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Expanding Entire Volume of Knowledge Influences on Incrementing Individual Knowledge

By Duli Pllana

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Expanding Entire Volume of Knowledge Influences on Incrementing Individual Knowledge

Duli Pllana

Abstract- In general, people chase knowledge tending to know the entire knowledge; nevertheless, they set one step forward and two steps backward. The development of knowledge grows exponentially; recently knowledge doubles every year- very soon is predict it is going to double every twelve hours. There are many researchers who deals with body volume of knowledge, and what percentage of entire knowledge are able to know specialist researchers. In a broad-spectrum people are eager to know the development of knowledge; likewise, how much they know in their favorite field or occupation; as a result, they test their knowledge in different ways. Usually, students or test takers are assessed by others on the test. Nonetheless, majority of test takers check their knowledge on their own before they take any test. Another way assessing knowledge is by getting feedback from others. The key question remains, do test takers/learners get the accurate assessment on their knowledge? Most likely the evaluation might be inaccurate on inspecting the knowledge in a specific field. Test givers are subjective in their decisions, teachers are too generous with giving a positive feedback, and assessing your own work is biased. Assessing your own knowledge is impossible because people inflate their evaluation or deflate. Furthermore, the paper deals with the question are children smarter than parents. The outcome will reveal the evidence of correlation between the entire and individual knowledge. Above all, Individual knowledge is relative since it depends on the development of entire knowledge.

Keywords: entire knowledge, individual knowledge, knowledge doubling, assessing, generation, iq scores, expert phase.

I. Introduction

Correlation of doubling knowledge, assessing own knowledge, and comparing intelligence of new generation with the old generation has nonlinear or linear association. Doubling knowledge with respect to time decreases the percentage of individual knowledge compared to the entire knowing. On the other hand, doubling knowledge contributes on growth of new generation's knowledge compared to the old generation knowledge. The process of continuous double knowing cannot occur infinitely because it is impossible for storing the infinite amount of a quantity in a finite space. The development of quantity of knowing will correlate with the enhancement of quality. Quality will postpone the fast rate doubling process of quantity, which will reflect a negative correlation or it will keep in a constant rate.

Quantitatively analyzing the knowledge doubling in relationship with time or the growth of knowledge in terms of time resembles exponential functions. The crucial question remains, does the doubling knowledge grows forever? According to the book "Turning Point in the chapter 7" writes, "The most common basis for criticism of the growth paradigm, however, has been the Malthusian argument: that the earth's resource base is finite and ipso facto inadequate to sustain unlimited growth" (Ayres, 1998). Furthermore, the book quotes Kenneth Boulding said, "Anyone who thinks that exponential growth can go on forever in a finite world is either a madman or an economist - Source cited by Richard Douthwaite, 1993, pl." Knowledge is a result of the finite sources, which multiplies rapidly; time on enlarging knowledge will decrease exponentially aiming toward the smallest possible value.

In general, Doubling Knowledge is happening every twelve months and in the near future is expected every twelve hours according to the article, *Knowledge Doubles Almost Every day, and It's Set to Increase* (Sandle, 2018). In several fields, doubling knowledge does not happen very quickly. Based on the journal article, *Review: The "Structure of the Knowledge" in the "Information Age"* states, "Scientific knowledge doubles every six or ten years, and, by bringing so much information to the public, exerts more influence from many sides on decisions of political and economic nature" (Maier-Leibniz, 1996). In the fields less interested for wider audience knowledge progresses will a slow rate because people do not invest enough money and energy. On the other hand, demanded field will produce knowledge very quickly. Considering accumulated knowledge in all fields, time producing doubling knowledge is expected to decrease less than 12 hours in the near future.

Self-reflection applies in all fields of life, but it does not describe the accurately situation or the state of knowing. Usually, teachers, students, lectors, self-reflect on their work. The article, *Self-reflection and Academic Performance: Is there a relationship? Points,* "The students in our study repeatedly had to reflect on how and what they have learned as the semester unfolded,

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and received continuous feedback from their teachers on their performances" (Lew &Schmidt, 2011). During the reflections students attempt evaluating their readiness for the test or evaluating their knowledge in a specific subject. Even though students want to be unbiased on their evaluation, they still struggle with their inflated or deflated self-assessing.

Self-evaluation of knowledge requires a great discipline, neutrality, and experience. Evaluating own skills in a subject reflects significant errors due to biased implementation. The book, Knowledge *surveys: Students ability to self-assess* claims, "We noted an apparent pattern in this data set. That is, students seemed to have a greater mismatch between survey and exam scores at some Bloom levels" (Clauss & Geedey, 2010). The mismatch of the exam data and self-evaluation reflects an inflated or deflated assessment. Human nature corresponds with biased evaluation on the areas involving self-interested. Experience in assessing own knowledge plays a key element on finding out the truth. For instance, the expert phase reaches a minimal gap between survey and actual knowing. On the other hand, the average phase inflates the gap between the survey and knowing to a highest point.

The Bennett Test proves that children are getting smarter than their parents; nonetheless, the IQ test might not be 100% accurate. The other factors on supporting the concept children are smarter than parents are knowledge increase and learning transformation from concrete to abstract. Based on the article, The *Flynn effect: your kids are smarter than you,* states, "Our society and intellectual environment have changed enormously over the last century, transitioning from 'concrete' to 'abstract'" (Dr. Carl, n. d.). The concrete thinking would make a difference between a wolf and a dog in terms of domestic animal and wild animal; on the other hand, abstract thinking would classify the wolf and the dog as mammals. Abstract thinking demands a great energy on thinking and a sophisticated conclusion. Also, the quantity of knowledge converts into qualitative knowledge, which assists young generation to be smarter than the older generation. Thus, IQ test corresponds with accurate scores – children are getting smarter than parents.

II. Knowledge Doubling

In the last two centuries, knowledge enlarged its entire magnitude more than eighty percent. The growth of knowledge launched with tiny (snail) steps; recently, the progress of knowledge is expanding with huge steps. According to the article *Op-Ed: Knowledge Doubles Almost Every day, and It's Set to Increase* claims, "Now our knowledge is almost doubling every day" (Sandle, 2018). The graph of doubling knowledge was as a linear function with a low positive slope. The positive slope boosted tremendously with a high rate. Comparing the knowledge doubled from 100 BC to 1700 AD and 2017 to 2018 gives the impression knowledge soon will blow to infinity. Nevertheless, humanity will keep the most useful data, digitally or physically, and the rest will belong to the forgotten knowledge. Collected knowing will always multiply its dimension with tendency on staying within a limited scope. Its graph resembles exponential function growth.

The branch of philosophy Epistemology (the reason about knowledge) studies knowledge in the details. Knowledge has a broad and several definitions; there is an attempt to mention a simple definition, which makes perfect sense. Referring to the *Oxford dictionary* the definition of knowledge verbalizes," Facts, information, and skills acquired through experience or education; the theoretical or practical understanding of a subject. Another definition is: The sum of what is known." The article *the Concept of Knowledge and How to Measure it defines knowledge roughly*, "Knowledge is often defined as a belief that is true and justified" (Hunt, 2003). In fact, the last statement is based on the philosophical perspective on study knowledge. In order for a piece of evidence to be true for an individual, someone must believe it is true. In addition the individual should justify the data is true by using recognized and reasonable epistemological and scientific approaches.

Knowledge is older than humanity because humans are not the only living being who grasp knowledge. Before humans came on the earth, animals, birds, and insects emerged on the Earth. They started to build their nets or chose the best locations to raise their family, and practiced simple reasonable movement to perform some kind of a simple beneficiary work. Additionally, ants are the most organized entity after the human beings. According to the article *Can Only Humans Have Knowledge* claims, "However, despite the growing body of evidence showing that animals can possess knowledge, there are still considered to be a range of abilities that distinguish humans from animals" (Boyes, 2016). There is no question are humans the most intelligent entity on the Earth? The matter of fact is when the knowledge presented on the planet Earth? Despite the differences between animals and humans on possessing comprehension, the existence of animals, birds, and insects is a proof that a form of a nonhuman knowledge exists and it is older than humanity's life span; thus, it proves knowledge is older than human beings.

Humankind accelerated knowledge all over with huge steps since they came into the life form on Earth. Before hundred thousand years ago, they draw animals and other living beings inside walls of caves. Today scientists discover many early man-artworks on stones, bones, and other inorganic materials. The article *When did the Human Mind Evolve to What It is Today* writes," After analyzing the mixture and nearby stone grinding

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tools, the researchers realized they had found the world's earliest known paint, made 100,000 years ago from charcoal, crushed animal bones, iron-rich rock and an unknown liquid" (Wayman, 2012). Man began progressing with thinking slowly, and knowledge mounded up relatively quickly compared with the previous knowledge (none human –knowledge). Nonetheless, there was a long way to go until it reached the peak of contemporary amount of knowing. The advancement of knowing prospered with respect to exponential growth function (Table 1. Shows the exponential growth of knowledge with respect to time).

Knowledge doubles	100 BC – 1700	1800 years
Knowledge doubles	1700 – 1900	200 years
Knowledge doubles	1900 – 1950	50 years
Knowledge doubles	1950 – 1970	20 years
Knowledge doubles	1970 - 1980	10 years
Knowledge doubles	1980 – 1988	8 years
Knowledge doubles	Now	Doubles every year
Soon it will double	Near the future	Doubles every 12 hour

Figure 1: Acceleration of Knowledge Doubling During the New Era (A.D.)

Endless Expansion of Universe induced the human brain on yielding advanced ideas and growing data exponentially in all segments of life. Accumulated data of information implemented with different speeds during different time frame. Based on the article *Knowledge Doubling every 12 month, Soon Doubling every 12 hour* writes, "Buckminster Fuller created the Knowledge Doubling Curve; he noticed that until 1900 human knowledge doubles approximately every century… According to IBM, the build out of the internet of things will lead to the doubling of knowledge every 12 hours" (Schilling, 2013). The growth of knowledge from 100 BC to 1700 AD shows a liner change with a low steep positive slope. Knowledge doubling from 1700 to 1900 has a steeper positive slope than the previous one. Moreover, from 1900 to 1950 the linear function has a steeper slope then the previous one. This process keeps repeating consistently as time tends to the future. Graphing all the pieces of linear functions together resembles exponential function growth. Based on the exponential growth model, knowledge doubling, soon will occur within the frame time of 12 hours. The big question remains what is going to be the ratio of humankind knowledge and individual knowledge?

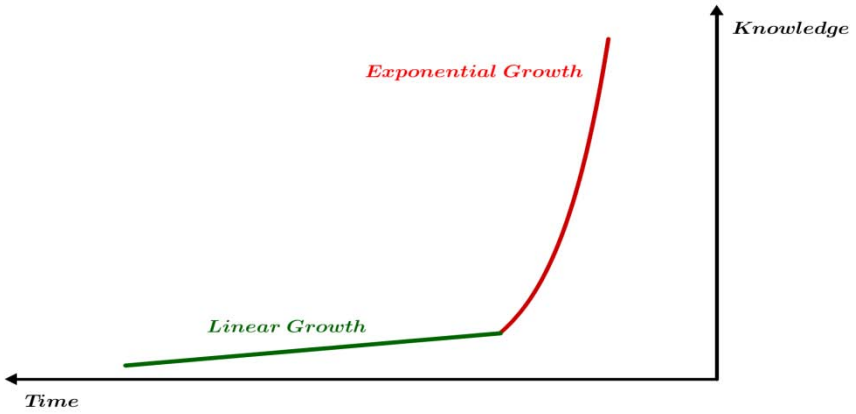

Figure 2: Knowledge Doubling Curve

III. Discussion on Knowledge Doubling

Laws of physics plays a large part in all sections of the life involving abstract human activities. Anything that starts to move from a resting position requires more energy to work against inertia. The article *Rapid Doubling of knowledge Drives Change in How We Learn* illustrates, "In 1982, futurist and inventor Buckminster Fuller estimated how long it took for all accumulated and transmitted knowledge up until the year One CE to double in size. His estimate was about 1500 years…" (Pedagogy and Learning, d.). Since knowledge was moving from this relatively rested position, the next doubling knowledge occurred seven times quicker. The inertia on movement of knowing rapidly increased up the motion; as a result, doubling knowledge enhanced quality and reduced its time tremendously.

The curve of doubling knowledge changes the shape as it goes to the Nineteen Century by multiplying its volume exponentially. In the twenty Century, it was a

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higher need to find new ways of working, learning, and living. The Growth of population in the world is another factor that affected new innovative ideas developing the whole spectrum of human life and contributed to the rise of doubling knowledge. There are many relevant factors on doubling knowledge then and now; I will not get in the depths of the factors that accelerated the new innovations. Nonetheless, various competitions between various rivals produced new ideas and multiple innovations with a higher rate causing the curve to get the J shape.

Digital technology in the twenty first century connected humanity in the entire globe of the world, and transformed education remarkably. Based on the article *AI in the 21st Century – With Historical Reflections*, States "The field of artificial intelligence has changed dramatically over the last 50 years" (Languerealla, Iida, Bongard, n. d.). Recently, Artificial intelligence reached a point of development to support natural intelligence to accelerate extremely doubling knowledge. Even though, the artificial intelligence has positive and negative sides, natural intelligence still is going to expand knowing by analyzing both sides. Taking into consideration speed and accuracy of artificial intelligence on multitasking operation, doubling knowledge will occur less than twelve hours per day.

IV. How Much do we Know?

Usually I read mathematics books, and I came across a thrilling evidence that says average mathematicians with PhD degree know less than 10% of whole mathematics. The volume of the mathematical knowledge (books and scripts) and human capacity obtaining knowledge is in a proportion with less than 1:10. The individual with a PhD degree understands the entire volume of knowledge in his or her field is extremely low, therefore, he or she knows to a certain degree there is a huge amount of information that are beyond his or her understanding. An individual who enters before expertise phase thinks he or she knows more than everybody else. An individual who enters college level or higher education, he or she knows there is the start to learn new modules, and there is a small limited portion of the study to perform until reaching the maximum of knowing. Majority of people inflate or deflate how much they know, and few people embrace the Socrates expression, "I know that I know nothing."

Few years ago, I came across an interesting graph (the graph has been modified recently by different researchers) in the Internet that represents three relevant questions; how much I know; how much more I realize is there to know; and how much I think I know? The graph of the knowing and the book that describes how much mathematics knows a PhD mathematician have many elements in common. As a result, I started to get more information on this topic and I did a research on the self-assessment of knowing and its graph. The graph illustrates the evidence where we start learning from nothing and we go in the circle. According to the article *As You Start to Know More, You Realize You Know Nothing* states, "We go from I know nothing to I am an expert I know nothing as our actual knowledge increases" (Erik, 2019)! The process that goes in the cycle from nothing – expert – nothing is explained thoroughly in the figure below.

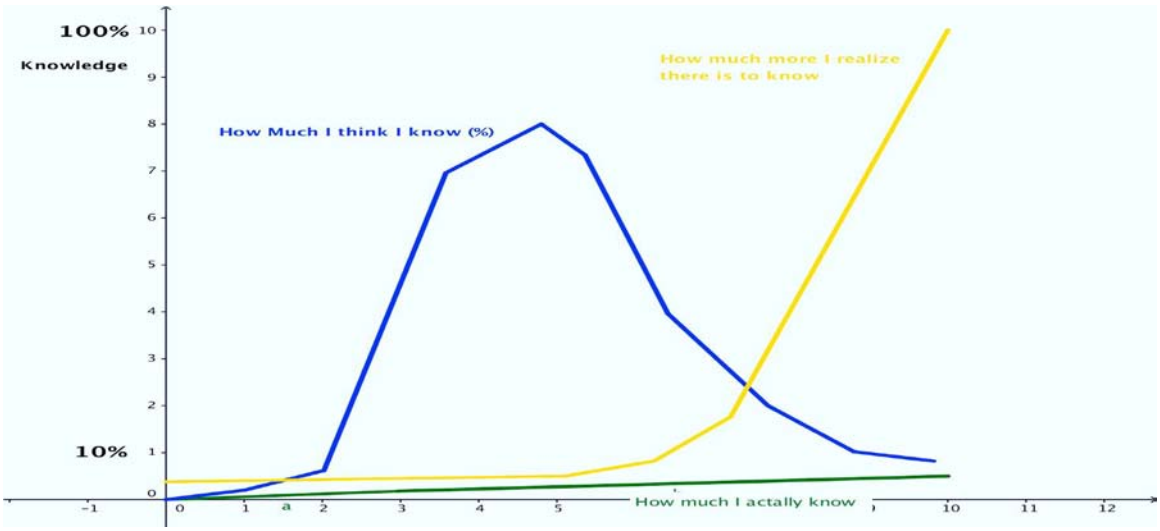

Figure 3: The graph represents the relationship of three human phases and knowledge.

- Beginner phase (The I know nothing phase)
- Average Phase-Hazard Phase (The I am an expert phase)
- Expert phase (The I know nothing phase)

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Legend: Relationship between three main factors presented in the plane coordinates.

- 1 How much I actually Know
- 2 How Much more I realize there is to know
- 3 How much I think I know

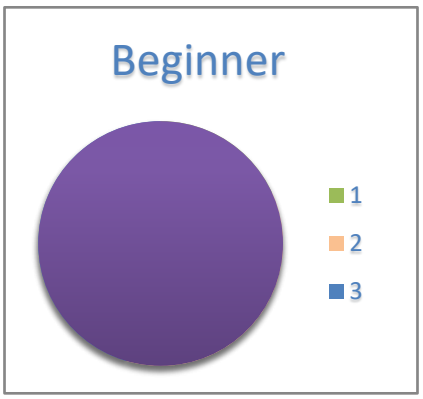

Figure 4: Beginner Phase

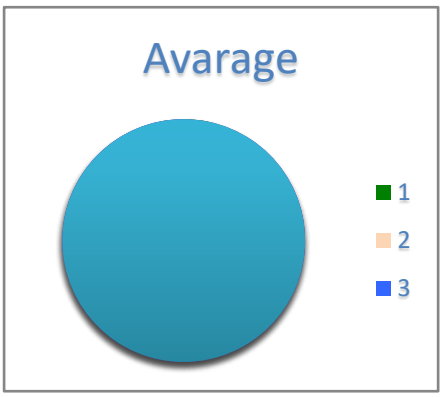

Figure 5: Average phase



Figure 6: Expert phase

I asked my students at a community college, how much they think they know mathematics in the scale from 1 to 10. The results were approximately with the results of the students from the charter high school. Since the results are similar, I will present just scores of the high school. I asked my students in charter high school, how much do you know about mathematics in the scale from 1 to 10. In integrated mathematics I have 30 students. In this case participated 30 students: 12 choose 5, 7 choose - 6, 10 choose - 7, and 1 chose - 8. My senior students' in college prep math: 2 choose - 6, 4 choose - 7, and 2 choose - 8. In contemporary math I have 10 students. 2 choose - 5, 4 choose - 6, 2 choose - 7 and 2 choose - 8.

Self-Assessing reflects incorrect outcomes since it is tempted to give a biased response on a certain task. Evaluating yourself resonates with a subjective intention in favor of personal interests. Referring to the article *A Q & A with David Dunning, PhD, Professor of Psychology at Cornell University* states, "It's difficult, almost impossible, for us to accurately evaluate our competencies… The first is the spin we tend to give the feedback we receive about ourselves from the outside world. That is, we claim credit for our successes and lay blame for our failures elsewhere. Second, what people tell you to your face is never exactly what they're saying behind your back" (n. d). External assessment impacts on self-esteem and self-evaluation considerably to the point the self-assessing would be deflated or inflated. Based on the article, *Why We Overestimate Our Competence, Social Psychologists Are Examining People's Pattern of Overlooking Their Own Weaknesses* asserts, "Steven Heine, PhD, a psychologist at the University of British Columbia, is showing that self-inflation tends to be more of a Western than a universal phenomenon" (Angelis, 2003). Usually, positive thinking plays a major role on students to inflate their knowing in the western world. On the other hand, In Asia students deflate their knowledge as a result of the modesty. In the both cases, self-assessment reveals inaccuracies of the outcomes.

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Number of Students who evaluate their knowledge on mathematics	Percentages (%) Picked
14 students	50.00
13 students	60.00
16 students	70.00
5 students	80.00
Median	65.00
Mean	62.50

Figure 7: Represents data of students self-assessing their knowing in mathematics

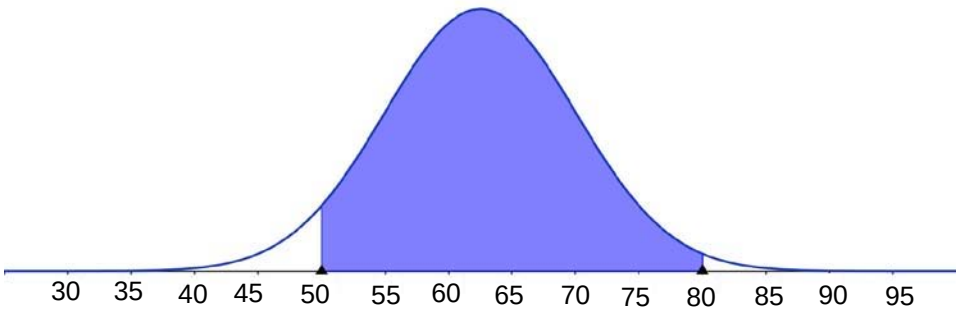

Figure 8: Normal distribution of students' data self-assessing their knowing in mathematics

The average phase most likely incorporates undergraduate college students to the beginner graduate students. Nonetheless, this phase includes all individuals who think they know everything. Dr. Hudson, mentor in teachers' program for charter schools, claims, "During the PLC (professional learning community) I had difficulties to work with teachers who have experience more than seven years. Several experienced teachers felt like they know everything, and they do not need to participate in PLC." New changes in education results as a necessity following recent educational development. New teaching and learning innovation occurring much faster than human brain can processes less than ten percent of it. In the case, a good teacher knows about ten percent of the entire knowing in education field in this academic year. The teacher will know less than five percent of entire educational knowledge during the next academic year. The ratio of entire educational knowledge and the teacher educational knowledge will grow exponentially - counting the average phase.

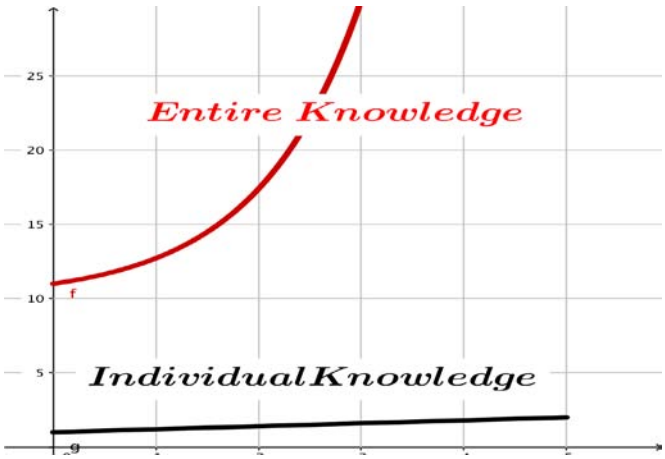

Figure 9: The ratio of the growth of Entire Knowledge and Individual Knowledge

The expertise phase requires a detailed work with deep analysis in a specific area of a subject. Usually, graduate study focuses on a narrow field with all-inclusive elements consisting in the proceeding methodologies. In the graduate study at New Jersey City University, Dr. Z says," When you choose a dissertation thesis it is like you are going in the mountain and choosing a tree. On the tree you are choosing a branch. On the branch, you select and pick up a leaf. The leaf you chose is your dissertation thesis. You are the one who knows the best about the leaf you selected." Dr. Z makes an analogy between the mountain with the entire

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knowledge in a particular field, and the leaf with the individual knowledge. The PhD candidate should know all facts concerning with the chosen leaf.

The Polish Mathematician, Stanislaw Ulam, describes how much is the volume of mathematics in his book, *Adventures of a Mathematician.* An interesting evidence of the book that was published in 1970 states, "the typical number of theorems per paper, Ulam estimated that around 100,000 to 200,000 mathematical theorems were being published every year." The article, *How much mathematics is There* states, "Philip Davis and Reuben Hersh, in their book The Mathematical Experience, estimated that the accumulated body of mathematical knowledge represented about 100 000 volumes of books: for comparison, they estimated that a specialist researcher might know the equivalent of between 60 and 70 volumes of mathematics…" (Srtatmaths, 2013). Calculating the percentages how much a specialist researcher knows mathematics is 0.07% according to the statistics in 1980. Nowadays, the body volume of mathematics has been expanded multiple times, hence the individual knowing of the whole (entire mathematical information) has been dropped extremely. Thus, individual capacity to retain quantities of the entire body of data tends toward shrinking as quantity of data expending; estimating the human's brain capacity of retaining knowledge with respect to entire body volume of material is unmanageable.

V. Discussion how Much do we Know?

In the past, entire knowledge has been spread within a narrow scope concentrated on several geographical locations. Usually, empires were thirsty for power, therefore, they accumulated the largest portion of the world's knowledge. However, the entire knowing in the medieval period was limited to a narrow scope. The article, *The Knowledge Doubling Curve*, illuminates, "The Renaissance Genius Sir Francis Bacon was thought to be the last person who knew everything a person could know–at least in a European nation in 1600" (Peter Lundell, 2014). Francis Bacon was considerate a very able man who had an incredible intelligence; during his lifetime the volume of body knowledge was not statistically organized, so the knowledge in the western Europe did not incorporate all information from other continents. Probably, Bacon might have known approximately all knowledge in the western world.

Now days the world has become smaller, people could share ideas in the matter of fractions seconds throughout the planet. Just by a superficial estimate without getting deep in statistics, it is clear the knowledge has been multiplied more than ten times since sixteen centuries. Logically speaking, if Francis Bacon was alive at this period of time, he would have known less than 10% of the accumulated knowledge. Literally, the graph in Figure 3 would spot Francis Bacon's knowledge in the expert phase. The graph of Figure 3 does not present the truth accurately, but it gives a general idea of relationship of entire knowledge and individual knowledge. The knowledge is expanding as a result of sharing information across the world, and then individual knowledge declines systematically with respect to entire knowing.

Now days, Internet diminishes the needs to have books and memorizing lots of information. Anything we need to know, we just google the questions, and then we find desired answers or we refresh our memories. According to the article *Individual knowledge in the Internet age* claims, "Some Internet boosters argue that Google searching serves as a replacement for our memory and that students need not memorize — need not learn— as much as they did before the Internet" (Sanger, 2010). Internet is one of the reasons that declines individual knowledge with respect to entire one. Considering the other factor (the increase of body knowledge in general) and Internet impact on individual learning, individual knowledge declines dramatically compared to the entire knowing.

VI. Recent Generations Are Smarter than Previous Generations

The quantity and quality of the knowledge change with respect to time; consequently, the ratio of the brain capacity containing knowledge and the total one, decreases as time increases. There is a disagreement when we question who is smarter than the old generation or new generation. Answering this question compels us to take a considerable number of empirical studies until we satisfy essential scientific criteria. Another reliable evidence is reading improves our thinking and accelerates the work of neurons with a higher rate. Reading books or other educational resources were accessible in the past and present; nonetheless, nowadays we have more books and other resources (digital medium) with higher quality than it was earlier. Considering the same percentage of people in the past and now have the same interest on intellectual work. Recently, the complexity of jobs to operate routinely coerces people to learn new techniques, processes, implementations, or information.

Today we have more books (digital books-reading material) that is accessible than ever before. Books are like windows to see many different worlds for those who are ready to read them. Obviously, reading gives an opportunity to expand our understanding in many directions. The article, *On First Understanding Plato's Republic* claims, "A book can change a mind, but only if that mind is ready to be changed. ... Books intrude into that process of self-evolving in a unique way" (Allot. 2011). As I mentioned earlier we consider

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the minds of the past and present who were ready to change for good. Mind in the present has a better access in a larger quantity and quality than those in the past. Therefore, children are smarter than their parents according to their availability of the reading material.

Studying intelligence is puzzling because we do not have a valid mechanism which would measure accurately. Nonetheless, we are going to observe from different viewpoints. Based on the article *Is Intelligence determined by genetics* says, "Intelligence is also strongly influenced by the environment. Factors related to a child's home environment and parenting, education and availability of learning resources, and nutrition, among others, all contribute to intelligence" (U.S. National Library of Medicine). Children inherit some genes with regard to the intelligence from parents, and they learn from parents' experience. Additionally, children get a qualitative education (interactive education involving technology) that was not available to their parents. Speaking from philosophical stance goods rises awareness in an advanced level.

The IQ test is very reliable test that measures intelligence with a high degree of accuracy. An IQ test for children has been taken in 1930, and the same test for the children has been repeated in 2010 (Briggs, 2015). According to the book "Using &Understanding Mathematics a Quantitative Reasoning" The average scores of IQ was 100, while in 2010 actual test, the average IQ score 124 comparing to the previous test (IQ test in 1930). Based on both tests, there is an increase of t of the 24 scores of the IQ from 1930 to 2010. The actual test in 2010 is an evidence the scores have been increasing at a rate of 0.3 score per year.

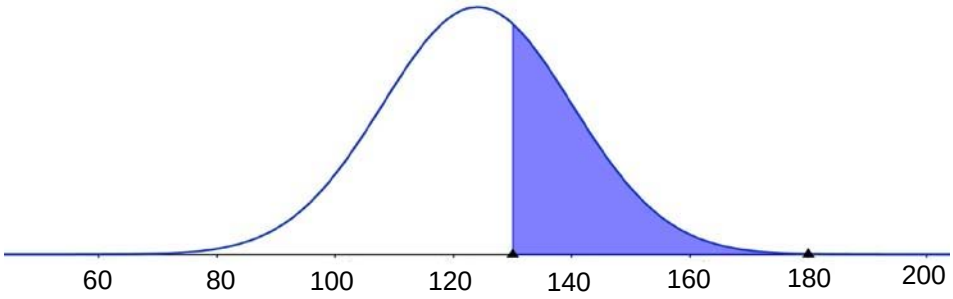

Figure 10: IQ scores in 2010 with mean 100 indicates the average would be at 124. Almost 50% of children were intellectually superior, while none of them were intellectually deficient.

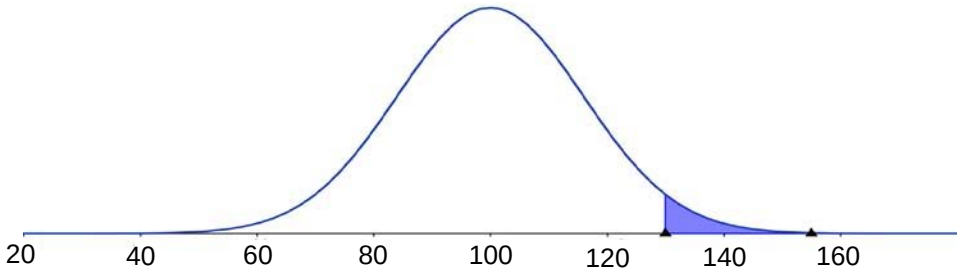

Figure 11: The IQ test of children, in 1930 with mean 100, and there were around 10% intellectually superior.

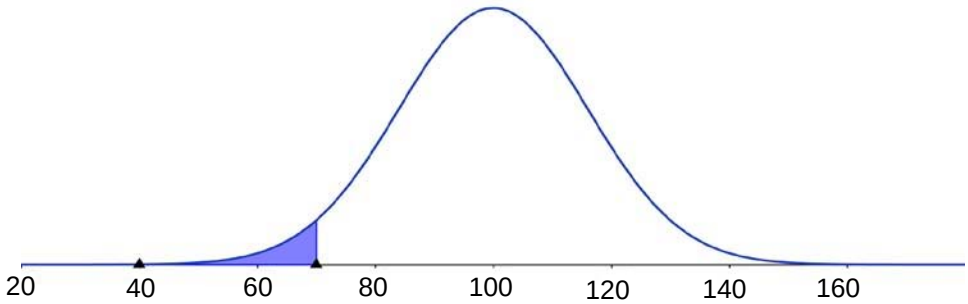

Figure 12: IQ test in 1930 shows about 10% of children were intellectually deficient.

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VII. Discussion on new Generation are Smarter than old Generation

New information enters the mind through reading or other learning methodologies; consequently, challenges our curiosity to analyze new data. The article *The Importance of Learning* claims, "Any kind of learning involves a change in neural structure or function" (Hanson, d.). While we analyze or wonder about the new data neurons do their necessary work by traveling on new pathways. New generation deals with more new data than older generations; hence, new generation have an opportunity to learn more than the older one. New accumulated knowledge makes new generation smarter than the older generation.

The IQ test is not perfect measurement of intelligence, but it is the most accurate device that exists today. Recent findings on measuring IQ suggests the new generations are smarter than older generations. Based on the article *Are Humans getting Smarter or Dumber* says, "Flynn and his colleagues have found that all around the world, the new generations score higher on the old tests than the original test takers did." The IQ test has been used for more than a century. Since the IQ test has been for so long, in principle has been used in the same way to the old generation to the new generation. Even though the IQ test might contain a degree of flaws, it has reliable outcomes on determining the new generation is getting smarter.

James R. Flynn studied the IQ of different generations for more than half a century across the world, he came to the conclusion that the new generation are getting better scores. The article, *The Flynn Effect and Bell Curve,* "I think there are two reasonable interpretations of the Flynn effect. One is to agree with Murray and Herrnstein that IQ test scores measure "intelligence" and to conclude that intelligence is primarily determined by environmental factors, and particularly by education" (Quiggin, 2003). Considering the transformation of the quality of the education toward a higher degree, new generation will increase their awareness and enhance their thinking. In the case, we compare/contrast the old generation and new generation, IQ scores support the idea that new generation is smarter than the older generation.

VIII. Conclusion

Historically observing doubling knowledge lead us to astounded results; there is no doubt the process of cumulative knowing grows exponentially fast in the relationships to time. Estimated volume of knowledge contains a degree of inaccuracies; nonetheless, still the exponential growth is indisputable. The ceaselessly development of new information dictates changes in teaching, learning, and assessing knowledge. For instance, the graph in the figure 3 asserts the expert phase (an individual with a PhD) knows between 5% to 10% of accumulated knowledge. On the other hand, referring to Ulma's esteemed of body knowledge and specialist researcher's capacity to know (the estimated knowledge in 1970) yields the expert knows about 0.07%. There might have been a certain period of time - the time was ephemeral when a PhD individual who knew 5% to 10% as the figure 3 states. The ratio of the whole body of knowledge and individual knowledge is in relation with the formula : $Ratio = \frac{Entire\ \ Knowledge}{Individual\ \ Knowledge} = \frac{e^n}{\frac{1}{10}} = 10e^n = \infty$. The graph of knowing is unpredictable, and it is going to change with respect to time. Obviously, the individual knowledge declines exponentially with respect to time. Despite the fact that individual knowing descents as entire knowing tends to infinity, new generations are getting smarter than the older generation. The rise of quantity and quality of the entire knowledge provides individuality with effective teaching and learning methods. Consequently, the growth of knowing impacts individual understanding to elevate to a higher level. The best, study case that proves enhancement of intelligence is justified in 1930 and 2010 IQ tests scores, which elucidates individual knowing expansion. The exponential expansion of knowledge does not grow indefinitely; after a finite number of knowledge doubling, it will reach the point of impossible expanding knowledge. Until then, we believe mathematical facts that show doubling knowledge will occur every twelve hours.

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