complete and attain a credential that is relevant to a career path that will have opportunities for advancement and yield a positive return on investment. These barriers include:
>
> - The high costs of training programs and postsecondary education

- Misalignment between coursework and curriculum that may not meet industry needs and long-term opportunities
- Significant time burdens in attaining different credentials and degrees.

When we devise educational programs for occupational advancement, these three points must be taken into consideration for the good of individuals and society. We can no longer design programs that serve the educational establishment at the expense of citizens.

College Is Not Perceived as Something to Aspire to By All People

Kelly (2015) considers the majority of people without a college degree who do not aspire to pursue postsecondary education. He states, "To the extent the gospel of education has reached the masses, we'd expect most to aspire to a college credential. And while most did, a sizable proportion – 43 percent – reported that they were satisfied." This was for adults in general, but for high school graduates, 51% "were satisfied with their current level of education…." The author states:

> How should we interpret the proportion who were satisfied with their level of education? One simple interpretation – which may be hard for elite college alums in Washington – is that many high school graduates have worked their way into a satisfying career and lifestyle. As much as it might pain the edu-intelligentsia to admit, some paths to happiness do not run through college. These are paths we should admire and learn from.
>
> Of course, another interpretation is that adults without a college degree don't have a taste for education for education's sake. They may see it as a means to an end, but not an end in and of itself. As such, they may feel no strong compulsion to climb the educational ladder.
>
> But the respondents that were satisfied with their current level of education may also believe that the benefits of further education do not outweigh the costs. They may also believe that the existing system does not provide opportunities that are flexible enough to serve people like them.

Those Not Part of Academia's World, Typically Are Marginalized

Farish (2017), president of Roger Williams University, addresses the objections the faculty at Purdue University has about Purdue acquiring a private school, Kaplan University, and who are of the opinion that the acquisition "posed a potential threat to Purdue's academic quality."

> The blogosphere has been buzzing ever since. At the heart of the dispute is an issue that has bedeviled education for centuries: the struggle for access by those seeking education, and the opposition by those who are educated and who seek to preserve their special status by restricting access to newcomers.

> In the Middle Ages, literate monks worked to prevent the spread of literacy to peasants. Colonial-era colleges were almost exclusively limited to the landed gentry. African Americans were obliged to create their own colleges, since very few of the existing colleges, including public colleges, permitted their enrollment.
>
> Jews were placed on a quota system in the first half of the 20thcentury by many of our most prestigious institutions. Some Ivy League presidents opposed the GI Bill, because it opened the doors of higher education to the working class. There are claims that, even today, students of Asian descent face a higher standard for admission at the University of California than do white students.
>
> The students (current and prospective), the colleges and universities, and society at large all are parties of interest as regards who are, and are not, offered admission to college — and their views are not congruent.

In order to divert attention away from this monopolistic force that does tremendous harm to a vast majority of citizens – and in particular, minorities, who academics purport to **care so much about** – academics point their fingers everywhere else, which provides them the necessary cover to protect their turf.

As if this wasn't bad enough, the academic community further marginalizes individuals at the secondary level. Adams (2105) references a report released May 1, 2015 by J. Rosenbaum: "The New Forgotten Half" a sequel to the 1988 report "Forgotten Half" "that revealed the lack of support for non-college-bound young people." Adams makes the point that while college enrollment is up, "many never finish and those with 'some college' are no better off in the labor market than those with just a high school diploma…."

> This new research indicates progress on the access front, but many unexpected obstacles … that contribute to students failing to complete. While 37% of on-time high school graduates enrolled in a community college with the intention of getting a bachelor's degree, nearly half drop out within eight years often taking on debt and gaining no wage advantage from the experience.

This is informative in that these individuals are not learning useful information that is transferable to the real world, i.e. they are gaining no applicable competencies. It also reveals that individual attributes unrelated to academic ability, such as ambition and motivation, may not play as large a role in economic success, generally speaking, as we might think. If the only thing that provides wage advantages is the credential – i.e., the sheepskin – versus motivation, ambition, knowledge and skills, we're in very serious trouble.

Adams continues:

> Just 33% of community college students earn an associate degree in eight years, the report found. For those who get a certificate, earnings on average are 13 percent higher than someone with just a high school diploma. Associate degrees increase earnings by 22 percent and a bachelor's degree by 34 percent, according to the new report.

Of course, these are averages and should not be used to make a decision simply to "go to college." Some people with only a high school degree earn far more than many with Ph.Ds. So it is dependent of one's talents and what career is chosen.

> Too often, students enroll in general education classes without a clear path to a career. They amass a collection of credits, but not the right combination to translate into a credential, said Rosenbaum.

Here is part of the problem: General education classes at the college level provide little to no benefit that is transferable to a job, or even life for the most part, which is the same for general education at the high school level. Students in college have already fulfilled their gen-ed requirements at the high school level where general education dominates given the fact that most in the public educational establishment are against "vocationalism," i.e. a career path. There is a contradiction here, however. While educators tend to be against career preparation until some point after students have grown up, subjects in secondary education are taught as though each student will pursue a career in the subject being taught rather than as useful information that will prove relevant to the individual's future social life. There is a complete disconnect in this regard.
In addition, there is a contradiction where educators believe secondary school is not an acceptable stage of development to pursue a career, but right after secondary school, magically and suddenly, individuals become ready for career preparation. Educators think in terms of students pursuing a bachelor's degree, so if we consider the time line – finish high school at age 18 and then finish general education requirements in college at 20 – they are, for the most part, past their developmental stages as explored by Jean Piaget. They have therefore been robbed of the appropriate time in their lives to develop very high levels of competence in a given field – i.e. during the formative years.

> … Rosenbaum and other[s] advocated for sub-baccalaureate credentials, some of which can yield even better payoffs than a four-year degree. Too many students are pushed to pursue bachelor degrees, while one- and two-year programs may be a better fit or at least a better first step, particularly for at-risk students, said Rosenbaum.
>
> 'Policymakers, who themselves have B.A.s are likely wearing 'B.A. blinders,'' said Rosenbaum. 'They focus narrowly on B.A. degrees and they rarely inform students about other good options.'
>
> [F]lexible pathways can provide off ramps to accommodate students' changing circumstances.

This is where micro-credentials,[30] competency-based credentials,[31] boot camp style intensive courses,[32] and stackable credentials[33] can really make a difference.

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[30] http://www.educause.edu/library/micro-credentialing

[31] http://www.educause.edu/library/competency-based-education-cbe

[32] http://techcrunch.com/2012/12/03/dev-bootcamp/

[33] http://www.evolllution.com/opinions/remember-building-stackable-credentials/

> Counselors aren't always informed about in-demand jobs … which require less than a bachelor's degree.
>
> Educators don't realize the quick timetable and payoff for sub-baccalaureate credentials, which can be an alternative for someone who falters in pursuit of B.A., said Rosenbaum. There is little direction offered to students who drop out of college, yet many affordable and attainable career paths are available through short-term programs.

Ullman (2016) writes about the findings of Trident Technical College and Achieving the Dream regarding student success rates. The study

> looked into the ways it offered courses – 14 weeks, seven weeks, five weeks – and discovered, to its surprise, that the shorter the term, the more successful the student. No matter how they disaggregated the data (by race, gender, age, academic program, PEL eligibility, college readiness, etc.), the results were the same: shorter terms equaled improved course-success rates.

To the average person, this is common sense, but to the academic community, this comes as a sort of revelation. This demonstrates the divide between academics and real world people.

Educational Data Collection

Baum et al. (2015) point to the importance of reliable data for postsecondary attainment and the use of this data to interpret the demand for credentials in the labor market. It is certainly commendable that the authors pursue this avenue and it raises an important question: What about analyzing data to consider alternative paths for those disenfranchised by the system? Secondary education could offer an incredible amount of possibilities if it were not for the mistaken cultural perspective that only post-secondary education can possibly provide the training and status-value needed in the workplace.

Another point the authors make is central to this essay. They state:

> clarifying the important distinction between correlation and causation, among other issues, are common to most data analyses. … The data are often difficult to interpret and sometimes yield inconsistent results. … One core confusion in discussions of educational attainment involves distinguishing between completion rates and attainment rates. These terms are not interchangeable. Attainment is a measure of the highest level of education that individuals have completed… completion is a measure of how many people finish the programs they begin….

The authors mention that many people equate the term “college graduate” with the achievement of at least a bachelor’s degree, which is incorrect. The term also includes associate degrees. The National Center for Education Statistics is cited which shows that of the 3.8 million undergraduate degrees, only 43% of undergraduate degrees in 2011-12 were bachelor’s degrees. In addition, “24% were short-term certificates and 33% were associate’s degrees.”

The authors then analyze causation versus correlation as it relates to education.

> A common weakness in the use of data to shed light on important issues is the confusion between causation and correlation. People frequently conclude that because two variables move in the same direction, one causes the other. Suppose you see that students who take more mathematics classes in high school are more likely than others to go to college. Can you conclude that the mathematics classes were the cause of going to college and infer that getting more students to take more mathematics classes will increase the college-going rate? Or should you consider the reality that students who aspire to a college education are more likely to take mathematics classes to prepare for college?
>
> Correlations might reflect causation, but it is possible that a third factor influences both variables. In the previous example, the third factor might be motivation or expectations.[34]

Another example of a *third factor* would be educational completion versus income. These are certainly correlated closely, but are the knowledge and skills acquired from college the cause of the potential for increased income or is our culture's fixation on credentials the cause – i.e. does status-level determine income potential more than knowledge and skills? Someone might have incredible abilities in a given area that could improve the success of an organization's bottom line, for example, but if a credential is not possessed, this person may never be given the chance to demonstrate it. Such truths are hidden from our view for the most part because talented individuals without credentials are frequently passed by.

Useful Completion Statistics And Income

In Lavy and Goldstein's (2022) paper, *Gifted Children Programs' Short- and Long-Term Impact: Higher Education, Earnings, and the Knowledge Economy*, they point out that "Gifted children receive special attention in many educational systems." They then question the effects of this institutional intervention on long-run life outcomes. They found "no effect of gifted children programs (GCP) on employment and earnings. Nor do we find that GCP participants work more than other equally talented children in the knowledge economy. … [However] we find a positive and relatively large impact on graduating with a double major and gaining Ph.D. degrees…." One might conclude that this demonstrates that the benefits of GCP are to the academic community and not the individual, other than what value individuals may derive from the empty and egocentric focus on status and prestige. GCP appears to be designed to develop and perpetuate academic graduates for academia's use.

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[34] And another might be related to those who possess mathematical talents. They may like math classes in high school, which then opens the door for them to pursue further studies in college. Those with exceptional math talents will be drawn to it like a magnet. They are the ones who make the discoveries and breakthroughs. They will find a way to develop their talents regardless of an educational system that demands everyone must study extensive math just so we don't lose the very small percentage of gifted mathematicians.

Something else the authors found that is interesting: "Perhaps surprising is the 'no' effect of GCP on integrating gifted children in work in sectors that produce 'new' knowledge." Could this be due to a lack of creativity and innovation? Academia has a tendency to stifle it.

The most important observation the authors made is summed up in the following: "Against the benefit and gains accruing in gifted children's programs, we should note the potential loss to other students in the education system." In a public system – in contrast to private institutions – special attention to one group, at the expensive of all others, is inappropriate and unjust. All children should receive equal attention and access to public resources. This requires more effort in designing alternative curricula for those gifted in the multitude of areas that are not traditionally seen as part of education.

The Committee for Economic Development's report (2015) provides informative graphs showing graduation rates for high school, associate's, and bachelor's degrees. Here is a summary of those graphs:

High School –

- 19% don't graduate
- 81% graduate (though this is highly doubtful given high school administrators not managing graduation rates accurately – it's closer to 70% graduation rate if GED holders are not included).
- 55% of those who graduate (which equates to 81% x 55% = 44.5%) continue on fulltime to either 2- or 4-year colleges: 19% into 2-year colleges and 36% into 4-year colleges.

College –

- Of the 2-year enrollees, 4% graduate within 3 years.
- Of the 4-year enrollees, 21% graduate within 6 years.

On page 7, a graph displays "Lifetime earnings" and "Unemployment Rates." It summarizes that BA earnings equal 105% of high school earnings. But how much would these statistics change if everyone had a college degree, or at the other end, if no one had a college degree but everyone had a high school degree exclusively? No doubt there would still be huge income gaps as we have today, but we would have to find some other cause to blame. We must dig deeper into data and measure more qualitative aspects.

Those who cite educational statistics typically harp on how much more individuals make in a lifetime with postsecondary degrees. These statements are always based on individuals completing such degrees in their "normal" allotted time. However, when it takes individuals a longer period of time, lifetime earnings will diminish accordingly. When people acquire these degrees later in life, the cost-benefit analysis could become highly negligible or even negative. The primary value then becomes either the elusive and egotistically oriented social status or simply a fulfillment of some personal interest.

The graph on page 8 – "Inflation-adjusted median household income by education level" – attempts to argue the inaccurate point that "A college degree still pays because less than

college doesn't."[35] It comes to this conclusion by arguing "College wage premium increasing because non-college incomes plunging." Looking at this graph, it shows there is little difference in household income between some college, high school degree, and less than high school degree. This implies that either individuals get a bachelor's degree or they may as well quit high school and start earning money as early as possible so their total lifetime earnings will improve. However, such broad generalizations of statistics hide a whole array of influences that dictate outcomes of individuals' lives. For example: If no colleges existed, would the graph still have similar patterns based on different criteria, such as the motivations and ambitions of individuals, or individual talents Gardner refers to as multiple intelligences? And did they find their talents during their formative years?

Publishing such broad and general statistical data without pointing out the inherent weaknesses of such data is misleading whether intentional or not. Individuals making life decisions, plus policy makers contemplating statutes and spending decisions, rely on this data and frequently make poor decisions due to their lack of understanding what the data reveal.

The authors provide their "Take-aways" to this report:

(1) "College attendance is growing; completion not so much." The growth of college attendance rates that are not matched by completion rates is a step backwards, causing great harm to individuals and society since high debt with little to no return on the investment for those who do not complete college. This exposes the callous view that individuals are not as relevant as public institutions that crave for more fodder given their insatiable appetite. But rather than devising a system that serves individuals, they attempt to force-fit individuals into their narrowly tailored institutions. It's easier that way, demonstrating the inherent problems with monopolistic or oligopolistic market forces.

(2) "Still advantages to a college degree, because the alternative has gotten worse." However, rather than saying everyone should complete college since the alternative is worse, we should look at why the alternative is worse. It is worse because secondary schools, in most cases, are not designed for anything but an academic career. The secondary years are where the solution can be found. This is rarely considered by most.

(3) "How well does a college degree prepare students for employment?" As the authors of this report reveal, 34% of employers see high school and college graduates equally deficient in preparation for the workforce. "Equally" deficient! This says very little for colleges and demonstrates why the sheepskin is the necessary ingredient in higher wages and lower unemployment rates – i.e. the credential is the only thing that has value for so many degrees; not the knowledge it is supposed to represent.

(4) "Students are paying more."

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[35] I think we are all aware that when political candidates depend on votes based on the alternative candidate being worse than them, they aren't hitting the heartstrings of voters, which is not a winning strategy. The same holds true for convincing students that postsecondary education is worthwhile for reasons that strike a chord other than being based on fear.

(5) “Student debt has been ballooning.” The cost of education has grown exponentially, outpacing all other social costs, without an equivalent return on the investment. It has now grown to an unsustainable level that requires a paradigm shift in our educational strategy and structure.

The authors for The Committee for Economic Development’s report “Take-aways” provide quite a bleak conclusion revealing the failure of our educational system. They show that just because a State may have high college enrollment rates does not mean there will be a corresponding high level of graduates. They state, “According to the *Digest of Education Statistics*, in 2009-10, 63 percent of high school graduates in the United States enrolled in degree-granting postsecondary institutions within the next year.” If we use the average of 70% high school graduation rate (which does not include GED certifications), this would equate to 44.1% postsecondary enrollment rate.

Real Education

Lindsay (2014) summarizes Charles Murray’s book *Real Education* (2008). He shocks academia with blasphemous language:

> Many in higher education worry continuously over the fact that only roughly half of students who enroll in college ever graduate, and that those who do graduate often take more than four years to do so. But few seek to go to the roots to attempt to discover the ultimate causes explaining these depressing statistics. One of the few who makes such an attempt is Charles Murray, whose contrarian explanation is, “Too many people are going to college.”
>
> … *Real Education* defends what he deems are four simple truths about education, but truths that cannot be said publicly without engendering the wrath of a culture fallen prey to what he labels “educational romanticism.” They are “(1) ability varies; (2) half of the children are [*academically*] below average; (3) too many people are going to college; and (4) America’s future depends on how we educate the academically gifted.” [*Of course, America’s future depends on how we educate everyone, not just a particular sector!*]
>
> The American education system, says Murray, “is living a lie. The lie is that every child can be anything he wants to be.” The lie is bipartisan, he argues; it spans both Republican and Democratic Party platforms….
>
> In higher education, the vision “that everyone should go to college”—like all well-intentioned projects suffering only tenuous connections to reality—asks “too much from those at the bottom, . . . the wrong things from those in the middle, . . . and too little from those at the top.”

It needs to be clarified that this author’s reference to “bottom,” “middle,” and “top” are misnomers. This is perspective is relative to academic talents Gardner (1983) refers to as mathematical-logical and linguistic intelligences. But these are not to be interpreted as the only intelligences and certainly not the “highest.” They are merely intelligences like all others.

The author distinguishes between easy college curricula and the more traditional, rigorous and stringent types. In attempting to answer "How many students, then, should go to college?" the author quotes Murray's observation that "no more than 20 percent of all students" qualify."

> But what of the need for even these students to attend college to enhance their capacity to make a living? Murray responds that four-year brick-and-mortar residential colleges are "hardly ever" the best places to "learn how to make a living." To begin, for most vocations, excluding fields such as medicine and law, four years of class work is not only "too long" but "ridiculous." For many of such students, two-year community college degrees and online education provide "more flexible options for tailoring course work to the real needs of the job."
>
> But what of the "wage premium" reaped by college graduates? For Murray, high-school graduates who pursue the B.A. primarily to boost their earning power are "only narrowly correct." Doubtless, B.A.-holders earn more on average than those without degrees, but this is due in part to a "brutal fact." Given the increase in the number of college graduates over the past half-century (more than a third of 23-year-olds now hold B.A.s), "employers do not even interview applicants" without degrees. "Even more brutal," the B.A.'s comparative advantage "often has nothing to do with the content of the education" received. The average employment gains of college graduates must be weighed against the fact that "wages within occupations form a distribution." Therefore, a student with average academic skills but exceptional "small-motor skills and special abilities" is more likely both to earn more and to be happier as, say, an electrician than as a mediocre middle-manager.
>
> … the wages of top performers in a plethora of occupations not requiring a B.A. are "higher than the average income for many occupations that require a B.A."

Dugan states, "When it comes to return on investment (ROI), not all degrees are considered equal. This article exposes eight college degrees with poor ROI. " She then lists sociology, fine arts, education, theology, hospitality, nutrition, psychology, and communications degrees providing the least return on investment. She concludes with "We know money isn't everything. A lot of people do these jobs and have great and fulfilling careers. But as the cost of education increases, it's important to know if you'll get your money's worth and see a positive ROI."

The report "Access to Attainment" (2015) states, "With Fewer than 50% of entering college students earning any credential within six years, the completion crisis is a real concern." This begs the question: should we be expending precious resources on pushing for college completion or should we open our minds to alternatives that are far more realistic, attainable, and affordable? This is a question that is not considered often enough. Too many are caught up on "college completion rates must be dramatically improved!" This sounds good on the surface but it is based on false premises, i.e., quantity (both in the sheer volume of coursework as well as degrees completed) over quality.

"By 2020 … there will be 55 million new job openings, and two-thirds of all jobs will require some postsecondary education and training. Yet it is not possible for our country to reach [this] goal without dramatically improving educational opportunity for 21st century students." This improvement should logically come from our secondary education system rather than postsecondary since students' time is already accounted for in this period; this is the most important period of an individual's formative years; and since monetary resources are already committed to this period of children's lives. The assumption that jobs of the future will "require some postsecondary education" is a false one. It is based on the idea that secondary education is a fixed institution that cannot and should not be changed. This is a fundamental flaw in perception since this perspective **must** be changed for the mental health of individuals and economic health of society.

To make the system equitable, we need to divert resources from abstract academic college preparation presently being expended on the 70 to 80% of the population who has no need for it and transfer it to real-world preparation through vastly expanded CTE programs and applied studies curricula. This would translate to a very large percentage of our school age population being sufficiently served. Based on Lumina's "Levels of Education" data (*supra*), this would serve approximately 38.28% of the population as represented by those with and without high school diplomas. The 21.76%, "some college, no degree," population will also be served by such alternatives. And certainly the 8.85% population with an associate's degree will also be well served by such a program since these degrees tend to be technical in orientation. All told, this is 68.89% of the population that currently receives little to no attention in the vast majority of our country's secondary schools. This is an injustice of the first order that hits the most vulnerable sectors of society the hardest.

What Distinguishes Experts From Novices Should Guide Curriculum Design

This section of my paper could just as easily have been used in my essay on transfer of learning; and as a matter of fact, it belongs in both. However, I chose to use it here because distinguishing between what an expert needs in a given discipline versus what individuals need, generally speaking, is critical in determining how much education is appropriate at public expense. The educational system is currently set up to teach every subject for the expert (in other words, it is a vocational system but for academic pursuits) rather than for a general education (see Tyler, *supra*), which is in direct opposition to what educators believe they are offering.

The National Research Council (NRC) (2000) reported on research done regarding what experts in a given field possess compared to novices. Their findings can help shape curricular design in order to 1) establish an appropriate foundation for all future learning, and 2) provide guidance in establishing the extent to which understanding of a given subject needs to be learned by the average person – as always, based on relative worth – in contrast to the in-depth level of understanding required by an expert.

> To develop competence in an area of inquiry, students must: (a) have a deep foundation of factual knowledge, (b) understand facts and ideas in the context of a

conceptual framework, and (c) organize knowledge in ways that facilitate retrieval and application.

This principle emerges from research that compares the performance of experts and novices and from research on learning and transfer. Experts, regardless of the field, always draw on a richly structured information base; they are not just 'good thinkers' or 'smart people.' The ability to plan a task, to notice patterns, to generate reasonable arguments and explanations, and to draw analogies to other problems are all more closely intertwined with factual knowledge than was once believed. [36]

But knowledge of a large set of disconnected facts is not sufficient. To develop competence in an area of inquiry, students must have opportunities to learn with understanding. Deep understanding of subject matter transforms factual information into usable knowledge. A pronounced difference between experts and novices is that experts' command of concepts, shapes their understanding of new information: it allows them to see patterns, relationships, or discrepancies that are not apparent to novices. They do not necessarily have better overall memories than other people. But their conceptual understanding allows them to extract a level of meaning from information that is not apparent to novices, and this helps them select and remember relevant information.[37] Experts are also able to fluently access relevant knowledge because their understanding of subject matter allows them to quickly identify what is relevant. Hence, their attention is not over-taxed by complex events. (pp. 16-17)

Research shows that it is not simply general abilities, such as memory or intelligence, nor the use of general strategies that differentiate experts from novices. Instead, experts have acquired extensive knowledge that affects what they notice and how they organize, represent, and interpret information in their environment. This, in turn, affects their abilities to remember, reason, and solve problems.

… We discuss these examples not because all school children are expected to become experts in these or any other areas,[38] but because the study of expertise shows what the results of successful learning look like.[39] …

We consider several key principles of experts' knowledge and their potential implications for learning and instruction:

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[36] However, factual knowledge alone is far from being adequate. A computer is full of factual "knowledge" but cannot reason its way out of a wet paper bag. What truly determines expertise is the ability to reason within a given domain. Exposure to a large variety of experiences within a given domain combined with extensive factual knowledge in that domain provides a fairly solid foundation for expertise and far transfer.

[37] This proves the very serious flaw in our assessment system; i.e. that outstanding memory and recall ability defines intelligence.

[38] Though this is exactly how subjects such as math, science and English are taught.

[39] This study also assists in discovering the depth and breadth of instruction in a given discipline as it relates to the needs of the average citizen versus the needs of a chosen career path. These are distinct requirements that academia has rarely considered, and therefore has focused instructional efforts on the needs of the expert.

1. Experts notice features and meaningful patterns of information that are not noticed by novices.
2. Experts have acquired a great deal of content knowledge that is organized in ways that reflect a deep understanding of their subject matter.
3. Experts' knowledge cannot be reduced to sets of isolated facts or propositions, but, instead, reflects contexts of applicability: that is, the knowledge is "conditionalized" on a set of circumstances.[40]
4. Experts are able to flexibly retrieve important aspects of their knowledge with little attentional effort.
5. Experts have varying levels of flexibility in their approach to new situations. (p. 31)

> The superior recall ability of experts … has been explained in terms of how they [arrange] various elements of a configuration that are related by an underlying function or strategy. Since there are limits on the amount of information that people can hold in short-term memory, short-term memory is enhanced when people are able to [arrange] information into familiar patterns. (pp. 32-33)
>
> The idea that experts recognize features and patterns that are not noticed by novices is potentially important for improving instruction. When viewing instructional texts, slides, and videotapes, for example, the information noticed by novices can be quite different from what is noticed by experts. One dimension of acquiring greater competence appears to be the increased ability to segment the perceptual field (learning how to see). Research on expertise suggests the importance of providing students with learning experiences that specifically enhance their abilities to recognize meaningful patterns of information.[41] (p. 36)
>
> We turn now to the question of how experts' knowledge is organized and how this affects their abilities to understand and represent problems. Their knowledge is not simply a list of facts and formulas that are relevant to their domain; instead, their knowledge is organized around core concepts … that guide their thinking about their domains.
>
> In an example from physics, experts and competent beginners (college students) were asked to describe verbally the approach they would use to solve physics problems. Experts usually mentioned the major principle(s) or law(s) that were applicable to the problem, together with a rationale for why those laws applied to the problem and how one could apply them. In contrast, competent beginners rarely referred to major principles and laws in physics; instead, they typically described which equations they would use and how those equations would be manipulated.

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[40] This contradicts the fundamental design of our current curricula where raw data is expected to be memorized so that at some point in the future, it may be recalled in some sort of related context, which cognitive psychologists have proven to be ineffectual, but educators have yet to realize and adopt.

[41] To decode much of the verbiage, the word "applied" or "application" is what this book is getting at.

Experts' thinking seems to be organized around big ideas in physics, such as Newton's second law and how it would apply, while novices tend to perceive problem solving in physics as memorizing, recalling, and manipulating equations to get answers.[42] (pp. 36-38)

The fact that experts' knowledge is organized around important ideas or concepts suggests that curricula should also be organized in ways that lead to conceptual understanding. Many approaches to curriculum design make it difficult for students to organize knowledge meaningfully. Often there is only superficial coverage of facts before moving on to the next topic; there is little time to develop important, organizing ideas. History texts sometimes emphasize facts without providing support for understanding. Many ways of teaching science also overemphasize facts.

The Third International Mathematics and Science Survey (TIMSS) criticized curricula that were "a mile wide and an inch deep" and argued that this is much more of a problem in America than in most other countries. Research on expertise suggests that a superficial coverage of many topics in the domain may be a poor way to help students develop the competencies that will prepare them for future learning and work. The idea of helping students organize their knowledge also suggests that novices might benefit from models of how experts approach problem solving – especially if they then receive coaching in using similar strategies.

Experts do not have to search through everything they know in order to find what is relevant; such an approach would overwhelm their working memory. …

The concept of conditionalized knowledge has implications for the design of curriculum, instruction, and assessment practices that promote effective learning. Many forms of curricula and instruction do not help students conditionalize their knowledge: 'Textbooks are much more explicit in enunciating the laws of mathematics or of nature than in saying anything about when these laws may be useful in solving problems' (Simon, 1980:92). It is left largely to students to generate the condition-action pairs required for solving novel problems.

… [S]tudents in a literature class might be asked to explain the meaning of familiar proverbs, such as 'he who hesitates is lost' or 'too many cooks spoil the broth.' The ability to explain the meaning of each proverb provides no guarantee that students will know the conditions under which either proverb is useful. Such knowledge is important because, when viewed solely as propositions, proverbs often contradict one another. To use them effectively, people need to know when and why it is appropriate to apply the maxim 'too many cooks spoil the broth' versus 'many hands make light work' or 'he who hesitates is lost' versus 'haste makes waste.' (pp. 42-44)

[42] Isn't this how they are taught to "think"?

> People's abilities to retrieve relevant knowledge can vary from being 'effortful' to 'relatively effortless' (fluent) to 'automatic.' Automatic and fluent retrieval are important characteristics of expertise.
>
> Learning to drive a car provides a good example of fluency and automaticity. When first learning, novices cannot drive and simultaneously carry on a conversation. With experience, it becomes easy to do so. Similarly, novice readers whose ability to decode words is not yet fluent are unable to devote attention to the task of understanding what they are reading. (p. 44)
>
> Expertise in a particular domain does not guarantee that one is good at helping others learn it. In fact, expertise can sometimes hurt teaching because many experts forget what is easy and what is difficult for students. Recognizing this fact, some groups who design educational materials pair content area experts with 'accomplished novices' whose area of expertise lies elsewhere: their task is to continually challenge the experts until the experts' ideas for instruction begin to make sense to them. (pp. 44-45)
>
> Beliefs about what it means to be an expert can affect the degree to which people explicitly search for what they don't know and take steps to improve the situation. In a study of researchers and veteran teachers, a common assumption was that "an expert is someone who knows all the answers." This assumption had been implicit rather than explicit and had never been questioned and discussed. But when the researchers and teachers discussed this concept, they discovered that it placed severe constraints on new learning because the tendency was to worry about looking competent rather than publicly acknowledging the need for help in certain areas. The researchers and the teachers found it useful to replace their previous model of "answer-filled experts" with the model of "accomplished novices." Accomplished novices … realize that what they know is minuscule compared to all that is potentially knowable. This model helps free people to continue to learn even though they may have spent 10 to 20 years as an "expert" in their field. (p. 48)
>
> Curricula that emphasize breadth of knowledge may prevent effective organization of knowledge because there is not enough time to learn anything in depth.
>
> … Many designs for curriculum instruction and assessment practices fail to emphasize the importance of conditionalized knowledge. For example, texts often present facts and formulas with little attention to helping students learn the conditions under which they are most useful. Many assessments measure only propositional (factual) knowledge and never ask whether students know when, where, and why to use that knowledge. (p. 49)

We should analyze what encompasses expert knowledge of each discipline in order to analyze what it is education is supposed to achieve, i.e., what we are trying to accomplish for individuals in an educational system in order to understand the distinction between expert knowledge and general knowledge. One of the major purposes of education is to

achieve expertise by each individual at some point in the educational experience, which varies depending on the profession. The goal is not to make experts out of students in every subject, as is presently the structure. By understanding what encompasses expertise, we have a better handle on helping people become experts in their chosen field rather than wasting time on teaching information they will never use. Laying a strong foundation for individuals so they can adapt to change is important to these ends.

Conclusion

Back to the question "How much education is really needed"? It varies dramatically. What is needed is a flexible system that provides numerous, almost unlimited, paths for individuals to formulate for their own career goals grounded in their individual talents and interests. The academic community needs to be marginalized in the process of making drastic changes to the system since they will look out for their own biased self-interests rather than that of individuals and society – it's simply human nature, not necessarily anything malevolent or conspiratorial.

McKendree College's 1910-11 Catalogue gives good insight into what should be required for furthering one's education in college. Their requirements were not unusual for the time. It changed due to the influence of Statism in the U.S. They provided the following:

> Requirements for Admission.
>
> Good moral character is a necessary prerequisite for admission to any of the departments connected with the College.
>
> When the applicant has been a student in some other college, a certificate of honorable dismission may be required before he is permitted to enter.
>
> The required studies for admission to the Freshman class must not include less than 240 term hours (term hour meaning one class exercise a week for a college term) of work **above the grammar grades**, distributed as follows: Latin, 45 hours. Greek or German, 30 hours. English, 45 hours. Mathematics, 51 hours. Science, 42 hours. History and Civics, 27 hours.
>
> The grades of accredited High Schools and of Colleges of like standing with this will be recognized as sufficient to determine the position of the applicant in our curriculum. In all cases such grades or certificates should be presented when the student matriculates. (p. 11; emphasis added)

Note no need for high school graduation nor any GPA nor an entrance exam. Only the hours of the listed disciplines are required and honorable dismission. This can be achieved right after graduating 6th grade. Therefore, 7th grade can be designed for college prep and right after that, entrance into a college. This is the way it used to be and we see no shortness of intelligent people from that period and we see no shortness of innovative and successful people in all walks of life.

* * *

The secondary education level – 6th through 12th grades – needs major renovation. It is here that the greatest amount of progress can be achieved for all socioeconomic classes and for all talents/intelligences defined, in very general terms, by Gardner (1983). By defining the purpose of education and then designing a program that takes into account the needs of all (i.e. what they learn and how they learn it), equity of social and economic outcomes would narrow, and by natural – rather than artificial and ineffective government coercion – means.

To conclude this essay, I offer Gardner's (1983) consideration of the Suzuki method of teaching piano to very young children:

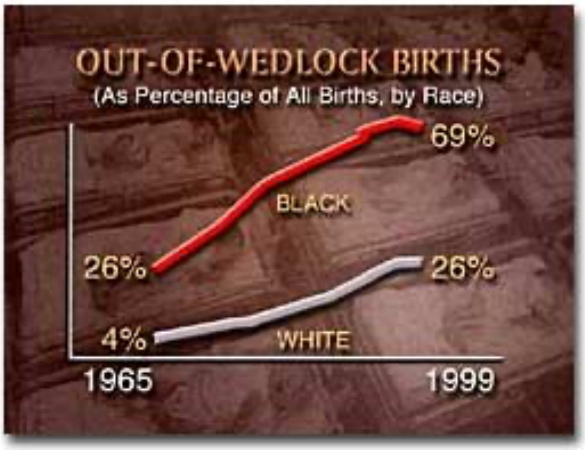
> In Japan, the great master Suzuki has shown that large numbers of individuals can learn to play musical instruments extremely well … even at an early age. To be sure, most of these individuals do not go on to become concert musicians – a result that does not disturb Suzuki, who sees his goal as the training of character, not of virtuoso performance. (p. 112)

This is how we should view the purpose of teaching during the K-12 years as it relates to academic subjects. Mastery of the various academic subjects is not the goal, but rather the ability to be self-learners through the skills acquired in school.

Appendix I

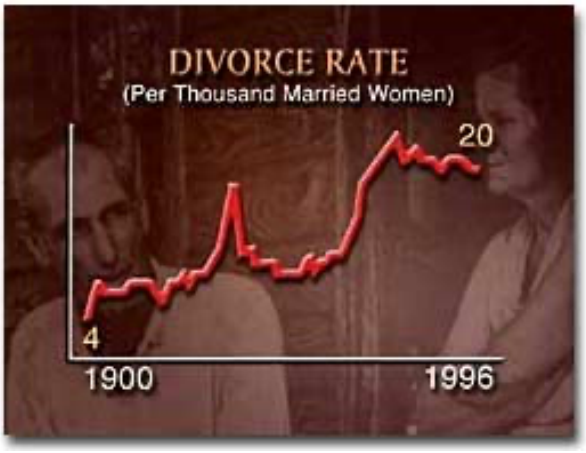
Out of Wedlock Births

In 1900 and for several decades thereafter, out-of-wedlock births were notorious and rare. Most pregnancies in unmarried women were rapidly followed by marriage when the pregnancy was discovered…. If not resolved by marriage, unmarried women who gave birth typically gave up their babies for adoption. From 1950 to 1999, the proportion of babies born out-of-wedlock … increased dramatically. …

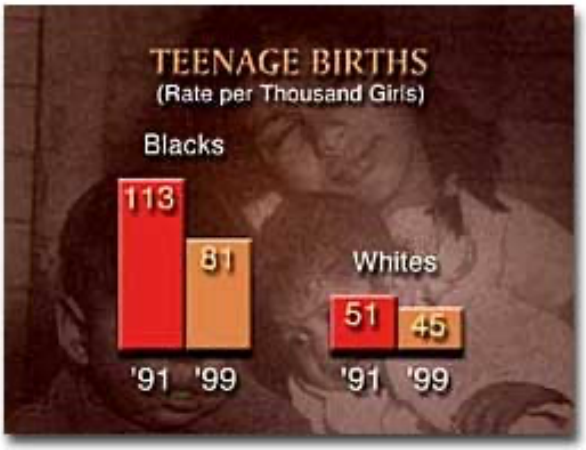


Cohabitation and divorce

Cohabitation was almost impossible in the United States prior to the 1960s. Laws prevented unmarried couples from registering in hotels and it was very difficult for an unmarried couple to obtain a home mortgage. From 1960 to 1998, cohabitation moved from disreputable and difficult to normal and convenient. Banks, employers, hotels, etc. all ceased to discriminate against cohabiters. Cohabitation became a common trial stage on the way to marriage for some couples, and a substitute for matrimony for others. Divorce was generally rarer in the first half of the twentieth century, except for a peak at the end of World War II, when ill-considered marriages made during the war were dissolved at war's end. In the 1960s and 1970s, divorce laws were changed in ways that made divorce easier to obtain. The divorce rate climbed to all-time highs, then receded somewhat. If the rates at the end of the century are maintained, then about 40% of marriages contracted in 2001 will end in divorce.

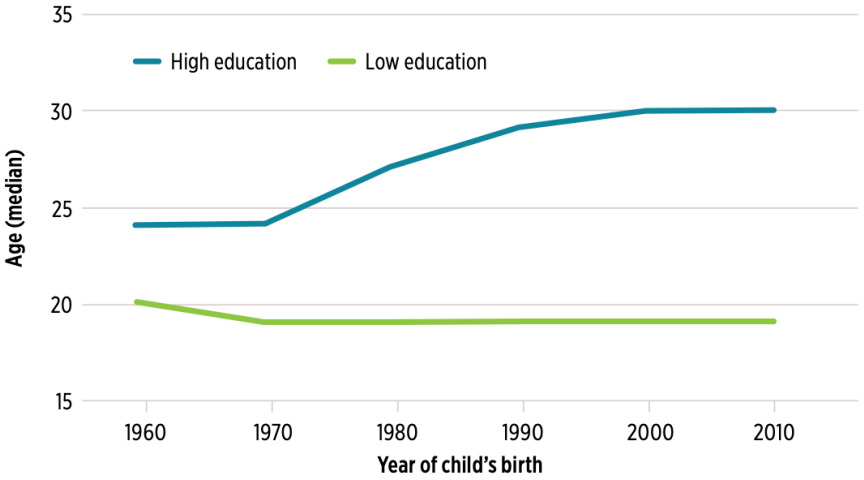


Teenage Births
After rising for many years, the number of births to teenagers (married and unmarried) suddenly declined in the 1990s. The drop was considerably larger among black teenagers than white teenagers, but both groups' birth rates declined significantly. This may very likely portend a drop in the out-of-wedlock birth rate.



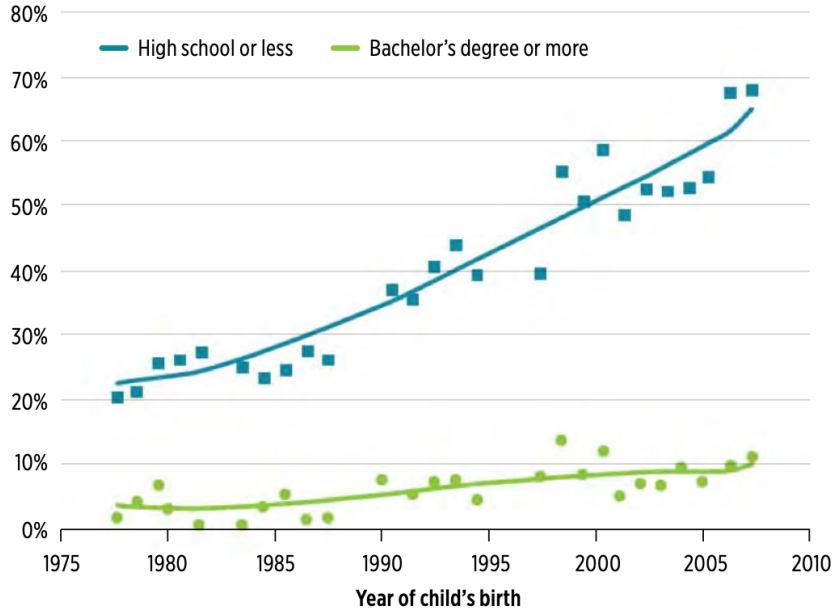
Source for the above information is unknown.

Figure 1. Trends in median age of mothers at first birth, 1960–2010



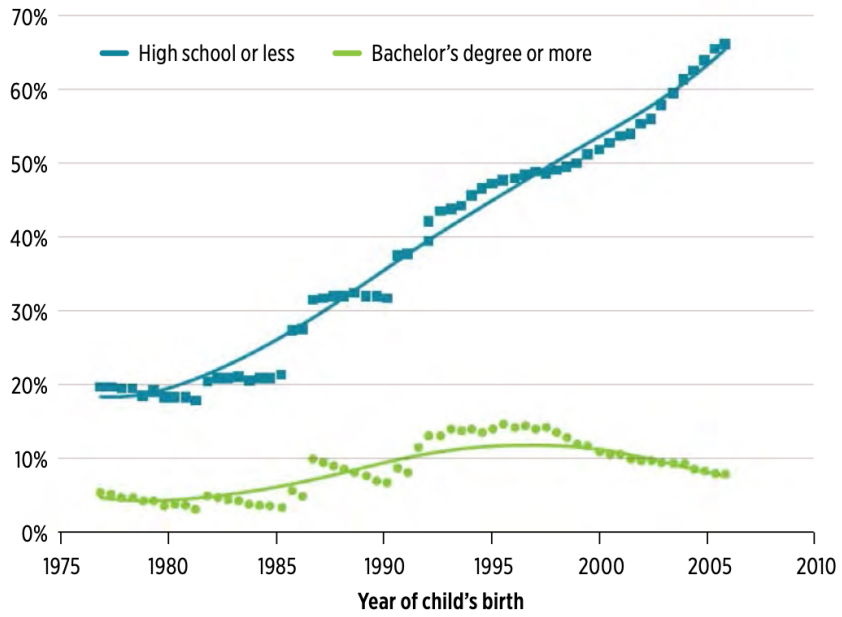
Source: McLanahan and Jacobsen (2015).

Figure 2. Births to unmarried mothers by education, 1977–2007



Source: National Surveys of Family Growth, Centers for Disease Control.

Figure 3. Children (aged 0–7) living in a single-parent family, by parental education



Note: Includes both single mothers and single fathers. About 4 percent of children—most of them from lower-income backgrounds—are being raised primarily by their grandparents.
Source: IPUMS (census 1970, 1980, 1990, 2000) and ACS 2001–12. Also McLanahan and Percheski 2008.

Tudor & Stuart England

A contrast between 16th-17th century England and contemporary times may provide some interesting comparisons to the above data and insight into human dynamics as influenced by cultural and economic forces. Such analysis is useful in determining how much education is really necessary.

During the Tudor and Stuart eras, English subjects may have had too little education, but it can certainly be argued that we currently have too much education – that is, current curriculum is filled with superfluous data that dramatically extends the amount of education youth receive with little to show for it in relative terms. In addition, there is a great deal of redundancy of educational material between high school and college. Much of what is covered in high school will need to be repeated in college to fulfill general education requirements.

Professor Bucholz's (2003) lectures provide the raw data useful for the purpose of comparison between 16th & 17th century England and contemporary United States.

Lecture 21, Private Life – The Elite

The aristocrats made up 2% of the population in this period – circa 1603.

- Children were wet-nursed by maids. This allowed mothers to have more children quicker since nursing acted as contraception. However, it distanced mothers and children from one another.

- Children were raised by nannies and educated by tutors.
- Tutors introduced pupils of both genders to a humanistic education: Latin and Greek grammar and translation, some mathematics, and religious instruction.
- From early adolescence, only aristocratic males received a school education.
- Males were trained to run the country.
- Around age ten, a male was sent off to a "public" school. There, he studied English, some Greek, and above all, the classics of Latin literature and history, which were intended to train him to rule. He also "networked" with fellow future ministers, peers, and members of Parliament.
- At around sixteen, he was sent up to university where he continued networking and studying a similar curriculum. Taking a degree was optional. After university, he might be sent to one of the four Inns of Court in London to study the law and to acquire further polish. Once again, application to the bar was optional.
- After about 1620, the wealthiest sons of the aristocracy embarked with their tutors on the Grand Tour of European capitals.
- Upon his return, an aristocratic male made his debut at court, where he might hope to acquire office and a suitable wife.
- Females were trained to run a household. Female children received formal education from tutors and training in managing an estate, running a household, and so on from their mothers.
- As teenagers, a chosen few girls might become maids of honor at court. Their chief goal was to acquire an aristocratic husband.
- Whether at court or in the countryside, aristocratic children married fairly young and almost always with a view to property.
- Aristocratic marriages had less to do with love than money, but individuals were never forced to marry against their will.
- Elder sons inherited the family's full estate(s).
- Younger sons received a financial stake to start them out in life. They might go into the professions, become a doctor, lawyer, clergyman, army or navy officer, government official, or estate steward.

Lecture 22, Private Life – The Commoners

Protestant reformers objected to some of the points listed below, which will be evident to those who are familiar with U.S. cultural history.

- Although life may have been harder and poorer in material wealth for the lower orders, it may also have been more fulfilling emotionally. Unlike their betters, ordinary people married for love, reared their own children, mothers nursed their own children (contributing to longer intervals between pregnancies), and experienced less formal and more intimate family relations.
- Menopause for women of this period came earlier than it does today.
- This, along with frequent migration as people looked for work, resulted in smaller, more nuclear families with fewer children.
- Though childbearing could be dangerous, less than 4% of births resulted in the death of the mother.
- Average families numbered around 4 to 5 people.

- Most couples stopped having children around age 35. In addition to early menopause, there is evidence of primitive contraception.
- Infant mortality at all ranks was high. One in 8 children died within the first year while one-quarter of all children died before age ten.
- The level of education children received depended on their social rank. Children of merchants and yeomen went to expensive grammar schools to study Latin and English until mid-adolescence. Children of husbandmen and cottagers went to petty schools – endowed by local wealthy community members, and taught by clergy – until about 7 or 8, when they were needed back on the farm. Their curriculum consisted of reading (English), writing, and some arithmetic.
- By 1600, some 25% of males and 8% of females could write their names.
- Four-fifths of boys and half of girls at this level experienced service outside of the family. Boys between the ages of 14 and 21 could serve as apprentices to tradesmen or craftsmen. Young girls were "farmed out" to other families in the village. This was, in large part, due to the tendency for adolescents to learn more from anyone other than their parents.
- Courtship involved more individual choice than it did for the aristocracy, but community and material circumstances still mattered.
- Most young people met while in service away from home, at church, during the harvest, and so on.
- Nearly all courtship was directed toward marriage. There was little "casual dating."
- Young people married for love. Women looked for good providers while men looked for effective managers of households.
- Because it took time for individuals to become financially independent, commoners tended to marry later. Men married in their mid- to late-20s while women married in their early- to mid-20s.
- The community might become involved to foil an unsuitable match, that is, one that would end with the couple being supported by public "welfare."
- A promise to marry was considered a virtual marriage in cannon law. [During the medieval period, marriage was simply the stated commitment between a man and woman to be husband and wife – no civil or ecclesiastical involvement. It can be assumed our common law marriage practices are derived from this.]
- This led to the popular convention that physical relations could begin as soon as two young people had agreed on marriage.
- As a result, about 20% of all brides went to the altar pregnant.
- This does not mean that such promises were exchanged lightly or to trick the other person into a sexual relationship. The illegitimacy rate in Early-modern England was only 2 to 3%.
- Marriage seems to have been warmer and even more egalitarian than for the aristocracy. They had to work together to survive and preserve their children. [Few feminists seem to be aware of the greater egalitarianism of those in the lower social ranks. This may be due to the sparse information available for this portion of society in this period, even though it was 98% of the population.]
- Divorce was too expensive so marriages typically ended in separation.
- Given an average life expectancy of 35, most marriages did not last much longer than ours do, on average, today.

- The hours of work were sunup to sundown and, thus, longer in summer than in winter.
- Work for men and women was heavily physical but not highly structured, timed, or pressurized.
- The division of labor was well developed with men and women doing tasks they were best suited for. Children were assigned light tasks according to their ages.
- Diet had not changed in centuries.
- Illness was frequent and mysterious. The connections among hygiene, diet, and disease were not understood.

Appendix II

Inventors & Businessmen with No High School Degree

The following is a short list of successful businessmen and inventors who did not complete a formal high school level of education, though many surpassed such an education on their own initiative, which, after all, is the purpose of education. In other words, a general education is meant to provide the means for individuals to learn anything they desire on their own initiative.

I have not done extensive research on any of the following individuals. This list is merely offered to demonstrate that formal educational institutional settings are not necessary to achieve great success in one's life and in many cases would have hindered them.

Much of what I provide below is from Wikipedia, which provides very quick summaries of these men's lives. If there are any mistakes, I apologize for the oversights. There is an endless list of other examples of successful individuals who could be used to demonstrate my point that institutional education is neither the only, nor necessarily the best, education there is.

Andrew Carnegie (November 25, 1835 – August 11, 1919) was a Scottish-American industrialist who led the enormous expansion of the American steel industry in the late 19th century. … During the last 18 years of his life, he gave away to charities, foundations, and universities about $350 million (in 2015, $13.7 billion) – almost 90 percent of his fortune. His 1889 article proclaiming "The Gospel of Wealth" called on the rich to use their wealth to improve society, and it stimulated a wave of philanthropy.

… Carnegie started work as a telegrapher and by the 1860s had investments in railroads, railroad sleeping cars, bridges and oil derricks. … He built Pittsburgh's Carnegie Steel Company…. Carnegie devoted the remainder of his life to large-scale philanthropy, with special emphasis on local libraries, world peace, education and scientific research. With the fortune he made from business, he built Carnegie Hall and he founded the Carnegie Corporation of New York, Carnegie Endowment for International Peace, Carnegie Institution for Science, Carnegie Trust for the Universities of Scotland, Carnegie Hero Fund, Carnegie Mellon University and the Carnegie Museums of Pittsburgh, among others. Wikipedia

John Davison Rockefeller Sr. (July 8, 1839 – May 23, 1937) was an American business magnate and philanthropist. He was a co-founder of the Standard Oil Company, which dominated the oil industry and was the first great U.S. business trust. Rockefeller revolutionized the petroleum industry, and along with other key contemporary industrialists such as Andrew Carnegie, defined the structure of modern philanthropy. …

As kerosene and gasoline grew in importance, Rockefeller's wealth soared and he became the world's richest man and the first American worth more than a billion dollars, controlling 90% of all oil in the United States at his peak. Adjusting for inflation, his fortune upon his death in 1937 stood at $336 billion, accounting for more than 1.5% of the national economy, making him the richest person in U.S. history.

… His fortune was mainly used to create the modern systematic approach of targeted philanthropy. He was able to do this through the creation of foundations that had a major effect on medicine, education and scientific research. His foundations pioneered the development of medical research and were instrumental in the eradication of hookworm and yellow fever.

… When he was a boy, his family moved to New York … where he attended Owego Academy. In 1853, his family moved to Strongsville, a suburb of Cleveland. Rockefeller attended … high school [for two years] and then [at age 16] took a ten-week business course at Folsom's Commercial College, where he studied bookkeeping.

Thomas Alva Edison (February 11, 1847 – October 18, 1931) was an American inventor and businessman. He developed many devices that greatly influenced life around the world, including the phonograph, the motion picture camera, and the long-lasting, practical electric light bulb. … [H]e was one of the first inventors to apply the principles of mass production and large-scale teamwork to the process of invention, and because of that, he is often credited with the creation of the first industrial research laboratory.

Edison was a prolific inventor, holding 1,093 US patents in his name, as well as many patents in the United Kingdom, France, and Germany. More significant than the number of Edison's patents was the widespread impact of his inventions: electric light and power utilities, sound recording, and motion pictures all established major new industries world-wide. Edison's inventions contributed to mass communication and, in particular, telecommunications. …

His advanced work in these fields was an outgrowth of his early career as a telegraph operator. Edison developed a system of electric-power generation and distribution to homes, businesses, and factories – a crucial development in the modern industrialized world.

In school, the young Edison's mind often wandered, and his teacher, the Reverend Engle, was overheard calling him “addled.” This ended Edison's three months of official schooling. Edison recalled later, “My mother was the making of me. She was so true, so sure of me; and I felt I had something to live for, someone I must not disappoint.” His mother taught him at home. Wikipedia

James Murray Spangler (November 20, 1848 – January 22, 1915) was an American inventor, salesman and janitor who invented the first commercially successful portable electric vacuum cleaner that revolutionized household carpet cleaning. … It was the first to use both a cloth filter bag and cleaning attachments. … He formed the Electric Suction Sweeper Company to manufacture his device. William H. Hoover was so impressed with the vacuum cleaner that he bought into Spangler's business and patents. Wikipedia

King Camp Gillette (January 5, 1855 – July 9, 1932) was an American businessman. He invented a best selling version of the safety razor. Several models were in existence before Gillette's design. Gillette's innovation was the thin, inexpensive, disposable blade of stamped steel. Wikipedia He was a self-educated man.

Henry Ford (July 30, 1863 – April 7, 1947) was an American industrialist, the founder

of the Ford Motor Company, and the sponsor of the development of the assembly line technique of mass production.

Although Ford did not invent the automobile or the assembly line, he developed and manufactured the first automobile that many middle class Americans could afford. In doing so, Ford converted the automobile from an expensive curiosity into a practical conveyance that would profoundly impact the landscape of the twentieth century. His introduction of the Model T automobile revolutionized transportation and American industry. As the owner of the Ford Motor Company, he became one of the richest and best-known people in the world. He is credited with "Fordism": mass production of inexpensive goods coupled with high wages for workers. Ford had a global vision, with consumerism as the key to peace. His intense commitment to systematically lowering costs resulted in many technical and business innovations, including a franchise system that put dealerships throughout most of North America and in major cities on six continents. Ford left most of his vast wealth to the Ford Foundation…. Wikipedia

I could find no evidence of Ford having spent time in high school. Instead his education was in machining and bookkeeping – two very practical endeavors that provided an excellent foundation for his future successes.

Štefan Banič (23 November 1870 – 2 January 1941) was a Slovak inventor who devised a military parachute, the first parachute ever deployed in actual use.

Born in Neštich, Austria-Hungary (now part of Smolenice, Slovakia), Banič immigrated to the United States and worked as a coal miner in Greenville, Pennsylvania. Wikipedia

The **Wright brothers**, **Orville** (August 19, 1871 – January 30, 1948) and **Wilbur** (April 16, 1867 – May 30, 1912), were two American brothers, inventors, and aviation pioneers who are credited with inventing and building the world's first successful airplane and making the first controlled, powered and sustained heavier-than-air human flight, on December 17, 1903. From 1905 to 1907, the brothers developed their flying machine into the first practical fixed-wing aircraft. Although not the first to build and fly experimental aircraft, the Wright brothers were the first to invent aircraft controls that made fixed-wing powered flight possible.

The brothers' fundamental breakthrough was their invention of three-axis control, which enabled the pilot to steer the aircraft effectively and to maintain its equilibrium. This method became and remains standard on fixed-wing aircraft of all kinds. From the beginning of their aeronautical work, the Wright brothers focused on developing a reliable method of pilot control as the key to solving "the flying problem." This approach differed significantly from other experimenters of the time who put more emphasis on developing powerful engines. Using a small homebuilt wind tunnel, the Wrights also collected more accurate data than any before, enabling them to design and build wings and propellers that were more efficient than any before. Their first U.S. patent, 821,393, did not claim invention of a flying machine, but rather, the invention of a system of aerodynamic control that manipulated a flying machine's surfaces.

They gained the mechanical skills essential for their success by working for years in their shop with printing presses, bicycles, motors, and other machinery. Their work with bicycles in particular influenced their belief that an unstable vehicle like a flying machine

could be controlled and balanced with practice. From 1900 until their first powered flights in late 1903, they conducted extensive glider tests that also developed their skills as pilots. Wikipedia

Garrett Augustus Morgan, Sr. (March 4, 1877 – July 27, 1963) was a black inventor and community leader. He was the subject of a newspaper expose in Cleveland, Ohio, for a heroic rescue in 1916 of workers trapped within a water intake tunnel, 50 ft. (15 m) beneath Lake Erie. He performed his rescue using a hood fashioned to protect his eyes from smoke and featuring a series of air tubes that hung near the ground to draw clean air beneath the rising smoke. By using this simple principle of heat, it allowed Morgan to lengthen his ability to endure the inhospitable conditions of a smoke-filled room.

[He possessed] only a sixth grade education….

Most of his teenage years were spent working as a handyman for a Cincinnati landowner. Like many American children growing up in the turn of the century, Morgan had to quit school at a young age in order to work full-time. Wikipedia

Charles Perkins Strite (February 27, 1878 – October 18, 1956) was an American inventor [*though by profession he was a mechanic*].

Strite was born in Iowa. He received [a] U.S. patent … for the pop-up bread toaster.

Percy Lebaron Spencer (19 July 1894 – 8 September 1970) was an American engineer and inventor. He became known as the inventor of the microwave oven. Wikipedia

He had no more than a 6th grade education.

Two historic figures, who came from very humble origins with little education, help get the point across that education may contribute to individual success, but it does not determine it. Captain James Cook (1728 –1779) and John Harrison (1693–1776) are two good examples. Rather than expounding upon their life's accomplishments here, I encourage the reader to read Wikipedia's summaries of their lives: https://en.wikipedia.org/wiki/James_Cook and https://en.wikipedia.org/wiki/John_Harrison

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