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Science Fiction for Leaders

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In the year I graduated from high school, 1970, a man named Alvin Toffler took the world by storm with a bestselling book.

These days, it's barely remembered.

But back then, it was *big*. The cover was purple: Space Age purple. And the title was "Future Shock".

Future Shock: the vertigo of the victims of progress.

All around him, Toffler saw them suffering: people for whom change was too fast, and adaptation, too slow.

They were stuck behind their times; strangers, lost in the present; frightened, adrift, and confused.

All they knew was that they could never go home.

Home was in the past. And the past was dead, gone.

Future Shock: the shellshock of time.

The image that springs to mind for me when I think of those Future Shocked people is the Mars One Project. You may have seen it in the media – and when it was first announced, way back in 2012, I was very excited.

I'm not now – you'll see why.

The idea is to establish a permanent human colony, on Mars, by 2035.

Here's the deal.

You sign up to be a colonist. You pay your application fee, which gets you into the queue.

If you're lucky, your application letter might be read.

If you're extra *extra* lucky, you might get an interview, pass the medical clearance, sail through the Mars Settler Suitability Interview, and be named in the final four.

You're strapped into a space capsule, and taken on a seven month voyage to Mars.

When you land – if you haven't suffered permanent damage from cosmic radiation, or gone mad from claustrophobia – you take up residence in a life pod, 10 metres by 50 metres.

Then you stay there for the rest of your natural life.

Yes, until you die: the technology doesn't exist to bring you home.

You're trapped on an alien planet for life.

Now that sounds bad – but according to Alvin Toffler, *Future Shock might actually be worse*.

At least when you sign up for the one-way ticket to Mars, you're travelling as a volunteer.

But the future never asks if you want to come along.

The future doesn't test if you're ready, and resilient.

The future doesn't train you, prepare you, equip you.

No, it just blows up your home planet and hurls you into space. On and on. Faster and faster. A stomach-churning and heart-sinking and gut-wrenching ride: for the rest of your life.

For just five seconds, hold that image in your mind.

That's Future Shock.

Alvin Toffler wasn't kidding when he called it a disease.

He meant it literally, something you could experience as a physical and psychological condition; or as he put it: "the shattering stress and disorientation that we induce in individuals by subjecting them to too much change in too short a time".

And this was something he detected in 1970.

1970: years before personal computers, the internet, the smartphone.

It's the age of Twiggy and the Beatles; when words like "cloning" still appear in Toffler's book in inverted commas; and the author has to apologise for the outlandish idea that maybe, just maybe, you could take a frozen embryo... and choose a human surrogate... and grow a baby.

Toffler expressed it like this – and I've updated the numbers, for our time.

Take the last 50,000 years of human existence, and divide it into approximately 800 lifetimes of 60 years, somewhere between the lifespan of an ancient and modern human.

Of these 800 lifetimes, 650 were spent in caves.

Only in the last 70 lifetimes have we known any form of writing.

Only in the last 6 lifetimes have we had the printing press.

Only during the last 3 lifetimes has anyone, anywhere, ever used an electric motor.

And almost everything material in your world today – every object, every technology, every building – was developed in the last lifetime.

The 800th lifetime. Your lifetime.

It's no wonder that Alvin Toffler detected the symptoms of mass confusion – and sheer exhaustion – in the people around him.

And he would undoubtedly concur with Jack Welch, legendary leader of the corporate giant GE, and the author of the immortal line that now has the status of a law.

“If the rate of change on the outside exceeds the rate of change on the inside, the end is near.”

But Toffler detected something other than Future Shock, in pockets of the population.

A handful of men and women, not many, but a few, were racing to the future not as hostages... but as pilots and willing passengers.

Some of them were actually signing up to build the rocket!

And in their minds was a vision of the future as a better place, that might be different and strange but joyous at the same time, something that would be, for all humanity, a new home.

They travelled with wonder, hope and conviction.

They were proud to be human, and free.

And Toffler asked himself what it would take to make the journey to the future a voyage like that, not just for the few, but for the many.

Now I repeat, this was 1970 – so Toffler had some unconventional ideas on how we might go about solving this conundrum.

He was right when he predicted the gig economy, Instagram celebrities, and a more embracing definition of marriage.

He was wrong on colonising the oceans, human cloning, and controlling the weather.

But buried in Toffler's book is a kernel that I take very seriously, not just as Australia's Eighth Chief Scientist but as a lifelong optimist. An optimist with... yes, a genuine, bona fide ticket to space.

I bought it from Richard Branson's space tourism venture, Virgin Galactic. Someday, I hope to be able to use it.

But back to Toffler and the Big Idea.

Here he is, pondering on an incredibly powerful technology that he believes could ultimately save mankind from riots, chaos, war, and civilizational collapse.

If the contemporary individual is going to have to cope with the equivalent of millennia of change, within the compressed span of a single lifetime, he must carry within his skull images of the future.

We must begin by making speculation about the future respectable.

Our children should be studying Arthur C Clarke, William Tenn, Robert Heinlein, Ray Bradbury and Robert Sheckley.

Not because these writers can tell them about rocket ships and time machines but, more importantly, because they can lead young minds through an imaginative exploration of the jungle of political, social, psychological and ethical issues that will confront these children as adults.

Science fiction should be required reading in the compulsory unit, Future 101.

That's Toffler's ultimate technology: the story.

Imagination.

Science fiction.

No, it's not what you expected to hear when you passed into the rarefied halls of the Cranlana Programme tonight.

But I hope to persuade you that science fiction is a respectable pursuit for leaders such as yourselves.

And it's more than respectable. Leaders, future leaders, friends of future leaders: for you, science fiction is required.

First, to help you understand the past.

Second, to help you grasp the future.

And third, to help you act in the here and now.

But first, there's a qualifier, and a caveat.

The qualifier is that the science fiction in question has to be *good*.

By good, I mean *my* definition of good, meaning that it has to pass two tests.

One: it has scientific plausibility, in the sense that it builds on our existing technologies or is at least broadly consistent with our best understanding of the laws of physics. I call this the "No Magic" rule.

And two: it has narrative plausibility, in the sense that it strikes us as a fair representation of how human beings might actually behave. I call this the "Human Factor".

No to Magic, and Yes to Human.

I impose these tests not for reasons of snobbery or to suggest that you can't learn anything from books or films that don't meet the rules.

Of course you can – but you're not engaged in what Toffler called "social futurism", and we might call "future thinking".

When writers or directors pass my tests – No to Magic, Yes to Human – it confirms that they have actually sat down, taken their concepts, and turned them over and over in their heads.

They can tell you what their worlds would look like, taste like, smell like, feel like.

And so they are forcing you to experience a possible way of being human.

So that's the qualifier.

Now the caveat: science fiction is not an alternative to learning science.

No, I don't think you can toss away the textbook and screen "The Terminator".

You might use "The Terminator" to catch a student's attention and overcome the ridiculous divide in our minds between maths and English; between science and arts.

Let the kids who love English discover science, in a film or a book!

Let the kids who love science start thinking about society, and culture, through a story!

Let them think, and dream, together!

And make them ALL READ PILES OF BOOKS.

Just a thought.

But of course, for any subject, it's not enough to simply catch the eye – the secret is capturing the heart.

You need to have the passion to push through the drills, and the tests, and keep going.

That's the difference between entertainment and education. It's important. Let's respect it.

Now, let's begin: textbooks open, welcome to Future 101.

The first reason you need science fiction is to understand the journey from the past, to the way you live today.

You might not know it, but you live in a world imagined for you, and scripted for you, in science fiction.

For some of us, this is literally true. We call it Pokemon Go.

But we could also point to the inhabitants of Second Life, a 3D virtual world where people meet, shop and trade by their avatars.

You can trade Second Life money for real money.

And you can study in Second Life towards a real degree: universities have adopted the platform so that students, on opposite sides of the world, can work together in real-world problem scenarios.

The creator of Second Life was directly inspired by fiction: the Metaverse depicted in Neal Stephenson's 1992 novel "Snow Crash".

And, of course, Second Life has gone on to inspire later works of fiction.

One of the joys of reading the great novels of the past is to follow the weaving pattern of ideas like this, from fiction into fact and back into fiction – like two opposing mirrors, endlessly bouncing rays of light.

Perhaps some of the greatest examples of science fiction's impact on society are the ones we now consider boringly normal.

The ubiquitous office scanner and photocopier was carefully described by Isaac Asimov in his "Space Ranger" book published in 1952 – five years before the very first image scanner was invented.

An electronic fingerprint scanner, like the one I use to unlock my iPhone, was used in the exact same book.

Asimov also envisaged the use of a personal, portable computer in 1954, more than twenty years before the first clunky laptops hit the shelves in 1975.

Or take Orson Scott Card's "Ender's Game", published in 1985.

He envisaged a world where students used flat, touchscreen computers in class; where citizens could access the 'nets' for worldwide digital communication; and where anyone could commentate on politics while hidden behind a digital identity.

Today, we call these: tablets, the internet, and social media.

It's a reminder that every great human advance is preceded by a leap in imagination.

If we learn nothing else from science fiction, that alone would make the effort worthwhile.

So science fiction is essential to you as a student of history, looking to learn from the past.

The second reason you need to pay attention to science fiction is as a student of the future, looking to grasp the world ahead.

Now I sense your anxiety – and I understand.

We associate speculating about the future with prophecy: voodoo and astrology and economics.

Did I say that?

My apologies: voodoo and astrology and *magic*.

As a leader, I agree that scepticism has merit. But like all things – in moderation.

Too much scepticism simply blinds you to opportunity.

“The horse is here to stay but the automobile is only a novelty – a fad.”

That was the President of the Michigan Savings Bank advising Henry Ford’s lawyer not to invest in the Ford Motor Company, back in 1903.

“Heavier-than-air flying machines are impossible.” Lord Kelvin, President of the Royal Society of England, 1895. The Wright brothers proved him wrong just eight years later.

"There is no chance that the iPhone is going to get any significant market share. No chance." Steve Ballmer, CEO of Microsoft, 2007.

Yes – looking ahead, imagining change, carries some risk. But it is important!

And any leader who ignores it is unworthy of the position.

This is understood by leaders in government, in business and in science.

It is why the Commonwealth Science Council was created, to combine insights from all three sectors into national policy development.

Chaired by the Prime Minister, and with myself, as Chief Scientist, as the Executive Officer, the Council has a mandate to position this country for the sort of future Australians want: prosperous, healthy, secure, *prepared*.

Acting on that mandate, we have commissioned a series of Horizon Scanning reports from the pre-eminent institutions that make up the Australian Council of Learned Academies.`

Four projects are well underway, on:

- Energy storage;
- Precision medicine and gene editing;
- Synthetic biology; and
- The Internet of Things.

There are more topics to come.

Every one of these topics represents a make or break moment for Australia.

Capitalise on the opportunities, and we won't just create jobs and wealth – we will literally add years to our lives.

Miss the boat, and we will struggle to sustain the phenomenal economic growth streak that has only been possible because our predecessors had the vision to look ahead.

Now I am not suggesting for a moment that you can simply read the future in a science fiction novel.

Clearly, you can't – which is why we have the Commonwealth Science Council, the Learned Academies, and the Horizon Scanning reports.

But there's still an important place for imagination.

Step back from the idea that science fiction is, or should be, a *prediction*.

Think of it instead as a *simulation* – a way of testing possibilities and thinking through how we might respond.

Let me explain by way of an example: "The City and the Stars", by Arthur C Clarke, first published in 1956.

The City is Diaspar: a completely self-contained society where people live forever.

They are born into physical bodies that last for about a thousand years. At the end of that time they choose which memories to save, dissolve their bodies and return their brains to the central memory bank – to be born again, in a new body, in a hundred thousand years' time.

Everything they could possibly need or want is provided: they don't have to sleep, they don't have to work, they never get sick.

How do they pass the time?

They can step at will into any one of billions of scenarios, or Sagas: virtual worlds that they experience as real.

When the story begins, they have lived this way for a thousand million years. So yes, it is a picture of success.

But it wasn't intended as a fairy tale.

Not at all. Arthur C Clarke was asking something difficult, and profound.

He was asking whether humans in a world that took care of their every need could still lead lives of real meaning and purpose, if they only experienced shock, or risk, or struggle, in fantasy.

And isn't that the very question that every parent of a teenager with an X-Box and a Vitamin D deficiency is asking today?

Can she *really* be happy, if she spends all her life in her room, playing those wretched video games?

Can I *ever* persuade her to get a real life, with a real job, and real friends?

Read Arthur C Clarke, and prepare to think.

And that brings me to my final point, the crux of the issue for you as leaders of our society, trying to boldly go where no-one has gone before.

How can science fiction help you to go beyond thinking, and reflecting, to *acting*? To *leading*?

You know, as I know, that we will be confronted in the years ahead by technologies that challenge or alarm us.

Babies with three genetic parents.

Autonomous killing machines deployed as weapons of war.

Companies that microchip their employees.

That's today: here, now, for real.

How are we to cope when the onrushing future crashes down on us, a hundred times stronger, when the victims of Future Shock multiply, when the fear is so visceral and raw?

It seems to me, as it did to Alvin Toffler, that no question is more urgent, or more confounding.

But let me answer in the only way I know how, as a techno-optimist, an engineer, a scientist, a serial entrepreneur – a husband to a woman who describes the future; and a father to two sons who help to bring it into existence.

Someone who could not possibly be any more invested in the future than he is today.

And an occasional reader of history, and science fiction.

I start in the firm conviction that human beings can and do adjust to complicated and even dangerous technologies, given time.

Look at the motor car. Look at electricity. Look at aviation.

All of them were once seen as technologies far too dangerous to put in human hands, and yet we tamed them.

So we can and do harness our powers for good – like a child, learning to pick up the sweet guinea pig, and pat it nicely, without crushing it to death.

But soon we're going to be a child with superpowers – a child who could crush civilisation in his fist before he ever gets the chance to grow wise.

But also, a child with superpowers who could do amazing things.

We will always go wrong when we stumble down any one of three paths:

One, utopianism. We buy into overblown promises far beyond anything that the science can actually support.

On this path, we expose people to the harms of magical thinking. They start to think of science as the silver bullet. When they discover that the answers are never easy, that every technology has costs, they feel betrayed.

And we panic, and impose a total ban.

Two, dystopianism. We set out in the belief that the future is bound to be terrible and so we may as well stop trying.

On this path, we don't bother to look down the technology pipeline or engage with science. We imagine that technology runs rampant, people are blindsided, and the only possible future is bad.

And we panic, and impose a total ban.

Three, atavism. We tell ourselves that everything was good in the past, so we should go back there and do more of the same. Forever.

On this path we don't just miss out on all the benefits of change. We discover that our image of the past was an illusion: impossible to recreate because it only ever existed in our minds.

Meanwhile the modern problems – the real problems – don't go away. They spiral. And we discover, all too late, that we've turned our backs on the science that might have helped us to solve them.

And darn it all – what's left to ban?

The only way to thread the needle between utopianism, dystopianism and atavism is to do our utmost to equip our society for critical and challenging debates.

And science fiction will help.

Science fiction, which can engage large numbers of people in the collective mission of imagining the future.

Science fiction, which carves out a space for the future in our minds.

So that no-one is blindsided.

So that people are challenged to think, and helped to be informed.

So that we can calibrate public policy with a better sense of the sort of challenges we might be facing ahead.

Let me give you an example: self-driving cars. The very stuff of science fiction.

And, in their own way, very scary to many people.

How do you ensure that in the moment when the self-driving car is approaching the intersection... and the little old lady steps off the kerb... and there's a baby in the car... that the car will do the right thing and protect the little old lady, and the baby, from harm?

But what if a crash is inevitable?

What should the car be programmed to do?

Should I be able to choose the settings of my car, so that I can prioritise my life over everybody else's life?

We can play this game for hours – and people do, through an online platform developed by MIT.

It's called the Moral Machine. And it's designed to crowdsource the answers to precisely these sort of human dilemmas – not just to inform governments and technology developers, but to get people thinking and engaged.

Last month the German government came up with an initial answer: regulations that require self-driving cars to place equal value on all human lives.

The decision-making algorithms will not be permitted to discriminate on any grounds: not age, not gender, not race.

All lives count the same: one human, one life. One rule.

Germany is getting ahead: it saw the looming thicket of moral and legal concerns, and it responded by clearing a path.

So developers have clarity and direction.

And communities know their values count, that the future is a place made not just for them, but *by* them.

Other countries might configure the ground rules differently – but any wise leader would agree: good regulation is a leader's best legacy.

Good science fiction prepares the ground for good regulation.

And good regulation will guide us to the good society.

I began with the image of a society shattered by the velocity of change.

Let me conclude with the image of a society exhilarated by the possibilities of progress.

We are more capable and creative than we know.

We hold the pen and we write the future.

We can choose to be heroines and heroes.

Set out in that spirit, and I promise you, our greatest adventure has barely begun.

And our children will marvel, when they come to read our chapter... that we touched with our human minds, a distant tomorrow.

THANK YOU.