



CODEx OF THE
FUTURE
SERIES

THE FUTURE OF EDUCATION AND LEARNING 50 THE NEXT YEARS

UNLIMITED THINKING . EXPONENTIAL POTENTIAL

BY MATTHEW GRIFFIN



ORDER COPIES

311 INSTITUTE



GLOBAL FUTURES ADVISORY : EDUCATION : FORESIGHT : INNOVATION : STRATEGY

ABOUT THE AUTHOR

Matthew Griffin, an award winning futurist and author of the Codex of the Future series, is described as "The Adviser behind the Advisers" and a "Young Kurzweil." Matthew is the Founder of the 311 Institute, a global Futures and Deep Futures advisory, as well as the World Futures Forum and XPotential University, two philanthropic organisations whose mission it is to solve global inequality and the world's greatest challenges.

Regularly featured in the global media, including the Associated Press, BBC, CNBC, Discovery, Entrepreneur Magazine, Forbes, Netflix, RT, Sky, ViacomCBS, and WIRED, Matthew's ability to identify, track, and explain the impacts of hundreds of exponential emerging technologies and trends on global business, culture, and society, is unparalleled.

Recognised as one of the world's foremost futurists, innovation, and strategy experts Matthew is an international advisor and keynote speaker who helps many of the world's most respected brands, governments, investors, NGO's, and royal households, explore, envision, build, and shape the future of global business, culture, and society.

BE BOLD. MAKE FIRST CONTACT.

mgriffin@311institute.com
www.311Institute.com



PROUDLY BUILDING THE FUTURE WITH ... & MANY OTHERS

The logo for ABB, consisting of the letters 'ABB' in a bold, red, sans-serif font.

The logo for Accenture, featuring the word 'accenture' in a black, lowercase, sans-serif font with a small purple chevron above the 'u'.

The logo for BCG, consisting of the letters 'BCG' in a bold, green, sans-serif font.

The logo for Bloomberg, featuring the word 'Bloomberg' in a bold, black, sans-serif font.

The logo for Deloitte, featuring the word 'Deloitte' in a bold, black, sans-serif font with a small green dot at the end.

The logo for Disney, featuring the word 'Disney' in its signature script font.

The logo for LinkedIn, featuring the word 'LinkedIn' in a blue, sans-serif font with a blue square icon containing a white 'in'.

The logo for Novartis, featuring a stylized orange and blue flame-like icon above the word 'NOVARTIS' in a blue, sans-serif font.

The logo for Sky, featuring the word 'sky' in a colorful, lowercase, sans-serif font with a gradient from orange to blue.

The logo for Standard Chartered, featuring a stylized blue and green 'S' icon followed by the words 'standard chartered' in a black, sans-serif font.





A LETTER FROM OUR **FOUNDER** **MATTHEW GRIFFIN**

WE LIVE in extraordinary times, in a world where individuals, organisations, and technology can impact the lives of billions of people and change the world at a speed and scale that would have been unimaginable just twenty years ago.

We also live in a world full of challenges, and a world where all too often negative news gets amplified at the expense of good news, and where tales of hope, inspiration, and positivity get drowned out and lost in the noise. It's no wonder therefore that today more people are more anxious about the future than ever before. And, arguably, a society which believes it's marching towards the darkness, rather than the light, has a poorer future than one that doesn't. Hope, however, is all around us and it's our purpose to light the way so all of us, people and planet, can prosper.

TESTIMONIALS

THANK YOU EVERYONE!

#FUTURENOW

EXTRAORDINARY!

Peter K., EMEA Managing Director
ACCENTURE

TREMENDOUS!

Chris T., Head of Creative
ADIDAS

ASTOUNDING!

Peter B., COO
AON

SIMPLY GREAT!

Isaac H., Country Manager
GOOGLE

WORLD CLASS!

Ana C., CMO
LINKEDIN

INSPIRATIONAL!

Jay C., CHRO
DENTONS

BLOWN AWAY!

Nicola P., Global Procurement Director
LEGO GROUP

INCREDIBLE!

JEFF N., Global Head of Learning
PEPSICO

EXCEPTIONAL!

Robert D., Global Strategy Director
QUALCOMM

PHENOMENAL!

Joni R., Head of Strategic Marketing
SAMSUNG

BLOWN AWAY!

Mark R., Dir. of Global Health & Benefits
WILLIS TOWERS WATSON

OUR MISSION.

FOR PEOPLE & PLANET: BUILDING A BETTER FUTURE

OUR MISSION is to be a driving force to help solve the world's greatest challenges, help organisations build sustainable and lasting legacies, and democratise access to the future so everyone everywhere, irrespective of their ability or background, can benefit from it.

We do this by surfacing essential future-focused insights and open sourcing our content, by amplifying inspiring stories and voices, and by bringing people together.

OUR BRANDS.

UNLIMITED THINKING . EXPONENTIAL POTENTIAL

OUR BRANDS compliment one another and align with our core mission, they include:

311 INSTITUTE

Our **globally renown** Futures and Deep Futures advisory working with the world's most respected brands, governments, and investors to explore, co-create, and shape the future of global business, culture, and society.

WORLD FUTURES FORUM

Our **philanthropic organisation** working with the United Nations and other world leading institutions to find solutions to the world's greatest challenges including all 17 UN SDG.

XPOTENTIAL UNIVERSITY

Our **philanthropic university** working with academia, governments, and regulators to create and deliver accessible future focused curricula and educational content for business executives and students from around the world.

**“THE FUTURE AND EDUCATION
ARE KINDRED SPIRITS - BOTH ARE
AWESOME ADVENTURES WAITING TO
BE EXPLORED.”**

- Matthew Griffin, Founder

311 Institute
World Futures Forum
XPotential University

EXPLORE MORE

WANT EVEN MORE
INSIGHTS INTO THE
FUTURE AND DEEP FUTURE?



Explore More

BLOGS • BOOKS • EDUCATION • EVENTS • KEYNOTES
NEWS • PODCASTS • SHOP • VIDEOS & More ...

www.311Institute.com
www.WorldFuturesForum.com



CODEX OF THE FUTURE SERIES _FUTURE PROOF YOUR BUSINESS CODEXES:

DOWNLOAD

Scan the QR code or visit
our **WEBSITE** to get copies



FUTURE PROOFING your business has never been harder. So
we've made everything easy for you.



HOW TO BUILD EXPONENTIAL ENTERPRISES

Exponential technologies have accelerated the global rate of disruption,
now it's your turn to disrupt the quo.

CODEX OF THE FUTURE SERIES EXPLORE MORE



LEADERSHIP LESSONS FROM ORGANISED CRIME

Explore the techniques Organised Crime groups use to grow despite being subjected to huge “competitive” pressures from governments.



STRATEGIC FORESIGHT FOR LEADERS

Explore how you can use strategic foresight to prepare your organisation for the future and turn future scenarios into actionable strategies.



THE FUTURE OF EDUCATION AND LEARNING

Explore how we prepare our children and society for a future where Science Fiction becomes Science Fact.

CODEX OF THE FUTURE SERIES EXPLORE MORE



THE FUTURE OF EXPONENTIAL DISRUPTION

Explore the forces accelerating global disruption and how close we are to disrupting industries in just a day.



THE FUTURE OF INNOVATION AND CREATIVITY

Explore what happens when creative machines and not humans are the dominant creative force in the world.

XPOTENTIAL UNIVERSITY

**UNLEASH YOUR
EXPONENTIAL
POTENTIAL**



Explore More

FUTURES EDUCATION FOR STUDENTS AND LEADERS

www.311Institute.com



CODEX OF THE FUTURE SERIES _FUTURE TECHNOLOGY & TRENDS CODEXES:

DOWNLOAD

Scan the QR code or visit
our **WEBSITE** to get copies



WITH HUNDREDS, thousands, of emerging technologies and trends it can be hard to identify them all and understand their implications. So we put them all right at your fingertips.



311 TRENDS CODEX

Explore the hundreds of megatrends and microtrends impacting and shaping your world and everything you care about.

CODEX OF THE FUTURE SERIES EXPLORE MORE



EXPONENTIAL TECHNOLOGY CODEX

Explore the hundreds of exponential technologies that are emerging in detail and learn about their implications for global culture, industry, and society.



THE EMERGING TECHNOLOGY STARBURST COLLECTION

Use our Griffin Emerging Technology Starbursts to explore the future and find new ways to disrupt the status quo.

CODEX OF THE FUTURE SERIES _FUTURE DEEP DIVE AND EXPERT CODEXES:

DOWNLOAD

Scan the QR code or visit
our **WEBSITE** to get copies



OUR DEEP Dive Codexes explore the future of individual topics in depth. So now you're the expert.



THE FUTURE OF THE CONNECTED WORLD

Explore the future of the technologies and trends that will connect everything and everyone and shape our connected future.

CODEX OF THE FUTURE SERIES EXPLORE MORE



THE FUTURE OF GAMING

Explore the future of gaming and what happens when the simulations become people's new reality.



THE FUTURE OF INSURANCE

Explore the future of insurance, and the dangers of a future where global risk becomes systemic.



THE FUTURE OF SMARTPHONES

Explore the future of smartphones and smartphone formats, and discover what's around the corner.

CODEX OF THE FUTURE SERIES

EXPLORE MORE



THE FUTURE OF SPORT

Explore the technologies and trends shaping the future of sport and sports performance.



THE FUTURE OF SYNTHETIC CONTENT

Explore the technologies and trends revolutionising how content is made and consumed.

CODEX

CONTENTS

Second Edition published June 2023. To request this Codex in an alternative language please contact the author.

24 ... WELCOME FROM THE AUTHOR

26 ... INTRODUCTION

30 ... THE POWER OF THE INDIVIDUAL

Today students have more power in their hands and more power to change the world at unfathomable speeds than any world leaders of olden times, yet we don't teach them how to wield it and we don't teach them how to manage it.

36 ... THE CASE FOR EDUCATIONAL CHANGE

Almost everyone on the planet realises that our Industrial Age education system needs reforming to keep up with today's and tomorrow's realities. Despite this though change isn't happening.

40 ... ADULTS ON UNCREATIVE AUTO-PILOT

As we face a future where Artificial Intelligence

automates more human blue and white collar jobs we're often told that "Creativity" is the skill that will set us apart from the Machines. However, not only is this skill too being automated, but all too often the jobs we do are designed to limit our need to be creative as companies chase the dream of scaleable efficiency.

44 ... THE TIME TRAVELLER'S VIEW

A quick plain English introduction to the Future that is already here and emerging.

48 ... THE TIME TRAVELLER'S DILEMMA

Proving that even with perfect knowledge of the Future we still probably wouldn't have changed our Industrial Age education system - overcoming bias.

52 ... WORLD CHANGING TRENDS AND TECH

The world is changing faster today than at any point in Human history, and while I have created dedicated 311 Institute Codexes to cover all the trends and technologies changing the world in this section I give you a summary of what you can expect when you download and read them for yourself.

54 ... THE TRENDS

58 ... THE TECH

62 ... 2023 Emerging Tech Starburst

64 ... 2022 Emerging Tech Starburst

66 ... 2021 Emerging Tech Starburst
68 ... 2020 Emerging Tech Starburst

70 ... A TALE OF TWO SOCIETIES

76 ... THE PROBLEM TO SOLVE

When it comes to Education reform what are the real societal needs and problems that Education is trying to solve? By understanding the real problems to solve we will be able to create a better education system.

82 ... THE RIGHT BRAIN MYTH

Almost everyone believes that Humanity needs to embrace Right Brain Thinking to out compete the Machines. But they're wrong because the Machines are already automating Right Brain Thinking. So where does that leave education reform and Humanity?

88 ... THE FUTURE NEEDS SOFT SKILLS

Soft skills have always been vital to Humanity's evolution and success, but these will also need to evolve in the Future if Humanity is to remain relevant.

96 ... EMERGING TECH IN THE CLASSROOM

We live in a technology centric world that is increasingly driven and dominated by technology, but most schools and classrooms have access to very few technologies or technology resources. This needs to change.

102 ... BUILDING SCHOOL X-LABS

One of the fastest ways for schools to reform and skill up is to create their own X-Labs and it doesn't have to be hard.

108 ... START YOUR TRANSFORMATION

The need for education and formal curriculum reform is decades over due. In this section I show you how you start your own transformation without compromising the goals and policies of our Industrial Age education system.

112 ... UPGRADING THE HUMAN LEARNING ALGORITHM

If Humanity is to keep pace with the rate of technological change the we are not only going to have to change the formal education system but also upgrade our own Human Learning Algorithm as we attempt to attain Human Super Intelligence.

114 ... ACCELERATING HUMAN LEARNING

In this section I show you how we can use powerful technologies such as Artificial Intelligence to help students learn faster and take their knowledge and expertise to the next level.

118 ... MASTERING PROMPT ENGINEERING

In this section I show you how to create your own

natural language text prompts to help you get the most out of the AI Chatbots that we have discussed to accelerate and improve human learning.

- ... Cross Domain Knowledge Prompts
- ... Debate Prompts
- ... Explain Prompts
- ... Glossaries Prompts
- ... Lesson Plans Prompts
- ... Marking Rubrics Prompts
- ... Quizzes Prompts
- ... Research Prompts
- ... Revision Notes Prompts
- ... Study Buddy Prompts
- ... Summarise Prompts
- ... Test Prompts
- ... Tutor Prompts

146 ... THE EXPONENTIAL FUTURES CURRICULUM

In this section we dive into the 311 Institute's Exponential Futures Curriculum (EFC) - the world's first future proof curriculum that's being adopted by schools and universities around the world.

- 150 ... A FUTURE PROOF CURRICULUM
- 160 ... RUNNING YOUR FIRST EFC COURSE
- 162 ... THE WORLD'S FIRST EFC TRIAL RUN
- 184 ... TEMPLATES & RESOURCES

200 ... LIFELONG LEARNING FOR LIFE

In this section we explore the importance of adopting a strategy of lifelong learning and examine some of the ways you can achieve it.

206 ... THE FUTURE ROLE OF SOCIETY

As different careers and jobs dead end at an accelerating rate it is not just enough to give students the tools they need to adapt, society must also adapt and shed biases that let them effortlessly switch careers as and when the need arises.

210 ... CONCLUSION





WELCOME FROM THE AUTHOR

PEOPLE . PLANET . PURPOSE

THE SKELETON COAST . NAMIBIA . 19.9873° S, 13.2605° E

I chose this striking image to represent this section because in many ways it's representative of many of today's realities: The Skeleton Coast is complex and unpredictable, but home to an amazingly adaptable ecosystem, yet it's also representative of the stark contrast between the have and have nots, those with water and other resources and those without, our increasingly polarised society, and even the contrast between our habitable blue planet and the desolation of space. The desert and the sea are also relentless, just like the human spirit, and given the right conditions they can overcome everything in their path, just as humanity can when we work together for the benefit of everyone to create a brighter future for all of us.

THE GAP between what today's Industrial Age education system delivers and what employers need today, and what the future holds for us all tomorrow is widening at an exponential rate. In this Codex I offer and explore solutions to close this gap and create a future proof education system that prepares everyone for the threats and opportunities that lie ahead. I will also demonstrate how we can accelerate human learning and upgrade what I'll refer to as our own "Human Learning Algorithm."

This Codex is not some casual academic exercise. It's a living document that is informing my own children's education and the development of my philanthropic XPotential University initiative. It's also designed to encourage debate and invite critique about how we build vibrant education and life long education initiatives that unlock limitless human potential and prepare us all, young and old alike, for life and careers in the Exponential Future where the rate of business, cultural, and societal disruption accelerates to mind defying levels, and where reality becomes increasingly difficult to distinguish from Science-Fiction.

Education is one of humanity's greatest achievements but it hasn't always existed. When the first organisms sprang into life in Earth's primordial soup billions of years ago they survived and evolved by relying on their primal instincts alone. Over time though as life evolved and became more complex these instincts were augmented by the development of more advanced communications and social competencies, giving rise to more purposeful and structured forms of knowledge transfer. And, in time, what

we now refer to as our Industrial Age education system was born.

Education has always played a vital role in the development, evolution, and ultimately the survival of human society. Now though as we race headlong into the future stakeholders from all walks of life, from world leaders and Billionaire polymaths, to parents, teachers, and even students themselves, believe that if we carry on as we are and don't reform education urgently then we will be putting our children's futures at risk and along with it the future of our society. Reform is hard though, and the reform of an institutionalised system is even harder - hence this Codex.

As a lecturer and teacher myself, and as one of the world's most renowned Futurists I have a front row seat to the future and play a pivotal role in helping governments and the world's most recognised brands create it - which arguably puts me in the strongest position to help create a future proof education system.

As the pace of technological and societal disruption accelerates today's world, let alone tomorrow's, will be unlike anything any of us have ever witnessed and our Industrial Age education system, which has evolved little in over two centuries risks woefully under-preparing us for the great period of business, cultural, and societal level disruptions that lie ahead - some of which, as you can see for yourself, has already arrived. It's time to fix education. For all of us.

Explore More,

Matthew Griffin
Founder



What's this symbol? Tell me and enter a draw to win \$10,000 for your favourite school.

311institute.com

25



INTRODUCTION

A STRONG education is the foundation of a healthy and wealthy life whose benefits can be passed down through the generations and whose impacts can ripple across the world to make it a more wondrous and prosperous place.

Today though formal education, whose purpose it to prepare students for whatever life throws their way, is no longer keeping pace with the needs and realities of today's technology driven society - increasingly it is like we are Cavemen wondering what the strange new tools we're making mean for us - and unless we are bold enough to acknowledge this and act to change it then we risk diminishing the relevance of one of societies most valuable and treasured institutions, and in a worst case scenario seeing it become irrelevant.

WHAT THIS CODEX COVERS

In this Codex you will discover why education needs re-inventing today so our students can have a prosperous future. I will also walk you through the problems our archaic industrial age education systems must overcome in order to remain relevant in the future, walk you through a tailor made battle tested future proof curriculum, and guide

you through the new tools that will help teachers become more productive and that will help students accelerate their learning by 3x or more, while boosting grades and expertise by 30% or more.

MIND THE EDUCATION GAP

It's no secret that the gap between what our industrial age education systems deliver and what employers, individuals, and society need to survive and thrive today, let alone in the future, is widening, and this is just one of the many reasons why today more companies than ever before are hiring what they refer to as "raw talent" straight from college and university and creating their own Nanodegrees and university programs to give those individuals the knowledge and skills "they really need."

However, while this gap has been getting slowly wider for centuries today, as we see technologies converge and their capabilities improve exponentially, this gap is now widening so fast that few companies and institutions can keep up.

In this Codex I'll explore these gaps and show you how not only we can create an education system that can keep up with the future but one that can also stay ahead of it.

WORRIED ?

YOU SHOULD BE .

**IN AN AGE WHEN
STUDENTS CAN ASK AI TO
DO THEIR HOMEWORK
AND ANSWER ALL
MANNER OF QUESTIONS
MORE STUDENTS ARE
ASKING WHY THEY NEED
TO LEARN ANYTHING .**

THIS IS A GROWING PROBLEM .

TEACHING TO THE 1960'S EXAM

Travel the world, speak to stakeholders, and you'll quickly realise why today's education system, and the gap between it and the future, is widening.

You'll also ironically hear Ministers and the leaders of Secondary Schools and Higher Education institutions, as I have, including those from some of the most prestigious and highly awarded institutions in the world rail against the fact that despite the level of global change we've seen in just the last few years let alone decades exams have changed little since the 1960's when the world was a very different place.

However, unless those in power change the model of "Learning to the Exam" as well as the content of those exams then from a teachers perspective at least when our students pass them we can say mission accomplished - irrespective of whether those exams are truly fit for the modern age or adequately preparing students for the future. And in my experience, when it comes to ensuring our students are "Future Fit" few teachers are happy or comfortable with that permissible abdication of responsibility.

From my perspective, and speaking frankly, not only is changing the

examination system and the content of exams a wasted opportunity, but it's arguably scandalous.

AI RISKS AND ACCELERATED LEARNING

As more people and students worry about the impact of that increasingly powerful and sophisticated AI's will have on the future jobs market, with many experts expecting AI to partially or fully automate at least 80% of all jobs and up to 100%, I'll also show you precisely with examples, how teachers and students can use AI and other technologies to dramatically improve productivity, accelerate learning, and upgrade our own "Human Learning Algorithm."

SOLVING BLOOMS TWO SIGMA PROBLEM

Using these same AI's, and others, I will also show you how we can solve what many in education circles refer to as "Bloom's Two Sigma Problem" - namely the problem of affordably scaling 1:1 personalised tuition to students, and how we can use them to upgrade the "Human Learning Algorithm" so our students have a shot at competing against many of those same AI's whose knowledge and capabilities are already starting to exceed our own.

**ONLY EDUCATION REFORM WILL HELP
STUDENTS COMPETE WITH AI .**

**IN 2023 CHATGPT HAD A VERBAL IQ OF
155, CONTAINED 1000X MORE GENERAL
KNOWLEDGE THAN ANY HUMAN MIND,
AND COULD LEARN AND TRANSFER
INFORMATION 300 MILLION TIMES
FASTER THAN THE HUMAN BRAIN .**

AND IT'S JUST GETTING STARTED .

THE POWER OF THE INDIVIDUAL





IT'S AMAZING how few of us realise, I mean really realise and take it to heart, that in all of human history we are each by far the most powerful versions of ourselves that have ever lived. And we're getting more powerful as our society and our technologies evolve.

Despite this fact though none of us are taught how to leverage this almost "Limitless Potential" or "Power" at school or at home.

For whatever reason learning about the power we have at our fingertips today and how it could benefit us as individuals and society is more often than not left to us to figure out with little to no support from our wider education communities.

Not only is this a missed opportunity but it's potentially one of societies greatest oversights and the greatest waste of human potential of all time.

UNLEASH YOUR POWER

At no point in human history has anyone - whether they were Kings or Queens, Emperors, or world leaders - ever had access to more knowledge, more powerful technology, or had the ability to change the world in timelines that can now be measured in minutes, hours, and

days - not months, years, or decades. Notably at a speed and scale that were unimaginable just a few decades ago, let alone centuries or millennia.

Today our digitally connected society gives us all fast and easy access to capital, knowledge, expertise, resources, and skills, and our increasingly powerful technologies let us ideate, create, and publish new concepts and products hundreds of times faster and thousands of times cheaper than was possible in the past - and that's before we discuss the impact of Human-like Artificial Intelligence on our society.

DISRUPT THE WORLD IN A DAY

When you really think about the power each one of us wields today consider this ... If you produced an idea or a product in the morning, and if - a BIG if - you could execute perfectly you could have it in front of 4 Billion individuals and have changed the world order by the end of the day. That's the power we all have.

Ironically, we almost saw this happen when in 2019 Meta released their Libra Cryptocurrency which, had global regulators approved it, could have been used by over 2 Billion people by the end of the day ... You live in strange times.

IN OUR TECHNOLOGICAL ERA

**3 QUESTIONS NO ONE
EVER ASKED YOU :**

WHAT WOULD YOU DO IF :

**YOU HAD ACCESS TO
ALL THE WORLD'S
KNOWLEDGE ?**

AI + DATA + HUMAN EXPERIENCE + THE INTERNET = " KNOWLEDGE "

ACCESS TO ALL THE WORLD'S **SKILLS**?

**ONCE ARTIFICIAL INTELLIGENCE AUTOMATES JOBS AND SKILLS IT CAN ALSO
DEMOCRATISE ACCESS TO THOSE JOBS AND SKILLS FOR YOU TO USE**

**AND THE ABILITY TO
BRING WHATEVER
YOU IMAGINE TO
LIFE?**

**TECHNOLOGY MAGNIFIES THE POWER OF THE INDIVIDUAL TO CREATE PRODUCTS AND
EXECUTE AT DIGITAL SPEED AND GLOBAL SCALE**

THE CASE FOR EDUCATIONAL CHANGE





THE TIME to change and evolve today's education and examination systems was arguably decades ago - and that's the view of the leaders of some of the world's most awarded and lauded educational establishments and regulators, as well as my own view.

However, trying to change national curriculums and a system which is as institutionalised as industrial age education is hard which is why many of those trying to make a difference in the end have resorted to building their own separate education platforms that compliment formal education.

THE ERA OF SCI-FACT

We already live in a world where science fiction is science fact - a fact that is lost on many of us because it's a matter of perspective and exposure.

Step back in time two millennia and the ancient Greeks would have marvelled at the electric scooters we use today that would have easily beaten their fastest Olympians. Step back two centuries and people would have marvelled at the artificial suns in our homes and offices, our lights. And step back just two decades and people would have marvelled at our contactless payment

systems and online banking, our ultra thin TV's and our wearable gadgets, our ability to video chat with people on the other side of the world for free, our talking computers and virtual worlds, and much much more.

However, while all these advances are revolutionary in their own ways today we live in a world where even all these pale into near insignificance with what's here, let alone what's emerging.

After all, we already live in a world where we can 3D print human organs and other products on demand, a world where AI and robots design, evolve, and spawn new versions of themselves at digital speed, a world where autonomous companies operate and scale themselves, a world where genetically engineered designer humans and in vivo gene editing are a reality, and where quantum computers that are billions of times faster than the world's fastest supercomputers can be accessed from the cloud for free by anyone. And, as anyone who follows my work will know, I'm only lightly skimming the surface still.

A FRONT ROW SEAT TO THE FUTURE

As a futurist I have a front row seat to the future we are building and as

Notes:

a father I and many others around the world including royal households, world leaders, and visionary billionaire polymaths, as well as parents, students, and teachers, see the urgent need to modernise our industrial age education system which for the most part, and as many accept and admit, has changed little in what it teaches and how it teaches our children in almost two centuries.

With the global rate of change accelerating, driven by new technologies and an increasingly digital and virtual connected society, the need to modernise what we teach students and how we teach them so that they can be future ready and prepared for everything the future throws their way is greater than ever, and in the vacuum of government and examination board leadership we and our partners have decided to forge ahead, light the way, and create a curriculum that makes sure everyone is prepared and that in the future no one is out skilled, surprised, or left behind.

A HUMAN SOFTWARE UPGRADE

In futurist circles one of the most popular sayings states that while technology is evolving at an exponential rate the human brain hasn't had a software update for over 300,000 years but

my reply to this point of view is that education is our software upgrade.

After all, it is education that has given us the mental tool kit and skills we needed to help us envision and develop our collective futures whether it's the discover of and invention of fire, the wheel, electricity, the loom, or the tractor, or whether it's the development of Artificial Intelligence, autonomous companies and vehicles, genetic engineering, or millions of other world changing innovations.

Furthermore, the benefits of education persist through the generations, like a pebble thrown into a lake the ripple effects radiate and have far reaching effects which not only magnify its importance in our society but also its impact.

As the world evolves around us we and our education systems need to evolve to, and that is why I created this Codex, XPotential University, and the 311 Institute's Exponential Futures Curriculum (EFC).

OUR GUIDING PRINCIPLES


PROGRESS THROUGH KNOWLEDGE .

PROSPERITY THROUGH PEACE .

STRENGTH THROUGH UNITY .

- MATTHEW GRIFFIN . CEO . 311 INSTITUTE

ADULTS ON UNCREATIVE AUTO PILOT



AS YOU'LL read about in greater detail later in this Codex it's going to be increasingly important that we all exercise our creative muscles now and in the future, especially since we face a future where Artificial Intelligence (AI) will automate more jobs faster, and where swathes of society are forced to switch career tracks faster than they're comfortable with, but also as AI automates Right Brain tasks and, most importantly helps democratise access to knowledge and skills which, in turn will help us unlock human potential on a level noone has ever seen before.

CREATIVE KIDS UNCREATIVE ADULTS

As children it's recognised that we have almost limitless creative potential, and that as we age this potential diminishes until we get to the point where the only creativity most adults exercise is which new meal recipe to try out. And, when we look at who or what is to blame for this sorry state of affairs there are many culprits.

On the one hand there is the education system itself which, as we move through it, eventually forces us to choose just a single path and focus on a single academic field to the exclusion of almost everything else - including expanding

our minds and exploring the many other wondrous experiences our world has to offer.

We can also probably blame human nature. As we get older and enter the next stages of our lives we unsurprisingly prioritise work and family activities, and we just don't think about being creative or get the opportunity to be as creative as we were when we were children. With the inevitable result being that we de-prioritise it and under invest in it as a vital future skill.

WORKERS ON AUTO PILOT

There's another silent culprit though that many of us don't give any thought to - our day jobs and the companies we work for.

When you bake it down every company irrespective of their sector is trying to achieve one thing - something the industry calls "Scalable Efficiency."

Ultimately all companies are trying to operate and do whatever it is they do as efficiently as possible and, if you want to be efficient, then you want all of the different units of the business - including your employees - to understand the tasks to be done and then do them as

Notes:

efficiently and as quickly as possible.

Think about it. When was the last time that you as an employee had to use your imagination or creativity at work - you get assigned a task, you are required to complete that task as quickly and efficiently as possible, and then move onto the next one. And then you repeat this process until you retire.

To all intents and purposes as much as we all like to think we are valued and special when it comes to our jobs we are all cogs in the machine - human automatons with little to no creativity required. Unless, of course, you are lucky enough to work in a creative role such as marketing or R&D, of course. But even these roles roughly follow the same role - albeit they require employees to flex their creative muscles more than those people in other roles.

Look across job roles and the pattern is the same. Programmers ... sit down, write code, debug it, test it, document it, repeat. Sales ... sit down, pick up the phone, call people, qualify leads, close deals, repeat. Teachers ... sit down, settle students, teach students, grade and assess students, support students, complete the admin, repeat. And the lists could go on.

Where's the need for genuine creativity or creative expression?

Now look at your own job and ask yourself: When was the last time you got to be creative, when was the last time you had flex your creative muscle, and when was the last time your company let you "go off script?" If the answer is never, or very little, then you likely see the point I'm making.

In the pursuit of scalable efficiency, and via our job descriptions, the companies we work for tell us what we need to do, why we need to do it, and when it needs to be done by - everything is laid out on a plate for us and at no point do we really need to think too hard about anything outside of our job remit, or flex that creative muscle. Andf, let's face it anyway the vast majority of jobs don't require you to be creative, your bosses just need you to get on with the job description and complete the tasks you're assigned.

Whirr. Click. Repeat.

And that latter statement, get on with the job description has another implication as well which just adds ironic fuel to the ironic fire of automation.

Notes:

AUTOMATING THE JOB DESCRIPTION

Whenever anyone says that their job can't be automated ironically it's this very job description that gives AI researchers almost all the information they need to automate your job.

After all, most jobs are a series of definable goals and targets, and tasks and workflows: "Do ABC in this order to get XYZ out." And, once you can define understand these steps then it's not hard to turn them into algorithmic steps in an AI machine learning model and automate someone's job.

In short, therefore, anything that is made up of steps - which is every process on Earth - can be automated with the only wrinkle being how complex each step is and how complex the overall task is. Even innovation is a series of steps which is why that too is already being automated as you'll see later in this Codex and in the complimentary Future of Innovation and Creativity Codex in the Codex of the Future Series.

In the business world a good example is the IPO process - once Goldman Sachs understood all 160 steps of the process of taking a company public they were able to create an AI model that automated their IPO teams. And that's an

example of how even a very complex set of jobs can be automated.

TEST YOUR CREATIVITY


So, it seems that as an adult and to earn a wage you don't need to be creative to survive or thrive, you just need to be an efficient and effective employee - a good automaton.

So, in our pursuit to spark your creative muscle again here's a test you can do to see just how creative you really are and, in almost all cases, show you just how much your creativity has diminished over the years.

First sign into a platform like MidJourney, a simple Text-to-Image Artificial Intelligence system, then using nothing more than natural language text prompts ask it to generate some images, like some of the ones in this Codex.

Based on my observations my guess is that after roughly five prompts you're going to start struggling to think of what images to ask it to generate next and if that's the case then you have some work to do to re-ignite your create spark.

THE TIME TRAVELLER'S VIEW



HAVE YOU ever taken time to consider what life will be like in the future? Say, for example, 5, 10, 20 or even 50 years out? Bearing in mind that in 10 or so years time your students will be entering the full time workforce, and that in another 50 they might still be working - albeit as they keep one eye on retirement.

If you're like most people then it's likely you have given the future more than just a passing thought, but it's also highly likely you spend much more of your time thinking about the near term than the medium or long term future.

When it comes to our children's education though I would argue we need to be thinking near, medium and long term, because while we're busying ourselves in the here and now our children are in an education system that's trying to prepare them for, among other things, life long careers that will span 50 years. And a lot will change in just the next decade - let alone the next 50 years.

Putting that into perspective if your son or daughter are 10 years old today then, depending on the country you live in, they'll be aiming to retire around the year 2080, or perhaps even later - dates that are beyond even the scope of even

this Codex. And if you consider just how much life has changed in the last 50 years, bearing in mind that change over the last few decades has been comparatively modest, compared to what's coming at least, then soon you'll likely come to the realisation that life in 2050, let alone in 2070 or 2080, will make today look positively primitive.

LIFE IN THE FUTURE

In order to try to put some of this in change in perspective I'm going to try and put it in context for you, with a twist at the end.

Imagine you're born with an inherited genetic disease, a terrible disease like Hunter's Syndrome, but the technology exists to edit it right out of your genes in vivo, and suddenly you no longer die at the age of 20 but 80. Or imagine that the DNA in your cells has been programmed to not just identify diseases like Cancer in your body but also programmed to produce the drugs needed to eliminate them on the spot, while elsewhere nano-machines with enzyme engines navigate around your bloodstream looking for other signs of trouble.

Imagine a world where people and

Notes:

machines communicate with each other telepathically, where we can upload information to our minds, and not from text books or videos, while machines stream our memories to the internet, and where bacteria are our computing devices, storing our movies and processing information at a speed and scale we've never seen before.

Imagine a world where products are printed and assembled using tractor beams, and where your clothes and food are all made in your own home, on demand, where the only cow you'll see is in a museum, and where the world's largest organisations and transportation systems are all fully autonomous. And this is just the beginning. But what about the twist I mentioned?

Well, the twist is that all of this is already here, done and demonstrated and you can see it for yourselves. As a consequence, if you think the world your children are going to grow up in will resemble today's then short term at least you'll be right, but as all these breakthroughs become increasingly commercialised and mature your children's future will make ours feel like the Stone Age - this is the future I'm trying to help prepare our children for.

Notes:

THE TIME TRAVELLER'S DILEMMA





IN MANY respects it can be said that we have trouble predicting the future - the further out we travel along the time line and the broader our area of interest the fuzzier and more inaccurate our predictions become. But what if we looked at things from a different perspective, what if we based our information on what really occurred in the future, not just an extrapolation of data, but data based on actual, observed fact?

In short, what if instead of being futurists we were time travellers with the power to go back in time with our perfect knowledge of today's world and we tried to use that knowledge to help the people in the past prepare for today's reality from the ultimate perspective - a Time Travellers perspective?

Ironically, even though you might think that being blessed with this perfect knowledge would be the best solution to helping us design the right fit education and training systems we need you might be surprised by the challenges we face.

In today's world, as certain jobs types begin to dead end we know, for a fact, that there is a huge demand for Cyber Security experts and Data Scientists across a wide range of sectors. Armed with this knowledge our time traveller

steps into his time machine, sets the digital dial to the year 1980 and careers back in time through his inter-stellar wormhole.

Now, standing in his old schools assembly hall listening to the headmaster run through the daily roster he raises his hand from the margins, announces his presence, and boldly sets about regaling everyone about the fantastic tales of the future and what jobs there'll be when they all get there.

"There will be a huge demand for Cyber Security experts, and the pay will be great," he announces assertively.

"What's a Cyber Security expert?" hollers back the headmaster from across the hall.

"They're people who help protect computers, data, and networks from cyber criminals who are using the internet to gain access to them so they can steal information and secrets for financial gain and other malicious purposes," he answers.

"Sounds great," says the headmaster, "but just tell me one thing... What's the internet?"

As our Time Traveller tells the assembly

Notes:

about the future, the role the internet plays in society and how it helps billions of people and millions of companies connect with one another he looks at their quizzical faces and with some trepidation the prospect slowly dawns on him that they think he's quite mad.

His grand aspirations of helping these children, their teachers, and the politicians of the time navigate and prosper in the future jobs market begin to unravel in front of his very eyes. To people living just a few decades ago a tale like this would seem fantastical.

Trapped by our linear view of the world I'd have to ask you what would you have thought if he was addressing you? If you'd had the power to change the education system, or the curriculum then, would you have, could you have?

As the pace of global technological development and disruption continues to accelerate ironically our own minds and biases could turn out to be our own worst enemies, and if we're going to give our children the best chance of prospering in the future we also have to change our thinking and embrace a futures mindset.

This is the Time Traveller's Dilemma.

Notes:

WORLD CHANGING TRENDS AND TECH



TODAY OUR world is changing faster than at any point in human history. To put this into perspective it's estimated that in the next 20 years we will see more progress made than in the past 20,000 years, and as the rate of change accelerates and as every part of society is disrupted not only are people finding it harder to envision what the future could look like and what's next, but they also have less time to generate a point of view and adapt.

It's unsurprising, therefore, that today more people are anxious about the future than ever before. So, in response to this problem and to try to simplify the Future and Deep Future for you I created the 311 Institute's **Codex of the Future Series** which conveniently explains and explores everything that will shape our collective future.

THE 311 CODEX OF THE FUTURE SERIES

Created to democratise access to the Future and Deep future for everyone of all abilities and backgrounds the series is a comprehensive collection of books that explore the near, medium, and deep future of all manner of different sectors, technologies, and trends. But it goes further.

Designed for future curious individuals and professionals everything's been written in a format that lets you get up to speed with the technologies, trends, and topics you care about in minutes, not hours. And, it also puts an invaluable set of futures foresight, innovation, leadership, and strategy frameworks in your hands so you can envision, create, and lead your own future.

To explore the entire series and download the others Codexes just click or scan the QR code below.





THE TRENDS

OUR PAST, present, and future have many things in common, and the influence of trends throughout the ages is one of them. However, while the trends themselves have changed over time their direct and indirect influence on business, culture, and society remains as iron clad as ever.

Unlike the past though as connectivity, digitisation, and travel continue to make our world a smaller place today the impact of emerging trends, wherever they originate, can be felt almost instantaneously, transcend borders, and influence even the remotest regions of the world.

Furthermore, unlike the past global trends today have a much greater regional impact than they ever would have or could have in the past. Not only does this change our lives in ways that were unfathomable and unimaginable just a few decades ago, but it also forces us to adapt to and deal with far flung realities that historically were out of mind and out of reach.

THE 311 ANNUAL TRENDS CODEX

As the rate of change accelerates exponentially and as our world becomes more complex to predict and navigate

it can be difficult to stay up to date with the trends that influence the topics you care about the most - like those we've discussed in this Codex.

To solve this I created the **311 Institute Annual Trends Codex**, part of my **Codex of the Future Series**, a living Codex that's constantly updated with all of the latest trends and insights, and which you can download for free from the 311 Institute website.

As you'll see from the following pages in this section and the example trend I've done my best to simplify all of this complexity for you by splitting the Codex into STEEP, Sector, and Universal Line of Business categories, and providing you with easy to follow trends insights and calls to action that make it quick for you to find, learn about, and act on the trends you're most interested in.

311 TRENDS EXPLORER . FIND TRENDS FAST

**ECONOMIC
TRENDS**

**ENVIRONMENTAL
TRENDS**

**POLITICAL
TRENDS**

**SOCIETAL
TRENDS**

**TECHNOLOGICAL
TRENDS**

**UNIVERSAL
TRENDS**

BUSINESS MODELS

MARKETING

SUSTAINABILITY

CONSUMER BEHAVIOURS

OPERATING MODEL

WORKFORCE

CUSTOMER EXPERIENCE

R&D

WORKPLACE

HR AND TRAINING

SECURITY

ICT

SUPPLY CHAIN

AEROSPACE

EDUCATION

INSURANCE

SPORTS

AGRICULTURE

ENERGY

LOGISTICS

TELECOMS

AVIATION

FINANCIAL SERVICES

MANUFACTURING

TRANSPORT

CONSTRUCTION

GAMING

MEDIA & ENTERTAINMENT

DEFENCE

HEALTHCARE

RETAIL

**SECTOR
TRENDS**



CLIMATE CHANGE

2ND YEAR ON THE LIST



QUICK TAKE

Scientists saw it coming in the 1950's. They called it out and made films about it in the 1980's. And now, over forty years later individuals, governments, and organisations are starting to take unilateral global action to tackle Climate Change with many scientist arguing that we are now too late to avoid a "life altering" 1.5C increase in average global temperatures, and that we are within years of crossing a climate tipping point which will see its devastating global effects accelerate and create a run away cascade of **Extreme Weather** and devastation.

Data sources: IPCC, National Geographic, WWF, and various.

IMPACT

The impact of Climate Change can be seen everywhere - from the changes of the seasons, and the subtle changes in the flora and fauna in peoples gardens, to the tree covered mountain slopes that used to be buried by glaciers and snow, to the expanding deserts of the Sahara, and the deep of the oceans. It impacts every living thing and every natural system on Earth.

From longer frost free growing seasons, to changes in global rain patterns, longer droughts and more intense heat waves, and more extreme weather, to more powerful hurricanes and higher sea levels, the consequences are as varied as they are acute.

If the world warms by 1.5C then the Arctic Ocean will become ice free once every 100 years, with extreme hot days in the mid-latitudes being at least 3C hotter than pre-industrial levels, and sea levels could rise by up to 0.77m, with a further decrease in global bio-diversity of between 5% and 8%. Meanwhile corals could decline by at least 70% with marine fisheries annual productivity declining by at least 1.5 Million tons. And a 2C rise would be exponentially worse for people and planet.

EXAMPLES

Earth is mission critical for humanity and all life on Earth. And as the rate of Climate Change accelerates we continue to see a variety of records being set and smashed with climactic events that used to be once in a century becoming once a decade, and then the norm. And examples of these are plentiful.

Greenland's ice sheet, the world's second largest after Antarctica, is now melting 12 times faster than in the past 12,000 years and losing over 532 Billion tons of ice a year - and that rate is accelerating. Not only does this melt account for almost 25% of today's sea level rise, but in 2021 the melt rate accelerated even further when, during a time when temperatures in the region were already 18C higher than average, three days worth of rain - where the rain itself was a first for the region - dumped over 7 Billion tons of rain water onto the ice sheet.

And, from the world's biggest, deadliest, and most damaging floods, to the world's biggest, deadliest, and most damaging droughts, heatwaves, hurricanes, and wildfires almost every country on the planet is now feeling the damaging impacts of climate change.

ACT NOW

As we see elsewhere in our universe, from the dust dunes of Mars to the acidic oceans of Venus, our planet will always be able to adapt to new climactic conditions. But life on Earth will find it increasingly difficult as Climate Change accelerates and its effects become more extreme and pronounced. Therefore, ironically, tackling this trend is more about saving humanity's future than the planets.

EXPLORE:

- Carbon Capture and Storage
- Emerging technologies and technology roadmaps
- Future of Agriculture, Energy, Government, Manufacturing, Sustainability, Transportation, and Work
- Net Zero Pledges
- Unilateral global accords and coordinated global action

USING THE TREND SHEETS

IN THIS codex we've gone to great lengths to document the major trends affecting all sectors and line of business operations and simplify them for you. Furthermore, we're always surfacing more trends which is why this codex is regularly updated. As a result each trend contains all manner of action points, details, insights, and stats that you can use to your advantage, whether it's developing scenarios and strategies using the frameworks in this and our other Codexes, or whether it's just exploring the art of the possible. This is the key to the sheets:

1 / UNITED NATIONS SDG NUMBER

The UN SDG most impacted if you act on the trend.

2 / TREND NAME

The most appropriate name for the trend.

3 / YEARS IN THE CODEX

How many years the trend has been listed in our codex since the first edition.

4 / TREND LONGEVITY

● LONG ● MEDIUM ● SHORT

The trends longevity and how long it is expected to have an impact for.

5 / TREND PRIORITY

The higher the number the more attention and weight you should give the trend.

6 / TREND MOMENTUM

⤴ ASCENDING ⤵ FLAT ⤶ DESCENDING

The overall momentum of the trend.

7 / TIMING OF THE TREND

● HERE NOW ● EMERGING ● DISTANT

When the trend is expected to have a measurable and pronounced impact.

8 / RELATED TRENDS

Other trends that either impact the trend or are impacted by it.

9 / DATA SOURCES

A list of our data sources for the trend.

10 / IMAGE

An image to portray the trend.

11 / ACTION

The action we suggest organisations take now based on the available data.

12 / EXPLORE

Other things you can or should explore to better understand the trend and how to solve or use it to your advantage.

13 / DISCOVER MORE

Click or scan the QR code to access more website resources related to the trend.



THE TECH

YOU DON'T have to look far to see technology's impact on Human civilisation. Now though we live in an age where Artificial Intelligence with its grasp of human language and its ability to create content is capable enough to not just re-write human history, but also define and direct the future of Humankind itself. And if that doesn't give you pause for thought then it should.

Historically our technologies have been little more than dumb prosthetics but today they are increasingly intelligent, powerful, and sophisticated. Furthermore, when combined together and fused into our increasingly inter-connected and digital society they are changing the world faster today than at any point in human history.

Despite this though we know that in time today's powerful technologies will be superseded by even more powerful ones, many of which we can see now circling above us like the stars in the Heavens, just biding their time waiting to fall to Earth where their impact will be total.

However, while this shouldn't be a surprise in itself what might be is the number of technologies that we, and increasingly the so called Creative Machines, who can create and invent their own products and realities

independently of humans, have at our disposal. Today I track over 600 with on average 60 being added every year.

THE 311 EXPONENTIAL TECHNOLOGY CODEX

Consequently trying to stay abreast of these technologies and understand their impact on the topics you care most about, like those we discuss in this Codex, is difficult. So, to solve this I created the **311 Institute Exponential Technology Codex: The Next 50 Years**, part of my **Codex of the Future Series**, a living Codex that's constantly updated with all the latest technologies and insights, and which you can download for free from the 311 Institute website.

As you'll see from the following pages in this section, as well as the collection of Annual Griffin Emerging Technology Starbursts, complete with that years biggest breakthroughs, and the example technology, I've done my best to simplify this complexity for you and provide you with easy to follow technology insights and calls to action that make it quick for you to find, learn about, and act on the technologies - and timelines - you care about the most.

TECHNOLOGY ALCHEMY

**DON'T THINK ABOUT
INDIVIDUAL TECHNOLOGIES
THINK COMBINATIONS**

USING THE TECHNOLOGY SHEETS

AS YOU can see I've gone to great lengths to detail as many emerging technologies as possible and simplify them for you. As a result each technology sheet contains tons of information to help you develop new product concepts and explore the art of the possible. This is the key:

1 / HERO IMAGE

An appropriate image for the technology.

2 / QR CODE WITH HYPER LINK

Scan or click the QR code to be taken to the latest news about the technology.

3 / MANUFACTURING READINESS LEVEL

The average MRL on a scale of 1 to 9 where 9 is the most mature.

4 / TECHNOLOGY READINESS LEVEL

The average TRL on a scale of 1 to 9 where 9 is the most mature.

5 / WEAPONISATION POTENTIAL

The technology's average weaponisation potential on a scale of 1 to 10 where 10 is the most dangerous and deadly.

6 / TECHNOLOGY NAME

The technology's official name or the one that best represents it.

7 / INTRODUCTION

A quick introductory summary.

8 / DEFINITION

The best definition for the technology.

9 / EXAMPLE USE CASES

Uses cases to spark the imagination.

10 / FUTURE TRAJECTORY AND REPLACABILITY

The estimated future development trajectory including anything that could supersede it.

11 / MATTHEW'S RECOMMENDATION

My next step recommendations.

12 / STARBURST APPEARANCES

The annual Griffin Emerging Technology Starbursts the technology's appeared on.

13 / IMPACT

It's overall estimated impact, disruptive nature, and primary deployment method.



HIGH
MODERATE
LOW



EVOLUTIONARY



DISRUPTIVE



CENTRALISED



DISTRIBUTED



DECENTRALISED

14 / STATUS

This panel summaries the technology's market readiness with estimated dates.



IDEA



CONCEPT



PROTOTYPE



PRODUCTISATION



MASS ADOPTION

LOW

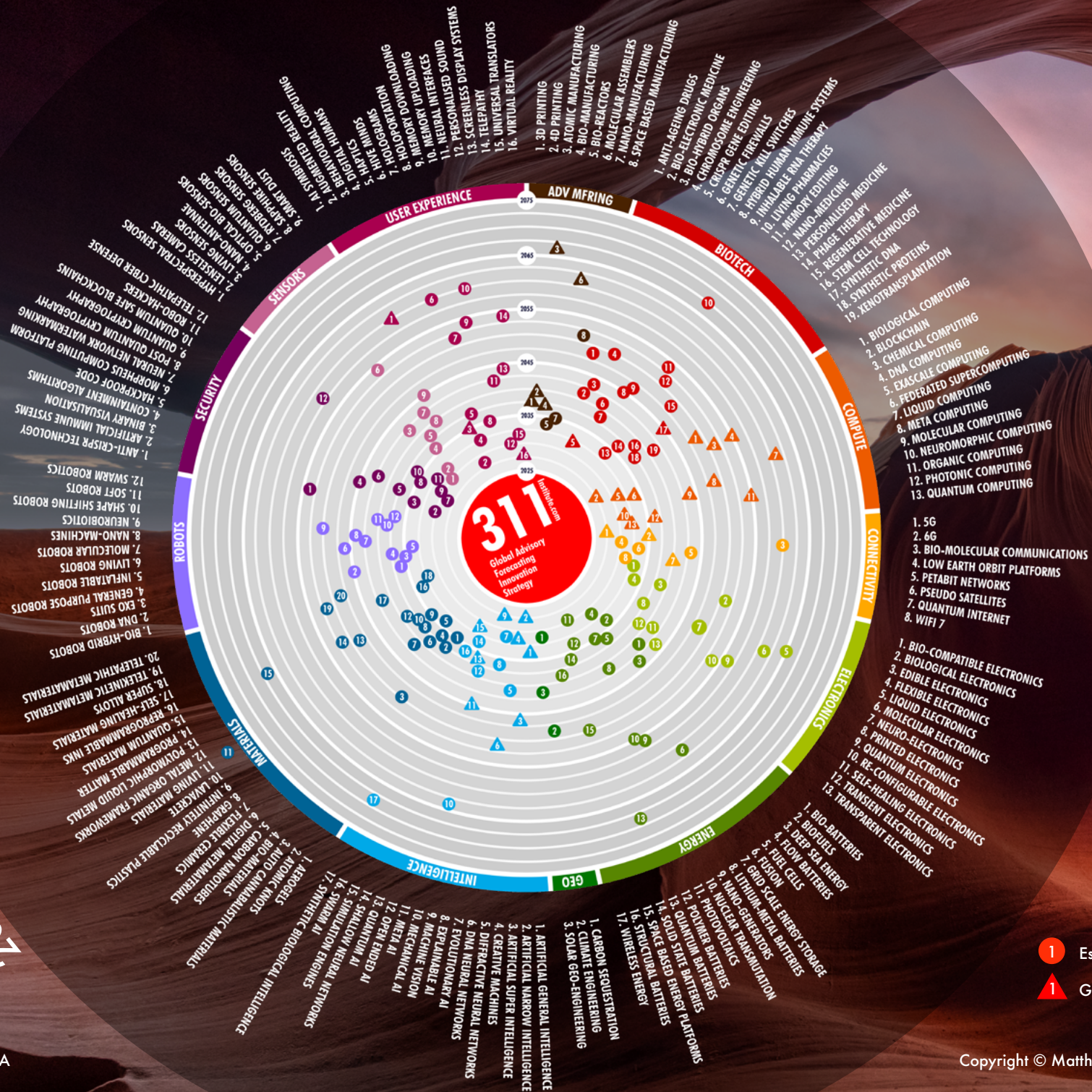
HIGH



15 / PRIMARY GLOBAL DEVELOPMENT AREAS

The primary development regions.

2023 GRIFFIN Emerging Technology Starburst





2023 STARBURST REVIEW

IN THE 2023 Griffin Emerging Technology Starburst I extended the timeline to 2075, an increase from the 2022 Starburst which only extended to 2070, and tracked the development of 167 of the world's most promising emerging technologies, each with an addressable market value of over \$500 Billion spread across 13 categories, I promoted 31 new emerging technologies and demoted 31.

USING THE STARBURSTS

The Starbursts have been specifically designed to let you quickly see the estimated maturity of different technologies across different technology categories, and to get the most benefit from them I recommend you combine the information from this codex with that found in some of the other codexes in my Codex of the Future series, such as my **311 Trends Codex** and **How to Build Exponential Enterprises Codex**.

By doing this you will have all the frameworks and information you need to quickly model future scenarios, assess their impact on your organisation, as well as global business, culture, and society, and everything you need to develop new products, roadmaps, and strategies.

TIMELINE:

2025 to 2075

Image: Florida Everglades, FL, USA





2022 STARBURST REVIEW

IN THE 2022 Griffin Emerging Technology Starburst, which displays 167 of the world's most significant emerging technologies, each with an addressable market value of over \$500 Billion spread across 13 categories, up to a timeline of 2070, I promoted 28 new emerging technologies and demoted 28.

In 2022 there was an up tick in notable world firsts compared to 2021 which as the global pandemic faded wasn't unexpected as investment and R&D flows started returning to pre pandemic norms. Therefore, as expected, I saw an increase in the number of new emerging technologies which were double the number spotted in 2021. Biotech, Compute, Energy, Intelligence, and Materials saw the largest gains.

2022's breakthroughs and stand out world firsts included: 100% effective personalised cancer therapies • AI designs new chemical weapons and simulates all known proteins • AI redistributes wealth better than politicians • AI generated content and

Digital Humans move mainstream • Chromosome Engineering accelerates biological evolution millions of years • First decentralised social network launches • First flexible ceramic • First lab grown blood cells • First Mechanical AI • First stress measuring wearable • First light based blood test • First tunnel dug by autonomous swarm robots • First telekinetic and telepathic materials • Google staffer claims AI is sentient • Lawyers drop NFTs to serve anonymous crims • Human mini-brains beat machine AI • Lab grown meat gains FDA approval • Military drone fleets emerge • Molecular computers break records • Russia first nation to use hypersonic weapons in wartime • Self-assembling space structures ace tests • Starlink achieves global network coverage. And many more.

TIMELINE:

2022 to 2070

2021 GRIFFIN Emerging Technology Starburst





2021 STARBURST REVIEW

IN THE 2021 Griffin Emerging Technology Starburst, which displays 167 of the world's most significant emerging technologies, each with an addressable market value of over \$500 Billion spread across 13 categories, up to a timeline of 2070, I promoted 17 new emerging technologies and demoted 17 - the lowest of any year so far.

In 2021 there were fewer notable world firsts than in 2020 which, as in 2020, I again attribute to the fact that much of the world's investment and R&D flows were re-aligned to fight the global pandemic, COVID-19. There was also a marked decrease, of approximately 23 percent year on year, in the number of new emerging technologies that appeared, and this marks the first consecutive year on year decline I've seen since I've been keeping records.

Unsurprisingly Biotech, Compute, and Energy saw the largest gains, and this was the year that many emerging technologies showed the world what they were capable of - whether it was using

AI to develop vaccines or 3D printing to print out of stock parts for ventilators.

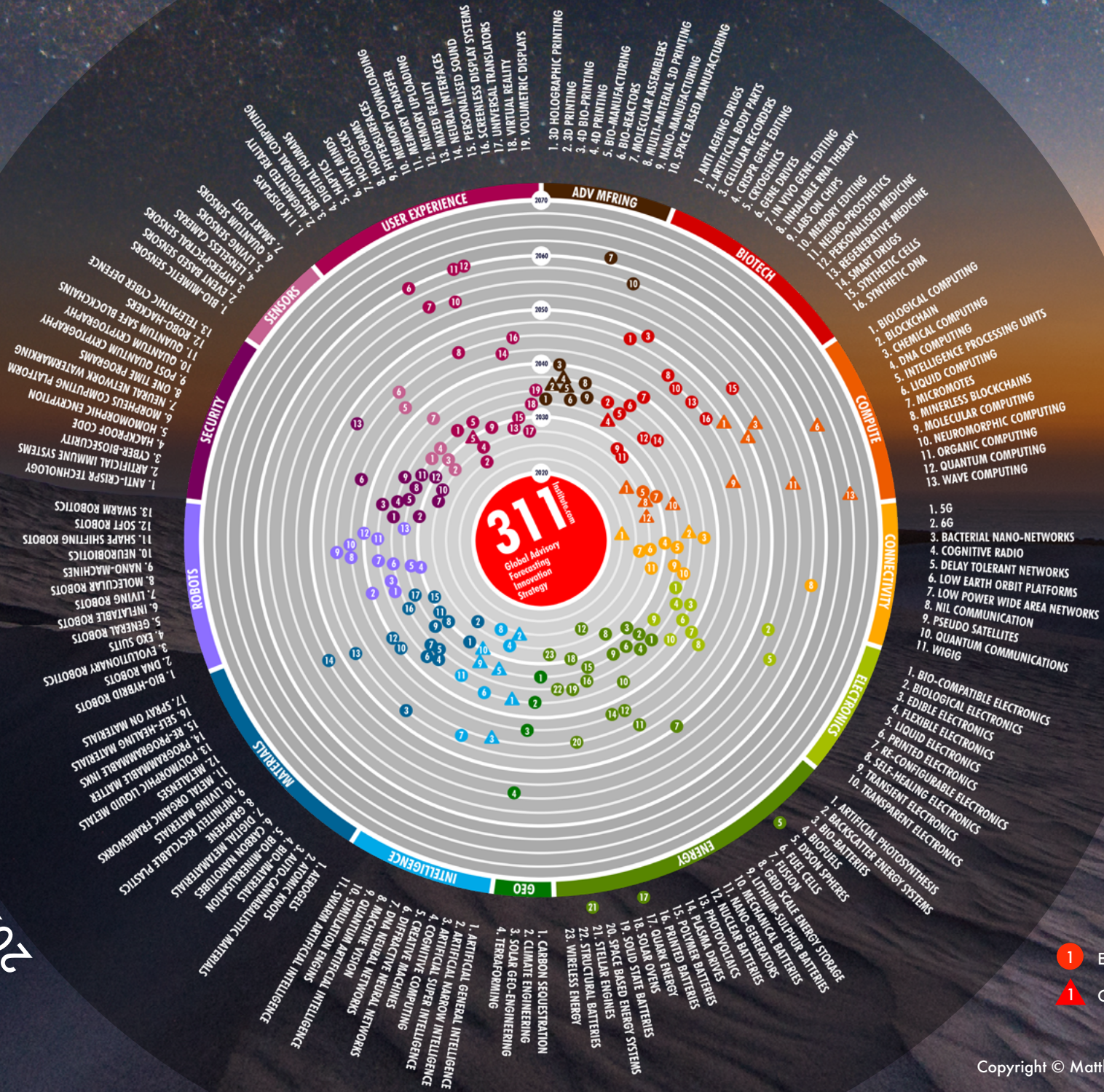
2021's stand out world firsts included:
AI learning the art of "Diplomacy" • First 2nm computer chip • First 5G NR installation • First 5 minute EV charging system • First AI credited as an inventor • First autonomous Hunter-Killer drone kill • First Bio-Artificial Kidney • First empathetic first person VR surgery preview • First EV with 1,000km range • First green steel • First unethical Human burgers • First Internet of Electricity material • First mass biometric spoofing cyber attack • First Metaverse city • First re-programmable satellite • First spontaneously replicating living robot. And many more.

TIMELINE:

2021 to 2070

2020 GRIFFIN Emerging Technology Starburst

TRANSFORMING
ENVIRONMENTAL
CYBER
SPACE
AUTOMATION
ARTIFICIAL INTELLIGENCE
BIOTECHNOLOGY
NANOTECHNOLOGY
QUANTUM
ROBOTICS
ADVANCED MATERIALS
AEROSPACE
DEFENSE
HEALTHCARE
AGRICULTURE
ENERGY
TRANSPORTATION
INFRASTRUCTURE
CONSUMER
INDUSTRY
FINANCIAL
LEGAL
EDUCATION
RESEARCH
GOVERNMENT
MILITARY
ACADEMIC
INDUSTRY
FINANCIAL
LEGAL
EDUCATION
RESEARCH
GOVERNMENT
MILITARY
ACADEMIC





2020 STARBURST REVIEW

IN THE 2020 Starburst I extended the timeline to 2070, an increase from the 2019 Starburst which only extended to 2060, and tracked the development of 167 of the years most significant emerging exponential technologies, each with an addressable market value of over \$500 Billion spread across 13 major categories, one of which “Electronics” was a new addition. I also promoted 44 new emerging technologies, and demoted 45.

In 2020 there were fewer notable world firsts than in 2019 which I attribute to the fact that much of the worlds investment and R&D flows were re-aligned to help the world conquer the debilitating global pandemic, COVID-19. There was also a marked decrease, of approximately 40 percent year on year, in the number of new emerging technologies that appeared this year and this is reflected in the 2021 Starburst that saw the lowest number of new entries since my records began. Unsurprisingly though the Biotech and Intelligence categories saw the largest gains.

2020's stand out world firsts included:
Advanced DeepFakes • First 3D printed mini human heart • First 6G satellite test • First AI generated interactive procedural VR game • First AR smart contact lenses • First artificial living cells • First Bio-Synthetic network • First CRISPR in vivo gene editing • First hypersonic weapons deployment • First in vivo 3D Bio-Printing robot • First novel Cancer vaccine • First pilotless commercial aircraft • First protein folding AI • First reversal of human ageing • First room temperature superconductor • First virtual food. And many more.

TIMELINE:

2020 to 2070

A TALE OF TWO SOCIETIES





E DUCATION IS an integral part of many species survival design, but human education requirements are different to those of almost all of our distant, biologically related animal cousins thanks in no small part to a divergence between the two that arguably began several millennia ago when someone invented the first monetary based trading system - the same system that today underscores, and arguably defines, our capitalist society and influences almost every aspect of our daily lives - including the purpose and role of our education system.

SHOW ME THE MONEY

Hierarchical, role based societies that acquire and share resources, such as the provision of care, food, and protection for the good of the group, as exhibited in everything from ant and bee colonies, to lions and Meercats, have existed almost since the emergence of complex life itself. And in this way, at a fundamental level at least, it can be said that human society isn't too dissimilar to the societies we come across every day in nature.

However, when you replace the benign, collaborative free sharing of resources with the concept of monetary based trade, as well as the concepts of wealth

accumulation and creation, it not only changes the paradigm of the society, but also the paradigms and principles that underpin the education system itself, from what we teach and how we teach it to how education is embedded into the fabric of the society itself.

The stark difference between these two societal systems, namely a monetary one and a non-monetary one, can be best demonstrated via a simple visualisation exercise that you can do now: Take a moment and imagine how you and your family would live your lives today if money had never been invented.

My guess is that you'd live your life very differently from the way you do today, and that your behaviours and purpose in life will also have changed dramatically.

In the absence of money I believe we can confidently say that while education would still play a dominant role in society and our individual development, it's also fair to say that its priorities and role would change, and that as a consequence it would be a very different form of education system from the one we have today.

GOING BACK TO BASICS

Notes:

In my opinion taking today's education system back to basics and examining the needs it's trying to fulfil means that today's and tomorrow's education systems have two main objectives.

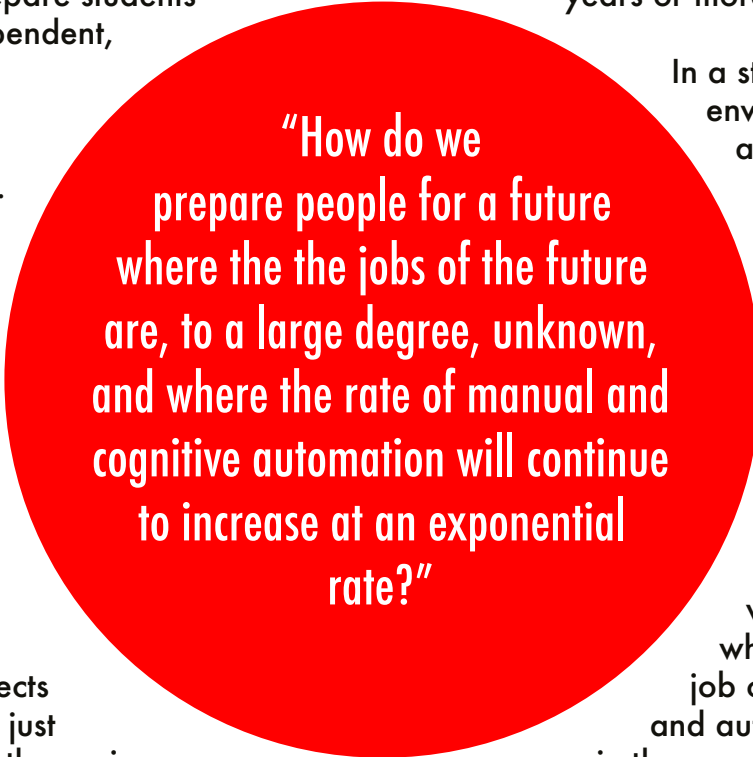
The first objective education is trying to fulfil is to prepare students for life as independent, fully functional adults, who fit in well with general society. The second objective, which as we get older becomes the more dominant objective, is to help students improve their long term earnings prospects so they can not just survive, but, as the saying goes, thrive and live well. And there's the rub.

As long as our lifestyles and well-being are tied to today's capitalist need to earn money that we trade for goods and services, no matter how basic or

benign those are, from water and food, to housing and protection, then our education systems will always need to be aligned with the principle of preparing people for life long employment, and today lifelong employment means, in many countries means working for 50 years or more.

In a stable jobs environment, where jobs and careers, as they used to be centuries ago, were for life, it was arguably acceptable for the education systems of the time to evolve at a relatively slow pace.

However, as we enter an age where the threat of job commoditisation and automation, both in the cognitive and manual workforces lurk around every corner, and where the pace of technological development is accelerating, we are now beginning to see professions, from call center agents and lawyers, to professional drivers and radiologists dead end faster than ever before. The



"How do we prepare people for a future where the the jobs of the future are, to a large degree, unknown, and where the rate of manual and cognitive automation will continue to increase at an exponential rate?"

Notes:

result of which is that the so called "Industrial age" education system that we rely on today, and that has served us well in the past, is drastic need of an overhaul.

21ST CENTURY LUDDITES

In the past as we've moved from one industrial revolution to another technology has helped both destroy jobs and create new ones.

Take, for example, the farm workers of the mid 1850's and early 1900's. After the emergence of agricultural automation and mechanisation the percentage of the population employed in agriculture fell through the floor, from a peak of approximately 45 percent in the 1850's to below 2 percent today. And as automation bites again, and as we see the emergence of fully autonomous farms, it could be argued that in a couple of decades time even this figure of 2 percent could appear high.

In the past Luddites showed their dissatisfaction of their situation and disdain for new the new technologies that were replacing them by smashing the weaving looms that took their jobs, but today smashing the distributed computing platforms that harbour the artificial

intelligences that will take many of our jobs won't be as easy.

As we head into another period of what some are describing as "tumultuous change," where there will be more technological progress made in the next 20 years than there was in the previous 20,000, and where many of the world's leaders believe that technological automation will, to quote the European Union's official 2017 report, "affect every strata of our society," I advocate that now is the time to drastically re-think our education systems, and create one that helps us all flourish, without worry, and prepares us for what's ahead, whatever the future holds.

PREPARING FOR THE FUZZY FUTURE

As many of you will already know, or should be able to surmise, it's much easier to predict what is going to happen in the near future than in the far future, and it's also much easier to predict what will happen within a narrow range of topics, than in a broad range.

When we're dealing with the future of education, which let's face it is in no small way linked to the future of jobs, tasks and work, whichever way you want to frame it, then we arguably have the

Notes:

worst of both worlds because not only are we trying to predict what jobs will exist, and which ones will fade away in the next 20 to 50 years, but the sheer range we're trying to cover, both the known and the unknown, is vast.

When we're trying to design a future proof education system, if one could ever truly exist, this ultimately means that, in my mind at least, we have just three options open to us.

We can design an education system that is fit for a future we predict, the risk being that that future might or might not pan out as we expect, we can design it for an uncertain future, or we can design it for a hybrid of the two. In other words we try our best to predict the medium to long term future but build in enough contingency to help us manage the surprises that will inevitably pop up at one point or another. This latter approach is my preferred, and it will be the one that forms the basis of this Codex.

We're all seeing with our own eyes how quickly the future is arriving, and how fast things change, whether it's thanks to the internet and the smartphones in our hands, which didn't exist 20 years ago, that give us access to all the world's information, and increasingly, expertise,

or the emergence of self-driving cars and in-vivo gene editing that didn't exist a scant 10 years ago. As well as a myriad of things besides.

As a futurist I get a fantastic front row seat to all this action, and in addition to seeing the future arrive faster than many people anticipate I also see how the pace of technological development is accelerating exponentially - where science fact often makes science fiction look tame, and where the number of variables are increasing at an almost immeasurable rate every month.

It's also this same front row seat though that compels me to impress on you both the need for educational change and prompts me to play a role in stirring debate and action in search of a workable, fit for purpose solution.

THE UNIVERSAL TRUTHS

As we look into the future there are going to be a number of what I call "Universal Truths" that, as far as I can tell, will remain true throughout the 50 year time line of this Codex.

Firstly, the amount of work, or more specifically, the number of tasks to be done, will increase exponentially, and

Notes:

the types of tasks will continue to be a mix of so called Routine and Non-Routine ones.

Secondly, technology will both compliment human workers, and in certain situations replace them. Inevitably technology advances will mean that the number and type of tasks that can be fully automated will also increase exponentially and at an accelerating rate, with some experts saying that in time everything will be automated.

Thirdly, as a result of all this, human workers will need to become increasingly adaptable and agile, and will need to become increasingly adept at jumping between different tasks and professions with minimal friction. Unsurprisingly, given our siloed career mentalities accomplishing this feat will arguably be the most difficult to accomplish and it will require changes in both our education system as well as how we support workers throughout their working lives - something that I'll focus on in more detail later in this Codex.

THE PROBLEM TO SOLVE





IN THIS Codex I am going to dedicate more time to proposing future education solutions rather than highlighting the challenges we all face from the rise of automation and more general disruption. The reason for this is simple. On the one hand as the spectre of technology driven automation casts its long shadow over every industry many of us are already seeing the composition of today's workforce change and the pressure on individual job categories ratchet up, so I believe finding a solution to this thorny issue is vital.

Meanwhile, on the other hand the potential impact of automation on human jobs is already well debated and documented, so for now I feel sticking my own oar into the mix will simply add more unnecessary noise.

THE PROBLEM TO SOLVE

Technology has always been both a destroyer of jobs, and a creator, this was true in the 1700's and it's just as true today. Today, however, just as in times gone by, it's also true to say that the majority of people have a better understanding about the professions technology will automate and eliminate in the next couple of decades than the ones it will help create.

While there has been, and will continue to be, much debate and speculation about the scope and scale of professions that future technology will help eliminate our problem, and your children's future problem, in my mind at least, boils down to the following burning question:

AS DIFFERENT careers dead-end how do we help those affected move between different professions quickly, and with minimal friction?

This simple question also belies two challenges, both vast in scope. The first challenge concerns the education system we need to put in place in order to support life long learning, and the second challenge, which is arguably the more difficult of the two to solve, concerns the creation of the right corporate and societal cultures that we need in place to support frictionless job mobility between different professions and industries.

At its most basic this is the equivalent of helping a tractor driver in the agricultural industry, for example, whose job was automated by the emergence of fully autonomous tractors in the 2020's, re-train and then gain gainful employment as a digital campaign manager in the advertising industry. Or as a cyber security expert in the technology

AI IS THE TRACTOR .

**THE LOOM . AND THE
PRINTING PRESS .**

**YOU CAN EITHER BE THE OUT OF WORK
FARM HAND OR THE CEO OF JOHN DEERE .**

Notes:

industry, and a million examples besides.

thinking, and seeing over the horizon.

PREDICTING THE JOBS OF THE FUTURE

While there has been much talk about the professions that technology will help automate and dead-end, something I discussed in an earlier chapter, along with the challenges we all have even when faced with perfect knowledge of the future in the Time Travellers Dilemma, there has been much less chatter and clarity about the new careers and jobs it could help create.

In one respect at least there's a train of thought that one of the reasons why we focus more on the threats than the opportunities is that evolution has honed our survival instincts over time to focus more on the threats, the things that in the past might kill or harm us, than on new opportunities. The other reason of course is that we could just, frankly, be really bad at forecasting, out the box

When trying to create a future fit education system knowing what professions could fall by the wayside is important but it's arguably much less valuable than knowing the ones that could be created, and to date I haven't seen any reports, or anything that convinces me we know what's coming.

"As the trends of automation and change affect more professions, and as their pace accelerates, we need to discover new ways to help people switch professions quickly, and stay gainfully employed throughout their working lifetimes."

That said though there are a number of things we can be certain about, for example, that binary coding will increasingly give way to coding chemistry and the code of life itself, that security experts, albeit with new talent sets, will be in increasing demand, and more, and I'll be focusing on this topic and delving into the future of jobs in more detail in my next complimentary Codex.

Notes:

PREDICTING WHO'S AT RISK

cases entire companies.

Surprisingly there are a couple of fairly simple rules of thumb we can use to determine whether a specific profession or group of professions could be automated, and despite their critics they work fairly well, and these are: If your profession can be described in a single sentence, or the group of tasks you and your colleagues perform can be broken down into a series of simple individual steps, then you could all be prime candidates for automation.

No where is this more stark than in the financial services sector, for example, where even the people running and managing Initial Public Offerings, in this case at Goldman Sachs, are beginning to be automated.

As it turns out most IPO's have over 164 individual steps, which when evaluated and understood, can then all be individually automated, and then sewn together to create, in this case, the world's first fully automated IPO platform. And if something as complex as an IPO can be automated, and all the people with it, then as you'll probably be able to figure out, it's not that difficult to automate other things too. Like claims adjusters, professional drivers, radiologists, wealth advisors, or in some

Notes:

THE RIGHT BRAIN MYTH





TODAY THERE are an increasing number of prominent voices around the world who advocate that the education system of tomorrow helps foster student's inner creativity, or in other words right brain thinking. The main reason for this being the fact that today many of the cognitive roles that are already buckling under the pressure of the first wave of automation are more left brain tasks than right brain ones.

Our brains are amazing, so much so in fact that some people say they're one of the miracles of the universe, something that, as grand a statement as it seems, is actually hard to refute, and they're split into two distinct hemispheres.

The left side of our brain is great for analytical and logical thinking, language, and reasoning, while the right hand side is great at managing abstract and creative thinking, emotion, intuition and spatial awareness - things that many analysts say machines will never be able to master, replicate or conquer. But, unfortunately they're already being proved wrong.

As a result those among you who are hoping that our right brains will be our saviours and help us fight back against the rising tide of automation might have to re-think things, but that said, things

aren't a complete loss - provided we understand our strengths and have ways to harness them.

FLIGHT TO THE RIGHT

At first glance this "flight to the right" as I call it makes sense. After all Artificial Intelligence and computers in general are much better at performing analytical and logic based tasks than they are at abstract thinking or being creative. But if we think taking flight from left brain professions over time and embracing right brain ones is a solid long term strategy then unfortunately we're lulling ourselves into a false sense of security. The reason for this is quite simple, because, you see, right brain skills aren't as hard as we think they are to replicate.

THE AUTOMATION OF CREATIVITY

To highlight the issue we face I'm going to show you how today we're automating the process of creativity, ironically thanks to our own creativity - I know, it's nuts when you think of it in that way, but that is the beauty, and curse, of human ingenuity.

The first real world example I'm going to use involves using AI's that are

Notes:

increasingly being referred to as Creative Machines to create “professional and unique music content in seconds,” everything from classical music to funk, as well as, hang on while I cringe, pop songs. Pop songs that are so catchy they’ve already racked up hundreds of millions of hits on YouTube and charted - something that’s not lost on Sony who recently signed a couple of them and used them to create the world’s first ever AI music album.

Take that X Factor.

Elsewhere though other creative machines are also in on the act but this time they’re tackling another challenge - innovation. And here again they’re getting quite good at designing and innovating new products, products as diverse as aircraft parts, chairs and drones, and clothes, sneakers and even “self-evolving robots,” without the need for any human intervention, for companies as diverse as Airbus, Amazon, DJI and Under Armour.

In the former’s case they used what’s known in the business as a Generative Adversarial Network, or GAN for short, to design new light weight components for the Airbus A380 to help reduce its fuel consumption, while in the latter’s they were used to design new a new

range of sneakers called Architect, a “Futuristic marvel of design” according to Under Armour that can be 3D printed and bought online for a mere \$300.

While it has to be said many of these creative machines are still only capable of iterative innovation, and not primary innovation, I can already see evidence that it won’t be long before we begin to see that, as some people say “most human of traits” become just another one of these amazing machine’s skills. And if you think that these creative machines will just start and stop with traditional products then think again, they’re also starting to innovate new chemicals, gene sequences, materials, and software.

Notes:



GOOGLE used synthetic audio generators to create Duplex, an AI assistant whose voice blew past uncanny valley.



NVIDIA used synthetic simulation generators to create the world's first computer game intro made by an AI.



OPENAI used synthetic text generators to create the world's first procedural text based games, which one day will include graphics.



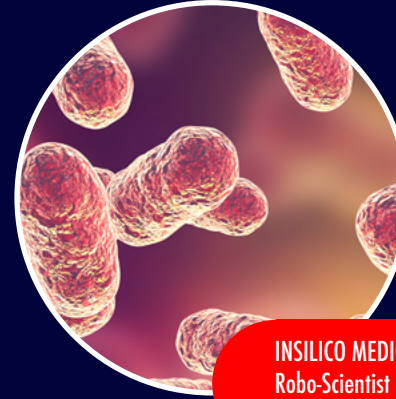
SPRINGER used a synthetic text generator to create the world's first research book written completely by an AI.

SYNTHETIC CONTENT GENERATED BY CREATIVE MACHINES

As the capabilities of Creative Machines improve more and more companies and individuals will use them to push the boundaries of synthetic content creation and use them to generate everything from simple adverts and art, all the way through to using them to generate books, games, movies, and even digital humans.



AIRBUS are using creative machines to design and innovate new ultra-lightweight components for their A330neo and A380 aircraft.



INSILICO MEDICINE are used an early example a Robo-Scientist and it designed 30,000 new drugs in 21 days, some of which were winners.



NASA are using creative machines to help them design new ultra-lightweight interplanetary landers and martian habitats.



UNDER ARMOUR are using creative machines to design new trainers and sports apparel which are then 3D printed in shops.

PRODUCTS DESIGNED BY CREATIVE MACHINES

As the capabilities of Creative Machines improve more and more companies are starting to experiment with them to create new product concepts, so here are some examples. And I could have also included Amazon and General Motors who are using creative machines to help them design fashion lines and cars - the floodgates are opening.

THE FUTURE NEEDS SOFT SKILLS





TALK, AND being able to shine a light on the challenges many of us will face in the future might be all well and good but what we're really interested in is putting forward a credible solution so these are the foundations, the soft skills, that I arguably propose all future education systems should be capable of teaching and instilling in students.

In my mind however while you'll have already no doubt identified the fact that many of today's education systems already play on and teach these foundations, many of which are soft but important life skills, personally I don't believe that there is a strong enough emphasis or focus on many of them.

All too often these are skills that are taught indirectly, often by coincidence, inference or stealth, than by actually focusing on them as their own specific subjects, and that's what I propose here, that there is much more emphasis on each of them tomorrow than there is today, and if we get this right then we will have a generation of adaptable, resilient children.

ADAPTABILITY

In the future, where, as I've discussed in

previous chapters, almost no profession will be safe from automation, certainly in the long term, and where the pace of technological development is going to continue to accelerate exponentially, leaving no corner of society or industry untouched, it will be more important than ever that students are able to adapt and navigate change, whatever its pace or scale, at speed - speed being the key point here.

Today the majority of schools don't focus on adaptability at all. Once students leave the confines of the classroom they are going to be entering a world where advances in technology are going to accelerate the pace at which professions are automated and careers dead-end, and while we can all do our best to predict the short, medium and long term future of jobs the fact of the matter is the further into the future we travel the more difficult everything becomes to predict. Ergo, in my opinion, teachers would be wise to try to prepare their students for the unknown, and as a result, students ability to adapt is going to be vital in the years and decades to come.

CHARISMA

We've all come across those people, you know the ones, the people who seem at

Notes:

ease speaking to anyone and everyone, and who have the almost annoying ability make everyone they meet feel special.

While there is much talk of developing and nurturing a myriad of alternative soft skills, which one could argue all, in one way or another, help contribute to an individuals charismatic personality there are no provisions made within schools to foster charisma specifically, despite the fact that we know, even today, that it's a special skill to have, and tomorrow even more so.

COLLABORATION

The ability to collaborate and work together within teams, whether those teams are physical and in your local area or virtual teams spread around the globe, will continue to be a vital skill just as it was all those millennia ago on the plains of Africa when humankind hunted in groups to find and take down large prey.

Today we are used to our teams being comprised solely of people, but as we race into the future again teams will be increasingly augmented by intelligent machines that will change team dynamics while at the same time improving

productivity. As a result it will be increasingly important that students are able to collaborate efficiently with both humans and machines, the latter of which will help spur a revolution in the field.

CONFIDENCE

Confidence is perhaps one of our most fickle skills. It's hard to attain, and easy to lose, furthermore getting the right balance can be difficult, tip the scale too far and people run the risk of coming across as arrogant, and no-one wants that.

From a confidence perspective at least, our journey through today's education system, just like in life itself, can be a roller coaster ride of highs and lows as students achieve success and grapple with failure on an almost daily basis. That said though very few people, if anyone, dispute the benefits that confidence can have on a students performance, both in the classroom and later on in life.

CREATIVITY

Every one of us is born with the creative flame within us that we express in different ways and with different levels of intensity. When combined with

Notes:

experimentation creativity, of all the skills we possess, is probably the one we should give the most credit to because without it it could be argued that the human race wouldn't be what it is today.

CURIOSITY

During our formative years we are all curious, insanely so. Curious about each other and the world around us.

We are all natural born explorers and in our early years our curiosity appears almost limitless and unbounded, after all, this is the time in our lives where everything is interesting, new and unexplored.

Curiosity needs fostering and nurturing though, and often as we age unfortunately our curiosity seems to wane which is almost criminal, especially when you realise that almost all of today's great breakthroughs were the result of one of more individuals intense sense of curiosity and desire to improve on what came before, and change the status quo.

EMPATHY

Most complex animals are able to exhibit empathy in one form or another, but in

the future empathy is, arguably, going to become a vital skill, and a more complex one to navigate, especially as we begin to see the emergence of machines capable of reacting to human emotional cues that will also be able to exhibit their own simulated emotions.

As technology continues to help make the world smaller students will be increasingly exposed to a greater variety of environments and situations than ever before, some of them real, and in their backyard, and others from across the other side of the planet, from the edges of space, or in new immersive virtual reality environments - environments that will be both real and simulated.

These new frontiers will offer students an unprecedented amount of exposure on a scale that previous generations could only have imagined and give them, on the one hand, the ability to understand some of the world's most pressing problems from the first person view, and on the other, present them with challenges when it comes to trying to separate truth from fiction.

EXPERIMENTATION

Combined with creativity, experimentation is probably one of

Notes:

the most important skills for students to master as we head into the future, whether it's experimentation at a small scale, or a grand scale. It's also a skill that is increasingly catching the eyes of education researchers and policy makers alike around the world, and more schools are already starting to make room for it in their curriculums.

EXPONENTIAL THINKING

Step back just five or so decades to the time of your parents' childhoods and it's fair to say that the majority of life was much more linear and local than it is today, or will be in the future.

Life changed, as it always does, but those changes were slower to permeate through society and their impact was more muted. Today we have the opportunity to curate revolutionary ideas and products that can affect billions of lives and at a speed that no one dared dream about just 50 years ago. As a result it's fair to say that increasingly our lives are impacted, for better or worse, by exponential advances in technology, and their capabilities, and by not just what happens on our doorstep, but also by what happens on the other side of the world.

Our world is increasingly exponential and global and if our students, whatever their ages, are to realise their full potential then their thinking needs to shift from linear to exponential where a whole new world awaits.

FOCUS

We are all aware of just how important the ability to concentrate and focus on the task at hand is, but similarly we are all guilty at one time or another of suffering from what I like to call split brain syndrome where we try to take on too many tasks at once with the result being that none of them get completed properly.

On the one hand new technologies and tools could make students' ability to focus even more challenging than it is today, but on the other, depending how these new technologies and tools are implemented, they could also help augment and improve it.

LEADERSHIP

While it could be argued that everyone has it within them to become a good manager the same isn't true of leaders, just ask anyone in business.

Notes:

Very few people, if any, are born with natural leadership skills, but the evidence of the benefits of good leadership and the positive impact it has on business, culture and society, are all around us. As we look to a future where technology, for example, will bring both great challenges and opportunities, I advocate that what we will need are more leaders, and fewer managers.

MORAL COMPASS

Everyone knows how important a good moral compass is, and while today's education system does the best it can to instil the right behaviours and thinking in its students the future will be full of ethical challenges and moral dilemmas, of a scale and intensity, that test the best of them.

As a result being able to objectively understand both sides of an argument objectively, and being able to find solutions to ethical dilemmas will become an increasingly important skill.

PASSION

You can always tell when someone is passionate about something. You can see it in their face and the way they hold and

express themselves, and you can also, for the most part, see the role it plays in their everyday lives.

Our passions inspire us and drive us, and that's why this arguably most human of traits, is one of the most important for educators to be able to tap into. But discovering a student's passion relies on them being exposed to as many different experiences and situations as possible, and as we all know what excites and inspire one individual may bore another to tears.

In the past, when life was local and linear, not global and exponential, the vast majority of people were limited to the experiences within their local area. Step back just a couple of hundred years and the sum of most people's experiences were typically encapsulated within a ten mile radius of where they lived. Today though this is no more, technology helps us see beyond our previously limited horizons and experience new things in new ways, whether they're right in our backyard, or at the edges of known space.

PERSISTENCE

We can all empathise with the amount of hard work and persistence we've had to

Notes:

exhibit in order to achieve one or more goals, but persistence, or grit, doesn't come naturally to everybody. It requires a certain character and mental toughness to be persistent when things aren't going your way, and others around you are throwing in the proverbial towel.

The mindset of persistence is one that I believe can, and should be, taught from an early age, especially if it's tied to helping a student pursue their passions, and realise their dreams, and there are countless examples of where persistence has paid off and played a vital role in helping people change the world.

RESILIENCE

With so many things changing and changing fast not only can it be over whelming but it can be exhausting which is why one of the most important traits individuals must have in the future is resilience and the ability to get things done and get through things despite the odds.

RESOURCEFULNESS

There are many times in our lives when we need to be resourceful, whether it's when we're stranded on a tropical

island in the middle of the great Pacific ocean with nothing to eat but sand, or building new products and companies. From my perspective as an entrepreneur I also believe it's an undervalued trait that's often under practised, other than, of course, on away day team building exercises.

STORYTELLING

Step back far enough in time and storytelling was an art, literally, murals of great expeditions and fantastic tales were painted onto the walls of the caves of our ancestors tens of thousands of years ago.

As complex language developed these cave paintings became the backdrops to the stories our ancestors told beside the camp fires that over time became the primary way knowledge was passed down through the generations.

Today we could argue that these cave paintings have been replaced by today's own digital murals, like the ones streamed live to us by the Insta's and Tiktoks of the world, that help individuals tell stories in new ways.

While this pictorial format of storytelling has somewhat survived, albeit in a radically different form, storytelling to

Notes:

groups around the camp fire has by and large vanished, replaced by games consoles, social media and television, and other modern day distractions.

The result of which is that the art of storytelling itself has also been, at best diminished, and at worst lost.

That said though, ironically, even as storytelling itself fades as both a family and social art form, as adults we are constantly reminded of its power, to create action, empathy and vision, which in today's society are no less important than they were all those millennia ago. In fact in some respects we could argue that storytelling is now more important than ever - whether it's to sell an idea or point of view, a product or service, or to bring people together. It's time to bring storytelling back and evolve it for the modern age.

TIME MANAGEMENT

Often left off of lists time management is arguably one of the more crucial skills that employers, in all sectors, have always valued, and that will be no less true in the future - especially in a world where we are more likely than ever before to be bombarded by constant distractions and technology notifications.

EMERGING TECH IN THE CLASSROOM





SINCE WE'VE looked at the fundamental soft skills that all students should have in order to gave them the best chance of succeeding in the future let's have a look at the technologies teachers can use in the classroom to help pique students interest and help them reach peak potential.

From virtual classrooms and digital avatars, to 4D printing and neuro-stimulation devices, let's dive in.

3D PRINTING

3D printers are a makers best friend, helping students of all ages bring different ideas and worlds to life in ways that were unimaginable just a scant five years ago, and 3D printers are revolutionising manufacturing, both inside and outside of the classroom, at a global scale. In a way we can say they're helping turn the classroom desks in front of you into the factories of tomorrow. And that isn't an understatement.

While it's often all too easy to think that 3D printers are only capable of printing inorganic objects, made, for example, of plastic, I'd also like to take the opportunity here to highlight that today they're being used to manufacture inorganic products, such as furniture, jet

engines and sneakers, organic products, such as food and replacement human organs, and hybrids of the two types. As a result I would strongly encourage educators to look into the future of this revolutionary technology in more detail and think bigger and bolder.

3D printers and their newer cousins, such as 3D Bio-Printers and 3D Holographic printers, will continue to help students move from concept to the manufacture of physical objects with relative ease, which is a distinct advantage for students who are learning about design and technology, particularly when it comes to testing and visualising the limitations and constraints of particular concepts and ideas.

After all, being able to play with and interrogate physical objects can make it easier for students to spot and debate mistakes in their designs, for example, in the design of a bridge or building. This allows them to gain valuable problem solving skills in a creative, hands on way that would be otherwise near impossible, and when they spot errors in their designs they also have the technology they need to create and trial new ones at speed.

The benefits of 3D printers in the classroom though don't stop there

Notes:

though. They can also help bring many other subjects to life too including Biology and Chemistry, as well as Geography and History.

Imagine, for example, being able to explore the ancient ruins of Pompeii or the hydrological landscape of the Himalayas using physical models, or disassembling different chemical compounds or exploring the make up of individual living cells. And all of that's before we get onto the topic of more altruistic endeavours that could include projects to create new prosthetics, and many other things besides.

As 3D printer technology and its related design software become increasingly advanced and capable the number of things that students will be able to create and manufacture will be unlimited - it's amazing what you can create when you have a factory on your desk.

4D PRINTING

Just as educators are starting to get used to the idea of being able to 3D print objects in the classroom a new technology, 4D printing, is starting to appear on the scene.

Related to 3D printing 4D printing adds

another dimension to the manufacturing process - time. As we begin to see the development of new types of materials and new design and manufacturing processes 4D printers will let students go even further than they can with 3D printers by allowing them to print objects, such as robots, that self-assemble themselves and work straight out of the printer. Cool eh!?

ARTIFICIAL INTELLIGENCE

Without doubt Artificial Intelligence has the potential to be one of the most beneficial technologies used in education, but it could also easily become one of the most contentious and divisive.

As AI's abilities improve over the years and decades to come, which they will and at an exponential rate, it's likely that there will be a cacophony of technocrats advocating that the technology is used to replace teachers at scale while at the same time moderates advocate a middle road where AI's help augment teachers and the learning process.

Either way, and whichever route individual schools and school districts decide to take, new AI powered adaptive learning tools, that help students learn

Notes:

at their own pace and in their own individual style, while helping deliver appropriately timed personalised interventions, will proliferate in the years to come.

Running parallel with these conversations and new learning aids though there will also be advocates promoting the idea of using AI as a broad brush tool to monitor students behaviours and academic progress both inside and outside of the classroom. While these conversations have great merit they also have the potential to introduce concerns about the privacy and welfare of students.

As the debates rage on though one thing will be certain, in the years to come AI will be used more, not less, within the academic environment. As a result we must all do our best to ensure it is used ethically and for the benefit of all with full transparency built in from the outset.

AUGMENTED REALITY

Augmented Reality is another technology that has the power to transform students learning experiences in new and exciting ways by bringing them to life in front of their very eyes.

For example, imagine being able to

explore and interact with the inner workings of the human body, or a dinosaur, right down to the cellular level in real time, or imagine exploding apart rocket engines with your fingers and being able to zero in on the individual chemical reactions in the combustion chamber before finally releasing your finger and letting the reactions kick off and shoot the rocket into virtual space.

Done right AR has huge potential to help transform the educational experience and sow the seeds of curiosity and imagination in a way that, again, was unimaginable even just a few years ago.

BEHAVIOURAL COMPUTING

The way we all interact with the devices and machines around us will continue to evolve in the years to come as we increasingly ditch our traditional computer interfaces in favour of new behavioural ones that we communicate with using simple biometric cues and our voices.

A revolution that's been decades in the making Behavioural computing, or Affective computing as it's also sometimes known, especially when we are referring to machines that can replicate human emotions, will

Notes:

fundamentally change the way we interact with technology and our relationship with it. These are also, over time, going to be the same interfaces that are integrated into many of the new adaptive learning tools I mentioned earlier, and while advances in behavioural computing will ultimately benefit all of us in the medium term they're going to present students with new cognitive and emotional challenges.

On the one hand as students increasingly find themselves interacting with AI and their "synthetic personalities" on a more regular basis they are going to have to learn how to get the best from their interactions with them, and on the other hand, over time as these synths, as I'll call them, get better at tailoring their persona to the individuals they're interacting with students could suddenly find themselves emotionally engaged and invested with them.

Think, for example, of your own interactions with some of today's behavioural interfaces such as Alexa, Bixby, Siri, and others, besides from having to learn how to communicate with these new digital assistants effectively it's also likely you've had at least a couple of humorous altercations with them.

As these synths and their conversational

capabilities improve the way students communicate with them, and their relationship with them are going to change, and while adults will likely be adept at coping with these changes it'll be very different for a 5 or 8 year old. These synths aren't just voices in a machine, they're personalities - personalities that sing us songs and entertain us, and that stoke our emotions, and the better they get the more we're going to have to think about how we tackle the so called ghost in the machine.

NEURO-STIMULATION TECHNOLOGY

As humanity continues to unlock the mysteries of the human mind, from the way it works and forms memories, to discovering new ways to leverage its plasticity for our advantage, we have recently reached the point where we are now able to both download and stream, as well as upload, thoughts and knowledge.

Furthermore, as Brain Machine Interfaces, and the other technologies that support them, such as Artificial Intelligence, improve, and are embedded into more everyday devices, such as Virtual Reality headsets, we are increasingly finding new ways to train our minds more effectively, and retain

Notes:

significantly more information for longer.

The upshot of which means that students cognitive and tactile capabilities and skills are significantly heightened and improved.

ROBOTICS

In the past the word robot referred to one thing - some form of mechanised automaton that was more likely to be found on the production line than in the home. Fast forward to today and the word encompasses a variety of different technologies that take a multitude of different forms.

Robots are no longer just pure hardware, they're also now pure software, in the form of avatars and bots, and they're no longer all hard, some are soft. But that's not all. Some are hybrids, made from both organic and inorganic components, and some are the size of a house while others are the size of individual molecules, and yes, just in case you were going to ask molecular assemblers are now real.

The world of robotics has come a long way since its early days, and that's before we start talking about the arrival of robots that can communicate with

humans telepathically, or robots that, through a combination of AI and cloud computing, have hive minds.

As robots become easier to build, and become more intelligent and capable, students are going to find themselves confronted with opportunities that very few though possible, whether it's creating Lego robots that move around a track or DNA and molecular robots that can form miniature factory assembly lines and build complex compounds.

VIRTUAL REALITY

Virtual Reality is a technology like none other, one that can make learning truly immersive, especially when it's combined with haptic feedback technologies that provide real time tactile feedback in the form of gloves and other apparel, as well as other complimentary sensory technologies.

As VR continues to evolve with resolutions and the volume and variety of content increasing over time the beneficial impact it will have on the field of education would be very difficult to doubt.

BUILDING SCHOOL X-LABS



2	2	7	8	9	1	5
0	8	8				5
1	5	2				0

PRIMARY TARGET
11 22



WHILE THE subjects and subject matter that schools have taught down through the ages have morphed and changed over time something that's remained consistent is the use of real world examples and experiences to augment and enhance student's learning experiences.

However, as the global rate of change continues to accelerate, and as the world becomes increasingly competitive, complex, and connected, I believe the way these experiential learning models are woven into the curricula also needs to change, and significantly.

As a result, as science fiction like technologies increasingly become science fact, whether it's the appearance of 3D and 4D Printing, Biological Computers, brain controlled prosthetics, Creative Machines, Deflector Shields, Holograms, In Vivo Gene Editing, memory editing, uploading and streaming, Molecular Assemblers, Nanobots, Neural Interfaces, self-coding and self-evolving AI's and Robots, Tractor Beams, and hundreds more, I'd strongly argue that schools must significantly increase their student's exposure to these and other exponential technologies, and actively promote an entirely new way of learning, working, and thinking. After all, it's difficult to provide students with practical

hands on experience with futuristic products and technologies that haven't been fully commercialised yet, or in some cases even invented.

To fill this gaping gap this is where I believe the introduction of school X-Labs, as I call them, gives schools a prime opportunity, today, to combine their traditional experiential learning models with more leading edge entrepreneurial, experimental and theoretical teaching, in an environment where educators and students alike can discuss and explore the technologies and innovations that will transform everyone's futures, and their implications, without boundaries, and with impunity.

Ultimately this approach, I believe, stands the best chance of preparing students with the hands on critical thinking and skills that will prepare them for whatever the future, and technology, throws at them.

INTRODUCING X-LABS

X-Labs is what I regard as the simple, but inevitable, evolution of yesterday's traditional school lab environments combined with futuristic and corporate accelerator twists, built on the foundations of a student first philosophy

Notes:

that maximises their opportunities for entrepreneurial, exponential and innovative thinking, with hands on experimentation.

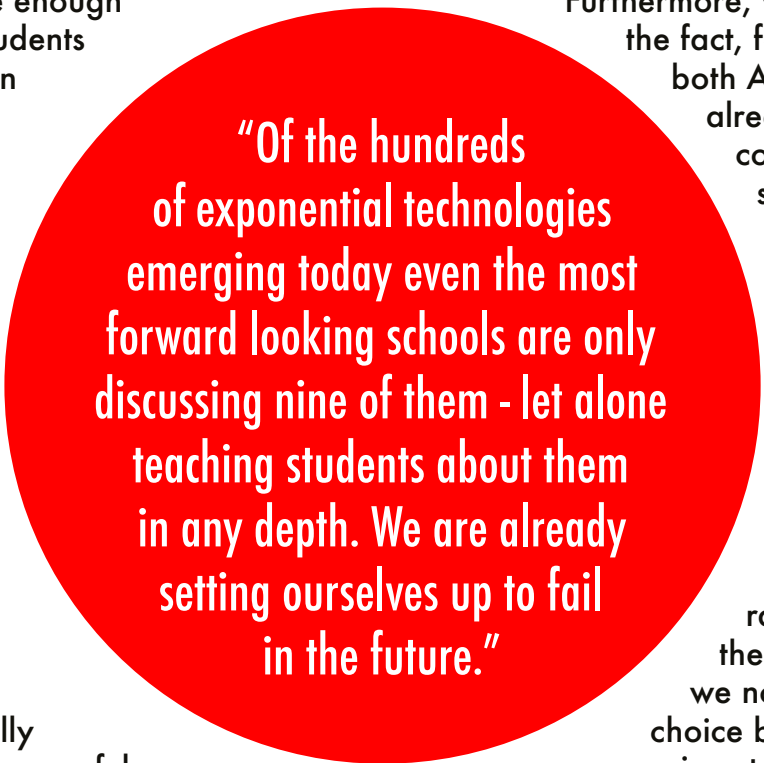
Today, even the most forward thinking school labs, I'd argue, aren't anywhere close enough to preparing students for careers in an increasingly complex, dynamic, and fast paced future - especially when set against the backdrop of increasingly rapid technological and societal change.

For example, while I personally track over 400 powerful emerging technologies today, which you can explore in more depth in my complimentary Exponential Technology Codex, on average only 9, yes, that's right, a measly 9, exponential technologies, such as 3D Printing, Artificial Intelligence, Augmented Reality,

Blockchain, Robotics, and Virtual Reality are even discussed in schools - let alone taught in depth, so it's by no means a stretch to say that this mismatch alone will leave society with an enormous skills gap in the years and decades to come.

Furthermore, when you consider the fact, for example, that both AI's and robots are already able to self-code, self-design, self-evolve, and self-replicate, albeit in a limited fashion for now at least, then over time that skills gap will get significantly wider, and at a much faster rate than we've ever seen before. This rate of change is also the prime reason why we no longer have a choice but to include more experimental and theoretical teaching within schools.

X-Labs are designed from the outset to combine the best of creative, interdisciplinary exponential experimentation with a vibrant atmosphere, and the entrepreneurship of world class



"Of the hundreds of exponential technologies emerging today even the most forward looking schools are only discussing nine of them - let alone teaching students about them in any depth. We are already setting ourselves up to fail in the future."

Notes:

corporate accelerators where students are free to explore and experiment with new ideas and concepts, as well as succeed and fail, with impunity, but without the pressure associated with companies' fierce focus on business returns.

As we head into the Exponential Era, that will be dominated by increasingly democratised, intelligent, and powerful exponential technologies, and where students will face unprecedented personal and professional challenges throughout their adult careers having these types of workshop spaces will be increasingly crucial.

However, just as the scale of the challenge we all face is great so too is the need for cooperation, which is why X-Labs have to break free from today's status quo, and forge new partnerships and encourage new thinking - all things that are pivotal to making them successful.

**CREATE WITHOUT
BOUNDARIES.
THINK WITHOUT
BOUNDARIES.**

BUILD YOUR OWN SCHOOL X-LAB

X-Labs need to be collaborative, entrepreneurial, multi-disciplined, open, and promote exponential and theoretical thinking, and experimentation.

With all this in mind, therefore, there are a host of new elements we need to incorporate that, when combined, will help change your schools culture of learning, your outlook on the future, and your students zeal for the future.

CONVERSATIONS

01

Create active conversations with lots of different groups to stimulate innovative thinking, and always ask questions.

GRAND CHALLENGES

02

X-Labs leaders should set a continuous series of Grand Challenges that encourage creativity, exponential thinking and problem solving.

INNOVATIVE SPACES

03

Design and use spaces that encourage collaboration, creativity, and innovative thinking.

LEADERSHIP

04

Students should have consistent and regular access to a vibrant community of inspirational and motivational leaders from a variety of backgrounds.

MENTORS

05

Experts who can up skill teachers and students, with a focus on creative and entrepreneurial thinking, and exponential technology are crucial.

PROBLEM SOLVING

06

Leaders must actively encourage and promote cross curricular thinking, and create novel theme based curricula that promote innovative thinking.

RESEARCH HUBS

07

Digital and physical hubs and resources that help teachers and students stay up to date, let them share ideas, and promote thought leadership, are crucial.

RISK CULTURE

08

The ability to experiment freely without fear of being reprimanded for failure is crucial.

PARTNERSHIPS

09

Continuous and controlled exposure to a wide range of diverse and inspiring partners will help provide students with fresh perspectives and ideas.

SCI-FI STORYTELLING

10

Writing science fiction stories is one of the simplest and most effective ways to stir students creativity and imagination, so choose your timelines and get writing.

TECH EXPOSURE

11

Continuous and controlled exposure to as wide a range of exponential technologies and their benefits as possible is crucial.

TIME

12


The majority of students best thinking takes place when there is an absence of duress and stress, so leaders must do their best to foster the right cultures.

NOTHING IS IMPOSSIBLE.

Notes:

START YOUR TRANSFORMATION





THROUGHOUT THIS Codex I've talked about the reasons why today's industrial style education systems should change, and need to change. I've also highlighted the opportunities that educators and educational establishments have to re-invent themselves in order to help create tomorrow's future fit entrepreneurs, professionals, and inspirational thought leaders.

However, I'm also the first to acknowledge that the future we are all racing into is as confusing as it is fast paced, which undoubtedly then leaves you asking just one question:

WHERE ON EARTH DO WE START!?

As any good coach, or teacher for that matter, will tell you the first thing you must do is actually START and get off the fence.

As for what comes next, well, take your time, but not too long, take baby steps, start simple, and don't be afraid to ask people for help, after all, we're all in this together.

1. CULTURE

Without the right attitude and culture within your school all the changes you try to implement, and your transformation, will likely fail. Therefore examine your culture and take the right steps to foster the right culture using a top down approach.

2. PREPARE

Next pull together a team of four to six enthusiastic and like minded individuals from inside and outside of your school, and include at least one or more senior stakeholders and sponsors - as your program gets off the ground you will need both sponsorship and air cover to help defend you and your team against the organisation's natural immune system which might try to kill it.

3. EXPLORE

Get out of your comfort zone and explore the future and deep future for yourselves using whatever connections and resources you have available to you, and pull together a point of view.

4. START SIMPLE

Notes:

TOP TIP: Why not start by creating your own robotic vertical farm, AI image classifier, or running a science fiction writing competition set in the year 2050?

Start with baby steps. Learn to crawl before you can walk.

As a team filter and then prioritise your findings from the first step, categorising those findings by impact, where impact is how you decide to define it.

The next step(s) that you take should be low risk and low cost because at this point in time it's unlikely you have any funding or access to any significant or meaningful resources.

One of the simplest places you can start is by introducing and encouraging some of the concepts mentioned in this Codex, for example, the soft skills, into your everyday curriculum and teachings.

After this, the next step should be to begin opening up more of your faculty and student's thinking by introducing them to the future and future thinking - something that can be done by creating appropriately tailored content, holding special assemblies or town halls, kick starting some projects, as well as using a

variety of other techniques.

5. PARTNERSHIPS

The next step involves improving your faculty and student's access to future thinking individuals and organisations by forging new collaborative partnerships.

These partnerships could include other academic establishments, entrepreneurs, industry experts, innovation communities, and other inspirational entities, with the purpose of these partnerships being to provide you all with easy and frictionless access to new experiences, new mentors, and new thinking.

6. REMOVE THE TRAINING WHEELS

Now, after a gentle start, correct the things that don't work, think bigger, hunt out more resources, be bold, start your own X-Lab, and scale.

And remember, if you need help there are plenty of people, not just myself, who are ready, willing and able to help. You are not alone.

Notes:

UPGRADING

THE HUMAN

LEARNING

ALGORITHM


HUMAN SUPER INTELLIGENCE

GET STARTED

... LEARN MORE . FASTER . AND COMPETE WITH AI .

ACCELERATING HUMAN LEARNING





AS WE look towards a future increasingly dominated by powerful technologies such as Artificial Intelligence (AI) each of us has the choice to either give in to the Machines as they automate more of the jobs and the workforce or find ways to turn them to our advantage and super charge our learning abilities and skills.

I prefer the latter which is why I have been busying myself with finding new ways to accelerate human learning and, as it were update our own "Human Learning Algorithm" so that together we can look forwards to a future where humans are as relevant as ever.

THE ERA OF HUMAN SUPER INTELLIGENCE

When we talk about the future of AI most people talk about two key events - the emergence of Artificial General Intelligence (AGI), whose abilities will rival those of all humans, and Artificial Super Intelligence (ASI), whose cognitive abilities will be so great that humans will be the intellectual equivalents of bacteria. Nice.

Despite this though noone as far as I have been able to see talks about the emergence of Human Super Intelligence (HSI), and how we use AI to achieve this

will be the topic of this section.

INTRODUCING THE AI TOOLS

In the past century the average human IQ has increased by 3 points, and we're going to need to do a lot better than that if we want to remain competitive in a world that's increasingly dominated by progressively intelligent Machines.

While we have Adaptive Learning solutions that we can lean on today, which personalise the learning environment according to the students behaviours and responses, we also have AI itself that students and teachers can lean on - the raw technology.

While the user experience of interacting with AI's directly is often less appealing than most EdTech solutions, and AI requires more skill to get the best from it, it wouldn't be hard to argue that its ability to supercharge learning is already superior to many EdTech solutions.

So, in this section I'm going to look at how students and teachers alike can use a variety of freely available AI tools such as Google BARD and the famous OpenAI ChatGPT to dramatically accelerate their learning and improve learning outcomes by multiples.

ACCELERATE LEARNING BY 3X

IMPROVE GRADES BY 30%

PERSONALISE LEARNING

UPGRADING THE HUMAN LEARNING ALGORITHM .

BEFORE I start I'd like to get this clear: in this section, using examples, I'm going to show you how teachers can use the aforementioned AI's, and others as they emerge, to create personalised learning plans for students while at the same time increasing productivity and student face time, and I'm going to show how students can use these same tools to learn at least three times faster and increase grades by over 30 percent.

What I'm not going to be doing though is giving you a walk through of how these tools work because by the time I've explained it they'll have been upgraded and the content will be out of date.

UNDER THE HOOD OF AN AI

While I'm not going to dive into how tools like BARD or ChatGPT work in depth I will give you a high level introduction, and if you'd like to know more then just get in touch.

Both of these AI's are what we call Cognitive Artificial Intelligences. In

geek speak they are Large Language Models (LLM) that can interpret natural human language inputs and produce professional human-like responses that rival those of many experts - hence their usefulness in the following tasks.

While they are both impressive feats of human ingenuity what's more impressive are some of the statistics especially when we look at ChatGPT which at the time of publication is widely regarded as the world's most sophisticated AI.

With over 1 Trillion parameters, which are the technology equivalent of the connections in the human brain, ChatGPT has a Verbal IQ of 155, putting it in the top 0.1% of human intellect, contains more than 1,000 times more general knowledge than any human mind, and learns and transfers information at least 300 Million times faster than any human brain - making it a formidable Personal Tutor and also a formidable competitor.

As AI continues to improve though, as its capabilities expands, and as new tools indubitably appear on the market, you can be assured that I'll keep this section

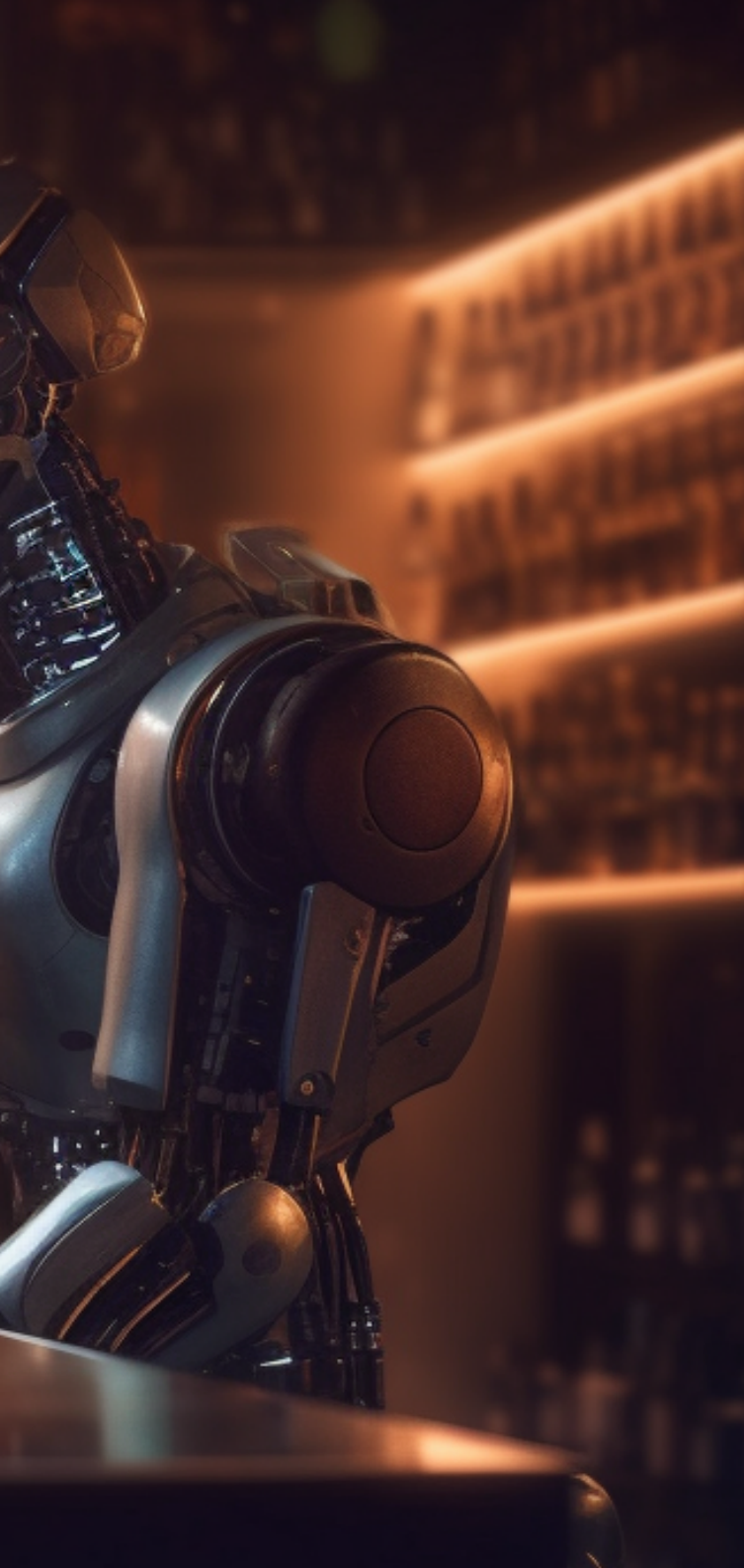
appropriately updated.

WHAT COMES NOW

Today, until their user interfaces evolve or are incorporated into other products, the best way to get the most from these powerful AI's is via natural language text prompts, so in this section I will give you examples of the prompts you can use to achieve the goals of improving teacher productivity, and improving students learning speed and outcomes.

MASTERING PROMPT ENGINEERING





FOR THOSE of you who wonder what the term “Prompt Engineering” really means in short it’s tech slang that relates to how we use natural human language, in this case text based inputs, to talk to Artificial Intelligence Chatbots, like the ones I mentioned in the previous section, to get the outputs and results we want and expect.

While AI has gotten a lot better over the decades at understanding human natural language it’s not perfect, it sometimes struggles with context, and it also struggles at remembering what’s gone before. So, just as you would when talking to anyone - or anything - that doesn’t speak your native tongue fluently you need to adapt how you communicate and that’s where in this case the “art” of prompt engineering comes into play.

YOUR GO

In my opinion the best way to learn how to communicate with these Chatbots is to not only experiment with - or engineer - your own text prompts, but also ask them questions that let them provide you with answers on how to get the most from them, something that ironically in the age of increasingly intelligence Machines noone seems to do. Other than yours truly.

In this section you will find examples of all the prompts I think you will need to improve your own productivity, learning speed, and learning outcomes, and each section is laid out by topic.

So, what are you waiting for? Let’s get busy!

CROSS DOMAIN KNOWLEDGE PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

1

PURPOSE OF THIS SECTION

In this section you will learn how to use prompt engineering to enhance students CROSS DOMAIN KNOWLEDGE and critical thinking. By leveraging prompts you will be able to generate assignments and questions that challenge their ability to apply knowledge and understanding across different domains.



2

PROMPT VARIABLES

Use a combination of these Key Phrases or Variables to engineer your perfect prompt

APPLY

COMPARE

DESCRIPTOR

EXAMPLE

FIND ANALOGIES

INTERSECTING IDEAS

OUTCOME

SUBJECT

For more ideas try this prompt: **LIST THE KEY PHRASES OR VARIABLES I CAN USE TO IMPROVE CROSS DOMAIN KNOWLEDGE, WITH DESCRIPTIONS, AND AN EXAMPLE**

3

EXAMPLE PROMPTS

Here are two example prompts you can adapt to create your own tailored prompts

Can we [DESCRIPTOR] of [SUBJECT] to [OUTCOME] in [SUBJECT]?

Can we [Use the Principles] of [Physics] to [Understand How Athletes Perform] in [Physical Education]?

How can [SUBJECT] [DESCRIPTOR] in [SUBJECT] [EXAMPLE]?

How can [Maths] [Be Used to Understand the Structures] in [Biology] [Such as DNA]?

CROSS DOMAIN KNOWLEDGE PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

4

EXAMPLE RESULT

Here is an excerpt of the generated result for our first example prompt ...

Absolutely, the principles of physics can be directly applied to understanding athletic performance in physical education. Here are a few examples of how you can make the connection:

1. Basketball: In basketball, the path of the ball is an example of a parabola. This can be explained with projectile motion in physics. Understanding the angle and force of the throw can help players improve their shooting skills.
2. Soccer: The concept of momentum and collisions in physics is demonstrated in soccer when players pass the ball or when they collide with each other.
3. Running: The principle of friction can be applied to understand why runners wear spiked shoes. The friction between the shoe spikes and the ground provides the necessary grip that helps the athletes run faster without slipping.
4. Swimming: In swimming, principles such as buoyancy (why swimmers float), drag forces (resistance experienced by swimmers in water), and propulsion (how swimmers move forward) can be understood through physics.
5. Gymnastics: Principles of rotational motion, gravity, and energy transformation can be applied to understand how gymnasts perform flips and balance on beams.

So, if you're looking for a prompt for this, you could use something like:

"How do the principles of physics, such as projectile motion, friction, buoyancy, and rotational motion, apply to athletic performance in sports like basketball, soccer, running, swimming, and gymnastics?"

Then, you can break down the prompt into individual aspects and explore each one in detail. Remember, the key to cross-domain knowledge is understanding how concepts from one area can be used to explain phenomena in another.

DEBATE PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

1

PURPOSE OF THIS SECTION

In this section you will learn how to use prompt engineering to turn your Chatbot into a formidable DEBATE opponent that students can engage with in sparring matches and use to refine and hone their debating skills, while exploring diverse opinions and perspectives on a wide range of topics.



2

PROMPT VARIABLES

Use a combination of these Key Phrases or Variables to engineer your perfect prompt

ACTION

ACTIVITY

ARGUMENT POINTS

COUNTER ARGUMENTS

EVIDENCE

OPPOSING POSITION

POSITION

REBUTTALS

TOPIC

YOUR STANCE

For more ideas try this prompt: **LIST THE KEY PHRASES OR VARIABLES I CAN USE TO CREATE A DEBATE, WITH DESCRIPTIONS, AND AN EXAMPLE PROMPT AND EXAMPLE DEBATE**

3

EXAMPLE PROMPTS

Here are two example prompts you can adapt to create your own tailored prompts

Let's have a [ACTIVITY] on the [TOPIC]. I will argue in favour of [POSITION] and you will argue in favour of the [OPPOSING POSITION]. Let's begin our dialogue.

Let's have a [Debate] on the [Impact of Technology on Society]. I will argue in favour of [We Need More Technology in our Lives] and you will argue [Against It]. I will provide my own arguments and responses, not you.

[YOUR STANCE] [TOPIC] and [OPPOSING POSITION]. I want to [ACTIVITY] it and will provide my own arguments and responses, not you. [ACTION].

[I support] [Climate Science] and [You Don't]. I want to debate it and will provide my own arguments and responses, not you. Create an opening argument.

DEBATE PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

4

EXAMPLE RESULT

Here is an excerpt of the generated result for our first example prompt ...

Sure, I can help you with that. I'll argue against the statement "We Need More Technology in our Lives." Please keep in mind that my responses are generated based on general arguments and perspectives and may not necessarily reflect personal opinions. Let's begin!

Against: We Need More Technology in our Lives

1. **Dependence on technology:** Increasing our reliance on technology can lead to a significant dependence on it. When we become overly reliant on technology, we risk losing essential skills and knowledge that are necessary for our everyday lives. For example, relying heavily on GPS systems can weaken our ability to navigate using traditional maps or landmarks.
2. **Social isolation:** The widespread use of technology, particularly smartphones and social media, has led to a decline in face-to-face interactions. Many individuals now spend a significant amount of time engrossed in their devices, resulting in reduced social interactions and a sense of isolation. This can have adverse effects on mental health and overall well-being.
3. **Job displacement:** As technology advances, there is an increasing concern about job displacement due to automation. Many routine tasks can now be performed by machines, which may lead to unemployment and economic inequalities. While technology creates new job opportunities, the rate of job creation may not be able to keep up with the pace of job loss.
4. **Privacy concerns:** The proliferation of technology in our lives has raised serious concerns about privacy. With the constant collection and analysis of personal data, individuals' privacy can be compromised. Technology companies and governments may have access to sensitive information, which can be misused or exploited for various purposes.

EXPLAIN PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

1

PURPOSE OF THIS SECTION

In this section you will learn how to use prompt engineering to turn your Chatbot into the equivalent of a personal tutor that is able to EXPLAIN topics in depth and detail and in a style that suits the student. By doing this students will be able to dramatically accelerate the rate at which they master the topics they're interested in or have difficulty mastering.



2

PROMPT VARIABLES

Use a combination of these Key Phrases or Variables to engineer your perfect prompt

ACTION

DETAILS

PROBLEM

REQUEST

TOPIC

For more ideas try this prompt: **LIST THE KEY PHRASES OR VARIABLES I CAN USE TO EXPLAIN CONCEPTS, WITH DESCRIPTIONS, AND AN EXAMPLE PROMPT AND EXAMPLE**

3

EXAMPLE PROMPTS

Here are two example prompts you can adapt to create your own tailored prompts

[ACTION] [REQUEST] in [PROBLEM].

[Explain] [How I Solve "X"] in [This Equation: $3x - 7 = 14$]

[ACTION] the [TOPIC]. [DETAILS].

[Explain] the [Process of Photosynthesis]. [Include a Description of the Main Steps, the Role of Sunlight, and Why This Process is Important for Life on Earth].

EXPLAIN PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

4

EXAMPLE RESULT

Here is an excerpt of the generated result for our first example prompt ...

To solve for x in the equation $3x - 7 = 14$, you would follow these steps:

Begin by isolating the term with x . You do this by adding 7 to both sides of the equation. This gets rid of the -7 on the left side. The equation then becomes:

$$3x = 14 + 7$$

Simplify the right side of the equation by adding 14 and 7 together:

$$3x = 21$$

Finally, to solve for x , you want x by itself. So you divide each side of the equation by 3:

$$x = 21 / 3$$

Simplify the right side of the equation by dividing 21 by 3:

$$x = 7$$

So the solution to the equation $3x - 7 = 14$ is $x = 7$.

GLOSSARIES PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

1

PURPOSE OF THIS SECTION

In this section you will learn how to use prompt engineering to create GLOSSARIES for different subjects or topics, the style of which can be adapted to suit the individual requirements of students as needed.



2

PROMPT VARIABLES

Use a combination of these Key Phrases or Variables to engineer your perfect prompt

ACTION

ACTIVITY

FORMAT

GRADE

INSTRUCTION

TOPIC

For more ideas try this prompt: **LIST THE KEY PHRASES OR VARIABLES I CAN USE TO CREATE GLOSSARIES, WITH DESCRIPTIONS, AND AN EXAMPLE PROMPT AND EXAMPLE**

3

EXAMPLE PROMPTS

Here are two example prompts you can adapt to create your own tailored prompts

[ACTION] a [ACTIVITY] of [TOPIC] for [GRADE] students in [FORMAT]

[Create] a [Glossary] of [The Most Important Chemistry Terms] for [Grade 10] students in [List Format]

[ACTION] a [ACTIVITY] of [TOPIC] in [FORMAT] and [INSTRUCTION]

Create a [Glossary] of [English Vocabulary Terms] in [List Format] and [Give Examples of Each]

GLOSSARIES PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

4

EXAMPLE RESULT

Here is an excerpt of the generated result for our first example prompt ...

Absolutely! Here's a glossary of the most important chemistry terms for Grade 10 students.

1. Atom: The smallest unit of an element, made up of protons, neutrons, and electrons.
2. Molecule: A group of two or more atoms held together by chemical bonds.
3. Element: A pure substance consisting of only one type of atom.
4. Compound: A substance made up of two or more different types of atoms chemically bonded together.
5. Mixture: A combination of two or more substances that are not chemically combined.
6. Chemical Reaction: A process that involves changes in the structure and energy content of atoms, molecules, or ions.
7. Solution: A homogeneous mixture where one substance (solute) is dissolved in another (solvent).
8. Solute: The substance that is dissolved in a solution.
9. Solvent: The substance in which the solute dissolves.
10. Acid: A substance that donates hydrogen ions (H^+) in a solution.
11. Base: A substance that accepts hydrogen ions (H^+) in a solution, often producing hydroxide ions (OH^-).

LESSON PLANS PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

1

PURPOSE OF THIS SECTION

In this section you will learn how to use prompt engineering to create tailored LESSON PLANS in minutes that you can use in class or at home.



2

PROMPT VARIABLES

Use a combination of these Key Phrases or Variables to engineer your perfect prompt

ACTION

ACTIVITY

APPLICATION

CONTEXT

GRADE

OUTCOME

ROLE

SUBJECT

tone

TOPIC

SKILL LEVEL

STYLE

For more ideas try this prompt: **LIST THE KEY PHRASES OR VARIABLES I CAN USE TO CREATE A LESSON PLAN, WITH DESCRIPTIONS, AND AN EXAMPLE PROMPT AND LESSON PLAN**

3

EXAMPLE PROMPTS

Here are two example prompts you can adapt to create your own tailored prompts

[ROLE] [ACTION] for [GRADE] that will let them [ACTIVITY] [TOPIC] and its [APPLICATION]

Acting as a [Science Teacher] [Create a Lesson Plan] for [Grade 6 students] that will let them [Explore and Analyse] [Climate Change] and its [Impact on their Local Environment]

[ACTION] [PURPOSE] [GRADE] to [OUTCOME and TOPIC]

[Create a Lesson Plan] [That Will Enable] [Grade 8 Students] to [Explain the Stages of the Water Cycle and How it Influences Weather Patterns]. Include [One Homework Activity].

LESSON PLANS PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

4

EXAMPLE RESULT

Here is an excerpt of the generated result for our first example prompt ...

Lesson Plan: Exploring Climate Change and Its Impact on the Local Environment

Grade Level: 6th Grade

Subject: Science

Objectives:

1. Students will understand the concept of climate change and its causes.
2. Students will analyze the impact of climate change on their local environment.
3. Students will explore potential solutions to mitigate the effects of climate change.

Materials:

1. Whiteboard or flipchart
2. Markers
3. Handouts or worksheets
4. Internet access (optional)
5. Science textbooks or reference materials

Procedure:

Introduction (10 minutes):

1. Begin the lesson by asking students if they have heard of climate change. Encourage them to share their thoughts or prior knowledge about the topic.

MARKING RUBRICS PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

1

PURPOSE OF THIS SECTION

In this section you will learn how to use prompt engineering to create MARKING RUBRICS that you can use to grade or mark any kind of assignments or work. When creating your prompt think about the specific goals and learning objectives of the assignment or work in question, the grade level, and the skills being assessed, then be clear with your descriptions and scoring criteria.



2

PROMPT VARIABLES

Use a combination of these Key Phrases or Variables to engineer your perfect prompt

ACTION

ACTIVITY

CITATION AND REFERENCING

CONTENT UNDERSTANDING

CREATIVITY

CRITICAL THINKING

FORMAT

GRADE

PRESENTATION

RESEARCH SKILLS

SCORE

SKILL LEVEL

SUBJECT

TOPIC

WRITING QUALITY

For more ideas try this prompt: **LIST THE KEY PHRASES OR VARIABLES I CAN USE TO CREATE A MARKING RUBRIC, WITH DESCRIPTIONS, AND AN EXAMPLE PROMPT AND RUBRIC**

3

EXAMPLE PROMPTS

Here are two example prompts you can adapt to create your own tailored prompts

In [FORMAT] create a [ACTION] for a [GRADE] [ACTIVITY]

In an [Excel Format] create a [Marking Rubric] for a [Grade 6] [Science Essay]

Create an [ACTION] for a [GRADE] lesson on [SUBJECT] in a [FORMAT] with [SCORE] for each [TOPIC]

Create an [Assessment Rubric] for a [Grade 8] lesson on [Cyber Security] in a [Text Format] with [Scores out of 10] for [Each Topic]

MARKING RUBRICS PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

4

EXAMPLE RESULT

Here is an excerpt of the generated result for our first example prompt ...

Certainly! Here's an example of a marking rubric for a grade 6 science essay in Excel format:

Criteria	Excellent (4)	Good (3)	Fair (2)	Needs Improvement (1)
Introduction	4	3	2	1
Content Knowledge	4	3	2	1
Organization	4	3	2	1
Language and Vocabulary	4	3	2	1
Accuracy and Precision	4	3	2	1
Formatting and Neatness	4	3	2	1
Conclusion	4	3	2	1
Overall Understanding	4	3	2	1
Total Points	32	24	16	8

To use this marking rubric, you can assign a score of 4, 3, 2, or 1 to each criterion, based on the quality of the student's work in that particular aspect. At the end, you can sum up the scores for each criterion to calculate the total points and determine the final grade for the essay. Feel free to modify or customize the rubric according to your specific requirements or grading standards.

QUIZZES PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

1

PURPOSE OF THIS SECTION

In this section you will learn how to use prompt engineering to create QUIZZES in different styles that let students test their knowledge of different subjects and topics.



2

PROMPT VARIABLES

Use a combination of these Key Phrases or Variables to engineer your perfect prompt

ACTION

ACTIVITY

FORMAT

GRADE

OUTCOME

POINTS VALUE

QUIZ TITLE

STUDENT TYPE

TOPIC

For more ideas try this prompt: **LIST THE KEY PHRASES OR VARIABLES I CAN USE TO CREATE QUIZZES, WITH DESCRIPTIONS, AND AN EXAMPLE PROMPT AND AN EXAMPLE QUIZ**

3

EXAMPLE PROMPTS

Here are two example prompts you can adapt to create your own tailored prompts

[ACTION] a [ACTIVITY] [FORMAT] to [OUTCOME] a [STUDENT TYPE] knowledge of [TOPIC]

[Create] a [Quiz] [With 20 Multiple Choice Questions] to [Test] a [12 Year Old's] knowledge of [Volcanoes]

[ACTION] a [ACTIVITY] [FORMAT] to [OUTCOME] [GRADE] understanding of [TOPIC]

[Create] a [Quiz] [With 10 Questions] to [Assess] [Grade 13 Students] understanding of [World War 2]

QUIZZES PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

4

EXAMPLE RESULT

Here is an excerpt of the generated result for our first example prompt ...

Absolutely, here's a multiple-choice quiz designed to test a 12-year-old's knowledge of volcanoes:

1. Which of the following is a type of volcano?

- A) Cinder Cone
- B) Spiral Cone
- C) Sugar Cone
- D) Pine Cone

2. What is the name of the world's largest active volcano?

- A) Mount Everest
- B) Mount Vesuvius
- C) Mount St. Helens
- D) Mauna Loa

3. What is molten rock called when it is beneath the Earth's surface?

- A) Lava
- B) Magma
- C) Ash
- D) Tuff

RESEARCH PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

1

PURPOSE OF THIS SECTION

In this section you will learn how to use prompt engineering to help students and teachers RESEARCH different subjects or topics so they can stay up to date with the latest developments and deepen their knowledge.



2

PROMPT VARIABLES

Use a combination of these Key Phrases or Variables to engineer your perfect prompt

ACTIVITY

STUDENT DESCRIPTION

FORMAT

OBJECTIVES

SUBJECT

TOPIC

For more ideas try this prompt: **LIST THE KEY PHRASES OR VARIABLES I CAN USE TO RESEARCH TOPICS, WITH DESCRIPTIONS, AND AN EXAMPLE PROMPT AND EXAMPLE OUTPUT**

3

EXAMPLE PROMPTS

Here are two example prompts you can adapt to create your own tailored prompts

I am a [STUDENT DESCRIPTION] acting as a [ROLE] help me [ACTIVITY] [TOPIC] in [SUBJECT]

I am a [Grade 11 Student] acting as a [Research Buddy] help me [Research] [The Latest Trends] in [Computer Coding]

I am [STUDENT DESCRIPTION] and don't understand [TOPIC] help me [ACTIVITY] it then [ACTIVITY] on it

I am [16 Years Old] and don't understand [Climate Change] help me [Research] it then [Create a Quiz] on it

RESEARCH PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

4

EXAMPLE RESULT

Here is an excerpt of the generated result for our first example prompt ...

Sure, let's explore the latest trends in computer coding as of 2023.

1. **Artificial Intelligence and Machine Learning:** AI and ML have become crucial in coding. They help create more intelligent applications, predict user behavior, and automate testing and bug fixes. Python, R, and Java are popular languages in this field.
2. **Quantum Computing:** Quantum computing is a rapidly growing field. While still largely in the research phase, new programming languages like Q# from Microsoft and Qiskit from IBM are being developed specifically for quantum algorithms.
3. **Low-Code/No-Code Platforms:** These platforms allow people to create software without needing to know how to code, or with minimal coding knowledge. They are becoming increasingly popular for developing simple applications and prototypes.
4. **Rust Programming Language:** Rust is gaining popularity due to its performance and safety, especially in system-level programming. It's seen as an alternative to C and C++ for system-level programming.
5. **Cybersecurity:** With the increase in cyber threats, there's a growing demand for secure coding practices. Languages like Python and JavaScript are widely used for cybersecurity solutions.
6. **Data Science:** With the growing importance of data, coding related to data analysis, manipulation, and visualization is increasingly in-demand. Python, with libraries like Pandas and Matplotlib, is a key language.
7. **Web Development:** JavaScript along with frameworks like React.js, Angular, and Vue.js continue to dominate development. WebAssembly is also seeing growing usage as a high-performance web development language.

REVISION NOTES PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

1

PURPOSE OF THIS SECTION

In this section you will learn how to use prompt engineering to create tailored REVISION NOTES in different styles that students can use to accelerate their learning and knowledge of different subjects and topics.



2

PROMPT VARIABLES

Use a combination of these Key Phrases or Variables to engineer your perfect prompt

ACTION

ACTIVITY

FORMAT

GRADE

ROLE

STUDENT DESCRIPTION

TOPIC

For more ideas try this prompt: **LIST THE KEY PHRASES OR VARIABLES I CAN USE TO CREATE REVISION NOTES, WITH DESCRIPTIONS, AND AN EXAMPLE PROMPT AND EXAMPLE**

3

EXAMPLE PROMPTS

Here are two example prompts you can adapt to create your own tailored prompts

[ACTION] [ACTIVITY] in [FORMAT] for [GRADE] students studying [TOPIC]

[Create] [Revision Notes] in [List Format] for [Grade 11] students studying [Computer Network Architecture]

In the [ROLE] [ACTION] [ACTIVITY] in [FORMAT] for a [STUDENT DESCRIPTION] studying [TOPIC]

In the [Style of Alan Turing] [Create] [Revision Notes] in [Essay Format] for a [Grade 8 Student] studying [AI]

REVISION NOTES PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

4

EXAMPLE RESULT

Here is an excerpt of the generated result for our first example prompt ...

Sure, here are the revision notes in list format for a Grade 11 student studying Computer Network Architecture.

1. Key Terms and Definitions

- a. Computer Network: Interconnected computers sharing resources.
- b. Network Architecture: Layout of the network, including physical and logical design.
- c. Server: Central computer storing files and providing services.
- d. Client: Computer requesting services from the server.
- e. Router: Device that routes data packets between networks.
- f. Protocols: Rules and standards governing communication between devices.

2. Types of Networks

- a. LAN (Local Area Network): Network confined to a small geographic area.
- b. WAN (Wide Area Network): Network that spans a large area, like cities or countries.
- c. MAN (Metropolitan Area Network): Network spanning a large campus or city.
- d. PAN (Personal Area Network): Network for an individual person, typically within a range of 10 meters.

3. Network Architecture Types

- a. Client-Server: Network where one or more computers (servers) provide services to other computers (clients).
- b. Peer-to-Peer: Network where each computer can function as both a client and server.

4. Network Protocols

STUDY BUDDY PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

1

PURPOSE OF THIS SECTION

In this section you will learn how to use prompt engineering to turn your Chatbot into a powerful, interactive, conversational STUDY BUDDY that helps students achieve their learning objectives faster by guiding and prompting them through the subjects and topics they're interested in.



2

PROMPT VARIABLES

Use a combination of these Key Phrases or Variables to engineer your perfect prompt

ACTIVITY

LEARNING OBJECTIVE

ROLE

SKILL LEVEL

TOPIC

For more ideas try this prompt: **LIST THE KEY PHRASES OR VARIABLES I CAN USE TO CREATE A STUDY BUDDY, WITH DESCRIPTIONS, AND AN EXAMPLE PROMPT AND EXAMPLE**

3

EXAMPLE PROMPTS

Here are two example prompts you can adapt to create your own tailored prompts

[LEARNING OBJECTIVE] in [TOPIC] can you be my Study Buddy and help me?

[I Want to Become an Expert] in [Python Programming] can you be my Study Buddy and help me?

Acting as a [ROLE] can you [ACTIVITY] about [TOPIC] to an [SKILL LEVEL]

Acting as a [Nutritionist] can you [Help Me Learn] about [Nutrition] to an [Expert Level]?

STUDY BUDDY PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

4

EXAMPLE RESULT

Here is an excerpt of the generated result for our first example prompt ...

Of course! I'd be happy to be your study buddy and help you become an expert in Python programming. Python is a versatile and widely used programming language, so it's a great choice for learning and building various applications. To get started, let's outline a study plan. Here's a suggested roadmap for becoming proficient in Python programming:

1. **Basics of Python:** Familiarize yourself with the fundamentals of Python, including variables, data types, operators, control flow (if statements, loops), functions, and basic input/output operations.
2. **Data Structures:** Learn about essential data structures in Python, such as lists, tuples, dictionaries, and sets. Understand how to manipulate and perform operations on these data structures.
3. **File Handling:** Explore file input/output operations in Python, including reading from and writing to files. Learn how to handle different file formats, such as CSV and JSON.
4. **Object-Oriented Programming (OOP):** Dive into OOP concepts, such as classes, objects, inheritance, encapsulation, and polymorphism. Understand how to design and implement object-oriented solutions using Python.
5. **Modules and Packages:** Explore the vast ecosystem of Python modules and packages. Learn how to import and use external libraries to extend the functionality of your programs.

Remember that practice is key to becoming proficient in Python programming. Alongside studying these topics, work on coding exercises, mini-projects, and real-world applications to apply what you learn. Feel free to ask questions, seek clarifications, or discuss any challenges you encounter. I'm here to help you throughout your Python learning journey!

SUMMARISE PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

1

PURPOSE OF THIS SECTION

In this section you will learn how to use prompt engineering to SUMMARISE different subjects and topics in different styles to help students learn faster, and improve their depth of knowledge and understanding.



2

PROMPT VARIABLES

Use a combination of these Key Phrases or Variables to engineer your perfect prompt

ACTION

FORMAT

GRADE

ROLE

SKILL LEVEL

STUDENT TYPE

STYLE

TOPIC

For more ideas try this prompt: **LIST THE KEY PHRASES OR VARIABLES I CAN USE TO SUMMARISE INFORMATION, WITH DESCRIPTIONS, AND AN EXAMPLE PROMPT AND SUMMARY**

3

EXAMPLE PROMPTS

Here are two example prompts you can adapt to create your own tailored prompts

[ACTION] the [TOPIC] for a [GRADE] who is an [SKILL LEVEL] in [FORMAT]

Summarise the [Krebs Cycle] for a [Grade 10 student] who in an [Expert] in [List Format]

Acting as a [ROLE] in [STYLE] [ACTION] [TOPIC] as a [FORMAT] for a [STUDENT TYPE]

Acting as a [Grade 5 teacher] in [Plain English] [Summarise] [The Water Cycle] as a [Short Story] for a [10 Year Old]

SUMMARISE PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

4

EXAMPLE RESULT

Here is an excerpt of the generated result for our first example prompt ...

Sure, given that the student is already an expert, this summary will use more precise scientific terminology. Here is a brief summary of the Krebs Cycle, also known as the Citric Acid Cycle or Tricarboxylic Acid Cycle:

The Krebs cycle, occurring in the mitochondrial matrix, is a key part of cellular respiration and plays a crucial role in the breakdown of glucose to produce energy for the cell in the form of ATP. The cycle begins with Acetyl CoA, a product of glycolysis (more specifically the linking step between glycolysis and Krebs cycle), which combines with Oxaloacetate (a 4-carbon compound) to form Citrate (a 6-carbon compound).

Through a series of eight steps, citrate is then transformed back into oxaloacetate, allowing the cycle to repeat. The steps include the following:

1. Citrate synthesis: Acetyl CoA combines with Oxaloacetate to form Citrate.
2. Citrate isomerized to Isocitrate: Through dehydration followed by hydration, Citrate is rearranged to form Isocitrate.
3. Isocitrate dehydrogenation: Isocitrate is oxidized by NAD^+ to form Alpha-Ketoglutarate, releasing one molecule of CO_2 and forming NADH.
4. Alpha-Ketoglutarate dehydrogenation: Alpha-Ketoglutarate is further oxidized, yielding a second molecule of CO_2 and another NADH molecule, leaving behind Succinyl CoA.
5. Succinyl CoA conversion to Succinate: The energy stored in Succinyl CoA's thioester bond is used to phosphorylate GDP to GTP, which can be readily converted to ATP. Succinate is left as a product.
6. Succinate dehydrogenation: Succinate is oxidized to Fumarate by FAD, yielding FADH_2 .
7. Fumarate hydration: Water is added to Fumarate, converting it to Malate.
8. Malate dehydrogenation: Malate is oxidized by NAD^+ to form Oxaloacetate, generating another molecule of NADH.

TEST PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

1

PURPOSE OF THIS SECTION

In this section you will learn how to use prompt engineering to turn your Chatbot into a powerful, interactive, conversational TEST tool that can test you on any subject or topic to any level in any format. You can also combine this with the Marking Rubric and Quiz prompts above to increase its effectiveness.



2

PROMPT VARIABLES

Use a combination of these Key Phrases or Variables to engineer your perfect prompt

ACTION

ACTIVITY

DIFFICULTY LEVEL

FORMAT

NUMBER OF QUESTIONS

OBJECTIVES

ROLE

SKILL LEVEL

SPECIFIED TIME

STUDENT TYPE

TEST FORMAT

TOPIC

For more ideas try this prompt: **LIST THE KEY PHRASES OR VARIABLES I CAN USE TO TURN YOU INTO A TEST TOOL, WITH DESCRIPTIONS, AND AN EXAMPLE PROMPT AND EXAMPLE**

3

EXAMPLE PROMPTS

Here are two example prompts you can adapt to create your own tailored prompts

I'm a [STUDENT TYPE] can you prepare [TEST FORMAT] that are [DIFFICULTY LEVEL] on the [TOPIC] then [ACTIVITY]?

I'm a [12 Year Old Student] can you prepare [10 Questions] that are [Hard] on the topic of [Computer Science] then [Provide Feedback Once I've Answered]?

Can you [ACTIVITY] [SPECIFIED TIME] with [NUMBER OF QUESTIONS] on [TOPIC] for a [STUDENT TYPE]

Can you give me a [Timed Test] with [20 Questions] on [Computer Science] for a [14 Year Old Student]

TEST PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

4

EXAMPLE RESULT

Here is an excerpt of the generated result for our first example prompt ...

Absolutely, I'd be happy to assist. Here are 10 challenging questions on the topic of Computer Science. Please type your answers, and I'll provide feedback right after each one.

Question 1: What does the term 'algorithm' mean in computer science?

Question 2: What is the difference between an interpreted language and a compiled language?

Question 3: What is a Boolean in computer programming?

Question 4: Can you explain the concept of 'recursion' in programming?

Question 5: What is 'object-oriented programming'? Name at least two languages that use this paradigm.

Question 6: What is 'Big O notation' used for in computer science?

Question 7: In web development, what does 'HTML' stand for and what is its primary purpose?

Question 8: What is the role of a 'database' in a web application?

Question 9: Can you explain the difference between 'syntax' and 'semantics' in the context of programming?

Question 10: What is a 'data structure'? Can you name and briefly describe two types of data structures?

Once you provide an answer for each question, I'll give you the correct answer and feedback. Remember, these are challenging questions so don't worry if you don't know all the answers. It's all part of the learning process!

TUTOR PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

1

PURPOSE OF THIS SECTION

In this section you will learn how to use prompt engineering to turn your Chatbot into a powerful, interactive, conversational TUTOR that can teach you about the topics you're interested in by taking on the role of a personal 1:1 tutor.



2

PROMPT VARIABLES

Use a combination of these Key Phrases or Variables to engineer your perfect prompt

ACTION

ACTIVITY

FORMAT

GRADE

OBJECTIVES

ROLE

SKILL LEVEL

STUDENT TYPE

STYLE

SUBJECT

TOPIC

For more ideas try this prompt: **LIST THE KEY PHRASES OR VARIABLES I CAN USE TO CREATE A TUTOR , WITH DESCRIPTIONS, AND AN EXAMPLE PROMPT AND EXAMPLE**

3

EXAMPLE PROMPTS

Here are two example prompts you can adapt to create your own tailored prompts

[ACTION] as a [ROLE] [ACTIVITY] about [SUBJECT]

[Acting] as a [1:1 Tutor] [Teach Me] about [Biology]

[ACTION] as an [SKILL LEVEL] [ROLE] in the [SUBJECT] [ACTIVITY] a [STUDENT TYPE] about [TOPIC]

[Acting] as an [Expert] [1:1 Tutor] in the [Field of Genetics] [Teach] a [Year 7 Student] about [Evolution]

TUTOR PROMPT CARD

311 INSTITUTE : THE FUTURE OF EDUCATION AND TRAINING : PROMPT ENGINEERING

4

EXAMPLE RESULT

Here is an excerpt of the generated result for our first example prompt ...

Great! Let's start with the basics. Biology is a broad and complex field that covers many different areas. However, it essentially studies life in all its forms and processes. Here are some of the key aspects:

1. Cell Biology:

Cell Biology is about the basic unit of life, the cell. It focuses on the structures and functions of cells, including their behaviors, interactions, and environment. There are two types of cells: Prokaryotic (those without a defined nucleus, like bacteria) and Eukaryotic (those with a defined nucleus, like plant and animal cells).

2. Evolution:

Evolution is the process by which different kinds of living organisms are believed to have developed from earlier forms during the history of the earth. It's the unifying theory of biology, explaining diversity and the shared features of life. Charles Darwin's theory of evolution by natural selection is a pivotal concept in understanding evolution.

3. Ecology:

Ecology is the study of the interactions between organisms and their environment. It looks at how different organisms affect each other, and how they are affected by their environment. It includes the study of individual organisms, populations, communities, ecosystems, and biosphere.

These are just a few of the many different areas of biology, and each one can be broken down into even more specific subfields. As you learn more about biology, you'll begin to see how these different areas interconnect and affect one another.

Do you have a particular area you're interested in, or should we continue with an overview?

THE
EXPONENTIAL
FUTURES
CURRICULUM

EXPONENTIAL FUTURES CURRICULUM

GET STARTED

... THE FUTURE AWAITS .

THE 311 Institute's Exponential Futures Curriculum (EFC) which aligns with the United Nations Sustainability Development Goals (UN SDG) is a self-led or instructor led first of a kind future focused curriculum.

Used by governments and schools around the world it's being used to help them future proof their students and inspire them to change the world for the benefit of everyone and everything that inhabits it.

Collectively, in partnership, we achieve this by providing students with the community, exponential mindset, and tools to help them envision the future and deep future, and succeed in a rapidly changing world where the rules that governed the past increasingly no longer apply and where the rate of technology led disruption, for better and worse, is accelerating exponentially.

FUTURE PROOF AND MODULAR

At a high level the curriculum is split into two distinct themes, each of which have their own distinct courses and both of which can be adapted on the fly as and when needed as the future evolves.


The first theme is the **Theory Module**

in which students discuss and explore all seventeen UN SDG, their associated global challenges and impacts, and then explore, learn about, and discuss the technologies and solutions that will help us solve those challenges.

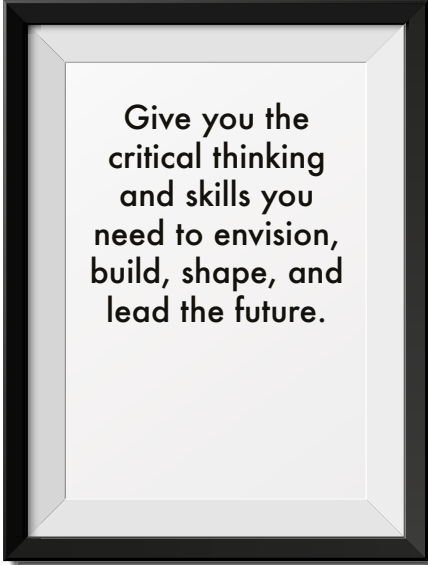
The second theme is the **Practical Module** where students are given the critical skills and thinking they need to build, launch, and scale their own exponential enterprises whose purpose it is to improve the world and solve the UN SDG challenges.

When run together these themes, and the courses within them, reinforce one another to give students unparalleled insights into the forces and technologies changing our world and the skills to prosper from them.


EXPONENTIAL FUTURES CURRICULUM GOALS .




Help you become
future ready by
future proofing
your thinking and
your skills.



Give you the
critical thinking
and skills you
need to envision,
build, shape, and
lead the future.

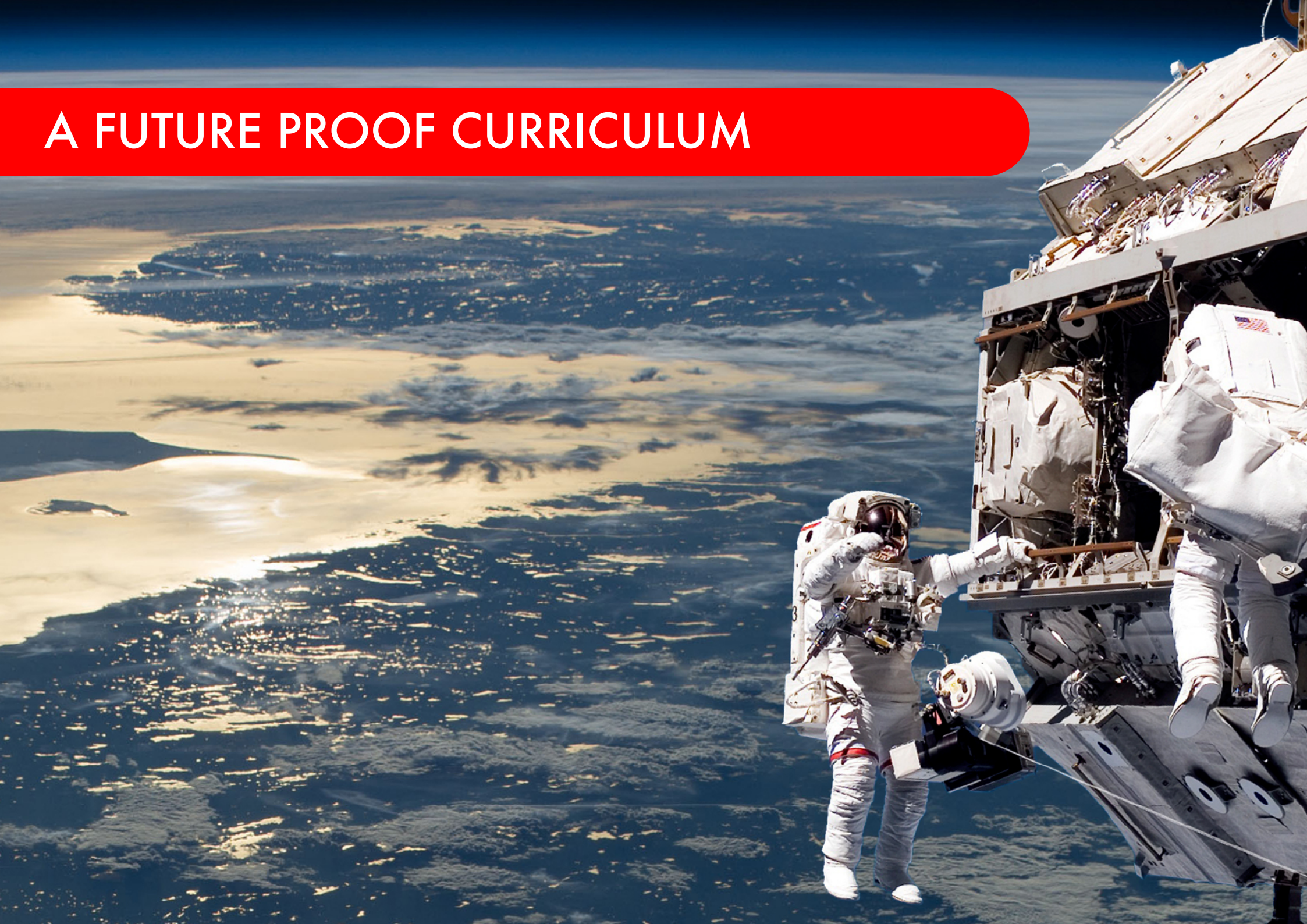


Help you realise
your full potential
for the good of
others and the
planet.



Give you access
to a vibrant
community whose
sole purpose is to
help you succeed.

A FUTURE PROOF CURRICULUM





IN A previous chapter I discussed the soft skills I consider to be the most valuable to master if students are to stand a good chance of being able to adapt and prosper in tomorrow's workforce, and let's face it, as you'd probably expect there are a lot. Now though it's time to turn our attention to the subjects themselves.

Subjects are potentially one of the education systems more contentious areas to discuss if only for the fact that while everyone has a valid point, and are quite right, in saying that every subject is valuable, the fact of the matter is that there is a limited amount of time to fit them all in. As a result we need to prioritise subjects, but prioritise wisely without leaving potentially dangerous gaps in students knowledge that could have negative consequences later on.

A NEW WAY OF TEACHING

From subjects to Themes. Ever since the first formal curriculum was penned, something that's thought to have taken place in Middle Egypt around 2,000 BC, subjects have largely been taught in silos with the connections between them being vague and inferred rather than clear and reinforcing, and I think this is both a mistake and an opportunity. An

opportunity for us all to do substantially more and deliver better educational outcomes with less.

WE MUST MOVE FROM TEACHING SUBJECTS TO CROSS DOMAIN THEMES

Take, for example, history. It's well understood that history is an important subject, but as we look to the future some argue that while interesting its relevance to many of us during our working lives is minimal, even though arguably it helps provide context to today's socio-political culture. And the same's also said to be true for geography, after all, when was the last time you had a discussion about Rill erosion?

Today we dedicate comparatively huge amounts of time to subjects and topics that, while playing an important role in helping us advance our general knowledge add little value to our day to day lives later on in life, whether it's domestically or professionally.

Furthermore, some topics, for example, such as map reading, that used to be used quite often by people as they went about their daily business have been

Notes:

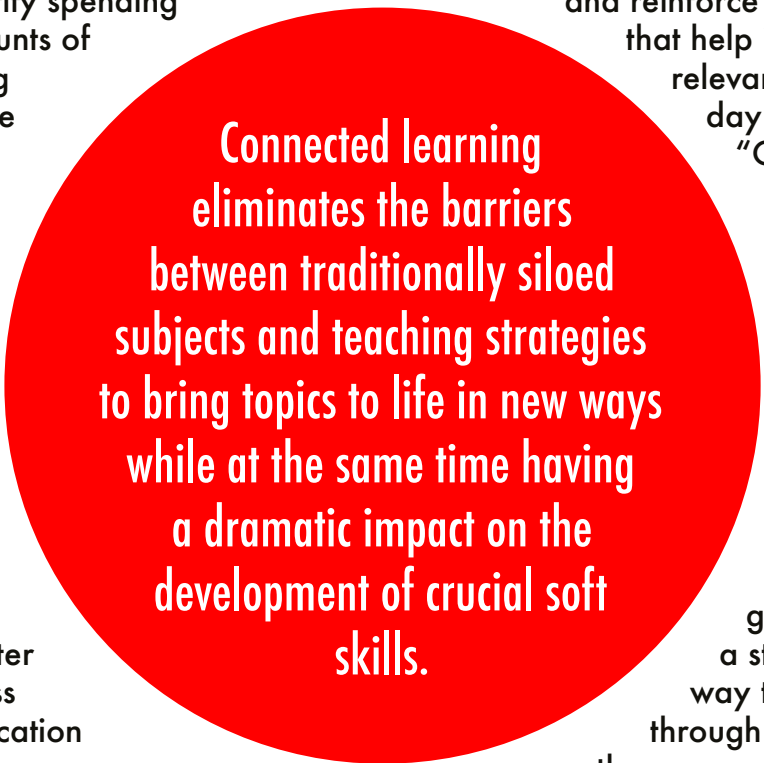
automated and made easier thanks to advances in technology, in this case sat navs, diminishing their importance.

As a firm believer that students should have a good, grounded and rounded, level of general knowledge I also find it difficult to justify spending significant amounts of time to teaching topics that, once students leave the classroom, are all too often locked away and forgotten in what amounts to the high school locker in our brains. And I'm not the only one, as you'll see later when we discuss alternative education strategies.

On the face of things when it comes to figuring out which subjects to embrace it looks like we have two options. On the one hand we can keep what I'll call broad base subjects as discrete subjects in the curriculum as we do today, or

alternatively we can de-prioritise them and ditch them.

But I think there's a third way. A new approach that will not only help students still gain access to those important subjects, but also help bring them alive and reinforce them in new ways that help improve their relevance during our every day lives, and I call it "Connected Learning."



**Connected learning
eliminates the barriers
between traditionally siloed
subjects and teaching strategies
to bring topics to life in new ways
while at the same time having
a dramatic impact on the
development of crucial soft
skills.**

At its core connected learning de-constructs the formal and incidental boundaries between today's individual, siloed subjects and brings topics that are generally taught in a static and isolated way to life. So let's run through an example, and there are many I can choose from, but for now I'm going to illustrate the basic principle.

Today history and geography are taught as distinctly separate subjects, and never the twain shall meet, but the two are often interrelated. Take, for example, the

Notes:

Maginot Line, built by the French in the build up to World War II, and the glacial terrain of the Ardennes Forest.

Traditionally these two topics, namely World War II and Glaciology, would be taught in complete isolation to one another by different teachers in different classrooms, but they, like so many other topics are intricately intertwined. After all, the French specifically avoided extending the Maginot Line into the Ardennes Forest because of its rugged terrain, which at the time they thought would be a deterrent to the heavily armoured German army. And this is the opportunity to change how we teach and bring subjects and topics to life in new ways. At a practical level I advocate that teachers and classrooms should be bought together to teach alongside one another, a communal teaching strategy if you will.

Imagine, for example, in this case collapsing geography and history together, teaching students about the Maginot Line and educating them about how the Ardennes Forest region was geologically shaped by nature at the same time.

Now start expanding the concept further, why not throw in lessons about economics by introducing discussions and

debates about how the line was financed, where that financing came from and how it was structured, the politics that raged around it, design, manufacturing, military strategy, and many things besides.

By exploring the benefits of connected learning suddenly we are de-constructing the distinct boundaries between individual subjects, and brining them to life in a way that not only provides student with valuable general knowledge, but that also helps them develop important soft skills that will be used in their everyday lives as they get older.

We are also, and this part isn't lost on me, eliminating the entire concept that underpins much of today's education system - the principle of siloed subjects, siloed lessons, and siloed teaching.

THE SUBJECTS

As the future continues to evolve so too will the subjects we teach, irrespective of how they're taught.

In this section I look into what we could be teaching to help students future proof themselves, as much as possible at least, and for the sake of simplicity I'm going to lay it out in today's traditional rote format and break them into Core and

Notes:

Foundation subjects where core subjects have a more structured format, and where foundation subjects are more fluid and dynamic, for example, following the principles of connected learning discussed previously.

CORE SUBJECT 1 COMMUNICATION

All of today's education systems prioritise their own sovereign languages, but while they prioritise literacy, writing and the spoken language they often stop short of teaching students about the more nuanced forms of communication, such as non-verbal communication, a form of communication which, if studies are to be believed, is one of our most dominant forms of communication.

As a result I would argue that rather than simply teaching Arabic, Chinese, English, or Spanish, for example, teachers should help students master communication in all its forms, with both humans and machines - the latter being a phenomenon that will be increasingly prevalent in the years and decades to come.

CORE SUBJECT 2 MATHS

The relevance of maths post education is often questioned, with trigonometry, for example, often being singled out as a topic that has little or no relevance in people's everyday lives. But today, while we continue to question the relevance of individual topics, maths is just as crucial as ever, if not more so, especially when you realise that it helps students grapple with optimisation and statistical problems, and that maths is the secret sauce that helps fuel everything from artificial intelligence and computer science, to cyber security, encryption, and even quantum mechanics - all of which are, and will continue to be for the foreseeable future, in high demand.

CORE SUBJECT 3 SCIENCE

Today the world would be a very different place if it wasn't for the multitude of scientific breakthroughs we've witnessed down through the millennia, from the discovery of Penicillin to the invention of the combustion engine, and many others.

As we move into the future science will continue to play a greater, not lesser role in society, but as we move from the molecular to the atomic, the electronic to the biological, and from electrons to

photons and quanta, all fields which will help revolutionise every part of our society, from aerospace and energy, to healthcare, retail and transportation, needless to say what we teach will have change at an increasingly frenetic rate.

FOUNDATION 1 CODING

Many people have latched onto coding, along with other so called “Digital skills,” as being one of the must have subjects taught in today’s modern classrooms, but in my opinion we run the danger of hanging too much hope on this single subject, in the way we’re teaching it today at least.

While it’s true that coding is in demand skill today, and will be for the foreseeable future, it’s also one that is already being automated by machines from a variety of multi-national companies ranging from Google to Microsoft and beyond. As a consequence we need to be very careful we don’t accidentally railroad today’s students into professions that could dead end in 20 to 30 years, when they’ll still only be a third of the way through their working lives.

That said though coding is evolving and

as a subject it still has a huge amount of runway left, the upshot of which is the fact that today we should be teaching students about the principles of biological, chemical, DNA, liquid, molecular, neuromorphic and quantum computing platforms, as well as how to code life itself, a field known as Synthetic Biology.

Tomorrow’s computing platforms will be capable of packing all of today’s computing power into a package the size of nothing more than a fingernail, 1’s and 0’s will be replaced, or at least augmented by DNA, Qubits and polymer chains, and much more.

Meanwhile, AI’s will be 3D printed, not just coded, and built from biological units and DNA, and all of that, which is still just the tip of the iceberg, is before we explore the new coding languages, simulation engines, and tools, that will emerge that will let us, and the machines, build and code new products millions of times faster than we do today.

FOUNDATION 2 DESIGN THINKING

Another important subject in today’s world, and one that is arguably under prioritised, design thinking draws on a

Notes:

variety of soft skills, such as empathy, and combines the best of traditional creative arts with the latest in cutting edge design, whether it's process or product design, or more broadly systems design, all of which will be increasingly relevant in the future, whether it's being applied to the creation and development of new computer programs, 3D printed skyscrapers, or the development of new artificial organisms.

FOUNDATION 3 ENGINEERING

Engineering is where scientific breakthroughs meet the road and are embedded into new products. For example yesterday's electromagnetic radiation discoveries were leveraged to engineer yesterday's televisions, just as today's quantum dot discoveries will be used to make tomorrow's televisions, as well as tomorrow's tricorder devices.

Engineering provides students with opportunities to build, explore and test how different ideas and concepts work, or don't, while at the same time helping them to improve their ability to reason and think things through in novel ways.

FOUNDATION 4

ENTREPRENEURSHIP

Entrepreneurship encapsulates a wide variety of skills, many of which I've discussed previously. At its core entrepreneurship is about identifying a problem, an opportunity, developing a vision and then working creatively and pro-actively with others to turn that vision into a reality, and better yet, it's inter-disciplinary, drawing in one way or another on everything I've discussed in this Codex, from creative thinking and experimentation to problem solving and beyond.

In the future we will see the rise of more fully autonomous organisations than many expect, and in fact we're already seeing the first ones appear, so it's absolutely critical that students are able to think on their feet, see the bigger picture and have the skills they need to create and execute their visions.

Similarly, as the cost of building, operating and scaling businesses of all shapes and sizes in all industries, digital and physical, continues to plummet, dropping by more than a thousand fold in the last few years alone, we have an opportunity today like never before to create a new generation of visionary thinkers who can change the world. But only if we give them the tools and the

skills they need.

FOUNDATION 5 HEALTH AND SPORTS

Healthy bodies and healthy minds will continue to play a vital role in helping people prosper and live well, but again today health and sports are all too often separated out into specific subjects, but as we continue to see the emergence of the Quantified Self, in both healthcare and in sports, I believe it makes sense to collapse the two together, and, as mentioned previously, eliminate the boundaries between silos.

Increasingly, thanks to the rise of new technologies, students will be able to see the impact that specific health and wellness programs have on their bodies and performance in real time, providing them with new insights and information that they can use to improve their health and performance.

FOUNDATION 6 HUMANITIES

Every student should be provided with a grounding in citizenship, ethics, and social studies that incorporate elements of history, geography and political

science which help them learn about the dynamics and nuances of human society.

As we head into the future though students will inevitably find themselves having to work within the framework of a decentralised global workforce that is comprised of both humans and virtual entities, and unless we help prepare them for this new world today they could find themselves quickly outpaced and lost.

Consequently I would strongly suggest that we evolve social studies to include teachings about synthetic intelligence and synthetic societies, abstract fields that today, admittedly are still emerging and difficult to get our heads around.

FOUNDATION 7 SAFETY AND SECURITY

One of the more unfortunate aspects of today's and tomorrow's world is the fact that there are people who do great good, but also people who do great evil, and this isn't going to be going away in the future. If anything it will get worse which is why we need educated and informed students who can be part of the solution and not the problem.

As increasingly powerful emerging technologies, such as Artificial

Notes:

Intelligence and Genetic Engineering, to name but two, become cheaper and increasingly democratised, as well as increasingly easy to leverage and use, by both humans and machines, safety and security are going to be a continued opportunity for school leavers, both in the short and long term - even though the technologies and tools will change.

future potential, a skill, that if mastered, will help give students the edge when they enter the workforce.

FOUNDATION 8

TECHNOLOGY EXPOSURE

The pace of global change in the last decade has been faster than at any other point in human history, and everyone agrees that the pace of change will continue to accelerate throughout the next decade, and as I demonstrated on my Starburst in an earlier chapter, technology is at the epicentre of it all.

In a world filled with increasingly capable and powerful emerging technologies understanding what they are and what they can help us build and achieve is going to be crucial to our students futures. There is a caveat though. While I believe it is important to expose students to emerging technologies it's arguably more important to help them, to use a phrase, "skate to the puck," in other words help them see where they're going and understand their

Notes:

RUNNING YOUR FIRST EFC COURSE





IT IS one thing to understand why we need to change what we teach our children and have the idea how to do it but it's an entirely different thing to actually do it and put it into action, and given the wide gap between the concepts and topics covered in the Exponential Futures Curriculum (EFC) and our Industrial Age formal education curricula it's natural to be slightly apprehensive when thinking about running your own EFC courses.

This is why as we and our partners moved from the Idea Stage to the Pilot Stage we documented everything about the first EFC trial runs - the highs and the lows, the good and the bad - so we could modify the things that didn't work in mid flight, find areas for improvement, and ensure that when it comes to running your own EFC courses you'd have everything you need to succeed first time every time.

GETTING TO "GO"

As with anything that you're thinking of doing firstly you have to have a reason for doing it. In this case I'm hoping I've made this abundantly clear, specifically to provide students with the modern day and futures knowledge and skills they need to survive and thrive in both today's

world and in the future that aren't taught as part of today's curriculum. Secondly, you need the full support of your school's leadership team, and thirdly you need a plan, access to resources, and time. It really is this simple.

Or it's supposed to be. But as we all know there are always different ways for different things to get in our way which is why I have created this codex and other content for you to explore and share with the result being that, arguably, the only thing you have to do is convince your school's leadership team to run a trial and I and our partners can even help with that. Which then leaves us with one question: What's stopping you?

THE WORLD'S FIRST EFC TRIAL RUN





AS MENTIONED previously when we ran the first Exponential Futures Curriculum (EFC) courses, the **Future of Food** and the **Exponential Entrepreneurship** courses, we documented everything we observed. On the one hand this allowed us to modify the courses in mid flight and improve them, but on the other we believe the observations provide valuable insights into the behaviours of students and teachers, as well as the logistics of running the courses, that could be invaluable for those of you thinking about running your own courses but who are intrigued about the unknowns associated with running what is to all intents and purposes a first of a kind curriculum.

BACK STORY

For us and the school involved getting to the point where we had a viable curriculum to run and then being able to run it took just under three years, partly because the global COVID-19 pandemic delayed its implementation for two years or so.

About the School

While there are many schools who could have run the first courses the decision was made to run them at Sherfield

School in Hampshire in the UK, a private Primary and Secondary school with over 450 students ranging in age from 3 to 18 that's part of the Bellevue Group and global GEMS Group, and which has a long standing tradition of educational excellence and innovation, with our sponsor being none other than the Headmaster, Nick B., himself.

I must stress though that while our objective is to democratise access to futures education for everyone - irrespective of their ability, background, and circumstances, or school - that the decision to run the pilot at a private school was in part guided by the difficulty that UK public schools have adopting things outside of the traditional core curriculum - the very thing people everywhere agree needs updating.

Ultimately, the rather harsh fact of the matter is that when it comes to trying to do new things in new ways private schools have a lot more flexibility than their public school counterparts so, to be clear, in this case it was never a question of money or resources, simply a matter of flexibility and that's something that governments everywhere should take heed of, and it's a challenge I'll be tackling another day.

SHOCKING !

AT LEAST **85%** OF WHAT WE DISCUSSED
AND TAUGHT IN THIS COURSE **ISN'T**
REPRESENTED IN EXAMS OR IN THE
CURRENT UK SCHOOL CURRICULUM AT ALL

THE FUTURE OF FOOD COURSE . FIRST RUN .

IT'S THE last term of the academic year, during a very busy period for the school that includes everything from exams and mocks to end of term plays, and this course was run with **Year 6 students** with an average age of 11.

Aligned to the United Nations Sustainability Development Goal (SDG) 2, Zero Hunger, this is a three week course with three one hour lessons and a small amount of after school homework.

We chose this course as our first because everyone consumes food and is familiar with it, as well as because it's crucial to human life and wellness.

Furthermore, in addition to growing food inflation and food insecurity, today over 1 Billion people still suffer from hunger and starvation on a daily basis which is no thanks in part due to the fact that currently 47% of all global agricultural yields - both animals and crops - are being wiped out by disease and pests as well as by extreme weather and water scarcity events. And all of these challenges are against the backdrop of a growing global population and middle

class which then ultimately leads us to argue that the way we produce food today is no longer future fit and that we must find new, better methods to produce it.

Fortunately for all of us though we have seen many breakthroughs, many of which are sci-fi-like in nature. These not only give us hope for the future but also eliminate many of the problems associated with current food production including animal welfare, deforestation, greenhouse gas emissions, epidemics, pollution, water consumption, and others, while at the same time dramatically improving food accessibility, affordability, quality, and yields. The result of which means that our children should be able to look forwards to a brighter future free from food conflict and stress.

LESSON OBSERVATIONS

You can find the course and lesson plans we used for this course later on in this codex.

These observations, from the first run of this course, include observations from both myself and the teaching staff involved.

In this case these lessons were taken by myself alongside Andrew R. the schools Year 6 science teacher who had no prior experience of this topic or lesson format.

LESSON 1

How Food is Produced and its Impact

1. Breaking Homework Rules . The decision to allow students to do the lessons' homework assignment in collaborative groups of their choosing with the people of their choosing, including parents, was a good one because it helped them practice and fine tune a wide range of future necessary

LESSON 1

WHICH STATEMENTS ARE **TRUE** ? **ALL . NONE . SOME ?**

1. WE DON'T NEED ANIMALS TO MAKE MEAT
2. WE DON'T NEED FIELDS TO GROW CROPS
3. WE CAN MAKE COFFEE WITHOUT THE PLANT
4. WE CAN MAKE FOOD FROM AIR
5. WE CAN PRINT FOOD IN SPACE

ANSWER : ALL OF THEM

soft skills including collaboration, leadership, and organisation. It also gave them skills that are in sync with those in the real world where we generally don't work in isolation, while this is counter to the current educational establishments mantra of independent learning and evaluation it is a vital skill.

2. Broad Knowledge . During the lesson workshop discussing how food is produced today the children discussed many more ways than we anticipated, including foraging and hunting, so we increased the time allowed for this activity.

3. Complete Attention . Throughout the one hour class we had their full attention about 97% of the time which equated to very high engagement, and that is probably made even better a statistic given the fact I'm not a teacher with the teachers authority.

4. General Knowledge . Having knowledge of other topics associated with this lesson such as cell reproduction, climate change, sustainability, and so on, proved to be important - this "associated knowledge" could be one of the main limiting factors when it comes to trying to roll these kinds of lessons out to younger children. That said though if children didn't have this knowledge it wouldn't be

too big an issue.

5. Hungry for Knowledge . The children were hungry for futures knowledge and in many cases had already gotten a lot of information about this and other topics, such as growing food on Mars and in space, via their informal education networks such as friends and online content. This was notable because none of them knew we were running this course which shows there is already an existing level of interest in this topic and in information not contained within the traditional UK curriculum.

6. Like Ducks to Water . Despite being told many times by people that you can't teach children about complex futures we consistently found that children grasped the concepts better and faster than the vast majority of adults I've encountered.

7. Permission to Think . Some of the children asked for permission to think out side of the box when we were discussing future food production methods which likely says something about today's culture.

8. Question Overload . The children almost overloaded us with questions, most of which were intelligent and showed a high degree of fore thought and lateral thinking, the result of which

Notes:

meant we will be adding dedicated Q&A time into lesson plans.

9. Right Fit . While we could teach this lesson to younger students in years 4 and 5 students Year 6 seems to be a good “minimum fit.”

10. Supportive Parents . The children’s parents, who we also needed to be “on board” with the initiative were not only supportive but they all saw the value with many of them turning into champions and sponsors of the program.

11. Teach the Teacher . The class teacher, Andrew R., grasped the lesson content fast which alleviated one of our main concerns about the implications of having to “teach the teacher.”

LESSON 2

The Future of Food Production

At the end of Lesson 1 the children were set the homework task of writing a short story on answering the question: “How will food be produced in 2030?” The question was intentionally broad in order to give the children the opportunity to explore the subject in greater depth at their leisure.

As expected the vast majority of their stories demonstrated linear thinking which can be summarised as “more of the same (of today’s traditional thinking - genetic engineering, more cattle and crops, and so on).”

Two students though did write about vertical farms and cellular agriculture, two new food production methods. However, even though their stories were high level and they had questions it was clear that they grasped the basic concepts even if they didn’t understand them with any particular clarity.

Our first hand learnings from running Lesson 2 included:

1. Can’t Wait . As we neared the end of the lesson the most dominant question was: “Why do we have to wait until the next lesson!?” which in this context meant they were eager to continue. Obviously it was an encouraging sign, and after the lesson a number of students came up to myself and the teacher to say the course was by far and away their favourite of all their classes.

2. Confused about Animals . It was interesting to see that as we talk about “Meat without the animal” and “Dairy without the animal” a significant number of the children were confused about what

we would do with all the livestock, in fact this became a minor sticking point ...

3. Guessing is not a Strategy . When asked a set of five questions about the future of food production, shown on the adjacent page, just under 20% of the children thought all the statements were true. However, we had good reason to think a few were guessing.

4. Intelligent Questions . While there were tons of questions - edging close to a hundred - as the children's knowledge grew their questions became more informed and intelligent including questions about food cost, quality, safety, and taste, as well as its nutritional value, impact on jobs, water consumption, the future of livestock, and more. In fact many of the questions were as good as or better than those asked by adults.

5. Limit the Tech . Where possible minimise the use of technology, such as laptops, in the classroom because between WiFi issues and software updates we were at risk of losing ten minutes of the lesson. Use technology only when necessary.

6. Question Overload . As we stepped through the various new food production methods including 3D Printed foods, Cellular Agriculture, food from air, and

vertical farming, the volume of questions was non stop. There was also a huge amount of group chatter and excitement - so much so that at one point I thought we would have to abandon the lesson and turn it into one long Q&A session instead. Frankly, it was fascinating to see, but it also means that delivering these lessons exclusively online might limit their impact.

7. Shallow Knowledge . When it came to listing today's common food production methods in general all the students could list them as well as their inputs and outputs. Against the backdrop of a growing global population, climate change, and their environmental impacts they all classified them as unsustainable which was interesting to see.

However, when it came to conversations about ingredients - more "obscure" food staples such as Palm Oil, Soy, and Whey - they were less sure about how these were produced and when we discussed Oil Palm monocultures none of the children thought about biodiversity loss as a consequence. In fact they thought the impact of the farming method was "neutral" because while one rainforest tree is felled in Borneo, for example, it's replaced by an Oil Palm. This was also interesting to see.

LESSON 3

The Deep Future of Food, and Implications

This lesson focused on the opportunities that the new food production methods discussed in Lesson 2 give us to transform old foods and create new ones.

It also focused on the cultural, ethical, and social consequences of these new food production methods including how incumbent companies who are disrupted by them respond in the real world, using real examples, and their impact on jobs.

Given the seriousness of the topics and the age of the class I always believed that this lesson would be one of the most challenging in the course especially given the fact that many of the issues we covered aren't included anywhere in today's traditional school curriculum - which is why I included them in the first place. However, while I was right to a degree and cracks in the students general knowledge definitely showed, that didn't stop them coming up with some surprising out the box thinking.

These are our first hand learnings from running Lesson 3:

1. Fighting Competitive FUD . When it

came to discussing how to counter the behaviour and narratives that incumbent companies put out when faced with new disruptive market entrants that they are trying to put out of business or slow down, by trying to turn consumer opinion, marketing, and regulations and law against them, as expected there was a lot of silence.

In part this was because students aren't generally taught about the "realities" of business in the real world whether it's about competition, intellectual property, marketing, regulation, sales, or value propositions. However, it'd be also due to the fact that in order to counter the incumbents objections and win over customers the children needed to have a deeper understanding about not just the new startups businesses, products, and value propositions, but also the incumbents.

My feeling is that this is where a dedicated entrepreneurship course would be beneficial. That said though with prompting the children did start to get their heads around how to counter many of the incumbents arguments and began using arguments about regulation, sustainability, as well as product innovation to their advantage. Given the fact that this was an in at the deep end assignment the evolution in their thinking

LESSON 3

LET'S TALK PANDA BURGERS

- RIGHT?
- WRONG?
- CULTURALLY INSENSITIVE?



was impressive and would put many adults to shame.

2. Getting Out the Box . There was one student who was reticent to present his idea and needed prompting to vocalise it because he thought it was impossible, namely the ability to create tasty edible plates and cutlery, the former of which could be wrapped around different foods like a Tortilla which was an interesting idea. Meanwhile, another student showed some significant out the box thinking and suggested developing foods with medicines in them, something that's ironically already been done and approved by the US Food and Drug Administration, but that we hadn't discussed. Both of these were excellent examples of lateral thinking.

3. New World Old Social Biases . When we discussed the ethics of Panda Burgers - Right, Wrong, or Culturally Insensitive - it was interesting to see that almost all the children thought they were wrong which then led us to have a conversation about the origins of food, cultural food bias and societal norms, and led us to discuss some of the foods that other cultures eat that we in the UK might find odd such as those cultures who eat dog, frog, horse, and snake meats, for example.

4. Radical Lateral Thinking . It was quite

staggering to see the children apply radical lateral thinking and start asking questions about what would happen if we used Cellular Agriculture to create Human Burgers - something that has already been done - then using their own initiative to debate whether that was cannibalism, something that I'm sure parents will love discussing when the students get home ...

5. Surprising Creativity . When it came to thinking up new food products that could be created using the new food production methods the children had no shortage of ideas. However, as expected many of those stayed in the safe zone with the children principally focusing on combining existing foods, flavours, and food formats together. Later on though they did start including textures in their ideas, and it was also encouraging to see them evolve their thinking to include the possible health benefits of the foods they created.

6. Work to be Done . When we discussed what happens to those people who lose their jobs because of the adoption of some of these new disruptive technologies, such as automated vertical farms, there was a wide mix of answers ranging from retraining them, hiring them, and in one case letting them sort things out for themselves. My feeling is

MYTH

**“YOU CAN’T TEACH CHILDREN ABOUT
COMPLEX FUTURES.”**

OBSERVATION

**THEY PICK IT UP
FASTER AND BETTER THAN ADULTS**

Notes:

that this would have been an interesting topic to spend more time on but alas we couldn't.

Notes:

**TODAY INDIVIDUALS CAN CHANGE
THE WORLD AT A SPEED AND
SCALE UNIMAGINABLE JUST
TWENTY YEARS AGO BUT
MOST OF US AREN'T TAUGHT
HOW TO UNLOCK THIS POTENTIAL .**

EXPONENTIAL ENTREPRENEURSHIP . FIRST RUN .

THIS SHORT two week course, which was back to back with the Future of Food course, and where students had to start their own Future Food startups, was run with **Year 6 students** with an average age of 11.

Aligned to the United Nations Sustainability Development Goal (SDG) 8, Decent Work and Economic Growth, the content of this course teaches students the entrepreneurial skills used by some of the world's most prolific and successful entrepreneurs and doesn't hold back. In short it is not a course that has been watered down to be age appropriate, and this was intentional because we wanted to see just how capable the children were when literally put in at the deep end.

The purpose of this course was to give the children the opportunity to create their own Exponential Startups then seek Seed Funding from an expert panel.

Today, not only do we live in a world where our children can create and scale businesses that sell to and impact billions of people faster than ever before, but

as we see titanic technological shifts and global business disruption, they will need to be armed with the critical thinking and skills to navigate it all and thrive. At its core this these are the skills this course teaches.

LESSON OBSERVATIONS

You can find the course and lesson plans we used for this course later on in this codex.

These observations, from the first run of this course, include observations from both myself and the teaching staff involved.

In this case these lessons were taken by myself alongside Andrew R. the schools Year 6 science teacher who had no prior experience of this topic or lesson format.

LESSON 1

Startup Workshop and Pitch Preparation

In this lesson we recapped the different ways that food production is changing and discussed how new technologies and the rise of an increasingly digital and connected society can help the children change the world and impact the lives of billions of people faster than ever before.

Notes:

Next, in groups, we left them to ideate their new companies, coached them on the information they needed to include in their investor decks, and gave them the pitch templates they needed to complete - based on the real pitch decks used by many of the world's most successful companies such as Uber to raise hundreds of billions of dollars worth of investment.

The students then worked in groups to develop their startups and pitch decks with oversight from myself and Andrew R. the teacher. They then continued working on them after school in their groups over the course of the week with assistance from anyone they wanted to be involved because, after all, that's precisely how it works in the real world - no barriers and no holds barred as they say.

LESSON 2

Pitch Session

In this second and ironically finally session the children got to present their startups and pitch decks to a panel of investors and trade equity and other tangible assets in return for Seed Funding.

It is important to say that at every step of the way through this course none of the children were given allowances, byes, or free passes because of their age. Giving them as authentic an experience as possible and treating them in the same way entrepreneurs more than twice their age are treated, both in terms of behaviours and lines of questioning, was done on purpose to see how they would cope and fare, and as daunting as that might sound this is our experience:

1. Creative Freedom . Having a standard pitch template to that students can follow, and use if necessary, is a must. But, that said, they should also be given full creative freedom to create their own if they wish to do so.

2. Variable Quality but Good . As expected the quality of the pitches, in terms of presenting styles as well as their branding and design, varied greatly. However, despite these variances all the pitches contained all of the necessary and vital information required by seasoned investors.

3. Levelled Up Job Almost Done . Despite some doubts it was clear that the children had in fact grasped and taken on board all the key learnings from both courses - this and the Future of Food course - as well as many of the subtler ones and

Notes:

been able to successfully combine them. The evidence of this was everywhere.

In their pitches they included comprehensive information about everything from the competitive landscapes and their unique value propositions, all the way through to details about new business models and their impact on people and the environment. They also showed amazingly high levels of lateral thinking.

Overall the quality of their pitches and presentation styles would have put many real entrepreneurs to shame, and I speak from first hand experience. Bearing in mind that both courses were new, rushed, and were built in flight as they say, this was perhaps our most staggering observation.

4. Competitors Beware . When it came to listing their competitors almost all of the children were not only well informed, but they also displayed a very high degree of lateral thinking and ambition. In short they had almost everyone who's involved in today's food industry in their sights - and this was surprising.

Sure, they saw traditional food providers such as Asda, Marks and Spencers, Sainsbury's, and Tesco's in their sights, but they also had KFC and McDonalds

in their sights as well. They even included Cargill, Deliveroo, Just Eat, and others as competitors they could take out, and I don't mean take out for lunch.

Furthermore, their value propositions against these companies were well thought out and almost every business model they sighted was Direct to Consumer (D2C) - the investors favourite kind of business model in today's environment.

What was perhaps most interesting though was that none of them had thought about partnering with said giants and instead decided in all cases to take them head on. Bold?

5. Social Good . It was interesting, and heartening, to see that every pitch had philanthropic elements whether it was giving free food to the homeless, or providing food at a discount to the 810 Million hungry people on the planet.

6. Variable Pricing Models . We also saw numerous examples of different pricing strategies for developed and developing nations which was interesting and showed a maturity of thinking that even some adult entrepreneurs gloss over or ignore.

7. Too Quick to Take the £££ . When the

Notes:

investors were making their offers only a handful of students asked what value those investors would bring to the table. Not only was this a missed opportunity but also a future coaching point.

8. Great Imaginary Skills . When the pitching teams described their leadership teams it was encouraging to see they all chose the right mix of skills and leadership qualities to develop their companies, with many of the world's top companies and universities being regularly cited.

9. Money to Buy Assets . Quite a number of students planned on using the investments they secured to buy assets and assets, such as factories and warehouses, rather than leasing these assets. This could be a future coaching point because as all business executives know Return on Capital Employed (RCOE) is a key performance metric for businesses, and it's generally yet another topic that's not taught in schools but is nonetheless vital to understand.

10. Child's Play . When asked complex questions about equity stakes, profit margins, pricing strategies, product development, sales to date, target markets, and other topics the great majority of students were able to think on their feet and could answer questions

that many adults might have struggled with quickly and competently. While they were obviously very impressive the big lesson here for both parents and teachers alike is that in many respects many students have skills far beyond their years.

MYTH

**“YOU NEED TO TEACH CHILDREN
LIKE CHILDREN .”**

OBSERVATION

**THEY PICK UP FUTURES CONCEPTS FASTER
THAN ADULTS . EVEN ENTREPRENEURSHIP**

EFC COURSE PLANS AND RESOURCES





IN THIS section you will find all the guides, resources, templates, and course plans that you need to begin running your very own Exponential Futures Curriculum (EFC) program, and hopefully while trying to envision and forecast the future is complex by using the resources in this section you'll find that running your program isn't.

TEMPLATES & RESOURCES



Notes:

AT THE 311 Institute our mission has always been to democratise access to the future so everyone can benefit from it and be prepared for what it holds. As a result we have taken the decision to open source our Exponential Futures Curriculum (EFC) under a Creative Commons (CC) license so that any school can create and run their own individual programs, and be a part of our community, should they wish to.

In this section you will find all the EFC templates and resources you need right at your fingertips, with editable PDF versions available online if you'd prefer to use those which can be accessed by clicking or scanning the various QR codes that you'll find dotted through this codex. And then, of course, if you do need help or have any questions then you are more than welcome to get in touch with me using any of the methods listed at the beginning of this codex.

COURSE OUTLINE CARD

311 INSTITUTE : EXPONENTIAL FUTURES CURRICULUM : COURSE OUTLINE



This Course Outline Card helps you build out and visualise your course in full from start to finish. It is your single point of reference and should include as much background information and detail as possible.

COURSE NAME:

SCHOOL NAME:

FOR YEAR GROUP(S):

1

ABOUT THIS COURSE

Describe the course objectives, content, and expected learning outcomes

Tick all that apply: This course will be run... In the Metaverse ☐ In Person ☐ Online ☐

3

OVERALL COURSE STRUCTURE AND DETAILS

Provide details of the course structure, lessons, and schedule

4

MATERIALS, RESOURCES, AND PRE-WORK

Provide details of the materials, resources, and any student or teacher pre-work that is required

2

ASSESSMENT

Provide details of how you will assess the course outcomes



Click or scan to download
this resource and other
educational resources.

LESSON PLAN CARD

311 INSTITUTE : EXPONENTIAL FUTURES CURRICULUM : LESSON PLAN



This Lesson Plan Card helps you build out your lesson and keep your class on track when learning about complicated or difficult topics. It can also help to give you peace of mind, knowing that everything is written down.

SCHOOL NAME:

COURSE NAME:

LESSON NAME AND NUMBER:

FOR YEAR GROUP(S):

1

ABOUT THIS LESSON

Describe the lesson objectives and overview

Tick all that apply: This lesson will be run... In the Metaverse ☐ In Person ☐ Online ☐

3

LESSON STRUCTURE

Provide details of the lesson structure, timings, and any homework

2

CRITICAL THINKING AND SKILLS DEVELOPMENT

Describe the critical thinking and skills this lesson will help develop

4

RESOURCES

TEACHER RESOURCES:

STUDENT RESOURCES:



Click or scan to download
this resource and other
educational resources.

EXPONENTIAL ENTREPRENEURSHIP

8 DECENT WORK AND
ECONOMIC GROWTH



**DECENT WORK AND
ECONOMIC GROWTH**
UN SDG #8



Notes:

WE LIVE in extraordinary times that are not only extraordinary because of the sheer level and speed of technology led business, cultural, and societal change, but that are extraordinary because in our digitally connected world today individuals have the power to build and launch businesses that change the world and impact the lives of billions of people at a speed that was unfathomable just twenty years ago.

Today, it is no secret that all of us are the most powerful versions of ourselves that could ever have lived, much more powerful than the Kings and Queens, Presidents and Prime Ministers, of ancient times. All of which then leaves us with the question: How do we all tap into this potential? And that's what this course is all about - helping students reach what we call their "Unlimited Potential."

COURSE OUTLINE CARD

311 INSTITUTE : EXPONENTIAL FUTURES CURRICULUM : COURSE OUTLINE



This Course Outline Card helps you build out and visualise your course in full from start to finish. It is your single point of reference and should include as much background information and detail as possible.

COURSE NAME:

EXPONENTIAL ENTREPRENEURSHIP [SHORT COURSE]

SCHOOL NAME:

FOR YEAR GROUP(S):

YEAR 6 AND UP

1

ABOUT THIS COURSE

Describe the course objectives, content, and expected learning outcomes

This course, which is part of the 311 Institutes's Exponential Futures Curriculum (EFC), has been tailor made to provide students with all the critical skills and thinking they need to create and launch their own exponential startups and both lead and navigate a future that no longer behaves in the same way as the past.

If you are running this course it is **STRONGLY** recommend that it is run as a **COMPLIMENTARY COURSE** to the other courses in the EFC.

Tick all that apply: This course will be run... In the Metaverse ☐ In Person ☒ Online ☐

3

OVERALL COURSE STRUCTURE AND DETAILS

Provide details of the course structure, lessons, and schedule

This course has TWO LESSONS and will be run over consecutive weeks.

The lessons in this course are:

1. STARTUP WORKSHOP AND PITCH PREPARATION
2. STARTUP PITCHES

4

MATERIALS, RESOURCES, AND PRE-WORK

Provide details of the materials, resources, and any student or teacher pre-work that is required

MATERIALS: [Teachers Bible](#)

PRE-WORK: None Required

RESOURCES: Interactive presentation tools; internet connectivity; Google Jamboard; laptops; marker pens; note books and paper; projector and or screen with audio; whiteboard; various software tools as appropriate (Adobe Express, Canva, Google Slides, Halo AR, iMovie, Kapwing, Keynote, Piktochart, QR Code Generator, et cetera ...)

2

ASSESSMENT

Provide details of how you will assess the course outcomes



Click or scan to download this resource and other educational resources.

LESSON PLAN CARD

311 INSTITUTE : EXPONENTIAL FUTURES CURRICULUM : LESSON PLAN



This Lesson Plan Card helps you build out your lesson and keep your class on track when learning about complicated or difficult topics. It can also help to give you peace of mind, knowing that everything is written down.

SCHOOL NAME:

COURSE NAME:

EXPONENTIAL ENTREPRENEURSHIP

LESSON NAME AND NUMBER:

1. STARTUP WORKSHOP AND PITCH PREPARATION

FOR YEAR GROUP(S):

1

ABOUT THIS LESSON

Describe the lesson objectives and overview

In this lesson students will be given the opportunity to create their own fictional startups - in line with the course or theme you've chosen - and will be tasked with creating a realistic pitch deck that they will present to a panel of judges in the next lesson in order to gain investment in return for equity in their companies.

The objective of this lesson is to give students the opportunity to build on what they have learned during the EFC program and create and virtually launch their own fictional startups - a task which will give them valuable entrepreneurial and leadership experience.

Tick all that apply: This lesson will be run... In the Metaverse ☐ In Person ☒ Online ☐

2

CRITICAL THINKING AND SKILLS DEVELOPMENT

Describe the critical thinking and skills this lesson will help develop

READING: I can explain, discuss, and present what I have read, focusing on a topic and using notes when necessary; I can back my views up with evidence

SPEAKING: I can pay attention and take part in conversations with others, staying on topic, and making and responding to comments; I can use spoken language to suggest ideas and explanations, and explore my imagination and ideas; I can assess different viewpoints and build on other people's contributions

WRITING: I can plan my writing by identifying the audience and purpose, and use this to choose the most appropriate form; I can use similar writing to help me; I can note down and develop initial ideas and carry out extra reading and research if needed; I can use layout features to structure a text and guide the reader; I can perform what I have written, using intonation, volume, and actions to make the meaning clear

3

LESSON STRUCTURE

Provide details of the lesson structure, timings, and any homework

TIME ALLOTTED: 60 MINS

- 15 Min . Introduce the Exponential Entrepreneurship course and the 311 Institute Pitch Template.
- 05 Min . Divide the class into two teams - or more depending on the time available and the class size - with each team being given the task to create a fictional startup.
- 35 Min . Working in their teams, and with assistance from the teaching staff and 311 Institute Pitch Deck Template, students will now be tasked with creating a realistic and investor worthy pitch deck for their startups. They will need to provide all the necessary information with the aim of securing Seed Funding to fund their startup in the next lesson where they will have ten minutes to present their pitches and another ten minutes to answer questions and secure funding from a panel of judges.
- 05 Min . Close and provide a brief summary of the next lesson.

HOMEWORK:

- If possible spend time working in your teams to finalise and hone your pitches before the final lesson. Students can seek help and assistance from any source.

4

RESOURCES

TEACHER RESOURCES: [Teachers Bible](#)

STUDENT RESOURCES:



Click or scan to download this resource and other educational resources.

LESSON PLAN CARD

311 INSTITUTE : EXPONENTIAL FUTURES CURRICULUM : LESSON PLAN



This Lesson Plan Card helps you build out your lesson and keep your class on track when learning about complicated or difficult topics. It can also help to give you peace of mind, knowing that everything is written down.

SCHOOL NAME:

COURSE NAME:

EXPONENTIAL ENTREPRENEURSHIP

LESSON NAME AND NUMBER:

2. STARTUP PITCHES

FOR YEAR GROUP(S):

1

ABOUT THIS LESSON

Describe the lesson objectives and overview

In this lesson students will present their startup pitches to a panel of pre-selected judges who will evaluate and grade them, provide feedback, and award investment in return for equity stakes accordingly.

The objective of this lesson is to give students the business acumen, entrepreneurial experience, and the first hand skills they need to pitch their startups in a realistic environment similar to those experienced by other entrepreneurs.

Tick all that apply: This lesson will be run... In the Metaverse ☐ In Person ☒ Online ☐

3

LESSON STRUCTURE

Provide details of the lesson structure, timings, and any homework

TIME ALLOTTED: 60 MINS

- 10 Min . Provide advice on pitching and presenting.
- 40 Min . In their teams students will present their pitches to your pre-selected panel of judges who will then provide feedback and award their funding awards, or not, based on their assessments.
- 10 Min . Close and provide a summary of the course and learnings.

NOTES:

- Depending on the class sizes and time available ideally students should have a maximum of 20 minutes to pitch - 10 minutes for the pitch and ten minutes for questions to secure investment.

2

CRITICAL THINKING AND SKILLS DEVELOPMENT

Describe the critical thinking and skills this lesson will help develop

READING: I can explain, discuss, and present what I have read, focusing on a topic and using notes when necessary; I can back my views up with evidence

SPEAKING: I can listen and respond appropriately to adults and other people my age; I can explain and justify my own answers, arguments, and opinions; I can describe, explain, and narrate for different purposes in a structured way including expressing feelings; I can pay attention and take part in conversations with others, staying on topic and making and responding to comments; I can speak clearly and fluently; I can take part in presentations and discussions; I can gain, keep, and monitor the interest of people listening to me; I can choose and use appropriate registers, formal and informal speaking, to communicate effectively

4

RESOURCES

TEACHER RESOURCES: [Teachers Bible](#)

STUDENT RESOURCES:

Click or scan to download
this resource and other
educational resources.



Notes:

THE FUTURE OF FOOD



ZERO HUNGER
UN SDG #2



Notes:

FOOD IS life. Food is health. Food is essential. And yet despite this today according to the United Nations over 690 Million people, or 9 percent of the world's population, suffer from malnutrition and hunger on a daily basis, and according to the World Food Program over 135 Million people suffer from acute hunger.

Furthermore, and perhaps even more staggering is the fact that in today's modern age with all of our advancements cumulatively these figures have risen by 10 Million people in the past year, and over 60 Million people in the last five years, with another 250 Million people potentially at the brink of starvation. All of which is before we discuss the impact that climate change and extreme weather will have on traditional food production which will only make things even worse.

From these statistics it is clear that the way we produce and distribute food of all kinds needs to change, and this is what this course explores as we highlight the problems, and discuss and explore the solutions which are already here and emerging as we attempt to take these numbers to zero.

COURSE OUTLINE CARD

311 INSTITUTE : EXPONENTIAL FUTURES CURRICULUM : COURSE OUTLINE



This Course Outline Card helps you build out and visualise your course in full from start to finish. It is your single point of reference and should include as much background information and detail as possible.

COURSE NAME:

THE FUTURE OF FOOD

SCHOOL NAME:

FOR YEAR GROUP(S):

YEAR 6 AND UP

1

ABOUT THIS COURSE

Describe the course objectives, content, and expected learning outcomes

This course, which is part of the 311 Institutes's Exponential Futures Curriculum (EFC), has been tailor made to address the gaps we see in many of today's current standard academic curricula whose content hasn't been updated in many cases for decades and as such fails to adequately prepare students for the significant disruptive technological advances that are already here and emerging, and that are changing global business, culture, and society at unprecedented scale and speed, and which if left unaddressed will have a derogatory impact on their future prospects.

During this course students will learn how current food production methods are being disrupted by new revolutionary technologies and how those new methods will help us solve global famine and UN SDG 2, Zero Hunger, while at the same time eliminating many of the agricultural industry's harmful environmental impacts by up to 100%. As we see the way we produce food, whether it be crops and fish or meat and other products, undergo a paradigm shift students will learn all about how we produce food today and its impact and discover new ways of producing these foods sustainably in a way that lets us solve almost all of today's grand food challenges.

Tick all that apply: This course will be run... In the Metaverse ☐ In Person ☒ Online ☐

3

OVERALL COURSE STRUCTURE AND DETAILS

Provide details of the course structure, lessons, and schedule

This course has THREE LESSONS and will be run over consecutive weeks.

The lessons in this course are:

1. HOW FOOD IS PRODUCED TODAY AND ITS IMPACT
2. THE FUTURE OF FOOD PRODUCTION
3. THE DEEP FUTURE OF FOOD, AND IMPLICATIONS

4

MATERIALS, RESOURCES, AND PRE-WORK

Provide details of the materials, resources, and any student or teacher pre-work that is required

MATERIALS: [Teachers Bible](#)

PRE-WORK: None Required

RESOURCES: Interactive presentation tools; internet connectivity; Google Jamboard; laptops; marker pens; note books and paper; projector and or screen with audio; whiteboard; various software tools as appropriate (Adobe Express, Canva, Google Slides, Halo AR, iMovie, Kapwing, Keynote, Piktochart, QR Code Generator, et cetera ...)

2

ASSESSMENT

Provide details of how you will assess the course outcomes



Click or scan to download this resource and other educational resources.

LESSON PLAN CARD

311 INSTITUTE : EXPONENTIAL FUTURES CURRICULUM : LESSON PLAN



This Lesson Plan Card helps you build out your lesson and keep your class on track when learning about complicated or difficult topics. It can also help to give you peace of mind, knowing that everything is written down.

SCHOOL NAME:

COURSE NAME:

THE FUTURE OF FOOD

LESSON NAME AND NUMBER:

1. HOW FOOD IS PRODUCED TODAY AND ITS IMPACT

FOR YEAR GROUP(S):

1

ABOUT THIS LESSON

Describe the lesson objectives and overview

In this lesson we will introduce students to the Future of Food course, to the United Nations SDG 2 Zero Hunger initiative, and we will explore the agricultural industry's status quo and its current impact on the world. Together we will then explore how well positioned existing food production methods are to help us meet the demands of a growing global population against the backdrop of many other global challenges including but not limited to climate change and water scarcity, as well as food affordability, availability, quality, safety, security, and sustainability.

The objective of this lesson is to provide students with a well rounded understanding of today's food production methods, their impact, and their limitations.

Tick all that apply: This lesson will be run... In the Metaverse ☐ In Person ☒ Online ☐

2

CRITICAL THINKING AND SKILLS DEVELOPMENT

Describe the critical thinking and skills this lesson will help develop

SPEAKING: I can speak clearly and fluently; I can gain, keep and monitor the interest of people listening to me; I can choose and use appropriate registers, formal and informal speaking, to communicate effectively

WRITING: I can perform what I have written, using intonation, volume, and actions to make the meaning clear; I can note down and develop initial ideas

3

LESSON STRUCTURE

Provide details of the lesson structure, timings, and any homework

TIME ALLOTTED: 60 MINS

- 05 Min . Introduce the Future of Food course
- 25 Min . Introduce the UN SDG 2 Zero Hunger objectives, progress to date, current food production methods and thinking, and their commercial, environmental, and social impacts
- 20 Min . Hold a class discussion to explore current food production methods; include different food types, where food is produced and the environments, where ingredients are sourced from and food miles, and explore farming cooperatives such as Fairtrade, as well as the impact of climate change, deforestation, desertification, and global population growth
- 05 Min . Groups to summarise their top three findings or insights
- 05 Min . Close and hand out homework task

HOMEWORK:

- In teams or as individuals write a short single page essay discussing how food will be produced in the year 2030

4

RESOURCES

TEACHER RESOURCES: [Teachers Bible](#)

STUDENT RESOURCES:

Click or scan to download this resource and other educational resources.



LESSON PLAN CARD

311 INSTITUTE : EXPONENTIAL FUTURES CURRICULUM : LESSON PLAN



This Lesson Plan Card helps you build out your lesson and keep your class on track when learning about complicated or difficult topics. It can also help to give you peace of mind, knowing that everything is written down.

SCHOOL NAME:

COURSE NAME:

THE FUTURE OF FOOD

LESSON NAME AND NUMBER:

2. THE FUTURE OF FOOD PRODUCTION

FOR YEAR GROUP(S):

1

ABOUT THIS LESSON

Describe the lesson objectives and overview

In this lesson students will be given the opportunity to discuss future food production methods based on their current research and understanding. They will then be introduced to the new food production breakthroughs that are already revolutionising how and where we produce food and how we sustainably feed a growing global population, after which they will be given the opportunity to explore the breakthroughs in depth and ask questions.

The objective of this lesson is to move students from a linear mindset, where the future looks somewhat similar to today, to an exponential mindset where their thinking is aligned with a world where exponential technologies are accelerating the rate of change and making the impossible possible.

Tick all that apply: This lesson will be run... In the Metaverse ☐ In Person ☒ Online ☐

3

LESSON STRUCTURE

Provide details of the lesson structure, timings, and any homework

TIME ALLOTTED: 60 MINS

- 10 Min . Building on the students homework assignment from the previous lesson hold a class discussion to explore the main ways we produce food today and to discuss a few ways we could sustainably solve world hunger.
- 35 Min . Present the lessons Future of Food presentation which explores new methods of food production and the science behind them including how they solve many of the agricultural industry's current scaling and sustainability problems. It is also recommended that students be given the opportunity after each section to ask questions.
- 10 Min . Hold a class discussion, based on the new information and insights, and let students explore and question what they've just learned.
- 05 Min . Close and provide a brief summary of the next lesson.

EXTRA CURRICULA CREDIT:

- Spend time exploring some of the ways the negative impact and implications of changing how we produce food could be mitigated or solved.

4

RESOURCES

TEACHER RESOURCES: [Teachers Bible](#)

STUDENT RESOURCES:

2

CRITICAL THINKING AND SKILLS DEVELOPMENT

Describe the critical thinking and skills this lesson will help develop

SPEAKING: I can summarise longer passages; I can explain and justify my own answers, arguments, and opinions; I can take part in discussions, presentations, performances, role play, improvisations, and debates

WRITING: I can note down and develop initial ideas and carry out extra reading research if needed



Click or scan to download this resource and other educational resources.

LESSON PLAN CARD

311 INSTITUTE : EXPONENTIAL FUTURES CURRICULUM : LESSON PLAN



This Lesson Plan Card helps you build out your lesson and keep your class on track when learning about complicated or difficult topics. It can also help to give you peace of mind, knowing that everything is written down.

SCHOOL NAME:

COURSE NAME:

THE FUTURE OF FOOD

LESSON NAME AND NUMBER:

3. THE DEEP FUTURE OF FOOD, AND IMPLICATIONS

FOR YEAR GROUP(S):

1

ABOUT THIS LESSON

Describe the lesson objectives and overview

In this lesson students will be given the opportunity to further explore the future of food and will then be given the opportunity to leap their thinking forwards and explore what the far future of food production could look like, including its commercial and social benefits. They will also be given the opportunity to discuss some of the negative consequences of changing how we produce food, including the ethics of it and its impact on the agricultural community.

The objective of this lesson is to provide students with a platform that allows them to think through all of the different consequences of what is known as a "System Level Change" where we move an entire global system from doing things in one way to a new way.

Tick all that apply: This lesson will be run... In the Metaverse ☐ In Person ☒ Online ☐

2

CRITICAL THINKING AND SKILLS DEVELOPMENT

Describe the critical thinking and skills this lesson will help develop

READING: I can pick out, write down, and present information from non-fictional texts; I can explain, discuss, and present what I have read, focusing on a topic and using notes when necessary; I can back my views up with evidence

SPEAKING: I can summarise longer passages; I can explain and justify my own answers, arguments, and opinions; I can take part in discussions, presentations, performances, role play, improvisations, and debates; I can assess different viewpoints and build on other people's contributions

WRITING: I can note down and develop initial ideas and carry out extra reading or research if needed

3

LESSON STRUCTURE

Provide details of the lesson structure, timings, and any homework

TIME ALLOTTED: 60 MINS

- 20 Min . Hold a class discussion, building on from Lesson 2, to further explore the positive impact and implications of changing how we produce food.
- 20 Min . Hold a class discussion, building on from Lesson 2, to further explore the negative impact and implications of changing how we produce food, including the ethics of it and its impact on the agricultural community. Students will then be invited to discuss solutions to these issues.
- 15 Min . Hold a class discussion to go beyond the future of food production methods presented in Lesson 2 to explore how they could be improved, and then explore what the far future of food could look like.
- 05 Min . Close and provide a brief summary of the learnings of the course.

HOMEWORK:

- Write a short single page essay discussing the future of food from your new vantage point, and compare it with the first essay you wrote after Lesson 1.

4

RESOURCES

TEACHER RESOURCES: [Teachers Bible](#)


STUDENT RESOURCES:

Click or scan to download this resource and other educational resources.



LIFELONG LEARNING FOR LIFE





ONE OF the wonderful things about the human brain is that it never stands still. It's always on and we're always learning, even if we sometimes chalk our newly acquired knowledge up to experience rather than any specific formal education program.

However, as wonderful as our giant brains are it could also be argued that the rate at which we learn as we age decreases, but strangely it's not necessarily because our capacity to learn is diminished, it's simply often because life as usual takes over and we don't make time for learning new things in the way we were forced to, for want of a better phrase, as children.

Once we leave the formal education system it's easy for us to get stuck in the rut of the day to day, where the high point of our educational experiences are delivered to us via corporate training videos a couple of times a month, or documentaries on television.

In order to fully prepare ourselves for the future, a future we can all play a prosperous role in, where we are the sum of our knowledge and not of our individual professions, we need to embrace a culture of life long learning and be part of a corporate and societal culture that nurtures and supports it.

SWAP PROFESSIONS AT SPEED

One of the greatest challenges many workers will face in the years and decades to come, whether they're blue or white collar workers, as I've discussed in previous chapters, will be the accelerating rate at which technology helps to automate and dead end an increasingly broad range of professions.

However, as everyone keeps saying, basing their future predictions solely on historical evidence, which is always a potentially dangerous scenario, we're always told that while technology helps destroy jobs it also helps create new ones. And it's this that will leave many people in a conundrum – as their own professions dead end, and redundancies loom, how are they going to be able to pull off the seemingly impossible, and make the jump to one of the new professions? Whatever those new professions might be.

Traditional experience and thinking tells us it takes years, often decades, to build up the experience we need to become experts in our respective fields and build careers in our chosen professions, and that jumping between professions is at best a difficult task, and at worst an impossible one - especially when it needs to be done at speed. But with the right

Notes:

support and attitude anything is possible, even switching professions at speed, so let's walk through how we break with tradition to create a new breed of agile workforce that laughs, not sobs, in the face of change.

One of the greatest challenges we'll all face is that, while we can do our best to predict the jobs of the future, the fact of the matter is that inevitably, for better or worse, it's likely we'll be somewhat wide of the mark which makes preparing ourselves to take advantage of the changes in advance even more challenging. But there's hope, and it comes not from our traditional childhood education system, but from a modern on demand education system that already provides training services to many of the world's largest corporations, a system that is epitomised by companies like Coursera, edX and Udacity.

Third party corporate training providers have been around as long as there have been companies in need of their services, but just like the companies they serve they haven't stood still. Just as technology has had an impact on their clients businesses priorities and operations it's also had an impact on how these third party training companies build and deliver their services.

Step back far enough in time and these corporate training companies would use armies of employees to help them identify new professions as they emerged and build suitable training courses that were delivered in person. Over time these face to face training sessions became complimented by video on demand training courses, and then step forwards in time again and increasingly the majority of corporate training is now delivered over the wire, on demand to your laptop, to your mobile, over breakfast, lunch and dinner, at home and in the office. Training has truly become decentralised, global, and ubiquitous, and it's these three traits that we can leverage to our advantage in tomorrow's world.

Our first problem, namely identifying the demise of certain professions and the emergence of new ones across regions and sectors can be solved, or at least made easier to identify and chart, by analysing real time aggregated global demand trends across training providers, and the second, the issue of helping people jump between professions at speed can also be solved, to a great degree, by leveraging these same platforms, but in a different way than we do today.

Historically professionals have used

Notes:

these platforms at the behest of their employers to help them stay sharp and on top of the skills they need to perform their jobs, and traditionally the training offered to employees was selected from a catalogue, and a generic catalogue at that. Today, however, training has evolved, and moved beyond the catalogue.

Fuelled by data collected from tens of millions of users from tens of thousands of professions today's online training platforms are now in a position not just to recommend specific training programs for employees, but they're also becoming increasingly adept at helping individuals identify the competencies they need to acquire in order to master particular professions. And it's this capability that we can leverage for our own advantage to help us stave off joblessness in the future.

As these platforms continue to leverage their extensive global networks to help them identify the emergence, then ascendancy, of new professions over time, they'll be able to use their huge datasets to create exhaustive competency matrices that detail all the skills people need to acquire in order to master them. For example, if we take a closer look at some of today's popular professions we can see the competencies needed

to become a computer scientist include computer networking, databases, human computer interaction, operating systems, security engineering and software engineering, to name but a few, while a data scientists competencies include data management, data visualisation, machine learning, maths, statistical programming, and statistics.

As a result these matrices give people the opportunity to use them as improvised learning roadmaps to gain all the skills they need to help them jump from dead-ending professions to new ones at speed, provided of course we can learn at speed, something I discuss in the next section, and overcome today's societal biases, which I discuss in the next chapter.

THE 10,000 HOUR MYTH

In 2008 an American author named Malcolm Gladwell posited that in order to become world class in a particular profession individuals had to put in at least 10,000 hours of practise. Over time though, and largely thanks to the popular media, this simple viewpoint quickly became accepted as the de facto amount of time needed to learn any new skill, and needless to say the difference between the two is vast.

Notes:

Recently though there has been evidence from lifehacker Josh Kaufman to suggest that just 20 hours of dedicated practise can help individuals acquire the crucial foundational skills they need to improve their chances of being able to move between professions, and when this methodology is applied to the competency matrices I discussed in the previous section, then hopefully this should give us all hope that as one profession dead ends, and a door closes, another one opens.

Notes:

THE FUTURE ROLE OF SOCIETY





CREATING AND nurturing a future fit education system is, of course, only part of the challenge as we all brace ourselves and try our best to prepare for an increasingly automated and uncertain future, because once students have left the relative safe confines of the formal education system they come face to face with the biases and challenges of the real world.

A world where different corporate and cultural biases and norms, that have arguably become engrained through the millennia, curb our ability to move frictionlessly between different careers, industries or jobs at speed, something that as I've discussed in previous chapters, will become increasingly important as the spectre of automation casts its long shadow over more jobs than ever before, and dead-ends careers with increasing voracity.

Today the biases I'm talking about exist almost everywhere, in every company, and in every country, and it's likely that you too, at one point or another have come face to face with them. For example, how many times have you heard of people switching careers? Or, at a more basic level, switching industries? And if they did was it simple and straightforward, or was it difficult and complicated?

BRINGING IT TO LIFE

It's time to bring this to life with a real world example, and please do feel free to disagree with me, I love a good debate.

As I've discussed previously, and as no doubt you've already heard a million times over and more from other people, historically technology has always destroyed jobs, but similarly it has always helped create new ones - ones that almost no-one could have imagined until they finally appeared.

To some respect this is epitomised by the calamitous fall in the last century of the number of labourers as a percentage of the overall workforce and the heady rise of the number of computer scientists.

At a high level we can argue that the so called "amount of work to be done" increased, but that the type of work to be done, ergo in this case by humans, changed. And here's the conundrum that's amplified by today's societal biases and norms: How many computer scientists, for example, do you know that used to be labourers, of any kind?

I'll guess that you don't know that many, and pushing the boat out further I'll guess you don't know any at all. Part

Notes:

of the reason for that could be the fact that as many of their jobs changed and dead-ended many of them retired, and the younger generations that would previously have filled their shoes chose to train to go into different professions.

However, just as both these options were as viable then as they are today there were still millions of people caught in the middle, and caught in a trap - people who were too young to retire, and too old to re-enter the formal education system. In these cases the only avenues often open to them were to re-train, often at their own expense, in their own time, and with no guaranteed job or outcome at the end of it.

Today re-training is the catch all answer handed out by everyone who's asked how we're going to manage the fall out from the "jobs apocalypse" that's supposedly around the corner. But while it sounds like a silver bullet to the problem of redundancies, and helping people switch professions, whatever their reason, it often isn't. So let's step through why re-training by itself isn't the answer, and how corporate culture and society have to change if we're ever going to stand a chance of limiting the impact of automation on individuals.

A FIRST PERSON VIEW

Being made redundant is always a nasty shock to the system, and it's one that's often made more jarring if it's because you've been replaced by a machine - whether it's a robot in the 1960's or an Artificial Intelligence in 2025. And while redundancy often comes with a three month severance payment, free CV writing services, and "re-training" the fact of the matter is that the re-training that many companies offer, which is often via contracted third parties, are superficial sticking plasters at best and useless at worst.

The other fact of the matter is that in many cases the re-training options on the table are often ill suited to the individuals particular skills and goals, and then, of course, there's the fact that there's no guarantee of a job once you've completed them. In fact, when all is said and done, when many companies announce redundancies that's the point at which their former employees are officially no longer their concern. No golden handshake, just a termination contract, a pay check and the phone number of some strange company you've never heard of before.

If, as academic and government studies suggest, we are going to be faced with

Notes:

between 20 percent and 50 percent of all of today's jobs, from accountants and lawyers, to data scientists and taxi drivers, being automated within the next 20 years, or in some cases now as were already seeing in the finance and legal sectors, then this status quo isn't good enough. We will need a new approach to helping people caught in these situations, one where we all play a role in helping each other be successful and flourish.

One of the biggest challenges people who are laid off will face, as they do today, will be the challenge of changing professions and finding companies that are willing to take a punt on someone whose background is within another field - the equivalent of hiring an ex-labourer as your next accountant, for example.

If we're honest it has to be said that in today's world the majority of corporate recruiters, whether they're artificial intelligences that can analyse thousands of CV's and video submissions a minute, or humans, would likely put an individual like this to the bottom of the pile and hire an accountant who had a firm background as an accountant. The same is true for anyone in any profession who might, for whatever reason, want to switch professions.

Until we are able to overcome and remove the institutional bias that we have as a society to job mobility then there will only be one winner, the machines, and frankly that would be criminal.

CONCLUSION





WHEN IT comes to education the time comes when we all have to take responsibility for our own life long learning initiatives, but we also have a responsibility to each other, to help identify and nurture talent, and help each other prosper and thrive irrespective of ability or background, and sometimes in the face of great hardship and adversity.

Education and the future are kindred spirits, both are adventures, filled with wonders and awe, and both are what we make of them, and that's as true today as it will be tomorrow and every day after that.

Now all that remains for me to do is to thank you for your time, and if you have any comments you'd like to make then please feel free to reach out.

I wish you, and your children, all the very best in the future,

[Explore More](#)

MATTHEW GRIFFIN
Founder

Notes:

THIS IS NOT THE END. **EXPLORE** MORE.



Copyright © Matthew Griffin, 311i Ltd. All Rights Reserved.

Produced in the United Kingdom.

This document is current as of the initial date of publication and may be changed at any time. Not all offerings are available in every country in which 311i operates.

The information in this document is provided "As Is" without any warranty, express or implied, including without any warranties of merchantability, fitness for a particular purpose and without any warranty or condition of non-infringement. 311i products are warranted according to the terms and conditions of the agreements under which they are provided.

This report is intended for general guidance only. It is not intended to be a substitute for detailed research or the exercise of professional judgment. 311i shall not be responsible for any loss whatsoever sustained by any organisation or person who relies on this publication.

The data used in this report may be derived from third-party sources and the 311i does not independently verify, validate or audit such data. The results from the use of such data are provided on an "as is" basis and the 311i makes no representations or warranties, express or implied.

UK311-012222-DOC01