Convocation 2018
Monday, August 20, 2018
"Convocation Remarks"
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286
196
162

What is the pattern or relationship? What do these numbers mean?

286
196
162

Come on...this is a mathematics academy…Would it help if I told you that these numbers have something to do with June 1, 2019?

286 is the number of all days between today and June 1, 2019. Does anyone know the significance of June 1, 2019?

196 is the number of all business days, excluding weekends and holidays between today and June 1, 2019 Graduation day for the class of 2019. Are they in the house?

And 162 days is the number of all classroom days, excluding weekends and holidays, excluding extended weekends, and excluding final exams between today and June 1, 2019--graduation day for which class? 2019!

Good morning and welcome to Convocation 2018!

Class of 2019, let's not be too anxious for graduation...before you know it, you will be walking and receiving your diplomas and medallions and leaving IMSA.

Over the past few days, I welcomed most of you personally on move-in day. To those I have not personally welcomed, please accept this welcome on behalf of the Board of Trustees and all IMSA employees. To the Class of 2019 and 2020--welcome home! And to the class of 2021, welcome to the IMSA family!

I want to recognize…VIPs (very important people)

Board of Trustee member...Scherrick

Elected officials...House Rep. Chapa LaVia

I would also like to welcome and recognize our Ambassadors and Emeriti, these are former employees, both staff and faculty, who served with distinction for at least 10 years and retired from IMSA. Please stand.

A special guest with us today is Dr. Judy Vargas, wife of Ambassador, Jim Bondi, our first Chief of Security. Welcome Judy!

We also have another group in our midst that I call "VS VIPs" (very special--very important people): IMSA faculty and staff, including Resident Counselors, please stand.

Students, please give a warm welcome our VS VIPs!

Today, we live in what some have called the 4th industrial revolution--one that is revolutionizing industries all over the globe through:

- Additive Manufacturing
- Artificial Intelligence
- Internet of Things
- Self-driving Vehicles
- Quantum Computing
- Biotechnology

This morning, I want to explore with you just three exponential technologies that are part of this industrial revolution; I want to ask you to imagine where

these technological improvements may be in 20 years-the year 2028, and have you consider some of the ethical implications of these advancements.

In light of IMSA's mission "to ignite and nurture creative, ethical, scientific minds," I believe that we ought to consider the ethics of exponential advances. Wouldn't you agree?

The **first** exponential technology that I want to discuss is autonomous or self-driving vehicles.

Already 28 states have considered 98 bills related to the general topic of autonomous vehicle. Policies, laws, and rules are what I would call "pixels" in a complex portrait of ethical considerations.

Self-driving vehicles pickup and drop off persons in several cities, such as Boston, Pittsburgh, and Phoenix.

Embark, founded in 2016, is a company of self-driving semi-trucks that started shipping refrigerators regularly from Texas to a distribution center in Southern California.

They recently completed a coast to coast 2,400 mile 5-day trip from California to Florida.

This exponential technology, autonomous vehicles, will not only disrupt jobs (truck drivers and taxi (and now Uber) drivers), but it will also have implications for car insurance, for car ownership, for when, or if people will get drivers' licenses.

What about the implications for parking, commuting and suburban living, ethics?

For example, how shall we program the self-driving vehicle when it is faced with two options: drive into a crowd of people, or drive into a single baby stroller, or an old men with a cane or walker...or a tree killing only the passenger?

Our ethical stance will drive (pun intended), or inform our software programming of autonomous or self-driving vehicles.

A **second** exponential technology is additive manufacturing, or 3-D printing.

Additive manufacturing technology is now being used creatively to make everything from jewelry to fashion to aerospace—they have already 3D printed jet engine parts.

You might already know how this technology is being used medically to create dentures, bones and even human organs and body parts, such as limbs and vascular systems using groundbreaking 3D bioprinting techniques.

Today 3D printing advances are already achieving remarkable things, how much more disruptive will this exponential technology be by 2028!

In 2014, for example, surgeons in Britain used 3D printed parts to reconstruct the face of a motorcyclist, Stephen Power, who had been seriously injured in a road accident.

In October of last year, a 20-year old woman, Penelope Heller, was fitted with a custom 3D-printed sternum and rib cage at the New York-Presbyterian/Weill Cornell Medical Center. She suffered from a rare bone cancer.

And in January, scientists in China printed ears for 5 children who had a condition called microtia in which the ear is underdeveloped. This was a cosmetic surgery since this 3D-printed ear was not functional/could not hear.

What jobs will be created because of this exponential technology? What are the ethical implications of 3D printing?

What if every person on the planet, no matter their country, socio economic status, political affiliation everyone in the world, had a powerful 3D printer that could print: clothes, food, currency/money, body parts, weapons?

Earlier this summer we saw some of the ethical issues about 3-D printing guns, didn't we?

19 states joined together this month to block a settlement that the Trump administration reached with a company that wants to post online plans to make fire arms (a gun called the Liberator) on a 3D printer.

The ethical issues around 3-D printing are just emerging because policies, regulations, and laws lag behind the exponential change of technology.

The **last** exponential technology that I want to mention is Artificial Intelligence or AI.

Fortunately, there are hardly any ethical concerns surrounding AI, are there?

Have you heard of the AI robot that passed a college entrance examination?

The Todai Robot was able to write a 600-word essay on maritime trade in the 17th century that was good enough to meet college entrance criteria. Take that Dr. Clay Skinner!

Noriko Arai, AI expert and member of the team that built the robot, explains in her TED Talk, "Can a Robot Pass a University Entrance Exam?" that this wasn't because it possesses intelligence, but rather because it recognizes key words.

"Our robot took the sentences from the textbooks and Wikipedia, combined them together, and optimized it to produce an essay without understanding a thing," Arai says.

...sort of like how I wrote this speech...not, just kidding.

Students don't get any ideas!

What can Todai Robot not do: discover, create, find meaning, consider ethical questions as we have been doing this morning.

One last thing to show you how crazy it's getting with AI, just last year in October 2017, a humanoid robot developed by Hanson Robotics named Sophia was granted citizenship in Saudi Arabia.

Sophia made history by becoming the first AI to gain citizenship.

Where will we be with AI in 20 years? I don't know.

But I imagine that there will be significant ethical questions to consider along the way.

I also know that the speed of change and adoption of technology is accelerating exponentially.

As Justin Trudeau said, "The pace of change has never been this fast, yet it will never be this slow again."

I am convinced that the mindset that we need to live in this age--the of the 4th industrial revolution is one of exponential thinking--by which I mean recognizing technology's exponential growth-rate and visualizing the future not just 5, 10, or even 20 years from now, but several generations from now and beyond.

For example, we cannot meet the goals of no poverty, gender equality, and climate action, three of the 17 United Nations Sustainable Development Goals by thinking linearly, we need to envision double and 10X improvements using exponential technologies; we need to think exponentially to meet the United Nation sustainable development goals.

According to the world economic forum, we need 10 skills to survive the "robot invasion"

Based of this explosion of new fields, new markets will emerge which will require a new set of skills for employment. Increasingly smart robots will take over some jobs, and jobs that didn't exist before will be in-demand.

In the interest of time, I will only list not amplify the top 10 skills identified by the World Economic Forum.

I will pause after each one to allow those of you with experience at IMSA, Class of 2019 and 2020 (and IMSA faculty and staff, including RCs, and our VIPs) to reflect on how IMSA is building these skills into each of our students.

Class of 2021, I have some good news for you; you will learn these skills at IMSA: in classrooms, through our research and internship programs, and through your involvement in our resident life programs, through extra curricular programs, and athletics.

Here are the 10 skills as identified by the World Economic Forum in 2017.

1. Complex Problem Solving
2. Critical Thinking
3. Creativity
4. People Management
5. Coordinating with Others
6. Emotional Intelligence
7. Judgment and Decision-Making
8. Service Orientation
9. Negotiation
10. Cognitive Flexibility

I would add 3 more skills to this list. I have already made my case for two of these skills:

1. **Ethical thinking**
2. **Exponential thinking**
3. **Deep work**--Cal Newport defines deep work as the ability to focus on cognitively demanding tasks while quickly mastering complicated information and producing better results.

Finally, as you can imagine, in a world of accelerating change, where the pace of change has never been this fast, yet it will never be this slow again, learning is a key competitive advantage…

Eric Hoffer said, Learners inherit the earth, while the learned find themselves beautifully equipped to deal with a world that no longer exists.

As I close, let me leave you with 3 big questions that I hope you will reflect upon and discuss during lunch, at tomorrow's picnic, and with each other over the next few days.

Q1-How can we balance innovation with mindful execution?

Q2 - How can we ensure emerging technologies are actually solving more problems than they are creating?

And Q3 - Are we making lives better for others, or just for ourselves?

So, let's brace ourselves for an amazing and a fast year at IMSA!

Thank you!

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