Structuring Curricula

Developmental Stages, Relative Worth, and Competency Stages

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Developmental Stages (Piaget), *Relative Worth* (Spencer), and *Competency Stages* (Bloom) are foundational to establishing curricula for the various subjects that will be covered throughout my *programs of study* essays.

Serious attention must be forthcoming to place limits on what will be included in a program since the general tendency of education is for subject specialists to continue adding content to a course of study over vast stretches of time, to the point where the information they deem important is overwhelming to students and instructors, and therefore crowds out more relevant subject matter that demands serious attention; or prevents the necessary depth of understanding on a particular subject due to the sparsity of time dedicated to priority subjects and knowledge.

It's not unlike old forest growth crowding out smaller trees and shading the forest floor to the point where diversity of flora and fauna become very limited. The two photos below provide imagery that is analogous to what happens to institutions, such as formal education. Similar to forests, institutions need regenerative cycles where destructive forces clear the way for new growth. This analogy is explained by Christensen's Disruptive Innovation and Technology theory.

https://i0.wp.com/www.terrain.org/wp-content/uploads/2017/09/old-growth.jpg?fit=1333%2C976&ssl=1

Old Growth Forest showing decaying logs and limited undergrowth. This is analogous to an old education system. It becomes decrepit like an old man.

https://ssl.c.photoshelter.com/img-get2/I0000dJe_hNychzg/fit=1000x750/ohanapecosh-mature-forest-EdBook7104.jpg
Mature growth forest showing greater diversity of plant life and vibrancy. The diversity of flora contributes to the diversity of fauna. A mature and healthy education system can do the same for societies.

To begin our analysis, we need to embrace a new paradigm where the memorization of superfluous data is ended so that foundational skills and abilities can be honed to a fine edge. This means that mastery of language and math, being at the very base, are the goals that all other subjects must be subservient to and therefore used to accomplish this end.[1] Memorization of facts, such as in history (e.g. names, dates, and events), science, etc., are to be minimized so that students' minds can concentrate on the goals of numeracy and literacy proficiency; and at the more advanced levels, to develop reasoning abilities, which the current public system is devoid of. Proficiency in these two subjects, in the end, marginalizes the need for institutional instruction, though this is not necessarily the intent of such a focus – it is merely the byproduct. With such proficiency, individuals are quite capable on their own to master any subject they desire. This is **extremely** important for those who don't have the resources to spend in costly formal educational settings.

This is not to say that such subjects as science and history are not to be taught. To the contrary, they are to be fully embraced with fascinating, and perhaps even entertaining content that can be designed to develop reasoning abilities rather than for data storage purposes. But, during the

[1] Digital literacy will become proficient by tying instruction with *in situ* application rather than as a course all its own. In addition, the following can be used as a resource for students/instructors to develop digital literacy: *Digital Resilience in the American Workforce: Findings from a National Landscape Scan on Adult Digital Literacy Instruction*, JFF, https://jfforg-prod-new.s3.amazonaws.com/media/documents/DRAWLandscapeScan-Publication-081122_508_Reviewed-2.pdf. Also, see Digital Skills Library, a free learning resource for developing digital skills: https://digitalskillslibrary.org.

primary years, they are to be used for a cursory exposure to familiarize students with the wonders of the world rather than to attempt competency in them when solid foundations need to be laid. Once a career direction is known in an economic sector, this is when memorization of specific knowledge must be pursued since it will be a job requirement. Until then, such subjects will provide subject matter to use for increasing competency in language and math (as well as digital literacy) until they become second nature, and are quite literally, taken for granted by everyone. This will lead to improved abilities of reasoning, which leads eventually to the attainment of wisdom.

Of course, mastery of language and math will vary dramatically throughout a population of students, but this is irrelevant since the peripheral subjects will be there for uniquely talented individuals to absorb in larger doses. Such talents can allow individuals to start down a career path earlier than others. For example, a person talented in science can pursue extracurricular studies in the general field of science and with succeeding years, refine choices to a narrower field of a particular science. The same is true for those talented in kinesthetic and spatial intelligences who are more interested in fixing things, making things, or designing things. This is why education needs to incorporate the useful arts as much as the useful sciences to help individuals discover their talents and interests, and then to provide the means to accomplish their personal goals.

Stages of Development

Instead of following the excessively structured grades K-12 and overly burdensome curriculum (a mountain of largely irrelevant information – irrelevant to the vast majority of individuals – needing to be learned in far too narrow a time frame for each bit of knowledge), we need to construct curriculum that is based on Piaget's[2] *stages of development*, and use competency-based structures (explained by Bloom's 2001 revised taxonomy) to scaffold curricula and measure progress moving from one competency to another. This is necessary since children learn at their own pace and individual children have their own combination of "intelligences" or abilities or talents (as explained by Gardner), which will determine their proclivities and weaknesses (which each individual is blessed or burdened with) for certain subjects. The overly defined grading system (i.e., such-and-such amount of information MUST be learned in each grade in such-and-such amount of time regardless of any other consideration) is madness. It is a major contributing factor to why we have such poor results across populations and across decades of time, in spite of all the money invested and all the educational innovations for over 100 years, all of which is measured by the elusive and highly flawed "intelligence" tests.

Piaget's *developmental stage theory* provides a very general guideline to understand the progression of development and learning in youth, which cannot be defined in 12-month increments as in the current structure. The various stages are critical periods for developing human attributes that are important to individuals' success in all its social manifestations.

[2] Jean Piaget, 1896-1980, was the renowned Swiss developmental psychologist.

Let's consider Piaget's hypothesis as a template to base a philosophical approach for teaching subject matter. Piaget held that biological maturation and environmental experiences were the sources of cognitive development. He suggested there are four primary stages of development:

1. Sensorimotor – from birth to the acquirement of language.
2. Preoperational – roughly covering ages 2 to 7. They are not yet capable of processing concrete logic or mentally manipulate knowledge.
3. Concrete operational – this is the preadolescent years, ages 7 to 11 roughly. The use of logic has begun, but abstract thought is not yet sufficiently developed.
4. Formal operational – this is the adolescent years, roughly ages 11 to 20. Individuals are capable of comprehending abstract concepts through logic. They can also understand how they learn (metacognition), and develop problem-solving abilities.

These stages should be seen as rough estimates, or averages, with widely varying application. After all, as Todd Rose, in his *The End of Average*, argues, averages might be fine for an analysis of a population, but there is no average person since no person has all of the attributes observed in an average population. In addition, Gardner establishes an understanding of multiple intelligences (though the word *talents* is more accurate which then influences the extent of one's *abilities*) that will certainly affect how individuals pass through each of Piaget's stages.

So, we have *stages*, *talents* and *abilities* unique to every individual that unequivocally precludes a one-size-fits-all system. Because of this unique combination in every individual, we must not strive for individual mastery in every discipline. The Animal School Fable offers an excellent analogy why mastery of each talent is not possible and why it is, without a doubt, the worst approach to educating our youth. The grading system – F though A for example – is the embodiment of this wrong-headed approach. It is my firm belief, this system is a major, if not primary, contributor to alienation of a large portion of the population, which then leads to deviant behavior of one sort or another, unless individuals are strong enough to be indifferent to what the educational establishment believes, says, and does. And, no, the public education system is not the only, or even the best path to success, much to its adherents' chagrin.

Addressing Piaget's stages of development, Gardner (p. 314) has this to say on the subject:

> A … controversial area[3] concerns the existence of stages of development, and the extent to which such stages may be linked to certain ages. As articulated by Piaget, the strongest position here holds that there are indeed discrete stages of development, which are qualitatively different from one another and stipulate characteristic world views. Moreover, as part of this point of view, there is the frequent rider that the stages of development are age-linked; and that if the child does not pass smoothly through a stage at the appropriate age, his subsequent development will be forever askew.

National Academies of Sciences (2018, p. 57), in reference to critical and sensitive periods in development of children, provides further insight into stages of development and their importance to the growth of each individual.

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[3] It can hardly be "controversial" since we have created artificial stages measured as grades in the K-12 system.

> Both critical and sensitive periods influence later development: an interruption (e.g., insufficient or inappropriate stimulation) during these times leads to difficulty (or even inability) to process in the affected domain later in life (Chaudry et al., 2017).

As the need for the fulfillment of Piaget's various stages relates to education, it becomes clear that those subject areas that are critical for individuals to develop, demands significant investment in time, which renders superfluous instruction as wasteful and harmful since the loss of foundational education at the appropriate time in an individual's development, stunts growth. This is why it is so important to identify literacy and numeracy education as being the priorities and all other disciplines/subjects providing the means to this end during the primary school years and, to a certain extent, during the secondary school years. That is, these secondary support subjects must be designed for the development of literacy and numeracy attainment without consideration for memorization of superfluous facts or data that specialists in these secondary subject areas deem so important, though they cannot articulate why.

Relative Worth

All analyses of an educational program need to rely on Spencer's *relative worth* principle – i.e., to distinguish between superfluous knowledge and that knowledge which is required by all to flourish in a society for the good of the individual, balanced with the good of society. Then there is that knowledge which is required by individuals who will pursue a career direction. These two interests must be distinguished so as not to fog our vision on the ends education must be designed to achieve.

We can look at algebra as an example of curriculum that is largely worthless to the vast majority of the population, and is a major contributor to so many students quitting school at both the secondary and post-secondary levels. Algebra is very useful for those going into science, engineering, math, and macroeconomics, for example, but mostly, if not utterly useless to the vast majority of careers. Like trigonometry and calculus, a familiarity with what they and algebra offer, expands our understanding of the world which can benefit *transfer of learning*, but there is a point at which instruction must stop so as to make time for studies in other more fundamentally important subject matter.[4] If one has need for any of these subjects later due to career choices, they can go into greater depth to whatever level they require at that time based on competency principles. It's not as if they can never learn subjects later given the fact the availability of instruction and instructional material is plentiful. A strong foundation in mathematical principles (e.g., axioms rather than computational mastery) learned at the appropriate stages of development, is all that is required to expand the mind in more complex math at a later date.

Algebra is the embodiment of a bloated curriculum. Such overgrown curriculum requires drastic pruning to ensure students get what they need and in the amount they need it. This requires an analysis of educational content from an earlier time. I think mid-nineteenth century America is a

[4] Learning financial management, for both personal and institutional uses, for example, is far more important than algebra for the average person to know, for obvious reasons. At advanced levels, algebra is used in financial management but the vast majority of people do not advance to these levels; hence the reason algebra's relative worth in educational requirements for the general population is low. It should be left to individuals to decide how far they wish to advance in algebra after the fundamentals have been introduced.

good place to start. This is around the time the German bureaucratic influence entered the American scene but before it overwhelmed our system and sent it down the authoritarian and Statist path that was designed to turn individuals into small cogs in a large wheel. Individuals may very well become cogs at some point when choosing a career, but let that choice be theirs and not the choice of politicians, policy makers and bureaucrats as we have it now.

To get a handle on *worthiness* of study, we need to determine what's at the base of all studies. Math and language are the foundation of education; therefore, we need to consider the use of such educational series as *Ray's* and *McGuffey's* programs for the primary years. They were developed before the bureaucratization of education and are therefore more pure, clean and wholesome in design and intent. Bureaucratization poisoned content in a multitude of ways, which has been thoroughly covered in my many educational essays.

1. Ray's Arithmetic for math: https://www.raysarithmetic.com/s144p1488.htm
2. McGuffey's Eclectic Readers for language studies: https://www.happyhomeschoolmom.com/mcguffeys-eclectic-readers-free-pdf-downloads/

These two American courses of study were the most popular in the latter half of the 19th century and into the early 20th and can now be downloaded for free since they are no longer copyright protected. They are still used extensively by homeschooling parents and private educational organizations. They are simpler to use and are proven to be effective by their decades of service across the United States. Khan Academy can be used in conjunction with Ray's and McGuffey's. See https://www.khanacademy.org

All primary education content should be strongly correlated to such math and language studies. Such foundational instruction will provide the roots of secondary education and therefore must be monitored to see that such roots grow deep and broad as programs of study are expanded in new directions in successive stages. This becomes crystal clear when we analyze all postsecondary education entrance requirements, whether college or career training. They do not assess knowledge of social sciences, physical sciences, or of history, etc. Math and language competencies are what entrance requirements demand; and before one can enter a school, these two abilities must be sufficiently developed, or remedial studies will be required. If they are sufficiently developed, education doors are opened wide, regardless of age.

Competency-Based Education

What is meant by *competency*? It is the ability to apply what one has learned – i.e. *transfer* – to a real-world scenario rather than simply parroting data, a concept, or idea. If it has not been absorbed enough for an individual to be able to transfer outside a classroom context – or from one discipline to another – competency has not been reached. The level of competency is relative to what an individual will need for the future. Will it be for further educational advancement relative to the individual's needs or for job requirements as outlined by a company's expectations or by an industry association's conclusions? As one climbs the educational hierarchical pyramid, competency expectations funnel or narrow down to what an individual requires for a given career; which informs us, there is no singular path.

The dominant instructional method of expecting students to memorize and regurgitate subject-specific information, currently governs the educational landscape, which, in large part, needs to be abandoned. It shapes minds to be more robot-like than a reasoning sentient individual. Connectedness and integration of knowledge across disciplines is practically nonexistent which is the primary cause of the *silo effect*[5] in academia. The silos do not take *outcomes* into consideration, other than the elusive and highly abstract "college preparedness" outcome. Such abstractions allow for infinite interpretations of what public education's purpose is.

There are two primary branches of education's purpose that must be defined and embraced to put things in their proper place:

1. There is the *public* aspect of education which requires public resources[6] to be used for the social and economic preparation and benefit of individuals' participation in a free society, which, contrary to what many academics believe, is reciprocal by its very nature. Academics tend to believe public education is for societal, more than for individual, benefits.
2. Then there is education of a *private* nature which incorporates seeking knowledge solely for one's personal benefit, e.g., the pursuit of a specific career, or seeking knowledge for its own sake.

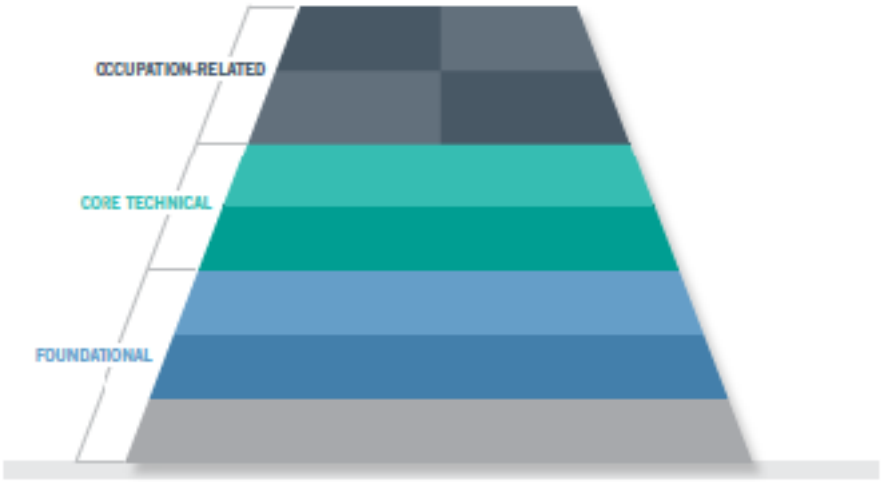
The former requires the cost to be borne by the community which demands its design avoid exclusively benefiting particular sectors (e.g., the college bound sector – 30% of jobs require college degrees – at the expense of other sectors); and the latter, in principle, requires the cost to be borne by private resources since it benefits individuals or certain sectors exclusively. Of course, communities may wish to offer public monies or financing be made available for high demand careers in their region, but it would be best to avoid Federal involvement in finance given the political "strings attached" demands whenever support is offered from this sphere of influence.

Academia conflates the two branches of public versus private interests, and this is why there is so much confusion. An example is seen in the position taken by those advocating that education is for expanding our minds. This falls under the second category of *private gain*. Education should certainly lay the groundwork so that individuals are quite capable, on their own, to seek the expansion of their minds, but it is not a public responsibility to take them all the way there. After all, many have no such interest, yet academics would hold them financially responsible to the minority who desire such an education. Also, what constitutes the expansion of minds: the left or the right's perspective?

To illustrate the public versus private benefits education offers, the U.S. Department of Labor provides an image of credentialing pathways for particular careers that I will use to illustrate the differences between the two (taken from Lane and Christensen, 2015). I extract one graphic

[5] "An isolated grouping, department, etc., that functions apart from others especially in a way seen as hindering communication and cooperation." https://www.merriam-webster.com/dictionary/silo
[6] Which can be used for home schooling, private institutions, or public institutions.

representation from an image of theirs to demonstrate where the separation between public and private responsibilities takes place:



- The black areas represent “management competencies.”
- The dark grey areas represent “occupational-specific requirements.”
- The turquoise area represents “industry-sector technical competencies.”
- The green area represents “economic-sector competencies.”
- The sky-blue area represents “soft-skill competencies” (e.g., teamwork & problem solving).
- The blue area represents “academic competencies” (e.g., reading, writing, math, science, and technology).
- The grey area represents “personal effectiveness competencies” (e.g., integrity, dependability, motivation).

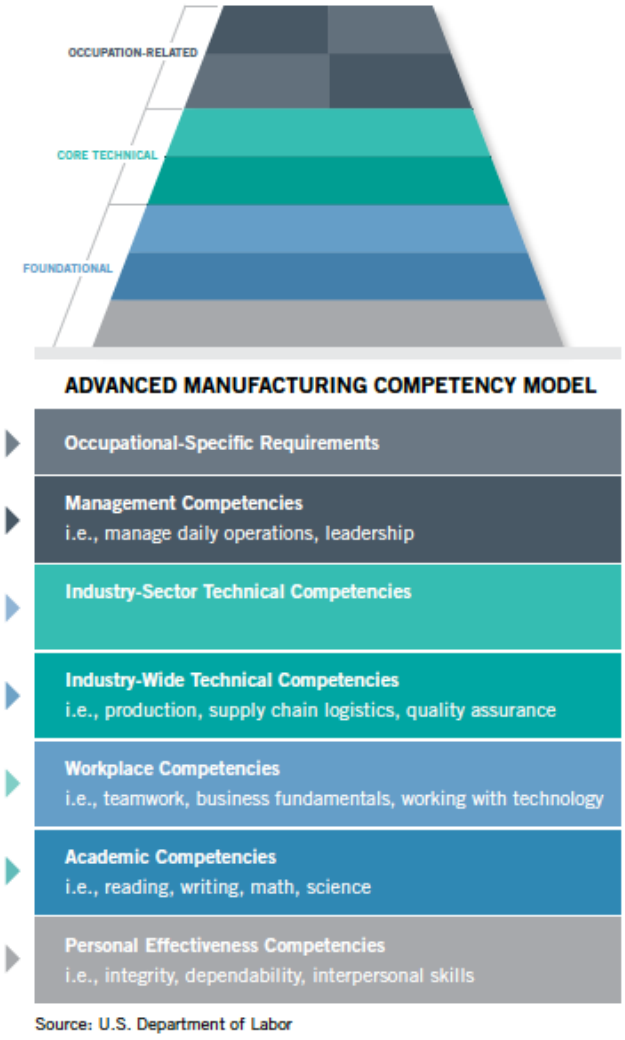
The bottom four competency levels are the public’s responsibility to provide our youth with instruction, while the top three are private matters. However, not all jobs are suitable for the involvement of technical educational inputs. Some are learned strictly while on the job, and there is **nothing wrong with this**!

The Bureau of Labor Statistics have a number of webpages that offer in-depth analyses of labor market opportunities and requirements, though I have not found more detailed analyses of the depth of competencies such as in math, e.g., the breakdown of exactly what amount of math is required for a career. Will an eighth grade level of math proficiency meet the needs, or will algebra, statistics, geometry, trigonometry, or calculus be required and to what level for each? In the current state of the education environment, a “high school level of education” has no meaning.

- https://www.bls.gov/ooh/
- https://www.bls.gov/ooh/about/teachers-guide.htm

- https://www.bls.gov/opub/mlr/2019/article/professional-certifications-and-occupational-licenses.htm
- https://www.bls.gov/osmr/research-papers/2019/pdf/ec190030.pdf

Lane and Christensen then analyze a particular industry sector, advanced manufacturing, to help us understand how a competency model breaks it down into a particular model:



Source: U.S. Department of Labor

Lane and Christensen then explain this model in greater detail:

> While specific competencies will differ by sector or occupation, a model can be used for each, based on foundational competencies that are necessary for success in any job. These foundational competencies are personal attributes, such as dependability and integrity, and essential skills like literacy, numeracy and teamwork. Adapting the model to a specific industry is done by identifying the competencies that are specific to the industry and then the competencies specific to the job profiles with the industry. (p. 9)

> … If a learner proves [competence in] a specific task, they are promptly awarded a credential for that competency. There is no waiting until the end of a program or course of study. In fact, learning does not have to take place in a formal setting. This means that training periods can be shorter and less costly…. [At the turn of the last century, correspondence courses were popular for this reason.]
>
> In some cases, industry associations[7] have created systems that identify, assess and certify the specific workplace competencies used in various positions within the industry. Research from The Manufacturing Institute in 2011 found 80% of U.S. manufacturers could not find the skilled workers they needed. Spurred by that, the U.S. manufacturing industry created a National Skills Certification System. The system "standardizes the skill sets required by manufacturing into an organized system that the entire industry has agreed to recognize," and is endorsed by the National Association of Manufacturers (NAM). (p. 11)
>
> In each case, while the job may be different, the basic workplace and academic competencies required are not. As an individual progresses up the workplace ladder, the same competencies from the lower levels of the competency framework appear in their job description – it is the level to which they have competency that changes. (p. 12)

Understand, what they explain above is the end goal of an educational model. The model is a pyramid with foundational requirements that everyone in a contemporary complex society is required to possess if they hope to prosper in it. As we ascend the pyramid, the competencies become more and more specific in the direction of a career path. But the structural skeleton remains the same for all industry sectors. This is what needs to be analyzed to help each individual achieve success.

To delve deeper into what distinguishes an expert in a given field from a novice, please refer to my chapter entitled *What Distinguishes Experts From Novices Should Guide Curriculum Design* in my essay *How Much Education is Really Necessary*, pages 63-67.

Now that we've analyzed the fundamental educational model, absent the current bloated and ineffective public system, to help distinguish between private and public educational responsibilities, let's consider the two branches of private gain:

1. The pursuit of a specific career.
2. To expand our minds, and/or learning for its own sake.

These two costs should be borne by individuals. However, there may be exceptions. For example: If an industry association wants to partner with a CTE program at a public school to pay for a specific trade program, e.g. such as carpentry, then as long as the association pays a fair portion of the program's way, then this is a good public-private partnership. In addition, it allows the association to have a large say in what the program will cover. This will help keep the

[7] In fact, industry associations are the best way to organize curricula for secondary and postsecondary education beyond the fundamentals needed by all. However, these associations should be very much a part of contributing to the design of the fundamentals needed by all.

academics at bay, who have historically sabotaged career education in public schools. In addition, academia raised barriers so that individuals must possess a high school degree to seek any further postsecondary training, thereby relegating non-graduates to a permanent lower socioeconomic status. This is an evil of the first order and reveals the true source of social inequities in contrast to the ethereal "white privilege" boogeyman.

Given this clarification of the public and private interests, one can argue that the amount of education for each individual and each job, or career path, requires only so many years in an education program. The bottom three competencies in the above competency model, are foundational representations of the private-public interest while the fourth competency (industry-wide technical competencies) is not an absolute must that each individual must choose from, though it behooves communities to provide it for those wishing to succeed to this level of education. At this point, private choice must rule. If we are to put a time frame on it by today's institutional standards, it would take place between 14 and 16 years of age (a not so uncommon age when teenagers become sexually active, risking pregnancy and single parent families, hence the reason the early Christian Church wanted young people married around this time). This was, traditionally, the age when apprenticeships began. The mental wherewithal is formed by this age, though academia fights to extend adolescence for as long as possible in order to extract our resources, mold our youth in a Statist mindset (which they refer to as "socializing"), and maintain a powerful influence over society.

The term "drop-out" must be abandoned so as not to stigmatize an individual (it is an insidious and evil practice equivalent to racial slurs). Therefore, it is imperative that by this age, individuals have a foundation in the bottom three competencies as solid as a rock. This requires a **major** restructuring of curricula to ensure this is achieved for all. This is why *relative worth* is so important to wrap our heads around. With such a solid foundation, young people don't need a "high school degree"; they simply need the mental wherewithal. They can then create their own futures with their research abilities, hard work, motivation, and wit. They can become incredibly successful entrepreneurs or technically savvy employees in any field if society and the special interests get out of their way.

* * *

Before discussing curriculum design, let me explain the limitations surrounding my work. The purpose of the Applied Education Foundation is to address the "public" aspect of education up to the beginning of specific career education, whether at the secondary or postsecondary levels. At that point industry associations must take over. But public education must provide individuals with a thorough foundation so that industry association training can focus exclusively on their industry's requirements – which is not necessarily company specific – without the need for remedial education.

Industry associations have educational publications for their specific industries that provide the groundwork for framing, in very general terms across industries, what is required from public education to prepare our youth for career education when choices are being made for a specific field or sector. Currently, the vast majority of high school graduates are wholly unprepared for

further career specific instruction, as well as being totally ill prepared for the work-world. This is due to irrelevant subject matter along with the lack of connectiveness between subjects.

To start down the path of improving outcomes for individuals and society, subject matter must be pruned of irrelevant information and the silo effect needs dismantling. And from this, the components need to be reevaluated so they may be reorganized into a coherent and relevant whole. This requires a major commitment of math and language teachers' involvement in every other discipline to assist subject specialist instructors accomplish their goals and to guide students through the mazes that disciplines create.

The reorganization of dismantled silos requires "architectural structures" to be used. Gottipati and Shankararaman (GS) (2018) offer a nice template to follow (I will paraphrase their paper.) They analyzed competency-based structures for specific career curricula, which is an overkill for our purposes, but they lay foundational principles for us to use. They use three layers of curriculum design which their Introduction does a nice job of explaining:

> Competency based education is an institutional process that moves education from focusing on what *academics* believe students need to know to what *students* [actually] need to know and be able to do in varying and complex situations. Competency based learning requires faculty and academic leaders to focus on *learning outcomes* which are subsequently broken down into *competencies* along sequential *levels of mastery*. Learning outcomes and competencies are employed in education programs for achieving clarity in course design and delivery.
>
> Learning outcomes are statements of a learning achievement and are expressed in terms of what the learner is expected to know, understand, and be able to do on completion of the program. The competency is usually expressed for individual courses within the curriculum, using the vocabulary of learning outcomes. Competency can be defined as a general statement detailing the desired abilities, knowledge and skills of students graduating from a course or program**.**
>
> Analyzing competencies at curriculum level has several advantages. First, it aids in understanding the overall design of the curriculum in terms of skills progression. It allows us to study the progression of skills from the first to the final year of the program. For example, if a course in the first year lays undue emphasis on advanced thinking skills, it can be moved to the advanced level. Secondly, it helps in discovering any discrepancies, blind spots or gaps in the program, and provides pointers for improving the curriculum. For example, if a particular skill is never addressed in the entire program, this becomes evident, and appropriate action can be taken.

Something else GS point out regarding analyzing competencies: "It helps in recommending the competencies for a new course." Their strategy here can be beneficial by using industry education publications for structuring curricula of a general nature; that is, by looking at the foundational requirements of each industry, and then summarizing them for all industries, the summation can be used to determine up to what point there is commonality between all careers. Anything beyond the common need should probably be relegated to private investments. To put

it another way: An analysis of competencies across industries will help in identifying the required foundational competencies for career education – broadly speaking – such that the overall progression of competencies is well designed and aligned with desired outcomes that benefit all learners.

The idea of competency-based education requires an analysis of purpose, goals, and outcomes. This helps identify the superfluous details entangled in the current bloated curricula. This requires the intervention of unbiased stakeholders outside academia. The public and industry associations are the primary sources for checking the self-interested tendencies of academia, but the public must abandon its awe of academia so citizens can participate in educational outcomes. Jefferson reveals the principal: "State a moral case to a ploughman and a professor. The former will decide it as well, and often better than the latter, because he has not been led astray by artificial rules."

GS point out that currently, competencies are course specific and their overall impact is unknown. In their Abstract, they state "Unfortunately, manual analysis is a painstaking process due to large amounts of competencies across the curriculum." They sought to develop a way to analyze competencies in a course to determine their impact on the overall curriculum design.

While their paper was written for development of college curricula, the principles of their research applies to all levels of education. However, their analysis goes deeper than is required at the primary and secondary levels of education since their investigation of postsecondary education was for highly specific career training.

"The conceptual framework of using competencies for analyzing curriculum design" is four dimensional:

- Stakeholders – The targeted audience of the analysis. For the purposes of this essay, it is primary and secondary students.
- Objectives – The main objective of curriculum design analysis is to reveal hidden information from data related to the curriculum. For example, modifying the competencies for a specific course or re-organizing the flow of the courses within the curriculum.
- Data – The data that is gathered for conducting the analysis. The data can be both specific to the curriculum (such as learning outcomes and competencies), flow of courses within the curriculum, or common learning classifications and groupings.
- Techniques – The techniques that are used in conducting the analysis. Under the current analysis, we are looking for preparing all youth for participation in a community at the social and economic levels. Once language and math foundations are sufficiently established, this will require development of curricula for other subjects.

See my essay, *The Applied Education Concept* (pages 23-76), for further review of potential subjects that can be covered.

Cognitive & Progressive Competencies
Competencies are studied under two dimensions; cognitive levels and progressive levels.

GS use Bloom's Taxonomy of educational objectives. However, let's use Preville's explanation of Bloom's Taxonomy to look at why they used it:

> Because of the nature of Bloom's Taxonomy, the way it moves from lower to higher order learning, it can be a really good scaffolding tool for course design, says Tony Erben, Chair of Education at the University of Tampa. John Redden, an assistant professor in the department of physiology and neurobiology uses a metaphor to explain metacognition to his anatomy and physiology students. "I tell them that they all know what a hammer is, what lumber is, what nails are—but that doesn't mean they know how to build a house. And I tell them that by the end of this course, they ought to be able to build a house. That's the goal they need to set for themselves: to be able to explain how all the parts come together and work together." Faculty such as Erben and Redden typically use Bloom's in three ways: to set learning outcomes; to structure classroom activities; and to assess progress.

In relation to assessment, Preville points out "Not all types of questions are suitable for assessing higher-order learning: multiple-choice questions, for instance, are best for assessing lower-order levels." Both true/false and multiple-choice questions, which dominate public education, are good only for lower-order learning. This is key, because I strongly advise avoiding these assessment methodologies as much as possible, although in the earliest years of education, they may be unavoidable.

Preville cites Redden's assessing of higher-order learning by structuring questions based on *application* and *analysis*.

> Redden also cautions against a classic instructor pitfall: turning a higher-order question into a lower-order question. "If you give them an analysis exercise during the semester and then put that same exercise in the exam – or worse, if you tell them that question will be on the exam – you've turned it into a recall exercise. That question no longer measures analysis, it just measures memorization."

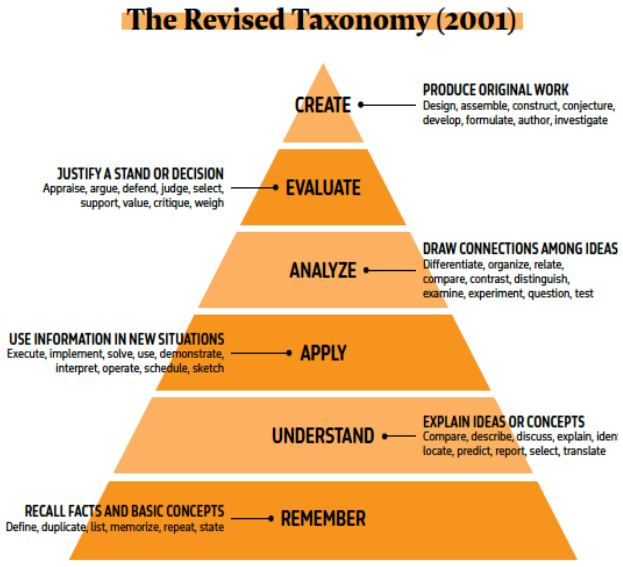
Preville points out some instructors share Bloom's Taxonomy concepts with their students because they think it will inspire them. Preville addresses students' proclivity to be distracted. "Distraction is often a byproduct of rudderlessness: if students don't see where a course is leading them, their attention is more likely to wane. Bloom's Taxonomy helps instructors be crystal clear about outcomes and expectations."

Bloom's cognitive domain (see below) involves knowledge and the development of intellectual skills. The first level of thinking is *remembering*. In this level, the learner may have the ability to recall or remember facts without understanding them. The second level of thinking is *understanding*. In this level, the learner may have the ability to understand and interpret learned information. These first two levels of thinking are, at times, one and the same level; that is, with understanding, remembering is accomplished. This is the superior way of learning if the subject matter allows for it. The two levels also correlate with Piaget's *preoperational* and *concrete operational* stages roughly speaking (*close* to *medium transfer of learning* takes place in this

realm). The third level of thinking is *applying*. In this level, the learner may have the ability to use learned material in new situations. The fourth level of thinking is *analyzing*. In this level, the learner may have the ability to break down information into its components. The fifth level of thinking is *evaluating*. In this level, the learner may have the ability to judge the value of a material for a given purpose. These last three levels of thinking correlate with Piaget's *formal operational* stage, and ends, for our purposes, at the beginning of career specific training (*medium* to some *far transfer of learning* abilities manifest in this realm). The sixth level of thinking is *creating*. In this level, the learner may have the ability to find associations between objects or concepts when they are not obvious (this is where *far transfer of learning* takes place and correlates with mastery of a skill, which matures after education is complete and some years of dedicated service to a career field has been established). The lower three levels in the pyramid are also referred to as lower order thinking skills, and the higher three levels are referred to as higher order thinking skills.

Preville understands the use of assessment better than most: "When connecting a learning outcome to a form of assessment it's worth remembering that assessment is a tool for teaching, not a scale that determines success or failure."

GS further refines our analysis by breaking down the meaning of *awareness*, *proficiency*, and *mastery* in a particular career. A learner progresses from being incompetent and ignorant to an *awareness* stage wherein, the individual becomes aware of the skills lacking and gains an understanding of improving the skill. The learner then advances to a *proficiency* stage, wherein the learner is now demonstrating the knowledge needed and can perform reliably. Finally, the learner reaches the *mastery* stage, wherein the learner is now performing the skill as second-nature or intuitively. The mastery stage is in the realm of specialists who are dedicated to a particular field or endeavor and comes only with extended practice.



Bloom's taxonomy for cognitive domains

Mastery
(career education & career)

Proficiency
(secondary education)

Awareness
(primary education)

Skill stages

When using *Bloom* to create learning objectives, Preville recommends:

> Create actionable, specific and appropriate learning objectives that bridge the gap from students' existing knowledge to what you hope they'll understand by the end of the class. There are two things that must be considered when creating an effective learning objective:
>
> What do I want my students to be able to do after this class?
>
> How do I know that my students have achieved it?

When using *Bloom* to create learning objectives to assess, Preville recommends: "When thinking through your goals, stick to actionable and measurable verbs." This is useful for assessing students' knowledge of such important information as mathematical axioms in secondary school, for example. He shows examples of non-actionable and actionable words:

> Non-actionable question for a physiology course: Students will *understand* the importance of homeostasis in the human body. **Why this doesn't work**: 'Understand' is not an actionable word. This not only makes it harder for you to formulate a standard assessment for your students, it also makes it hard for your students to know what to do in order to 'understand.' What is also not clear is to what extent students should be 'understanding.' How do the students know that they have understood the importance of homeostasis to the degree that they have met your expectations?
>
> Actionable question: Students will be able to *explain* the importance of homeostasis in the human body including its effects on the body's physiological systems. **Why this works**: We have replaced 'understand' with a verb that students can assign an action to – 'explain.' We also made sure the verb was chosen with the assessment in mind. In other words, you want to focus on building the student's analytical skills. We've chosen an action that demonstrates an individual's ability to analyze. Since there are so many possible degrees of correctness, we also made sure to specify to what degree students must 'explain' homeostasis.

For primary and secondary education levels, *awareness* and *proficiency* in subjects are the goal. Mastery must be left to career-oriented education, and when the individual has joined the ranks of a career sector. There is no sense in attempting to master every subject taught given the monumental effort it takes, and realistically, is not possible. We can only master a limited number of activities and only after extended practice. Time invested in one activity deprives us of time available for other activities – hence the observation of *relative worth* when designing curricula.

PRO-TIP:
Start thinking about how your various assessments will fit into your formative or summative plans of evaluation.

Bloom's Level of Learning

Assessment Technique	Remember	Understand	Apply	Analyze	Evaluate	Create
Multiple Choice questions	✔	✔	✔	⊖		
True/False questions	✔	✔				
Matching	✔	✔				
Short Answer/Word Answer	✔	✔	✔	⊖		
Discussion/Essay			⊖	✔	✔	✔
Oral			⊖	✔	✔	✔
Anecdotal, comments	⊖	⊖				✔

✔ Always appropriate ⊖ Can be appropriate in some situations

Above, Preville provides a nice diagram of Bloom's levels of learning.
Then Preville offers nice organizing structures:

EFFECTIVE ASSESSMENT METHODS			
Topic:			
Learning Outcomes	**Action Verb**	**Cognitive Domain (Bloom's)**	**Assessment Technique(s)**

INNOVATIVE ACTIVITIES TO ENGAGE YOUR STUDENTS

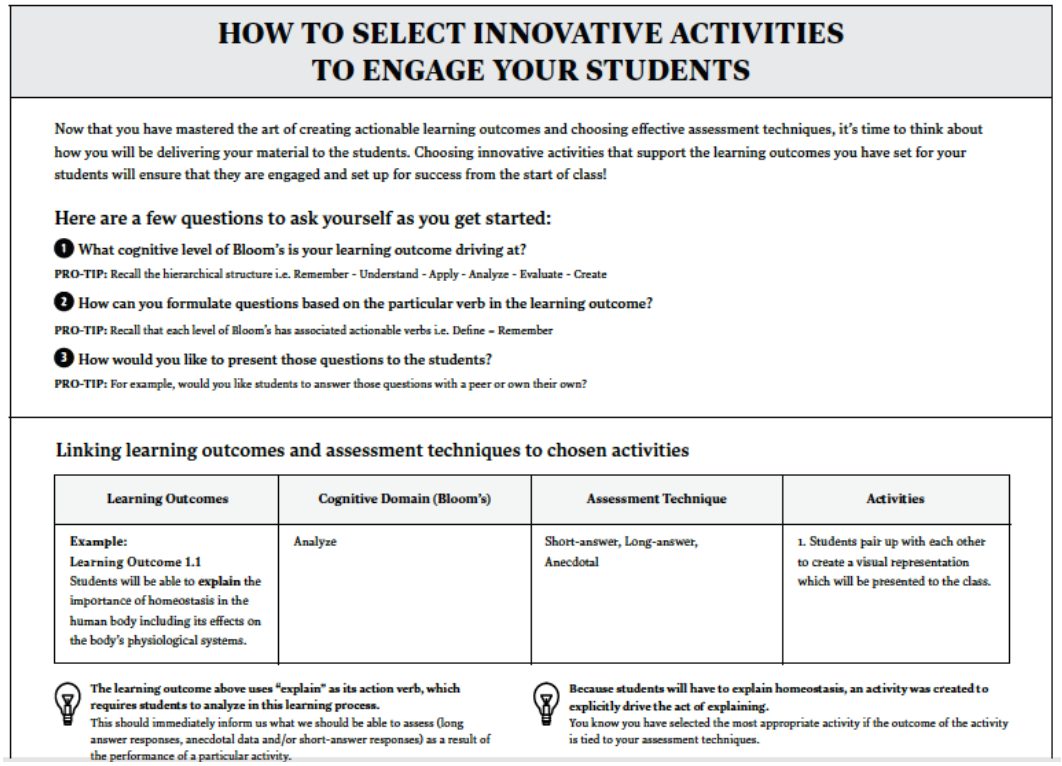
REMINDER: Ask yourself these three questions when choosing your classroom activities.

1. **What cognitive level of Bloom's is your learning outcome driving at?**
2. **How can you formulate questions based on the particular verb in the learning outcome?**
3. **How would you like to present those questions to the students?**

	Actionable Verbs	Questions	Activities
Remember	Define Describe Recall Recognize	• Find the meaning of... • Who/What was it that...? • Can you tell why...? • ... True or False?	• Discuss with a partner, your definition of... • Make a facts chart. • List all the...in a narrative. • Come up with a clever analogy.
Understand	Compare Discuss Explain Predict	• Can you provide an example of what you mean...? • Who do you think...? • Can you write in your own words...? • Who was the key character...?	• Create a chart of similarities and differences. • Retell the story in your words. • Illustrate what you think the main idea was. • Write a summary report of an event.
Apply	Determine Discover Express Predict	• What do you think will be the end result? • What more information can you gather on...? • How does this connect with.....? • What do you think will happen when...?	• Create a synopsis of steps taken to determine the end result. • Research different methods used today. • Form a panel to discuss views, i.e. "Learning at School." • Think-pair-share with a partner about what will happen next.
Analyze	Compare Identify Investigate Relate	• What do you see as other possible outcomes? • What are some of the problems of...? • Can you compare your ... with that presented in...? • How does this connect with your everyday life?	• Construct a graph to illustrate selected information. • Make a diagram linking to the source of the problem. • Write a report about how this ties to what we're learning. • Discuss with a partner how this connects to you.
Evaluate	Conclude Interpret Support Validate	• Do you think ... was a good or a bad thing? • Is there a better solution to...? • Can you defend your position about...? • How effective was...?	• Prepare a case to present your view about... • Make a booklet about five rules you see as important. • Write about your feelings in relation to... • Give it a name and plan a marketing campaign.
Create	Develop Formulate Incorporate Summarize	• What ways can you expand your findings? • What questions still need to be addressed? • Can you give an example of what you mean by...? • Can you distinguish between...?	• Make a booklet about five rules you see as important. • Write a letter to ... advising on changes needed at... • Tie your learnings to another course you have taken and present. • Prepare a flow chart to show...

INNOVATIVE ACTIVITIES TO ENGAGE YOUR STUDENTS

	Actionable Verbs	Questions	Activities
Remember			
Understand			
Apply			
Analyze			
Evaluate			
Create			



HOW TO SELECT INNOVATIVE ACTIVITIES TO ENGAGE YOUR STUDENTS

Now that you have mastered the art of creating actionable learning outcomes and choosing effective assessment techniques, it's time to think about how you will be delivering your material to the students. Choosing innovative activities that support the learning outcomes you have set for your students will ensure that they are engaged and set up for success from the start of class!

Here are a few questions to ask yourself as you get started:

1. **What cognitive level of Bloom's is your learning outcome driving at?**
   PRO-TIP: Recall the hierarchical structure i.e. Remember - Understand - Apply - Analyze - Evaluate - Create
2. **How can you formulate questions based on the particular verb in the learning outcome?**
   PRO-TIP: Recall that each level of Bloom's has associated actionable verbs i.e. Define – Remember
3. **How would you like to present those questions to the students?**
   PRO-TIP: For example, would you like students to answer those questions with a peer or own their own?

Linking learning outcomes and assessment techniques to chosen activities

Learning Outcomes	Cognitive Domain (Bloom's)	Assessment Technique	Activities
Example: **Learning Outcome 1.1** Students will be able to **explain** the importance of homeostasis in the human body including its effects on the body's physiological systems.	Analyze	Short-answer, Long-answer, Anecdotal	1. Students pair up with each other to create a visual representation which will be presented to the class.

The learning outcome above uses "explain" as its action verb, which requires students to analyze in this learning process.
This should immediately inform us what we should be able to assess (long answer responses, anecdotal data and/or short-answer responses) as a result of the performance of a particular activity.

Because students will have to explain homeostasis, an activity was created to explicitly drive the act of explaining.
You know you have selected the most appropriate activity if the outcome of the activity is tied to your assessment techniques.

To conclude:

First, in deciding on curricula, one should use Piaget's *stages of development* as a general reference, rather than as a concrete recipe to follow. It will need to be adapted by those responsible for students as their individuality reveals their uniqueness.

Second, *relative worth* requires us to choose subject matter that is necessary for all citizens at the primary education levels, and then to choose subject matter and curricula at the secondary levels that will be necessary for those who are heading down industry paths for given economic sectors. However, at the secondary level, proficiency, not mastery, is necessary for these subjects: economics (mostly micro- but a little macro-economics), history, and civics are important for participation in society; while science and technology are important for a greater understanding of the world we live in so that we may adapt to its ever changing forces.

Third, *competency* in well-chosen and well-planned subject matter must be the goal for students to achieve. The parroting of data must be minimal and used only where it is a must for supporting worthy knowledge (e.g., memorizing the alphabet and the various letters' pronunciation is a building block for assembling and knowing the meaning of words). The integration of math and language arts into all subjects, where appropriate, builds a strong infrastructure on which anything can be built. Since the primary and early secondary years (5 to approximately 15 years old) are not for career specific education, periphery disciplines, such as history, civics, science, technology, music, art, geography, etc., serve as tools to strengthen linguistic and math abilities to very solid levels.

Hillsdale K-12 at Home – An American Classical Education

https://k12athome.hillsdale.edu

Hillsdale College has designed an educational system based on a traditional classical program. It can be used for college preparation or a guideline for history and civics education for those not interested in attending college. Hillsdale is a far superior system when compared to public institutions that are loaded with leftist ideologies, which is antithetical to a free constitutional republic.

The following is from Hillsdale's website to introduce the reader to what they offer and see if it is appealing.

What is K-12 Classical Education?

A classical education emphasizes human virtue and moral character, responsible citizenship, a content-rich course of study, and teacher-led classrooms.

At Hillsdale College, we help parents and teachers offer this time-honored education to their students, whether at home or in the classroom. Ultimately, a classical education leads to the cultivation of moral and intellectual virtue so that each student becomes capable of self-government, and therefore able to live a happy life. These ends, in turn, will help to create good citizens and strong families and communities.

Resources for Parents

Hillsdale College's K-12 Education staff have compiled suggested curricula for homeschool parents and students. These are the same resources used in Hillsdale's network of classical schools, so we can confidently recommend them.

Recommended Curriculum for Homeschool

While the K-12 Education Offices works to make a homeschool curriculum available, we've put together some recommendations for parents to use in the meantime. Below are some excellent curricula that Hillsdale can confidently recommend. All of our recommendations are used in Hillsdale Classical Schools. Hillsdale College does not financially benefit from recommendations of curriculum not published by Hillsdale College.
https://k12athome.hillsdale.edu/recommended-curriculum

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