

You shall not pass. The untouchable pillar of governments; Education & the rapidly innovative “Technology” of today

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Abstract

Looking at innovation, it is very hard to not feel overwhelmed by what is happening all around us. This has been going on since man first got to the moon. Now though technology is changing and affecting our daily lives in a very real and seeable way. The objective of the research is to try to understand the gap within education and technology. Though this might be a very subjective study I believe it is a real conversation we need to have to be able to create support systems where we could understand how to suffice the needs of the next generation. The approach I took was researched base and looked at the evolution, regarded the factors of today and took it on a case-by-case basis. The outcomes that were derived from the research shows that there are very technological areas of the world that flourish and give advantages to student were as the rest are just trying to keep up. It is clear that the private sector is pushing forward technologically and reaching new heights every day but the fact is that we are no longer in a knowledge base society we cannot keep teaching our kids the same way, they are living in another reality where information is everywhere. The have to be given a place to learn from their mistakes and be able to push the boundaries of a book.

Keywords: *learning, machines, reform, teaching.*

In a TedTalk entitled Imagining the Future: The Transformation of Humanity by Peter Diamandis (Diamandis, 2017) states that technology is changing so fast it is having implications on the world of today in the following ways; Literacy has gone up from 12%-88% in over 100 years, transportation is 100 time cheaper, communications is 100,000 times cheaper and knowledge is millions times cheaper. In 2010 only 23% of all humanity were internet users, by 2022-2025 we will have 66% of the world being internet users. The way we shop, we learn, the way we travel, think, work our whole world view will change because most of our

communications, time at work, even free time will be spent on the internet. Technology is changing, innovation is coming and spiraling faster than we could imagine. That being said we could thank technology to all the advancement in every field, we could see positive out bringing in what we might find within our everyday lives, which all focus around the 15 subjects below that governments try to manage on an everyday basis.

- Security.
- Government and civil rights.
- Democratic elections.
- Criminal justice.
- Human Rights.
- Corporatism.
- Healthcare.
- Education.
- Housing.
- Environment.
- Economy.
- Media.
- Food and Water.
- Transportation.
- Worker rights and creation of jobs.

Innovation, technology, modernization, artificial intelligence, sustainable development, resilience, human-robot interactions, democracy, information, global warming, climate change; these are all words that are thrown around when talking about the future, when trying to solve the difficulties around the 15 subjects that are above. The idea of globalization was one that really created a spur for the notion that the world isn't getting bigger, it is actually getting smaller, people are choosing more and more to move into urban areas as the population continues to grow in number, while capitalism is raking in the money. The rich are getting richer and the poor are getting poorer and we are more interconnected than ever before, through media, communication, economies etc... Sounds like a very uplifting start to an essay that is suppose to talk about the future and how innovation and technology is going to solve all our problems.

The fact of the matter is I am not a specialist in any of the above fields, I do not know what I could bring to the table regarding new technology that could advance human thinking. What I could do is write a long story like Jules Verne did and talk about my dreams of what I believe is the next step but unlike Jules I am not a story teller; his stories sparked the imagination of many young thinkers of our time, and later those ideas or vision that Verne put forth, how we reach the moon, the use video conferencing, travel around the world in 80 days, explore the depths of the sea... etc all came true. I unfortunately do not have the words to beautify my imagination to such extent that would keep people reading long enough to care to understand what I believe is the next big adventure for human kind, I will leave that to the crew at Universal Studios and Marvel which are doing a fantastic job.

Therefore what does that leave me with? Well throughout my research and the years I have been in school I kept asking myself one thing. What next? Not in the sense that “what is the next big thing” but what can I learn next within my field. What is happening with all this innovation where do I jump in or fit in.... It has been an overwhelming task at that. Nevertheless, the question that I do want to discuss which I believe is in direct link to all the 15 subjects above and linked directly to governance and innovation is the tall untouchable pillar in our government which is **educational reform**.

The world is changing, technology is changing, people are no longer thinking, learning the same way, the tools are constantly being upgraded, whether that be the new computer, new calculator (if anyone still uses that), all in all what differentiates ourselves (humans) from machines. Firstly we have to agree to one thing when talking about education, the fact is that education is a **resource**, some countries and cities have realized that and have created specific policy to attract the brightest and most intelligent minds from around the world. Second fact is that education is at the responsibility of governments to make sure it is a **public good**, all have access and all have a right to learn no matter what their status, ethnicity, wealth and social class.

But the big question is why education? Why do we need primary schools, high schools or even universities.... What is the reason to why have these structures been created? What is so important that I need to go to school to learn when I have YouTube and all its tutorial videos? Why do I need a diploma? A bachelor’s degree? A master’s degree? Look at mark Zuckerberg, Steve jobs, Michael Dell, Paul Allen, Dave Thomas (KFC), Henry Ford (Schmitz, 2011)... all extremely successful people who did not go or did not finish school. Well maybe these are all one offs, maybe they are all just the lucky ones... or maybe they are the ones that understood what it means to move away from knowledge base thinking and create, think, imagine, but also work extremely hard and push to reach your dreams.

We are currently learning on a knowledge basis formula, from when we are small the teacher has a book with key things we have to know or master to pass to the next grade. Right now main subjects are: Math, Science (chemistry, biology, physics), Languages, Social Science (all mandatory in schools depending on country of origin) then there are optional which are arts, physical education, shop... more depending on what your school offers; The mandatory subjects are all based on knowledge, the curriculum for these subjects started to exist some 200 years ago, yes there has been advancements, yes there have been new information, corrected information and we are constantly pushing the boundaries. But it remains knowledge base thinking; we read, memorize and then get tested on what we know. After that a lot of us forget, the problem is that computers have all that knowledge and it is available to us at the click of a button and computers they do not forget. Therefore whether I know the capital of France is Paris or that the square root of 81 is 9, it does not matter. The next generation has to be taught something that is completely different than what the machine could do and what it can accomplish. There has to be a distinct difference between what we do and what machines do, which is extremely hard to predict due to the fact that who knows what the next great inventor could bring forth. 200 years ago if you told a farmer that they would

be self-driving a tractors and they would use flying machines to scatter seeds he would think you're crazy (Bandoim, 2019).... Today this is what the future of farming is. It is no longer the bond and duty of a man using a horse to plow his fields. Therefore skills need to be taught and not knowledge base learning and this is where I want to begin the more critical part of my essay. I know this essay was to think about future technology and AI etc, but the way I believe I could make things different isn't by providing internet to all or by imagining the world with its new possible gadgets, but in providing a way of offering a new way of thinking while moving forward and staying optimistic within the problems society has and believing that this experience called education is something that will be passed down from teacher to student. Therefore what subjects and disciplines should be taught? Angus McMurtry & Robert Y McMurtry state that:

“Traditionally, subjects and disciplines were taught as ‘the facts’: objective, unchanging truths that existed independently of human knowers. But from a relational perspective, they are neither objective truths nor idiosyncratic, subjective inventions. Instead, they are valuable, constantly evolving cultural tools and practices that help us to interact with the world in (hopefully) ever-more effective, nuanced and ethical ways. (McMurtry A, 2016)

I grew up learning that there are 8 planets in our Solar System; I learnt them all by memory (I can't name them all anymore). I remember questioning that fact and saying, well what if there are more and we do not know... I remember to this day that the teacher (who was a very lovely teacher still one of my favorites) stating that it is a known truth and it is published I must not question it, if it were untrue then it couldn't have been published....Well little and behold, that changed, we no longer have only 8 planets, and Pluto isn't considered a planet anymore... The main point is that we shouldn't teach facts; facts bore kids and in my case taught me to not question things, until I was later in university, where I learnt it was okay to think independently. Tools, instruments, ways of thinking, methods, procedures, systems, techniques, practices, means in which students could find answers are ways in which we could guarantee success of the future, not facts. Facts can be found by the students, they can come to their own conclusions, but understanding, thoughtfulness, fulfillment that is gained through trial and error.

Therefore what is important and what we should teach through the many subjects isn't tests, quizzes, statistics that people forget. I know because I've experienced this I cannot remember what the final exams from last year were specifically on but I do remember every paper and presentation I did. What new high-tech companies are looking for nowadays isn't knowledge, its experience or no experience. Because through experience you learn to be a “self-governing thinker” to work within a team setting, to believe in yourself, to care for others and to find and know value in everything. Computers and technology cannot do those things just yet. Therefore how do we teach our next generation to think in that way, how do we push from knowledge to learning environments. Or companies require no experience and they can mold you exactly how they want through their systems, which require understanding, hard work and a good positive mentality.

Therefore if machines, computers are taking over jobs and intertwining themselves in every part of life and culture, how do we develop what is more than

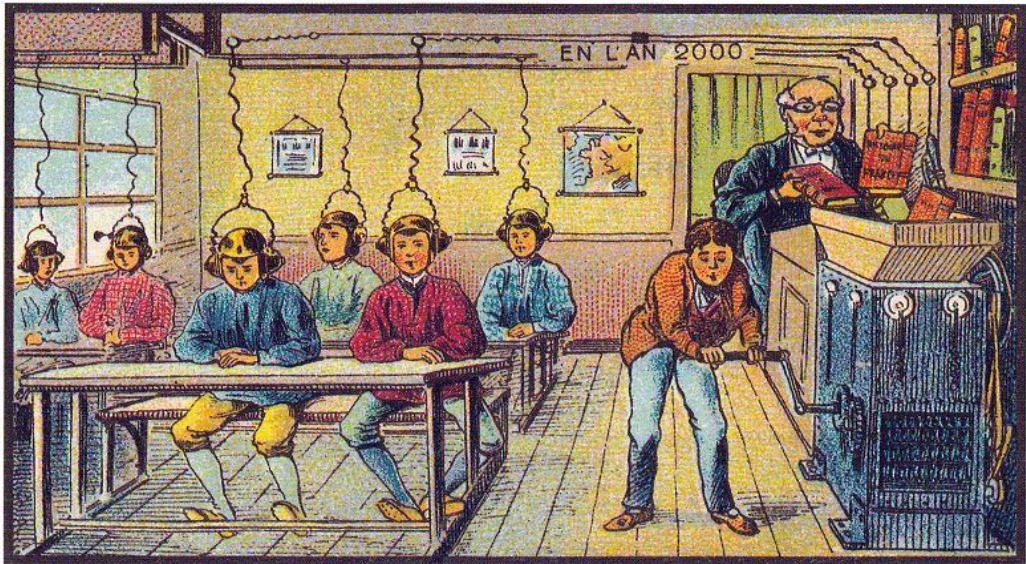
just numbers formulas and move towards creativity, originality, vision and that in my point of view is done by doing things that a machine can't do, which is sports, music, art these things cultivate the part of the brain that pushes us to be fluvial in understanding of oneself. I was lucky enough within my years to play sports, to learn music and these two things developed my way of thought, developed attributes in me. I learnt strategy, teamwork, hard work, perseverance, I learnt beauty, compassion through these very basic but emotive undertakings that have and will constantly change me forever. That being said not everyone is an artist, musician, or athlete, doesn't matter, the attributes are what is important. We like to hail the mightiest of athletes because of the constant competition and glory it brings to be the best. But we tend to forget that these are the things that shape us. The creative gene to code the perfect software doesn't come from C++ manual. The manual could tell you how to push buttons but it takes an artist, an engineer with creativity to be able to program to what is required in our day. Robots could input code faster than we can, though the creative gene is unattainable for them...for now.

The important part within our educational system is creating a safe place for **failure for mistakes**...We get rejected on a daily basis, we have to prove ourselves to the world everyday, but if we learn from the mistakes that's where we learn the most. That doesn't mean that by learning from mistakes we will be able to avoid all but it makes us learn the attitude on which we should push forward throughout life. As the film Forest Gump says: "Life is like a box of chocolates you never know what you will get." With that in mind how do we prepare the next generation for what is to come. How do we strive to flicker imagination in the eyes of students, how do we make them develop wisdom, not knowledge.... How do we push the boundaries of their creativity and create experience driven learning. 200 years ago we were focused on manufacturing, now that we are efficiently solving all of our labor and production needs through robots, machines and AI. The way we produced has changed the way we teach has to change with that. Mass production is not our main problem anymore. Sustainability, resilience, quality of life, comfort, joy, belonging.... I could think of words forever that might mean something to someone reading this.

The main point is that we need change in a way that we do not seek knowledge but understanding. When studying in high school I was lucky enough to be part of a pilot program where all the kids were given a laptop and we learnt via teleconferencing with the teacher twice a week for certain classes. Specialists the best of the best though means (laptops) and we changed from pen and paper to computers. Now all of the kids within the same school district have laptops and they are no longer learning through books, but online journals, presentations, there is more information available to students online than any highschool library... how do we cope with that. Technology has entered within the walls of our schools however we remain rigid to the knowledge base teaching instead of understanding. A good example is the idea of having a laptop, working on a laptop, understanding software (proclaimed expert in Microsoft office) but not knowing how the computer works, not knowing how to explain the internet, servers, satellites. We get taught about every muscle in the body but we cannot understand the components of a computer.

We memorize the periodic table but cannot understand the difference between 4GB of Ram and an intel processor I7. These things should be taught in school, we need to understand the machines we are using to understand how to push the boundaries farther. But... that is not in the curriculum, Buckminster Fuller came up with the term Ephemeralization (Friedlander, 2015): which is doing more and more with less and less until eventually you can do everything with nothing. Lately the technological “machine learning” which is exactly what it sounds, machines being able to learn from themselves, from us using them has blown up due to the fact that we have not only proper code but also we now have the computational power to run algorithms which to some look like they are never ending, the algorithms could then learn from itself and self-correct. The future will not need translators as machines could translate in real time (google), you do not need to go to a walking clinic to get a quick check up as machines could take our vitals instantly. Basically we will all have our own Jarvis from the avengers, which could calculate almost any chance of success in any situation and know our health at any point.

In 1899 Jean-Marc Cote created a vision for the education of the future, more specifically the year 2000: (Aldersey-Williams, 2013)



At School

Figure 1. (a); 1899 Jean-Marc Cote

The tools were understandable then when people in 1799 understood that education would change with the invention of new technologies as seen above. Another picture that I want to show is that of the University of Kentucky libraries (Cuban, 1986):

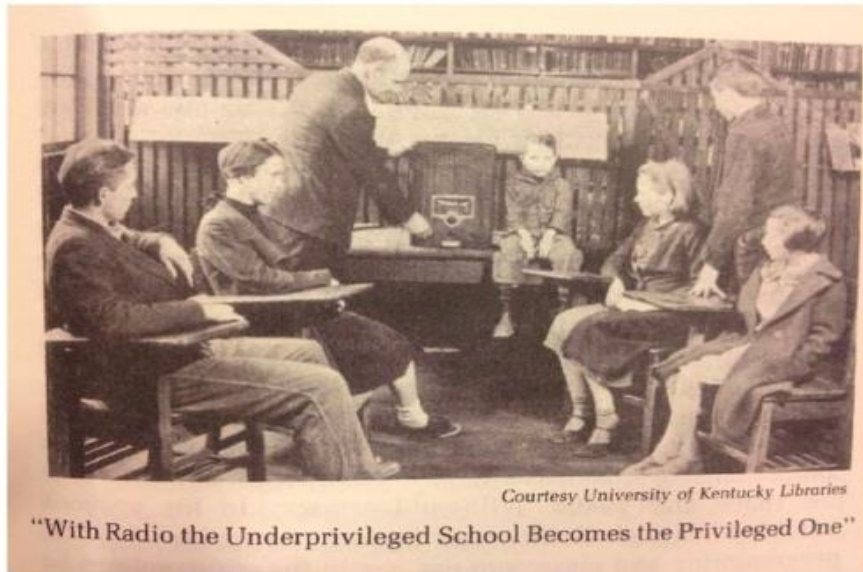


Figure 2. (a); University of Kentucky libraries (Cuban, 1986)

The use of Radios would concur the knowledge from one end of the country to the other. Students could hear and learn just from listening to a box with a funny sound coming out of it. This was the revolutionizing technology that was back then.

The tools that will be implemented from the bottom up or the private sector within our lifetime in schools if they haven't already is virtual reality head gear, Google has created ways in which through small cardboard cutups to transform your phone in a VR device. 3D printing instead of regular papier-mâché showing tells to transform what you are imagining into real life. Cloud technology, which will completely get rid of the old heavy books that we used to carry around from class to class. Biometrics technology could be available to sign into class or take out equipment from the school. Holograms technology is still expensive but could come up within our lifetime to take away our old projectors, which would allow teachers to give lessons from across the world. The potential is amazing and scary because it could make us forget how to live in the real world, unplugged, surrounded by nature and creating more time and less stress.

Therefore how do we even tackle such a curriculum reform, well it has already begun, in the "silent of the night" as one would say. These reforms are slowly happening from the bottom up. Change is happening through the adaptation of students with ideas on how to proceed through learning and with teachers using what they have at their disposal to enrich the learning experience. I believe it will continue to happen from the bottom up, slowly all around the world until even the private sector gets involved and slowly things will change and the pillar of education will fall and further more require change. Let's hope that it does not come to that, Education is changing isn't only about teaching and transmitting knowledge; it is changing to managing discovery of the future. There are success stories happening throughout and I would leave you with this: Canada, the province of British

Columbia, created a new discipline within their curriculum called “Applied Design, Skills and Technologies” (BC, 2018), Kids learn how to build things, how to create code, design, how to communicate big ideas, by building prototypes and optimizing solutions through project base hands on learning. This is all to the fact that the jobs and technologies of the future require these skills. The jobs that we are preparing our next generations might not exist now in our time they are jobs that will be created to suffice a community and global need.

The ball is rolling, and we cannot stop it. The idea is that we need to maintain and keep up with it and not loose control. The world is getting smaller, mistakes are becoming less apparent when working directly with machines. It is imperative to know that without mistakes one can't learn and to be ashamed of mistakes isn't something to be taught within our educational system. The imagination is our biggest deterrent when we compare ourselves to machines it is the one thing that could allow us evolve more, from knowledge base teaching that focuse on statistics, facts and numbers to learning environments which create skills and experiences and develops mindsets to empower and prepare generations to come. This to make sure they understand themselves and society to create a prosperous outcome.

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