Héctor U. Levatti, Construction Master Builder, 1989.

Pros & cons of Covid-19 pandemic in Technical Education

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Pros & cons Covid-19 pandemic in Technical Education

Dr. Héctor U. Levatti
11th November 2020

Abstract

The pandemic generated by Covid-19 acts as a magnifying glass that shows the weaknesses and strengths of health, social, economic and government systems.
The virus shows how interdependent and connected we are.
The pandemic accelerates the phenomenon of technological disruption, which is causing the disappearance of half of the jobs in the world.
Covid-19 also produces the arrival of countless new opportunities.
The world changes at breakneck speed and with it our profession and our careers.
Today, the key to professional success are continuous training, resilience and adaptability to the changes that occur daily in the technological world.
More than ever we participate in a race where results depend, among other things, on the ability to adapt to changes.
Construction master builders and Electromechanical Technicians solve technical problems using tools and knowledge. Today, access to tools and knowledge has no limits if we guarantee access worldwide web.
Let's reflect on these issues and see in which areas we can work as Construction master builders and Electromechanical Technicians in a technological world under an unprecedented pandemic.

Content

➢ *Who am I?*

➢ *Changes in the world*

➢ *Technological disruption*

➢ *What can we contribute as professionals?*

➢ *Connected and interdependent*

➢ *Covid-19*

➢ *Examples of the present and future of civil engineering*

➢ *Conclusions*

Who am I?

I'm Hector, a formosenian, I lived in Formosa until I was 18.

I lived in Corrientes for 14 years (1990-2003).

My wife is a correntin and I have a 22-year-old son.

I lived in Barcelona (Spain), Lausanne (Switzerland), Swansea (Wales) and now we live in London (England).

Civil Engineer and PhD in Geotechnical Engineering, Senior Lecturer, Researcher and I have a million projects to be implemented.

Currently, I work at LSBU, CCiBSE and in collaboration with UPC, Coventry University and other universities and institutions.

The changes in the world

Construction Master Builder (MMO) in 1989 (31 years)
Getting a book was a challenge
(Limited access to information -> knowledge)
There was no internet or cell phones, computers ...
(PC Commodore 128, no network access)

Today we have unlimited access to the information but
it's not knowledge until it's processed.
What's the world like today?
What will the world be like in five years?
I'm 49 years old, what will the world be like when I'm 54-55?

There will be more changes over the next 20 years than in the past 2000 years.
To face the changes, the only possibility is the Continuous Training in a Dynamic World.

The changes of the world

Technology provides us with powerful tools and we are certainly living in a technological age.

Information, connectivity, virtual reality, augmented reality

Technological Revolution!

This is not the first time such a revolution has ever been produced. Language and writing has had a deeper impact than all current technology (≠ Speed).

Our brain is the most powerful tool.
However, if we don't exercise it, it's like a Ferrari without a motorway, a Smartphone without internet.

Technological Disruption / Disruptive Technology / Disruptive Innovation

Technological products and/or services that abruptly replace dominant technologies.

- ✓ *Writing replaced those who memorized stories*
- ✓ *The brick replaced wood, leathers and adobe*
- ✓ *Portland cement shifted to adobe, lime and natural cements*
- ✓ *Transistors replaced the electronic bulbs*
- ✓ *Microprocessors replaced transistors*
- ✓ *Car replaced horse-drawn carriages*
- ✓ *Mobile phone replaced landline, cameras and computers*
- ✓ *The Internet is replacing air TV*

Technological Disruption / Disruptive Technology / Disruptive Innovation

Technology is replacing people in all easily programmable repetitive tasks

CAE (Computer-aided engineering; Ingeniería asistida por ordenador)
CAD (Computer-aided design; Diseño asistido por ordenador)
Optimización estructural (topología y optimización)
Análisis de tensiones (FEM: Finite Element Method)

+

Artificial Intelligence
Unlimited access to information (Internet)

ALL OF THIS IS EVOLVING VERY QUICKLY

Is this the end of the technicians?

No, but you have to offer something that adds value to technology

What can we contribute? Added value

Developing our Learning Capacity

Recognize our Limitations

Eliminate Error Stigma (resiliency)

*Empower creativity*

Encouraging Collaboration

Giving value to Diversity

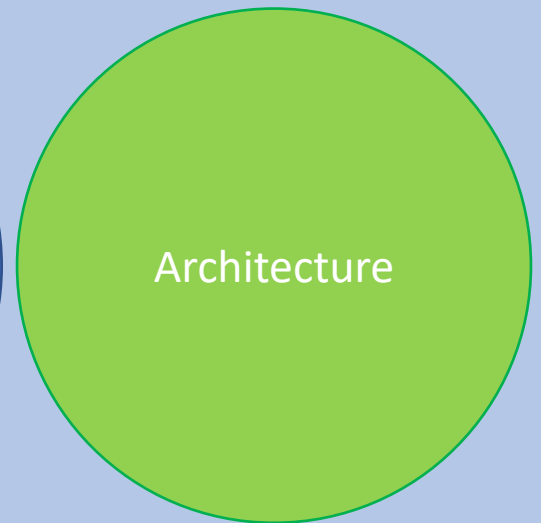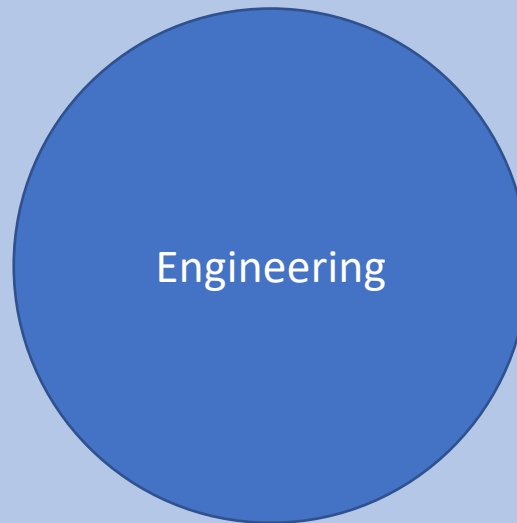*We need to learn how to learn and develop our creativity*

Connected and interdependent

A few years ago we divided reality into well-defined parts so that we could study and understand it (Physics, Chemistry, Biology, Geology, Engineering, Architecture)

Suppose we're going to build a hospital

Engineering

Engineering

Architecture
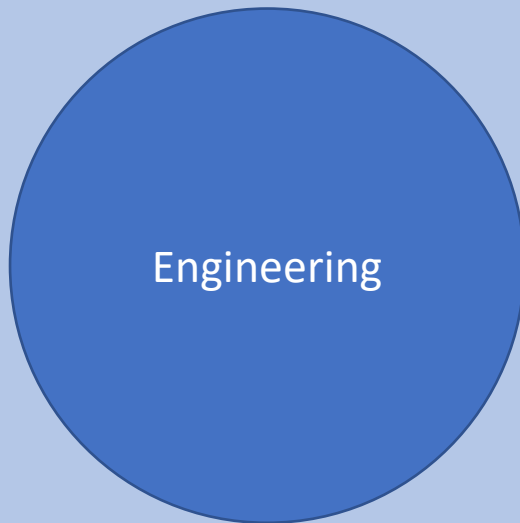
Disciplinary

Multidisciplinary

Connected and interdependent

It is known as interdisciplinarity to the quality of interdisciplinary (i.e. what is carried out from the implementation of several disciplines). The term was reportedly developed by sociologist Louis Wirtz and would have been first officialised in 1937.

Suppose we're going to build a hospital
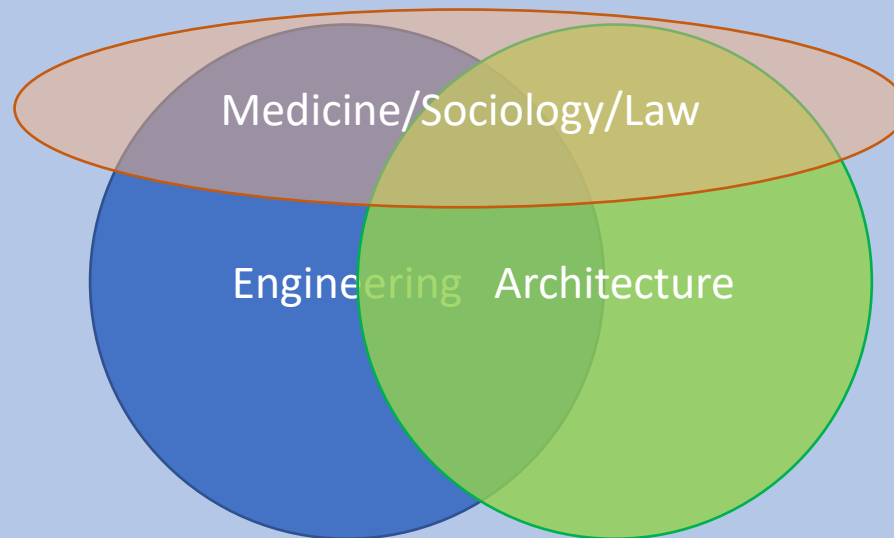
Engineering   Architecture
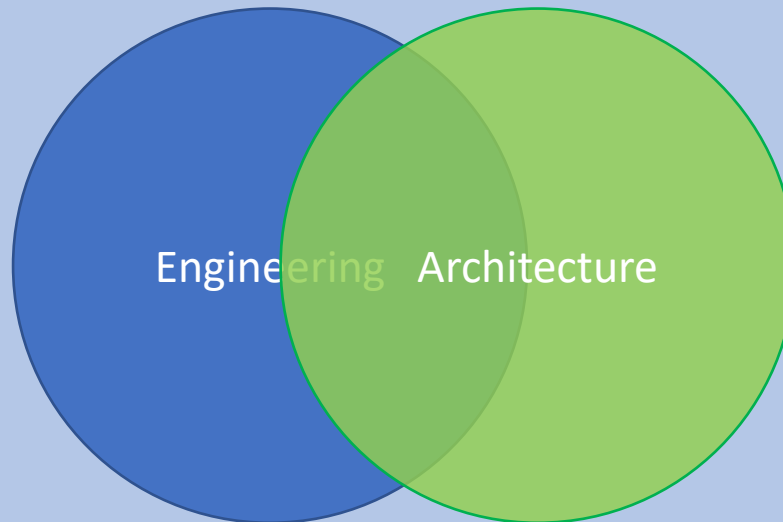
Interdisciplinary

Connected and interdependent

Transdisciplinarity connotes a research strategy that crosses many disciplinary boundaries to create a holistic approach.

Suppose we're going to build a hospital

Medicine/Sociology/Law

Engineering   Architecture

Transdisciplinary

Connected in interdependent

The concept of racing is obsolete, it should disappear.
The time it takes to concrete a Race is too long.
In five years the world changes and what was valid ceases to be.

Cross-cutting content is very important
(critical and own thinking, responsibility, recognition of the common good).

Education changes society when it produces people with self-thinking and critical sense.

We must educate on values.

Covid-19

Acceleration in the implementation of remote work, especially university education
Disruption

Highlighting the degree of interdependence in the world

Highlighting the possibility of living in a different way by less impacting the environment (Sustainability)

Highlighting the fragility of the individual and the population

Highlighting the impact of political decisions on the global and local economy

ROBOTICS IN CONSTRUCTION
Firefighting using drones in the work site

Student: Liam Mitchell
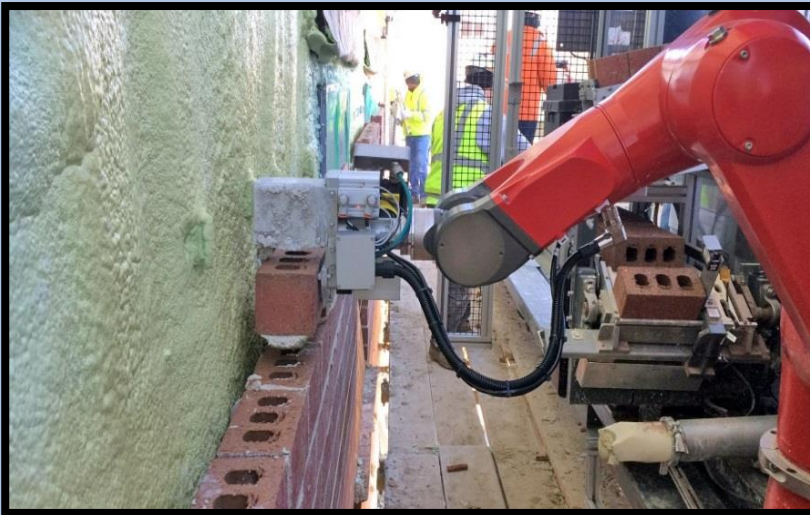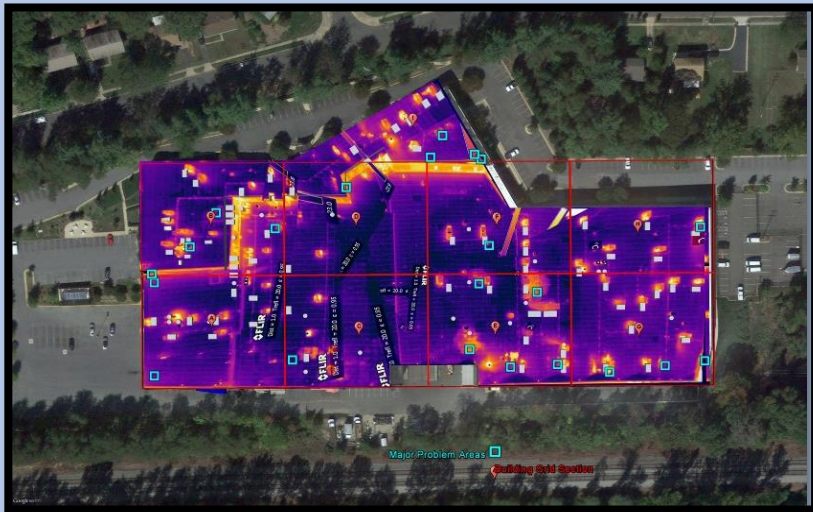Supervisor: Dr Héctor U. Levatti

Demolition

3D printing

Stackers

Drones

ROBOTS EN LA CONSTRUCCIÓN

Fire extinction in construction siteers using drones

Firefighting
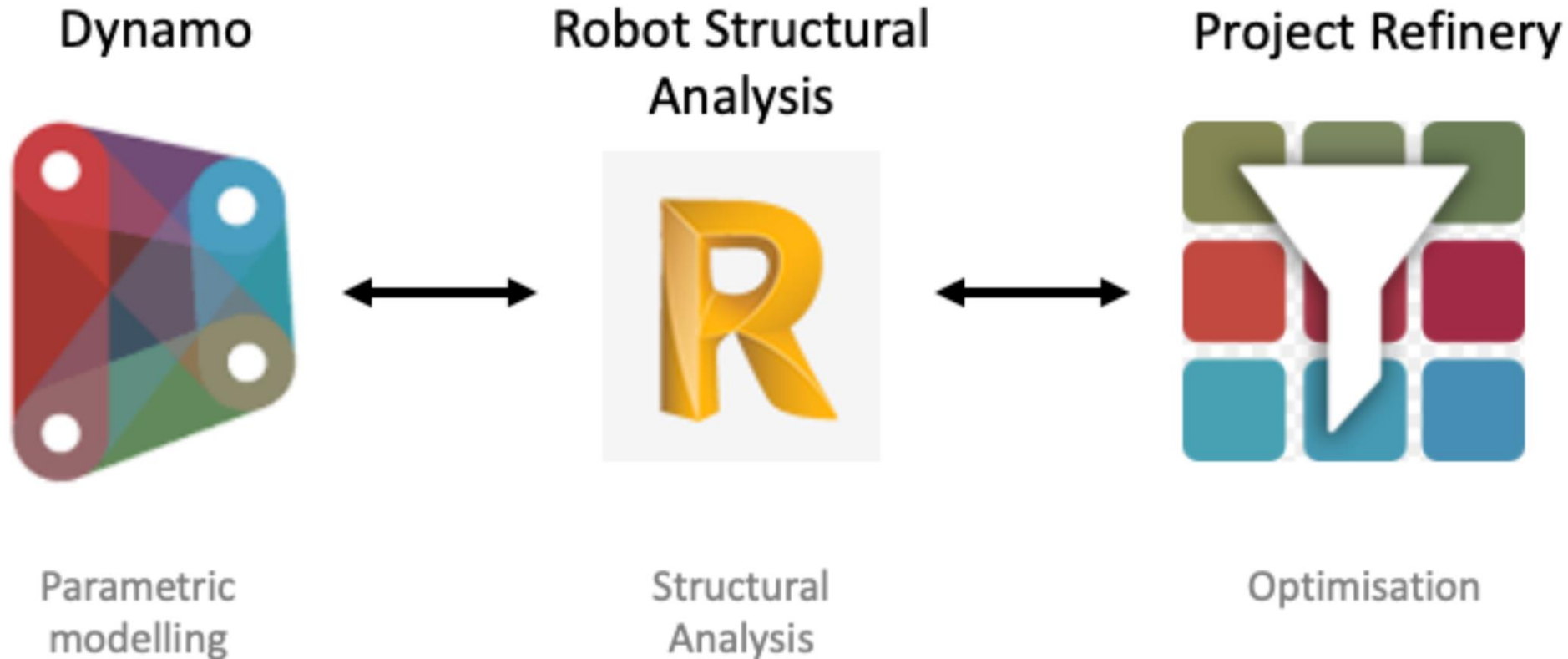

Thermal vision

Thermal vision

OPTIMISING THE CHOICE OF STEEL PROFILES FOR STRUCTURES
USING GENETIC ALGORITHMS

Student: Akira Kanakuri Aguirre
Supervisor: Dr Héctor U. Levatti

Genetic algorithms are a subclass of algorithms called evolutionary algorithms

Dynamo	Robot Structural Analysis	Project Refinery
Parametric modelling	Structural Analysis	Optimisation

CREATIVIDAD!

Study of the evolution of species and how evolution optimizes organisms to optimize structures.

Conclusions

It must be acknowledged that we are living through an era with a degree of unprecedent technological development

Today, the most important thing is to learn how to learn and develop creativity, resilience, adaptability and self-thinking

Information and technology need to be managed to transform it into practical knowledge to solve problems

You can educate and solve problems in a lot of ways and with different tools

The best tool is our brain and the interaction between us, between our brains (collaboration and diversity)

Acknowledgements and References

"From well-born people it is to thank the benefits they receive".
Don Quijote de la Macha. Miguel de Cervantes Saavedra.

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Questions?

¿Preguntas?

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