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| **Unit 1 Lesson 1** | **TECHNOLOGY** |

**Early Adopters Fall into a Costly Trap**

It’s undeniable: being among the first to try out a new piece of technology is cool. When you’re the sole member of your social circle with the latest hot gadget, people stare in fascination, seeing you as the holder of powerful and secret knowledge—at least until the next big thing comes along. People tend to underestimate the costs of this temporary coolness, which they end up paying for in more ways than one. So take it from me and don’t fall into the early adopter trap by joining the first wave of consumers who invest in the latest uncharted territory in technology. Instead, if you just wait and see, you will save money and avoid being stuck with defective, possibly doomed technology that could even erode your privacy.

Early adoption is a bad investment, to put it bluntly. First, the earliest versions of products are not only expensive, they are the most expensive that those devices will ever be. Companies presumably charge more to recover the cost of development and production as fast as possible, and they know that there are serious tech-lovers who will pay a great deal to be early adopters. Once the revenues from early adopters’ purchases are safely in their hands, they can cut the price and shift to the next marketing phase: selling the product to everyone else. This tactic is why the cost of the original iPhone dropped about $200 only eight months after its release. Prices of gadgets most often fall shortly after release, and they are likely to continue falling. For instance, many new TV models drop significantly in price as little as ten days after hitting the market. Furthermore, electronics rapidly depreciate because they become obsolete so quickly; the resale price of a used cell phone or laptop can drop by fifty percent within just a few months.

Those who are first to leap into a new technology not only risk wasting money, they might also lose time on something that will never catch on with the general public. In 2006, two competing options for high-definition video entered the market: HD DVDs

and Blu-ray discs. Both seemed promising, and both required special devices called players, costing hundreds of US dollars. Cautious consumers decided to stay neutral, realizing that one or the other would probably end up dominating, and refrained from buying either product. But a few eager consumers took a gamble, and those who regrettably bought an HD DVD player quickly found themselves stuck with a virtually worthless machine. In the struggle for high-definition video dominance, Blu-ray was much more technologically advanced than HD DVD and could store up to seven times the amount of information. Sales dropped steadily for HD DVD players, and by early 2008, support for the product was discontinued entirely. Many new products face a similar fate; early adopters are then stuck with pricey gadgets that do nothing but sit on their shelves collecting dust.

Even worse, your new device might have functions that you don’t know about and would likely not approve of if you did. In 2013, Amazon Echo introduced the world to a digital assistant named Alexa, who is supposed to become active only when you say “her” name. However, voice-recognition technology is still imperfect. These devices often activate without users’ permission and record what they hear (though this fact is not acknowledged in the packaging or marketing). The privacy implications remain unclear but are causing tension between developers and consumers. As tech reporter Adam Estes told the Guardian in 2019 in a discussion of digital assistants, “I hate to be dramatic, but I don’t think we’re ever going to feel safe from their data-collection practices.”

Early adopters do something most others are reluctant to do: buy overpriced technology before it has matured for the dubious rewards of being the first and enjoying a short-term increase in status. These trailblazers help the rest of us through their willingness to spend the extra money and work out the problems with a new product. So if you know any early adopters, thank them, and then congratulate yourself on not being one of them.

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| **Unit 1 Lesson 2** | **TECHNOLOGY** |

**The Fun of Being an Early Adopter**

If you are not an early adopter, you almost certainly know someone who is. She was the first person in your group of friends to own a foldable smartphone, and she couldn’t wait to show you what it could do. He was the one who talked excitedly about 5G services revolutionizing people’s lives and allowing for things like cloud-based gaming services. Early adopters are that select minority of users who adopt new technology in its earliest days before it is widely used or even thoroughly tested. According to one widely cited piece of research, early adopters are defined as the first thirteen percent or so of people who begin using a device, game, social network, or other new product. While the majority of us sit back and wait for an innovation to prove itself, early adopters jump right in. By doing so, they get the pleasure of exploring a new frontier, enhanced prestige, and even power within the tech industry.

For many people, trying to figure out a new piece of technology is a slightly scary undertaking, but it’s a favorite way for early adopters to spend their time. They get a deep sense of satisfaction from learning and playing with new technology. They love to throw away the user’s guide and experiment. Jimmy Selix, who blogs about being an early adopter, says that people like him would look at something new and say to themselves, “This is going to . . . “ or “I can use this for . . . “ or “What if I . . . ?” The first users of a product are pioneers who discover new ways of using technologies, sometimes in ways that even their original creators couldn’t foresee.

Perhaps even more fun than becoming the master of new technology is sharing that mastery with others and enjoying the respect that goes along with it. When it comes to having the newest electronic device, a superficial concern with economic status is surely a motive for many early adopters. After all, most first-generation devices are expensive. But a desire for status as a tech whiz is more defensible and useful. As one early buyer of the first-generation iPad explained, “It gives you an air of expertise in technological matters to have the latest gadget.” Also, when the device’s price does drop, many of the early adopter’s friends, family, and social media contacts will want one, too—and guess who will happily give them help and advice? Early adopters are more knowledgeable about technology than most, and they are justly proud of that. A reputation as an expert in new technologies has other benefits as well. Always being up-to-date on the latest program or IT service relevant to your occupation—and being the person that all your colleagues consult when they have a tech question—does not hurt your career.

Plus, as the earliest and savviest consumers of new technology, early adopters wield a great deal of power in the industry. The most obvious way they exercise this power is by pointing out bugs and other defects to the makers of the new product, who then quickly fix them. But more than that, social media has given early adopters a forum to discuss new products and make a name for themselves as shapers of public opinion. “Companies are now starting to realize that . . . early adopters are more than just geeks with a passion but also a great way to spread their brand and products,” writes Selix. As a result, the first purchasers of a product are often rewarded with discounts, free accessories, or other incentives for good reviews. They also sometimes have a say in forthcoming products.

Early adopters realize that they are, in a sense, voluntary guinea pigs, but they are OK with that. For them, figuring out a new tablet, game, or app has its own charm: it allows them to learn something new and employ their creativity; it improves their status as experts in technology within their social circles, and it gives them influence with tech companies that crave their input and approval. Increasingly, technology is the driver of change in the world. Who wouldn’t want to be one of the people in the driver’s seat?

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| **Unit 2 Lesson 1** | **EDUCATION** |

**The Benefits of a Creative Education**

The word “school” doesn’t have to evoke the feeling of being stuck at a desk solving math problems or memorizing the periodic table. Today, some countries and leading institutions are utilizing and thereby illustrating the educational benefits of creative activities, and these benefits range from academic to personal and social.

In Finland, there has long been a focus on learning through play; in fact, children do not begin school until they are six years old, giving them more time to develop and learn at home in a relaxed, informal setting. When they do arrive at school, their first “pre-primary” year is defined mainly by play, and it is not until age seven that a more formal academic curriculum is introduced. As their education continues, rigid, didactic teaching and standardized tests are given far less significance than in many nations. Instead, there is a strong focus on art and music education: children must have at least two to four hours of music lessons each week, and, as secondary school begins, visual arts, crafts, media arts, music, literary art, circus art, dance, and theater are all taught regularly.

Besides tangibly promoting creativity, cooperation, communication, and collaboration (the four Cs), creative activities are believed by many Finns to reinforce learning in other subject areas. There is evidence to support this notion. Finland frequently tops worldwide educational rankings, and it is perhaps no coincidence that the northern European nation also regularly ranks as the happiest in the world. Of course, it should also be remembered that Finland is a wealthy country with a relatively small population. Its education system and comfortable way of life rely not only on creativity but also on the availability of investment in education. These investments come largely from the country’s 56.95 percent income tax rate.

In other parts of the world, education is not as heavily oriented toward creativity. Although developed countries like the US and UK are home to private institutions such as Steiner Schools, which prioritize learning through play, these are often prohibitively expensive. In publicly funded schools, art, drama, and music departments are under pressure through a lack of funding. In fact, for each student at an ordinary school in the UK, the 2021 budget allowed just £9.40 ($12.79) for art and music education each year. Perhaps this could help explain why the number of students choosing to continue in art education after the age of fourteen—when it becomes elective—has dropped by twenty percent over the last ten years.

Of course, it can seem illogical to fund abstract, “impractical” subjects like painting or dance in less wealthy areas with high unemployment. But creative subjects have been proven to encourage children to remain in education and to achieve more. According to research, in schools with low participation in the arts, around twenty-two percent of low

socio-economic status children do not graduate. Meanwhile, only four percent drop out in schools with high arts participation. And, of those who remain, students who take three to four years of arts and music education have been found to average 100 points better on SATs than those who do not. Furthermore, graduates’ options improve from an education in the arts. When asked, seventy-seven percent of employers agreed on the number-one attribute they are looking for in new employees: creativity. This skill can only be developed by encouraging students to think independently and outside of prescribed parameters.

The arts themselves can also contribute to nations financially. Today, the UK’s culture industry adds around £11 billion to the economy. Of course, most students will not become professional musicians or film directors. Still, as the twentieth-century American painter Grant Wood put it: “The aim of art education in public schools is not to make more professional artists but to teach people to live happier, fuller lives.” It can also build emotional intelligence and encourage empathy: leading universities such as Harvard and Columbia now include art lectures and modules like painting in their medical schools’ curricula to help students relate to future patients.

So learning through play, creativity, and self-expression can benefit students of all ages. It has been proven to improve academic results and increase employability; it can also aid social and emotional development and help to build healthy societies. Simply put, it is something from which we all stand to gain.

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| **Unit 2 Lesson 2** | **EDUCATION** |

**Aiming High**

Singapore is well-known as one of the Four Asian Tigers. Along with Hong Kong, South Korea, and Taiwan, it was given this title because of its rapid economic growth over the past fifty years. Experts offer several explanations for Singapore’s rise to riches. One reason they point to is how the country has tied education reforms to the pursuit of national prosperity.

This approach to education has raised Singapore’s status in academic excellence. Its students regularly score among the highest in the world according to various research indexes. For example, the UN’s Organization for Economic Cooperation and Development (OECD) has repeatedly placed Singapore in the top five countries globally for educational outcomes. Michael Gove, a UK cabinet minister, has publicly praised Singapore’s education and quality assurance methods, commenting that the UK should look to Singapore as a model for Britain’s school reforms.

So, how exactly has Singapore gotten ahead of so many other countries? For starters, its government established a strong commitment to hiring quality teachers. In fact, Singapore had a shortage of school staff and administrators throughout the 1980s. This situation brought about policy changes to attract the best teachers and retain them with ongoing support. Standards are high for entry into the National Institute for Education, which trains all the nation’s teachers, but the rewards are great as well. Teacher trainees receive free tuition and a monthly allowance, which must be paid back if they don’t complete the program. Once they begin teaching, they are also provided with generous support and opportunities for professional development.

In addition, policymakers work to align the country’s educational regime with its industrial needs. They accomplish this through clear objectives and strict education standards. Like other Asian nations, Singapore has an exam-focused culture. Students are tested at a few points during their school career, and the results are collected by the Ministry of Education (MoE) for evaluation. The ministry uses the data as the basis for policy changes and a measure of school performance, commending schools whose students are doing well and requiring improvements of schools whose students aren’t.

Besides localized tests for each class, students take national exams at specific grade levels. The first is the Primary School Leaving Examination after six years of primary school. At the secondary level, most schools in Singapore follow the British system by using the Cambridge curriculum. This system requires students to take a General Certificate of Education (GCE) Ordinary Levels exam when they are fifteen to sixteen years old. Then they take a GCE Advanced Levels exam at ages seventeen to eighteen as they exit high school and move on to university.

Another important feature of Singapore’s school system is the adoption of digital devices. It’s common to find a classroom full of tablets or laptops equipped with education programs and games for student learning. You are also likely to see a science teacher with a group of students off-campus using tablets or other digital devices to do field research. The widespread use of technology is intended to give students more chances to collaborate with their peers as part of the MoE’s plans to move away from the heavy focus on high-pressure testing.

However, not everyone is happy with the structure of the education system or the changes that the government is trying to make. The MoE receives criticism from both students and parents that school is still too demanding and that the government relies too much on standardized tests. They also want more to be done to develop important competencies such as creative thinking and public speaking. In response, officials point out that the education system is rather flexible—there are various options offered across disciplines, including schools for sports and the arts. In addition, importance is placed on the acquisition of life skills such as civil literacy, global awareness, and responsible decision-making.

Since it became a nation in 1965, Singapore has undergone major economic progress, and this growth can be credited to the many policy reforms concentrated on equipping students with the skills they need to succeed in today’s job markets. Schools are required to employ qualified teachers who can achieve the best results. Furthermore, the MoE holds schools accountable through regular performance reviews. All of these actions come from Singapore’s competitive drive to be among the world’s best.

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| **Unit 3 Lesson 1** | **CAREERS** |

**Kicking the Nine-to-Five**

When we founded our company, my partners and I assumed that we’d keep regular office hours. I mean, every other job any of us have ever had was a nine-to-five, so why should ours be any different? Well, the problem was that, like many developers, I’m a night owl, so I don’t get going until about noon. Also, I’m at my most productive between 8:00 p.m. and midnight. My co-founders are the opposite. They’re the most energetic first thing in the morning, and by mid-afternoon, they’re ready to crash. We all struggled for the first three months—I could hardly stay awake at morning meetings, and they were exhausted from my late-night phone calls.

Our fledgling start-up’s problems made us examine our assumptions about our working hours, and a quick look at history reveals just how outdated our modern standard is. The current workday emerged almost a hundred years ago: a different era with different demands and needs. If there were good reasons for it a hundred years ago—reasons that still apply today—then perhaps we could justify maintaining it.

Well, the fact is that there were never compelling reasons for adopting the forty-hour workweek. During the 1920s, the Industrial Revolution was in full swing, and factories typically ran twenty-four hours a day, with workers doing ten- to sixteen-hour shifts. Then Ford Motor Company founder Henry Ford established a five-day, forty-hour workweek while paying the same wages. Ford later explained that he had made the change to give workers more time to shop—specifically, to buy his cars. Regardless of the motivation, other manufacturers followed suit, and gradually, governments began specifying the forty-hour workweek as part of labor law.

A uniform work schedule made some sense at the time because the office was the locus of work, and workers had to be available during work hours to collaborate in person. However, in the era of laptops, cell phones, and ubiquitous wireless connectivity, do arguments for this model continue to carry any weight?

The conventional workday is ideal for one type of person in particular: the early bird. Research shows that genetic factors determine the length of a person’s circadian cycle: the biological signals that influence the body’s rise and fall in energy levels and trigger drowsiness, wakefulness, hunger, etc. According to Katherine Sharkey, a professor at Brown University, this cycle determines whether someone is an early bird or a night owl. If your cycle is a bit shorter, you’re likely an early bird, and the nine-to-five routine suits you perfectly. When you come to work in the morning, you’re all fired up and ready to go, but by the end of the day, you are running on empty.

But what if you are more productive later in the day or at night, like a sizable proportion of the population? The nine-to-five routine forces night owls to be productive when their alertness and energy level are naturally at their lowest. As a result, night owls typically get a reputation for being lazy or unmotivated. This assessment is unfair, given that they are merely victims of their own wake-sleep cycle, which they are more or less incapable of changing.

Several steps led to our company’s eventual break from the traditional nine-to-five schedule. Originally, we adopted a “flextime” system whereby everyone had to be at the office between 11:00 a.m. and 3:00 p.m.; beyond that, they could just come and go as they liked, provided they worked a full eight hours a day. However, flextime was abandoned after a few months because the quantitative measure of how many hours someone worked wasn’t as important to us as the qualitative aspect. We wanted beautiful, creative products and brilliant solutions to problems, and we found we got more of those out of our team when we let them set their own schedules.

On the surface, having no set working hours might seem like a recipe for disaster, but for our company, it’s been perfect. Since abandoning a set work schedule, we’ve seen improvements in our productivity, our health, and the overall quality of our lives. It’s a decision we’ve never regretted, and it’s one I would recommend to other business owners.

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| **Unit 3 Lesson 2** | **CAREERS** |

**The Great Resignation**

Out of caution and government-mandated restrictions, the COVID-19 pandemic that struck the world in early 2020 forced countless people to stay home or isolate themselves from others. Millions of lives were lost, and those who remained healthy had to deal with losing loved ones, jobs, and property. Crises tend to clarify what’s important. So, with that in mind, the combination of COVID-19 fears and government policies mixed with a sprinkle of self-reflection has helped create a new version of work-life defined by the kind of work people want to do and the role people want their work to play in their lives.

One consequence of the shifting expectations of work has been called the Great Resignation: a widespread trend of workers leaving their jobs. A 2021 survey by Microsoft of IT workers and others around the world found that forty-one percent of employees were thinking of quitting in the coming year. During the pandemic, Americans quit their jobs in extraordinary numbers: a record four million resigned in April 2021 alone. In Germany, Europe’s biggest economy, more than a third of companies reported difficulty filling vacancies. Furthermore, a record-setting 10.9 million jobs were still open the following July in the US. These statistics may have influenced the Microsoft study, which concluded that “leaders are out of touch with employees and need a wakeup call.”

Employers in some industries needed that wake-up call more than others, as resignations have not been evenly distributed. Restaurants, for example, were hit particularly hard during the pandemic, with one million fewer workers in the field in 2021 than in 2020. US fast-food places also struggled to find workers, despite some businesses offering up to $19 an hour (over twice the US minimum wage) as well as bonuses. This statistic shows that money isn’t the only thing motivating employment. After twenty-six years in the industry, Jeremy Golembiewski quit his position as a general manager at a chain restaurant in California. When COVID-19 hit, he was furloughed, giving him time to spend with his family. This was something he greatly missed when restrictions were eventually lifted, and he had to return to an understaffed restaurant that pushed him to work nearly a sixty-hour workweek. Jeremy decided his family took precedence and that he should seek a less demanding job in a different field—even if that job came at a lower position in the company hierarchy.

Another industry that has seen a mass exodus of employees is the technology industry. One survey found that a stunning forty percent of US tech workers have quit or intend to quit by 2022. The COVID lockdowns demonstrated that many jobs could be done remotely, allowing flexibility for workers. As a result, many workers lost the will to go back and work in the office. Microsoft’s survey determined that more than half of employees felt overworked and that one in five felt their bosses didn’t care about their work-life balance. Several American companies have displayed some adaptability to this situation: Twitter, Google, and Facebook, for example, all announced that pandemic-related work-from-home arrangements for many employees will now be permanent.

As for the economy, the Great Resignation could benefit employees because wages tend to rise when companies compete for talent. Yet there’s no reason to assume this will last since the Great Resignation has been significantly enabled by temporary government programs instituted because of the pandemic: extra unemployment benefits, cash assistance programs, moratoriums on evictions and student loans, and more. It remains to be seen whether the pace of resignations will sustain itself once COVID-related government help is no longer available and job-seekers are forced to become less picky.

The alterations in attitudes toward work spurred by the pandemic are potentially long-lasting, both in the US and globally. For many, the Great Resignation was about rejecting “workism”—the idea that your job is the core of your identity and life’s purpose. Victoria Short, CEO of a British job recruitment agency, told the Guardian in 2021 that from now on, people are going to be less likely to accept excessive workloads or stay in jobs they hate. “The pandemic has changed how some people think about life, work, and what they want out of both. It’s made people step back and rethink their lives. COVID has reminded them that life is too short.”

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| **Unit 4 Lesson 1** | **ENGINEERING** |

**Nanomaterials: Tiny Revolutions**

Today, without realizing it, you will encounter nanomaterials. These materials exist in three dimensions but are so small or thin that they are invisible to the naked eye. Materials have to have one external dimension (height or width) that is less than one hundred nanometers (Nm) to qualify as nanomaterial. How big is a nanometer? Well, there are a billion nanometers in a meter.

Nanomaterials have always existed in nature, but today they can be created or “grown” in laboratories, usually by breaking down and restructuring larger particles. This means scientists can engineer entirely new materials perfectly adapted for specific uses. In fact, artificial nanomaterials are already in the makeup and sunscreen you apply or the clothes you wear. Materials engineering is developing incredibly fast, and a variety of exciting new nanomaterials are in the pipeline.

One of the most promising nanomaterials is graphene. Given that it is made solely of carbon—just like the filling of a pencil—graphene may not sound that remarkable. However, the carbon cells in graphene are bonded in a hexagonal honeycomb-like structure; together, they form a sheet just one atom thick—that’s 0.354 Nm, or one-millionth as thick as human hair. Graphene is, therefore, the thinnest substance in existence, so you could be forgiven for thinking that it is rather delicate. Nothing could be further from the truth, though, as graphene is also the strongest substance known to science: it can support millions of times its weight and is flexible and completely transparent.

Graphene is the ultimate coating material, as it could strengthen large structures like buildings and bridges without affecting their bulk, weight, or appearance. It could also lighten vehicles, airplanes, and spacecraft by replacing heavier—and invariably weaker—materials. On top of this, graphene is the most conductive material on Earth, making it ideal for batteries, fuel cells, and solar panels. While we cannot yet produce graphene easily or cheaply in large quantities, it has the potential to be a highly disruptive technology.

The structure of graphene was inspired by nature, a trend that other nanomaterials follow. Researchers at the VTT Technical Research Centre of Finland spent years studying mantis shrimp. These shrimp use “hammers” on their limbs, called dactyl clubs, to smash through the hard shells of mollusks. The material that the clubs are made from is known to be one of the hardest in the natural world and can survive repeated impacts without damage. The team at VTT has managed to recreate it. This nanomaterial—which does not yet have a name—is likely to have applications in industries like mining, but could also be used to make things such as longer-lasting dental implants.

While some of our clothes already contain nanofibers, scientists at Rice University have taken this idea to a whole new level with a T-shirt for athletes that has carbon nanotube threads woven into it. These hollow fibers are just as flexible as cotton thread, but they are only 22 microns wide (0.022 mm). The threads are sophisticated sensors capable of collecting and sending information to a computer or cell phone, including the wearer’s heart rate, breathing, and temperature. The result is a “smart” T-shirt that is more sensitive, accurate, and practical than any wearable device.

Besides monitoring our health, nanomaterials are also capable of protecting us from diseases. During the COVID-19 pandemic, scientists at the University of Central Florida became concerned that the disinfectants sprayed on areas like door handles and tables were not long-lasting enough. They set to work creating a disinfectant containing nanoparticles that would remain active longer. Incredibly, the substance they created works not only chemically—as traditional disinfectants do—it also functions mechanically. Its nanoparticles, formed from silver and a rare-earth mineral called cerium oxide, emit electrons that continuously kill viruses on a surface for up to one week.

Of course, we don’t yet know how these nanomaterials will behave over time or whether they involve their own innate health risks. But on paper at least, now that we can manipulate materials at the smallest level, the possibilities are infinite.

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| **Unit 4 Lesson 2** | **ENGINEERING** |

**Where Are Our Autonomous Cars?**

Most adult drivers would willingly acknowledge that driving, while usually the most convenient way to get around every day, can be an incredibly frustrating experience. This common human experience could be why cars that can operate autonomously through artificial intelligence have been a common theme for futurists’ discussions for decades. Although science has made great strides in the past decade, some of us are getting impatient about realizing this vision: “It’s 2020: Where are our self-driving cars?” asks a headline at the website Vox. It turns out that while autonomous vehicles are an attractive technology that has made great advances, perfecting them is much harder than we’d ever expected.

First, let’s address the advantages of having a fully autonomous car: how many poor drivers have ever cried out in frustration after their third attempt at parallel parking? The technology for a self-parking car has existed for a while. At the 2013 International Consumer Electronics Show, the Audi RS7 Sportback SUV gave an impressive performance, parking itself neatly into a spot while the driver stood on the curb and gave the vehicle commands from a smartphone app. No scratches, no bumps, and no need to leave an awkward note on someone’s windshield.

Moreover, no one wants to sit aimlessly in their car every morning and afternoon while moving slowly along a congested highway with thousands of other irritable commuters. If there is even one fender-bender along your route to work, you can be delayed up to an hour. A study by the US National Highway Traffic Safety Administration found that self-driving cars could reduce traffic jams by approximately seventy-five percent. The computers driving the cars will be able to communicate and basically choreograph their own dance, in which commuters can safely move around one another at an even pace and without having to slow down to a crawl. The technology would allow cars to check in with each other, anticipate one another’s movements, and calculate the best actions to perform.

Computers just do some things better than people do—and more importantly, they can perform several tasks at once. They aren’t distracted by phones, passengers, or loud motorcycles, and they can’t drink, take drugs, or get tired. Ninety percent of all car accidents are caused by the drivers’ own mistakes. It’s been estimated that once ninety percent of the cars on American roads are self-driving, 4.2 billion accidents could be avoided, and 21,700 lives saved annually. When human error is taken out of the equation, traffic accidents—and consequently, deaths and injuries—will plummet, at least theoretically.

But the key word is “theoretically.” In recent years, engineers working on driverless cars have been forced to admit that the technical difficulties are greater than they had anticipated. The first death ever attributed to an autonomous vehicle occurred in 2018, when a prototype car being tested by the ride-hailing company Uber and its human “safety driver” struck a woman walking her bicycle across the street. Unfortunately, the driver took his eyes off the road, and the car’s autonomous mode failed to detect the woman in time to avoid a collision. An investigation found that the driver was negligent and that the car’s AI system had failed to indicate to the driver that a person was in its path. After the accident, Uber suspended its testing of driverless cars and later sold that division to another company.

The tragedy highlighted the fact that autonomous cars likely have a ways to go before the general population can trust that they’ll be safe using them. It also raised questions about who bears responsibility for any harm done by self-driving vehicles—a question that has led many companies to re-evaluate their investment in this technology.

However, the effort continues. The recognized leader in the field is Waymo, a company formerly owned by Google and now by Google’s parent company, Alphabet. Waymo has been working with several manufacturers to make commercially practical driverless cars. It has already launched the first fully public, fully autonomous taxi service—safely, so far—though, for now, it is confined to one city in the state of Arizona. In the meantime, for most of us, autonomous vehicles remain in the realm of science fiction.

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| **Unit 5 Lesson 1** | **CRIME** |

**Making the Right Connections**

In the 1973 film The Sting, Robert Redford and Paul Newman play two suave con artists. The characters are sympathetic, and the film is a stylish, entertaining, and intelligent examination of human psychology. However, the reality of con tricks and those who perpetrate them is rarely as glamorous or cerebral. Today, most scams take place anonymously online as phishing, in which unsolicited and often badly written emails appeal to people’s sense of charity. A variation called spear-phishing asks for victims’ account numbers, often promising a financial reward for the respondent. But since many internet users now know the warning signs of these familiar schemes, personal online fraud increasingly relies on the victim unknowingly chatting with a criminal. For instance, “romance scams” use dating or social media sites to play on the human need for friendship, companionship, or love. Fake accounts can appear highly convincing, as fraudsters are willing to put in time and effort to appear entirely genuine. Once a scammer gains another user’s trust—possibly over months or even years—requests begin for financial help with invented problems; these often include illnesses, travel expenses, or the cost of education.

It is estimated that one in ten profiles on dating sites is fake, and incidences of fraud increased during the COVID-19 pandemic as locked-down users looked online to combat loneliness. Back in 2015, US dating site users reported being tricked out of $33 million, but in 2020, this number jumped to $201 million. In Hong Kong alone, around 700 people reported being defrauded6 via dating sites between January and September 2020—a fifty-percent increase on the previous year. Hong Kong police confirmed that almost ninety percent of victims were female and that together they had lost around HK$160.8 million (approximately $30 million). Older victims, who tend to be wealthier, are also fairly common, though victims in Hong Kong ranged from fifteen to eighty-five.

After initial contact on social media, a sixty-seven-year-old Chicago woman named Ellen Floren began corresponding with a charming man called “James Gibson,” who claimed to be an executive. Conveniently, whenever Ms. Floren arranged to meet Mr. Gibson for coffee or lunch, there was always a last-minute problem: a sudden business trip or emergency. Before long, Mr. Gibson asked Ms. Floren for $100 as he’d run out of Netflix credit while on a flight. She agreed but became suspicious when he soon announced he’d also left some tools in a taxi and needed $2,600 to replace them. Wisely, Ms. Floren refused and contacted the police. Stories like hers can provide useful lessons to guide us in building friendships online.

1. When using social media, don’t accept friend requests from strangers. But equally, don’t feel a false sense of security because you were the one who initiated contact; scammers will often post hundreds of fake accounts and wait for other users to contact them.

2. A photo or specific information about ages, jobs, or locations is no guarantee that an account is genuine. Scammers may use real names and matching photographs so that when searched for online, they appear convincing. Similarly, they will often claim that their webcams are broken in order to avoid identification.

3. Most scammers will quickly want to move away from social media and induce you to use a more secure and private means of communication, such as texts or phone calls. Until you are sure, stick to the hopefully reputable platform on which you met them.

4. Never send money, gift cards, or bank details to someone you have only met online. Scammers will do or say virtually anything to avoid meeting and will often claim to be on the other side of the world. In fact, it is common for them to request money for a flight so that they and their victim can finally “meet in person.”

Although cybercrime cost the world economy an estimated $1 trillion in 2020, it is important to remember that not everyone is out to defraud you. In fact, communicating online is an increasingly common way to meet people with shared interests or even find the love of your life. But when online, ask questions and get to know someone slowly—just as you would in the real world. And remember, when attempting to build a friendship or relationship, the last thing an honest person would do is ask for money.

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| **Unit 5 Lesson 2** | **CRIME** |

**Prime Targets**

Frequent travelers take pride in their ability to successfully navigate unfamiliar places and cultures, which is why falling for a local scam can feel so humiliating for many tourists. Let’s say, while exploring the Nanjing Road shopping district in Shanghai, you are stopped by two friendly young women who ask you to take a photo of them. You chat for a few minutes, and they mention that they’re on their way to a tea ceremony and would like you to join them. Excited by the opportunity, you accept. Now imagine your shock when, after sipping tea for about half an hour, you notice that your newfound friends are nowhere to be seen. In their absence, you are stuck with a bill for over $100. Sadly, this is not a misunderstanding—it is a common scam. While it’s natural to feel foolish in this situation, victims can take solace in the fact that they are not alone. Cons happen every day and harm people all over the world, and the reason they work is the con artists’ ability to identify easy targets.

As the situation demonstrated, foreign tourists are prime victims of scammers for several reasons. For one thing, if people can afford to travel abroad, their wallets are likely packed with plenty of cash and credit cards. Just as important, Chris Hagon, who heads a security consulting company, explains that “travelers are easy targets because they are unfamiliar with the environment, lack awareness, and are too trusting.” Con artists tend to exploit something as simple as unfamiliarity with the local currency. For example, tourists have to check their change in Italy carefully: a two-euro coin looks similar to Italy’s old 500-lira coin, but the 500-lira coin is worthless. Additionally, scammers know that tourists are reluctant to file complaints with the police because of time constraints and difficulty with the local language.

The elderly are also a common target for con artists and scammers. In the US alone, people sixty and older lose almost $3 billion a year to various frauds, many of which are phony investment schemes—and often one where an entire estate is lost. Naturally, one might assume that this is due to a natural loss of mental sharpness as people age, but the true explanation isn’t quite that straightforward. In a study performed at UCLA, researchers had adults of various ages look at photos of faces and evaluate how trustworthy they seemed. Some of them showed classic signs of deception, such as an insincere smile. It turned out that younger adults were significantly better at identifying potential con artists than older adults were. MRI scans showed that younger people had greater activity in the anterior insula, a part of the brain that registers danger when looking at untrustworthy individuals.

So if people are young and in their home country, are they safe from con artists? Not necessarily. The third category of likely scam targets is one that everyone belongs to at least once in their lives: the emotionally distressed. A study of 11,000 US internet users compared the recent life experiences of those who had fallen for online scams and those who had not. It found that scam victims were more than twice as likely to have recently lost their jobs and were much more likely to have experienced a financial loss in the period before the incident. As one of the researchers put it, “Just as a weakened immune system lowers your resistance to disease, negative life events lower your resistance to fraud.” Keenly aware of this, many con artists prey on the lonely and depressed through internet dating sites, where they befriend the victim and then extract money from them once they’ve gained their trust.

Victims of a scam may feel worse about their predicament because they believe they actively participated in the crime. Thus the anger and stress over the financial loss are often mixed with embarrassment. If you’re ever made a victim of a scam, remember that you’re not the only one who’s been fooled and that con artists are very good at what they do. They are clever amateur psychologists who know when people are most vulnerable and how to take advantage of it. By arming yourself with knowledge, you can take the necessary steps to protect yourself from these predators.

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| **Unit 6 Lesson 1** | **PSYCHOLOGY** |

**Understanding Memory Power**

Nicole C. Rust, a psychologist and professor at the University of Pennsylvania, suggested that some studies find human memory to be highly accurate while others conclude that it is “not only faulty but utterly unreliable.” The truth is that individuals differ in terms of what—and how much—they can recall. The reasons for this disparity are mysterious, but today, sophisticated studies are attempting to shed light on the murky world of memory.

While some of us struggle to recall what we had for lunch yesterday, highly superior autobiographical memory (HSAM), or hyperthymesia, allows a small number of individuals to remember every day in great detail. The phenomenon was first documented in the early 2000s when Jill Price contacted neuroscientists at the University of California, claiming to recall every day of her life for the past twenty years—since she was twelve years old. Investigations comparing her diary with news reports found her claims to be quite genuine, and by 2021, sixty other people worldwide had been identified as having similar abilities. Surprisingly, subsequent scans of Price’s brain and others with HSAM did not appear in any way unusual.

Just as it is not clear why some of us naturally have far better memories than others, we also don’t know how brain injuries affect memory or why memory deteriorates with age. This is primarily because memory processes are not assigned to a single brain region unlike visual, auditory, emotional, and motor functions. However, most experts agree that an area called the hippocampus, which lies deep within the temporal lobe, plays a crucial role in memory.

In 2020, neuroscientists at University College London (UCL) began a large-scale study to clarify why memory levels differ. The Multifaceted Examination of Memory and its Origins examined volunteer subjects from various backgrounds, including the young, the elderly, and those with brain injuries. Cognitive tests and questionnaires were used to establish which areas contribute to memory and in which ways. This was achieved by comparing lost information or abilities with the precise area of the brain affected by the injury. For Dr. Ian A. Clark, who worked with 217 subjects, this is a means of mapping the brain’s anatomy as it pertains to memory. Dr. Clark’s ongoing studies found that the hippocampus is indeed essential to memory and particularly to scene construction—the ability to create and describe mental imagery, something that those with HSAM do at a very high level.

Dr. Clark and his colleagues also used Functional Magnetic Resonance Imaging (fMRI)—an advanced form of MRI used to scan for diseases like cancer—to establish how the size of the hippocampus related to levels of memory function. They examined an additional 217 healthy subjects of various ages by asking them to recall facts and repeat lists. The study did not find a clear and consistent relationship between hippocampal volume and memory function. However, it did produce one interesting finding from subjects who worked as London cab drivers. To get that job, applicants must pass a test called “the knowledge,” which requires them to memorize a network of 25,000 streets by heart. The taxi drivers in the study had larger-than-average hippocampi—suggesting that perhaps in extreme cases, the hippocampus can grow to allow exceptional recall.

The team also investigated which other qualities of the hippocampus were related to increased memory function. It had previously been posited that higher iron levels might be beneficial to memory and that greater amounts of myelin (a fatty substance that surrounds some brain cells) could also be related to superior memory. Neither of these theories was definitively proven to be the case. The study did reveal that some individuals’ hippocampi were better connected by a greater number of “wires” to the rest of their brain.

In summary, understanding memory relies on processes of elimination and painstaking, long-term research. Scientists like those at UCL continue to pin down memory function specifics to treat brain injuries better and mitigate the effect of diseases like Alzheimer’s. In a world where people live longer than ever, their work could prove essential in ensuring that these extended lives are as constructive and fulfilling as possible.

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| **Unit 6 Lesson 2** | **PSYCHOLOGY** |

**Everyday Tips for Better Memory**

Have you ever wished that you could remember something that you’d forgotten? Perhaps it was a story you wanted to tell, or maybe you had trouble recalling a person’s name or phone number. You’ve probably forgotten an important date such as a family member or friend’s birthday. The truth is you are not alone; everyone deals with these sorts of memory difficulties at one time or another.

What if there are ways to improve your memory and enhance your brainpower so that you have a greater capacity to store and recall details? While science has not solved the entire puzzle of human memory, it has certainly made great strides. With convincing evidence that documents their findings, researchers are able to propose effective ways of improving people’s memory retention and recollection.

For starters, there are numerous physical considerations for preventing memory loss. A study by the American Academy of Neurology concluded that overeating is likely to increase a person’s chances of memory loss. By observing three groups of elderly subjects (aged seventy to seventy-nine) with different eating habits, it was found that the group that ate the most calories above the recommended daily intake had a fifty percent greater risk of developing mild cognitive impairment. This impairment stage is between normal age-related forgetfulness and serious mental ailments that induce substantial memory loss, such as Alzheimer’s disease.

Similarly, certain foods can actually play a role in memory loss as well as retention and recollection. Some foods have even been nicknamed “brain food” because tests show their nutrients improve mental functions. A good example would be fish that is high in a fatty acid called omega-3. Researchers have found that omega-3 from eating fish or fish-oil supplements accumulates in the hippocampus—an area in the central part of the brain where many key memory functions take place—and improves communication between memory cells.

Getting a good night’s sleep is also known to consolidate memories and strengthen their accessibility. This is because memory capabilities are linked to both the quantity and quality of sleep. Doctors recommend sleeping a minimum of six hours a night, with eight hours being ideal. During sleep, specifically in the later stages, the brain works to restore its memory functions. It uses this time to channel short-term memories to other areas of the brain by making connections so that the memories become more permanent. This consolidation process leads to what is called long-term memory, which allows people to remember experiences that happened the day before, weeks or months earlier, and even years in the past.

No discussion of memory enhancement would be complete without talking about the importance of regular aerobic exercise. Experts believe that exercise can make the hippocampus grow, which enhances its functions. A study published in the journal Brain Research indicates that the hippocampi of physically fit children are twelve percent larger than those of the less fit. These children also performed better on memory tests than children who did not get as much exercise.

Besides eating carefully, sleeping enough, and getting enough exercise, there are other steps people can take to improve their memories. A common practice among students that, for many, is unavoidable is cramming. Scientists have found that people remember information longer if their study sessions are spaced out over a week or more. Another effective technique is to do self-tests between sessions instead of merely memorizing the material. Studies have shown that students who use these techniques remember fifty percent more of the material they are studying.

Believe it or not, computer and video games can stimulate memory enhancement. In Sweden, game therapy research on patients with serious brain injuries found that their memory abilities improved significantly in as little as five weeks. The American Psychological Association has even endorsed certain video games—especially those involving puzzles or role-playing—for their memory enhancement abilities.

It would be nice if there were a “magic pill” for memory enhancement. But there is no substitute for a conscious effort to make important lifestyle changes and a commitment to strategies that work to improve one’s memory.

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| **Unit 7 Lesson 1** | **ENERGY** |

**Nuclear Power: A Twentieth-Century Error?**

On June 27, 1954, at the Obninsk Nuclear Power Plant around seventy miles from Moscow, a nuclear reactor began creating steam to drive a turbine—and for the first time, nuclear energy was generating electricity for homes and factories. By the late 1950s, the US Atomic Energy Commission had announced that by the year 2000, it would have built more than one thousand nuclear power plants. For various reasons, this dream never came to pass; today, the US has just ninety-six nuclear power stations, and in many parts of the world, nuclear is no longer seen as the solution to our energy needs.

Accidents and disasters have led to public concern about safety and financial costs for governments. In 1979, for example, the plant at Three Mile Island in the US state of Pennsylvania suffered a partial meltdown that caused radioactive liquid and gas to escape, polluting the nearby area; it took fourteen years and $1 billion to make the area safe again. In 1986, a meltdown at Chernobyl in Ukraine provided an even louder wake-up call for the world. It caused the deaths of around one hundred workers, but it is thought that the disaster—which was initially covered up—led to hundreds of thousands of long-term deaths from cancers caused by radiation. Almost forty years later, the environment in the area remains radioactive, despite around $63 billion having been spent to make it safe.

Climate change and the severe weather that comes with it bring another set of safety challenges for nuclear power plants. Reactors need large amounts of water for their cooling systems and are therefore often located on or near coasts. The dangers are obvious: in 1992, Hurricane Andrew, one of the worst storms ever to strike Florida, landed near Miami about eight miles from the Turkey Point nuclear power plant. With winds of 280 kilometers per hour, the hurricane sent five meters of water crashing into the facility and cut off its electrical power. The fire safety and communication systems of the plant were disrupted for five days. Although large parts of the facility were damaged, and the plant had to shut down for six months, the reactors released no radioactivity thanks to backup generators.

While this story had a happy ending, incidents like Turkey Point illustrate the vulnerability of coastal nuclear power stations. In a world where sea levels are rising and extreme weather events are becoming increasingly common, nuclear power could become more dangerous than ever. Even low levels of radioactivity that enter the ocean could have a devastating effect on marine life, the fishing industry, and possibly on people across the region, say experts.

When functioning properly, nuclear power has little impact on people or the environment, but overall, other renewable forms of energy present less risk to human life. In fact, for each terawatt hour (one hour of 27,000 people using electricity), nuclear power leads to 0.07 deaths, whereas wind power leads to 0.04 deaths, and solar power leads to just 0.02, making these the safest forms of energy by far. They are also less expensive than nuclear power; to produce the same amount of power, building a nuclear plant is more than twice as expensive as building a solar array and almost four times as expensive as wind turbines.

Given all this, many countries are turning away from nuclear energy. The US now relies on it for less than twenty percent of its power, and the UK just fifteen percent. Meanwhile, China, whose needs are even greater, has never fully embraced nuclear power, relying on it for just five percent of its needs in 2021. Although it continues to use fossil fuels in huge quantities, China is looking toward renewables rather than nuclear power to increase energy production while reducing or offsetting its carbon emissions. Other countries, such as Germany, Switzerland, and Belgium, have announced plans to phase out nuclear power entirely.

Despite being potentially more dangerous and expensive than some renewables, countries continue to invest in nuclear energy. It still seems almost magical, and safety is likely to continue improving, but its risks cannot be entirely negated. In fact, climate change could create new conditions that directly impact all 443 nuclear reactors in operation across the globe.

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| **Unit 7 Lesson 2** | **ENERGY** |

**The French Model**

As the effects of climate change become increasingly apparent, many countries are looking to develop innovative forms of renewable energy, including wind, solar, and hydropower. However, the world already has an advanced, clean, and efficient means of producing large amounts of energy: nuclear power.

France has long realized the practical benefits of nuclear power as an alternative to fossil fuels such as coal, oil, and gas. These substances are hard to produce or extract, are concentrated in certain parts of the planet, and are in limited supply. In 1973, following the Yom Kippur War, Saudi Arabia cut off oil supplies to some nations, and the price of oil skyrocketed from $3 per barrel to $15 in a single day, and then $40 by the end of the decade. Realizing the need for independence, the French government under Prime Minister Pierre Messmer drew up the “Messmer Plan,” an investment program that would involve the construction of 80 nuclear power plants by 1985 and 170 by the year 2000. The plan was a success. Today, as much as seventy percent of France’s energy needs are met by nuclear power. In addition, the country is now largely protected from oil crises and free from dependence on foreign fossil fuels.

French residents are regularly reminded of the benefits of nuclear power every time their electricity bill arrives. At only $0.22 per kilowatt-hour in 2020, their electricity currently remains among the cheapest in the world. In Denmark, the cost is around $0.34, and in Germany, it is closer to $0.40; these countries still primarily rely on fossil fuels. The costs of fossil fuels are not only financial: the rate of worker deaths within the oil industry is 263 times higher than those in nuclear energy. Accidents like those at Chernobyl are alarming, but they are infrequent. A fitting comparison could be made with air travel—it seems risky, and when accidents do take place, they receive huge amounts of coverage, but it is statistically far less dangerous than traveling by bus, car, boat, or train. In any case, to calm the public’s fears, France announced in 2012 that it would spend $13.2 billion on safety upgrades to its reactors and the sites they occupy.

Moreover, reliance on nuclear power means that France is one of the greenest countries on Earth. Its carbon emissions are one-tenth of those in Germany and the UK and one-thirteenth of those in Denmark. These countries are attempting to reduce carbon emissions by focusing on wind and solar projects; however, few modern renewable forms of energy can match nuclear power for its low levels of pollution. For each gigawatt-hour generated (the amount of energy roughly needed to power 160 homes in the EU annually), a nuclear power plant produces three tons of carbon. Running a wind farm emits four tons for the same amount of power, and a solar array emits five tons. Hydropower, meanwhile, puts far more carbon into the air: thirty-four tons per gigawatt-hour.

Renewable forms of energy like wind and solar primarily rely on unpredictable and unreliable weather conditions that are only found in certain regions and at certain times of the year. Once built, a nuclear power station quietly produces constant power for a lifetime of up to forty years, and today we have the technology to extend this duration. In fact, the decommissioning, or closing, of nuclear power stations can raise difficult questions. At San Onofre, California, a nuclear power station was decommissioned in 2013. However, by 2021, federal authorities had still not agreed on how to properly secure the dangerous nuclear waste that remains on-site. Without workable plans for their closure, stations like San Onofre might as well have been safely upgraded.

Nuclear power has the potential to solve many problems. It can slow climate change significantly by providing a greener alternative to fossil fuels, and, unlike many renewables, it is a proven way to produce energy consistently and in large quantities; it is also safer than many people suggest. Rather than consigning nuclear power to the scrap heap—which carries its own risks—now could be the perfect time to reassess, reinvest, and begin a new chapter for nuclear power.

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| **Unit 8 Lesson 1** | **PSYCHOLOGY** |

**HALF-EMPTY AND HALF-FULL**

Is the glass half empty or half full? In uncertain times, do you expect things to go your way or to end in disaster? The answers to these questions are said to determine whether a person is an optimist or a pessimist, and people will often define themselves as one or the other. Some even come to rely on the term as a means of understanding their entire relationship with the world.

Whatever we claim, we are all capable of being both optimistic and pessimistic. An individual may, for example, be very positive and hopeful about their career while also feeling negative and hopeless about their romantic life. Furthermore, we all have good days and bad days, and our attitudes can fluctuate wildly. In fact, our mental health and well-being rely on balancing the high expectations of optimism and the preparedness for failure provided by pessimism. Full-time optimists, where they do exist, are probably confidently striding toward a painful fall or likely to take unnecessary risks. Meanwhile, professional pessimists could be busy creating their own bad luck by discounting possibilities when they appear.

Therefore, optimism and pessimism are best thought of as a spectrum, not binary conditions. That said, scientific studies have shown that individuals tend toward certain modes of thought because optimism and pessimism seem to originate in different hemispheres of the brain. It is known that the balance of activity in these two distinct sides varies slightly from person to person. Positivity, high self-esteem, and a “can-do” attitude are all associated primarily with the brain’s left hemisphere (LH). On the other hand, low self-esteem and a tendency to concentrate on the negative aspects appear to be linked to neural processes in the brain’s right hemisphere (RH).

RH brain activity is also responsible for our survival instincts: the ability to be cautious, passive, and defensive. If this side of the brain becomes dominant, these vital skills can easily mutate into insecurity, indecision, and of course, pessimism. LH brain activity, meanwhile, provides the impulse to be active, confident, and therefore, optimistic. Again, it is crucial to understand that all brain activity occurs across both hemispheres, and in most of us, it would be hard to tell which side is dominant. Thus, neuroscientist David Hecht’s research focuses on individuals with extreme RH or LH dominance to better understand what is occurring—in more subtle ways—for the rest of us.

Hecht aggregated research on various medical conditions that provides insight into the relationship between RH/LH activity and pessimism or optimism. Anosognosia, for example, is a condition that can follow a stroke. Although the sufferer cannot move one side of their body, they insist that nothing is wrong. Research shows that anosognosia is far more common in RH strokes, which affect the left side of the body. In these cases, the side of the brain that is responsible for pessimism or negativity becomes subordinate or even effectively “switched off.” Extreme risk-takers such as high-stakes gamblers were also found to have inhibited RH activity. Conversely, extreme hypochondriacs and sufferers of severe depression were found to have an imbalance that favored RH neural activity.

How does this affect those of us fortunate enough to have a generally satisfactory balance? As many online articles suggest, can we train ourselves to be more optimistic? Maybe, because logic games such as crosswords and Sudoku are said to promote LH brain activity. Some studies have also shown that physical exercise focusing on the right side of the body stimulates the left side of the brain. It has even been suggested that simply writing with one’s right hand may be beneficial. A 2019 study at Oxford University found that while the left-handed often have better verbal skills, they may also be at slightly higher risk of some mental disorders.

In any case, for most of us, a generally healthy lifestyle is enough to maintain a balance between RH and LH activity and, therefore, between optimism and pessimism. But a realistic attitude about the pros of pessimism and the cons of optimism is perhaps also key to remaining mentally healthy.

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| **Unit 8 Lesson 2** | **PSYCHOLOGY** |

**Hooray for Pessimism!**

“Think positive!” “Look on the bright side!” These words of advice—commands, really—regularly come my way from family, friends, co-workers, and even total strangers. However, these empty statements do little to ease my anxieties because, deep down, I consider myself a pessimist. That’s not to say that I’m unhappy. However, at any given moment, I’m likely to be preoccupied with scenarios about what might go wrong next. The social and health benefits of optimism notwithstanding, I’ve learned that pessimism is greatly underrated, and a healthy amount of such negativity can benefit a person emotionally, professionally, and financially.

Pessimism takes many forms, but the relevant ones here are dispositional and

defensive pessimism. In psychology, dispositional pessimism is the personality trait of having generally low expectations. In other words, dispositional pessimists may not know what will happen, but they are pretty sure it won’t be anything great.

Although this sounds like a dreary way to go through life, surprisingly, dispositional pessimism might lead to stronger, longer-lasting relationships. Several studies have found that negativity positively affects a couple because it prepares them for the worst. One study followed eighty-two married couples and found that the optimists suffered most because of their “extreme and often irrational” disappointment when they encountered difficulties. In contrast, dispositional pessimists accepted some trouble with their partners as normal and could thus deal with it better.

A bit of dispositional pessimism confers some advantages at work as well, according to psychologist and critic of what he calls the “cult” of optimism, Dr. Aaron Sackett. As he explained to Psychology Today, if an optimist is denied an expected promotion, they will feel both shocked and crushed. However, a pessimist in the same situation never had his or her hopes up to begin with, so he or she will not be nearly so deeply affected. “Optimists never get the joy of a pleasant surprise,” Sackett points out. While that sounds like a bummer, this mentality can be beneficial in helping pessimists move on and focus on what lies ahead.

Defensive pessimism, which some could view as dispositional pessimism applied to specific situations, can benefit people in more concrete ways. Defensive pessimism can be described as the tendency to be anxious about all the things that could go wrong, both major and minor, and to use that anxiety as motivation to act. Imagine you are a pessimist in charge of organizing an important presentation. You might expect technical problems, so you’ll set up and test the computer equipment in advance. And you may fear that additional people might show up, so you’ll have extra copies of the handouts ready. Through the power of negative thinking, you will be much better prepared than the optimist that assumes everything will proceed smoothly.

Defensive pessimism may also lead to more prudent money management. One interesting experiment involved observing college students gambling on simulated card games and slot machines. Those who had scored high on a test of optimism were more likely to believe they would win—and they believed this even more strongly after they had lost money, leading to further losses. Only the pessimistic students reduced their bets after losing, which is surely the logical thing to do. A similar principle could be observed on a global scale following the 2008 world financial crisis, which made defensive pessimists out of millions of people. Since then, many of those in affected countries have felt increased anxiety about their financial futures and have adjusted their behavior accordingly, saving more for retirement and avoiding disastrous credit card debt.

Considering how pessimism can prevent disappointment, shield one’s ego, and protect against job-related or financial misfortunes, one would think it would be more widely accepted as a valid point of view. Dr. Julie Norem, who specializes in this area, told the Huffington Post: “Currently, there’s an awful lot of pressure for people to present themselves as cheery and optimistic, and it probably causes more pain than pessimism itself.” Norem adds that the dominance of optimism may be coming to an end, and soon there may be a “broad cultural shift” toward more negativity. Maybe, but I’m not getting my hopes up.

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| **Unit 9 Lesson 1** | **LIFESTYLES** |

**Staying Put**

First identified as a trend around twenty years ago, the “boomerang” phenomenon initially referred to young adults returning to their childhood homes after university. By 2021, however, it came to denote a deeper and more problematic social situation in many developed countries. In the UK, for example, studies have shown that seventy-five percent of single adults aged twenty to thirty-four have either always lived at home or have returned to it. This is due to a perfect storm of student debt, high rent and property prices, low pay, unstable employment, and the increased general cost of living.

In the second half of the twentieth century, homes were built rapidly to keep up with growing post-war populations. This relative abundance made buying a home affordable. By 1981, the average first-time buyer in the US was twenty-nine years old. However, in the 2010s, half as many homes were built compared to the preceding decade. According to mortgage provider Freddie Mac, in 2021, there were 2.5 million too few homes built in the US. This scarcity has driven up property prices. For most Millennials and Gen Zers, owning a home is now a long-term project that requires them to gradually accumulate funds for a substantial deposit or down payment while living at home. In the US, only 37.8 percent of Americans under thirty-five years old are homeowners. First-time buyers are now thirty-four years old on average.

In fact, for many young adults, even renting an apartment is becoming a pipe dream. Across the Atlantic in London, the average cost of rent is £1,572 ($2,714) per month, and economists predict that this is likely to rise to £2,300 over the next five years—an increase of twenty percent. This inflation might be manageable if wages increase to match, but rental costs in the UK rose by thirty-eight percent between 2011 and 2021, and the average wage rose by just twelve percent. In New York City, the average rent is a bit higher, at $3,095 per month; concurrently, the average monthly wage is $3,507. When the rising costs of food, utilities, and transportation are added to the cost of rent, it is easy to see why many choose to remain at home long into adulthood.

Today, it is not only this disparity that controls young adults’ lifestyles; the types of work they do have also changed. So-called “freeters” are free workers—young adults who do not rely on one full-time job for their income. Instead, they work various part-time jobs or regularly move from one job to another. This term was first used in Japan and is an amalgamation of the English word “free” and the German word arbeiter, meaning worker. However, this term may be somewhat misleading as this apparently more relaxed attitude to employment often has more to do with an unpredictable job market and short-term or “zero-hours” contracts. These flexible agreements are designed to make it easier for businesses to shrink or expand their workforce in line with demand. Unfortunately, they neither allow young adults to make long-term plans nor provide an income reliable enough to enable them to leave home.

For other young adults, simply finding work is a problem. An increasingly competitive job market has made finding employment difficult for many fresh graduates, and the COVID-19 pandemic exacerbated the problem. To make matters worse, many young workers who worked in industries badly affected by the pandemic, such as hospitality, leisure, and tourism, lost their jobs. In addition, many young adults decided to delay university or college due to the pandemic but found that they could not find short-term work. These people are sometimes referred to as NEETs, a term first used in the early 90s to describe people who were not in employment, education, or training. In 2020, NEETs constituted one in six young adults in the EU. Even in South Korea, a country less affected by the virus than others, there was a 24.2-percent increase in those categorized as NEETs between 2019 and 2020.

If these trends continue, young people and parents will have to recalibrate their expectations. Living at home is currently a reality for many young adults. While it may suit some, the reasons for this growing trend are usually economic; evidently, it is not motivated by changing attitudes but by a lack of choice or agency.

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| **Unit 9 Lesson 2** | **LIFESTYLES** |

**Multigenerational Homes**

Jenny Currie is a twenty-eight-year-old graduate with a degree in English Literature from the University of British Columbia in Vancouver, Canada. However, the economic situation where she lives is so dismal that even with a steady job, she has discovered that it’s practically impossible to afford her rent and expenses on top of trying to eliminate her student loan debt. Her parents have suggested that she move in with them to pay off her debt faster and restore her financial well-being. Jenny is not alone in her predicament; gone are the days when children would leave the parental home for good as soon as they reached adulthood. Jenny is part of a segment of society labeled the Boomerang Generation: adults who move back home after living independently.

Canada is not the only country where young adults return to their parent’s homes. According to an article written by Lisa Smith for Investopedia, the Italians call these grown children mammone, or “mama’s boys.” The Japanese call them parasaito shinguru, or “parasite singles.” As these terms suggest, there is a certain amount of stigma attached to young adults moving back in with their parents, which many equate with giving up one’s independence. But in the past decade, in a trend accelerated both by financial crises and the COVID-19 pandemic, more people have been rediscovering the advantages of moving back to their parent’s home—even when they’re already married and have children. The result has been a sharp rise in multigenerational households.

A multigenerational household is defined as either one in which at least two adult generations live together—with or without children—or one in which children live with their grandparents. The recent increase in this phenomenon has been especially dramatic in the US. Between 2011 and 2021, the number of Americans residing in such homes grew from seven percent to twenty-six percent, and while some may see this as a step backward, it might just be a needed transformation in our priorities. Generations United is a nonprofit organization whose stated mission is “to create a country where public policy and programs connect generations” instead of isolating them. It conducted a survey in 2021 which found that nearly all (ninety-eight percent) of Americans in multigenerational households said that they were pleased with their living situation.

It’s not too difficult to see why such living arrangements have become more appealing in the current era. One reason is financial, and it’s not just a consequence of student debt. COVID-19 and the resulting business closures and economic slowdown have put financial pressure on people of all ages. Many families find it easier to make ends meet by living together and sharing expenses. When forty-two-year-old Talib McDowell was furloughed from his job, he, his wife, and their two children moved in with his parents. By doing so, the family saved on mortgage payments and childcare, he explained to the New York Times. In addition, McDowell’s parents described themselves as “thrilled” that they could see their grandchildren every day.

Tae and Monnica Kim of California moved into his parents’ home with their two children for similar reasons—so that they could work and save money while the grandparents helped out with the kids. Their situation brings us to other perks of multigenerational living: enhanced family relationships and improved health. Monnica appreciates the closeness that her children enjoy with their grandparents: they have “a lot more quality time together and create a lot of memories,” she says. And given that senior citizens are especially vulnerable to the pandemic, quite a few adults have invited their elderly parents to live with them—both to prevent their social isolation and to help with care if they become ill. Generations United found that more than three-quarters of people living in multigenerational homes believed it positively affected at least one family member’s physical or mental health.

Crushing debt, economic crises, and a global pandemic have caused enormous suffering. If there is a silver lining, maybe it’s this: multiple generations of families are drawing closer together and finding joy and comfort in helping one another.

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| **Unit 10 Lesson 1** | **EDUCATION** |

**Is Private Education Worth It?**

In the US in 2020, around 50.8 million students from kindergarten to the twelfth grade were attending 130,930 different schools. Of course, these schools vary greatly in size and location, but there is another, more fundamental sense in which America’s schools differ: some are public and others are private. Public schools are paid for by national and state taxes and offer free education to all. Private schools require students to pay tuition, which is around $12,500 per year on average but can run as high as $85,000 at the most exclusive schools. With such a high entry price, why do some parents choose private education, and why are so many convinced that it guarantees their children higher educational attainment?

Of all US schools, 32,461 (around twenty-five percent) are private, but they are only attended by around ten percent of the total US student population. In fact, many parents cite smaller class sizes as a motivating factor in their decision to “go private,” believing that their children benefit from closer, more personalized attention. However, statistics show that the public school system has, in most cases, managed to keep class sizes to a minimum too. While the average class in a private school has twelve students to each teacher, public schools are not too far behind, with a ratio of sixteen to one.

This is primarily because the public school system employs vastly more teachers than private education. Somewhat surprisingly, given the cost of tuition, one of the reasons public schools manage to attract teachers is that they pay $10,000 to $15,000 more, on average, for similar positions found in private schools. This may be partly due to one public teachers’ trade union, the American Federation of Teachers (AFT), which has consistently campaigned for wages that reflect the value of public-school teachers to society. Meanwhile, private school teachers are often happy to overlook the lower pay because they have greater freedom in what they teach and enjoy a more relaxed atmosphere. Some even suggest that this makes them more effective, enthusiastic educators.

But whether private or public, most teachers enter the profession because of intrinsic motivations, specifically because they want to help create a fairer society through education. In any case, the public-school teaching market is more competitive. Eighty-seven percent of teaching jobs in the US are in public schools, and all applicants must be trained and licensed teachers. In theory, private schools are free to hire whomever they wish. However, in practice, they are more selective with candidates and search for teachers from prestigious universities with graduate degrees in their academic fields. Although private schools certainly hire subject-specific experts, it could be argued that public-school teachers are better versed in education’s social and developmental aspects.

Far from being solely academic institutions, schools are communities where children learn how to relate to one another. Certainly, in private schools, students have the chance to socialize via a greater choice of sports clubs and cultural societies. These extracurriculars usually benefit from appreciably more space, better facilities, and newer equipment. Indeed, private schools are free to specialize in whatever they want, meaning that children with a particular talent—be it football or theater—can explore it more fully. Additionally, parents can also choose private schools because they represent or extol a certain set of beliefs; seventy-eight percent in the US are affiliated with a religion. Yet despite freedom of religion and the free market being pillars of US democracy and American identity, one could argue that the diversity of public school is more reflective of contemporary US society.

While private education generally produces slightly higher grades, the difference is not vast. Supporters of private education often invoke the fact that private school students are disproportionately more likely to go on to university, but this data is skewed by socioeconomic factors like being able to afford additional one-on-one tutoring, having parents who went to university, and being able to afford university tuition at all. When considering classroom education by itself, private education may not always provide a product as superior as its price would suggest. Public schools provide an excellent standard of education thanks to well-trained, well-paid teachers. They also provide a more accurate model of the world outside their walls, one which awaits all children when they finish their education.

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| **Unit 10 Lesson 2** | **EDUCATION** |

**Standardized Tests for a Non-Standardized World?**

As we might recognize them, the earliest form of exams took place at universities in the eleventh century. They were oral and involved small groups of elite candidates who were expected to debate with lecturers on topics from philosophy to the natural sciences. It was a system fraught with variables and inequities. It wasn’t until the nineteenth century that written exams became common. Since then, many would claim, we have gradually amended examinations to be fairer, more effective, and more relevant—but are the exams students take today really fit for purpose?

Today, exams such as the Scholastic Assessment Test (SATs)—which secure entry to universities—are nationally standardized. This standardization means that, unlike those early exams, all students take identical tests to make a “fair” comparison of many students. However, according to critics, tests such as the SAT inherently favor the wealthy. The COVID-19 pandemic exacerbated this issue. With schools closed, economically disadvantaged students were less likely to encounter crucial alternatives like individual tutelage or homeschooling. Many also found that their tests were repeatedly rescheduled or canceled at the last minute; others could not take the exams at all. Such was the prevalence of the problem that 1,600 US universities, including every Ivy League college, signed up to the “test-optional” movement. This meant that in 2021 at least, colleges would not necessarily take SAT scores into account when considering applications. Initially, the test-optional movement was an emergency response to the pandemic. Still, like many such measures, we may find that its flexibility makes it a fairer option in the future.

Even if we ignore the socio-economic issues behind standardized exams, the question remains: are they really an effective way to find out how much a student knows? Some students are emotionally and psychologically better suited than others to the pressure of providing evidence—on one given day—of several years of education. This fact was made clear when the situation surrounding the COVID-19 pandemic shone a spotlight on the mental impact of tests. As schools closed and college application deadlines approached, stress among students skyrocketed. Many feared that the lost months would affect the rest of their lives. In the UK, a 2020 study by Rahim Hirji for Quizlet found that of 1,400 teenagers, eighty-five percent were stressed or anxious. In response, the UK and other governments instructed teachers to rely on their detailed first-hand knowledge of students’ long-term performance to decide grades.

Even under normal conditions, some argue that the heavy reliance on examinations leads to ineffective education, rote learning, and “teaching to the test.” Critics like Dr. Robin Harwick argue that current students are not given a holistic education but are simply taught to score highly. “Standardized tests are only useful for measuring standardized minds,” says Dr. Harwick. “However, humans are not standardized, nor do we want them to be.” Another argument against standardized tests is that the prevalence of multiple-choice exams—which computers can quickly grade—pushes students to learn how to deduce logical answers rather than use independent critical thinking. In addition, schools seem to benefit most from teaching students to succeed at quantifiable tests since school ranking tables are now widely published and referred to by parents. Their prominence leads schools and teachers to feel pressure to focus on test results, perhaps at the expense of other, less tangible aspects of educational development.

Of course, supporters of standardized tests would point to the transferable skills required in studying for them, including organization, preparation, and self-discipline. In fact, the very stress that some cite as a problem could also be seen as a useful experience. We will all one day be required to retrieve and apply information under pressure in our adult lives. Thus, exams serve a clear purpose as one part of an educational strategy, and even critics wouldn’t call for their total elimination. However, many would argue that too much weight is placed on them and that it would be fairer and less stressful to think of exams as just one component in a wider grading system of long-term coursework, which includes research, presentations, and essays.

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| **Unit 11 Lesson 1** | **INFORMATION TECHNOLOGY** |

**Retail and the Individual**

Since the 1970s, businesses have gathered information on their customers’ desires and habits. Initially, using simple questionnaires and surveys, companies could broadly categorize customers and alter their products, prices, and mass-marketing campaigns accordingly. Today, thanks to technological developments, businesses can draw on vast amounts of highly detailed information. While this “big data” is enormously valuable to businesses, the way it is gathered, stored, and used is not without controversy.

In 1993, the first real customer relationship management (CRM) systems began appearing. This type of software grouped customer details and interactions and replaced inefficient “data silos” with unified “data warehouses” or “data lakes.” With the growth of e-commerce, companies gained access to even more information. The modern successors to those CRM systems have nearly unlimited capacity and automatically perform complex analytics to ensure that no customer falls through the gaps.

The data that companies store can be divided into three categories: first, customer profiles include information such as names, ages, phone numbers, addresses, and bank details. Second, customer activities: this includes information on what an individual has bought, what they looked at, when they looked at it, and for how long. Finally, customer management records contain interactions between the business and the customer. This almost priceless information is instantly cross-referenced, allowing businesses to “remember” each customer, address them by name, and expose them to personalized content and targeted advertising.

Such is the commercial value of CRM systems that by 2027, it is thought the information they contain will be worth $17.85 billion to retail businesses. Indeed, big data has already been essential to the success of one of the world’s largest companies, Amazon. Much of the corporation’s popularity is due to the ease with which customers can use its site—its “one-click” ordering system is a perfect example of the efficiency and intelligence of contemporary CRM systems. Besides its speed, it also allows users to view previous purchases, track deliveries in real-time, and update their own details, making them feel that there is transparency to the system.

Amazon is now so powerful that it has developed its own CRM system, ensuring the company’s independence in data collection and use. Furthermore, it now develops new areas of data collection, like its biometric system Rekognition. Many of us already use biometrics to unlock phones or open doors. Amazon is introducing the technology as a means of security and payment, both online and at its Amazon Go stores. At its stores, customers scan their palms as they enter. Then they proceed to shop and leave with goods equipped with Radio Frequency Identification (RFID) tags. These tags tell the company what customers have taken, and they are billed for it. Biometric data is so useful and valuable to the company that Amazon offers customers who register their palm print a $10 gift.

However, some believe that the amount of data that private companies like Amazon have about us is already too great, and biometrics gathering is likely to worry them further. There is justified concern that personally identifiable information (PII) could be stolen. In 2021 alone, hackers gained access to private data held by Microsoft, US Cellular, and Alibaba’s Taobao shopping site, allowing them to see tens of millions of phone numbers, addresses, and PIN codes. Even if data is secure, some individuals feel that any entity other than themselves having this level of PII is an invasion of privacy, even seeing it as a civil rights issue. They also worry that in the future, CRM technology could be sold or repurposed. In 2020, US politician Jimmy Gomez wrote to Amazon CEO Andy Jassy expressing concern because the company had sold its Rekognition technology to US law enforcement groups and seemed to have plans to sell it to governments worldwide. Amazon responded to this outcry with a one-year suspension on the selling of Rekognition to government bodies.

Of course, it is in the interest of companies to convince the public that they are protecting our data, and they spend billions of dollars trying to reassure customers that they’re safe. However, while CRM systems make shopping easier than ever, some companies’ systems are so advanced that the way they operate is not totally clear. This has left many government ministries struggling to keep up and to assuage citizens’ concerns.

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| **Unit 11 Lesson 2** | **INFORMATION TECHNOLOGY** |

**Governmental Privacy Protections**

Are there any internet searches you have done that you would not want anyone to know about? Well, you might be surprised to learn that most search engines store search terms and other identifying information for every search you make. There is probably a lot more of your data being stored online than you realize, and that can be a disconcerting thought.

Privacy concerns have been compounded in recent years because of several global threats. One is the rise in cybercrime following the widespread adoption of the internet and information technologies, and another is the perceived increase in terrorist attacks. These issues have placed individuals’ privacy rights in conflict with a nation’s responsibility to protect their citizens from harm. Governments argue that these dangers justify the need to suspend certain privacy rights to defend and maintain national security. The justification is that criminal actions are a serious problem that must be dealt with and national agencies have the best resources for defending against these threats. Therefore, citizens should trust the government with their personal information for their own self-interest.

On the other hand, there are concerns that governments have gone too far with mass surveillance, and in the process, violated people’s rights to privacy. For example, some say the US government has gone beyond minimal information-gathering by actually listening in on people’s phone calls and reading their private emails. There are even those who argue that citizens should not give up any amount of privacy, as it could become a slippery slope that allows the government to take away more and more privacy rights until there are none left. Hypothetically, this would create a world in where governments spy on their citizens’ every move.

Regardless of what the future holds, the world is currently split between countries seeking to safeguard personal privacy and those engaging in mass surveillance to provide national security. Germany and Malaysia are two examples of this divide.

Germany is recognized as one of the countries with the strictest privacy protections in Europe. Its constitution clearly states that the privacy of citizens’ letters, online posts, and telecommunications is inviolable. Germany is also home to the world’s first data protection legislation, originally passed in Hesse in 1970 and became a national act in 1977. In 2021, Germany passed another privacy law requiring online companies to obtain users’ consent to track their information via cookies unless it is “essential,” meaning necessary for the website to function.

In contrast, Malaysia does not specify that citizens have the right to privacy in its constitution. It also did not have any coherent policy against privacy violations until the Personal Data Protection Act (PDPA) was implemented in 2013. However, there continues to be criticism of the PDPA. A major point of contention with the act is that it does not apply to federal or state agencies. The act still allows government officials to collect personal data, including background, education, and health records, and government agents are not required to inform the individual being monitored. Thus, critics say that nothing has changed and that supporters of the PDPA have no concern for protecting privacy.

Moreover, the Malaysian government passed the Security Offences (Special Measures) Act in 2012. The act contains clauses that give police the power to intercept private communications without permission from a court. Police can also search any person’s house and make arrests if they believe there is a national security threat. The concern is that they will abuse this power by targeting people who have different political opinions than the ruling government. The result would be the invasion of people’s privacy and the erosion of personal freedoms.

The examples of Germany and Malaysia demonstrate clear differences in the approaches that countries take concerning the privacy of their citizens. This indicates that the situation is complex and that personal information may be less protected than before. Even when organizations claim the best intentions, citizens should still be mindful of who is watching their online activities. They should also be aware of how their personal information is being used because, in the end, each individual is the first line of defense against privacy violations.

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| **Unit 12 Lesson 1** | **URBAN PLANNING** |

**The Future of Cities**

Future cities might be home to exciting inventions like flying cars, but in the meantime, city planners, designers, engineers, and urbanists face a variety of more urgent challenges. Solutions to these may be less glamorous, but they will require equally innovative thinking. Answering the difficult questions posed by climate change and overpopulation is essential not just to the improvement of our cities but to their continued existence.

Research suggests that the number of people at risk from flooding has increased by

twenty-five percent since 2000. Many of these people live in cities such as Jakarta, the low-lying capital city of Indonesia, which is thought to be one of the cities most at risk. In fact, President Joko Widodo recently announced plans to move the capital to Nusantara, Borneo, a new location on higher ground. For less dramatic solutions, cities often commission projects by the Dutch and the Danish, experts in flood prevention and protection. For example, the Danish company Bjarke Ingels Group will soon commence construction of the Big U in New York City. The Big U will be a $335 million system of walls and raised land that will be ten miles long and wrap around the bottom of Manhattan to protect its adjacent business district and 220,000 residents from flooding. The Big U will also serve as an area of much-needed public green space, which city dwellers have come to value even more during the COVID-19 pandemic.

In cities such as New Orleans, rewilding could also be a solution to flooding. Existing urban areas can be demolished and converted into wetlands that absorb floods naturally. Other flood defenses will be more subtle. Dutch company Waggonner and Ball are working on permeable surfaces for roads and parking lots that allow water to sink into the soil below. Other designs allow rainwater to be channeled, stored, and recycled as additional drinking water, which cities will need as populations grow and temperatures rise.

A lack of space is another issue that will face many city dwellers. With 5.1 million people living in an area less than half the size of New York City, the island city-state of Singapore is investigating the possibility of building “earthscrapers,” which would be much like its skyscrapers but in the opposite direction—seventy stories down. These subterranean constructions would, in theory, be surrounded by underground parks, commercial centers, and green spaces, which would be connected by new subway lines. However, the cost of these projects is estimated to be more than twice that of building above ground, and a lack of natural light could affect both physical and mental health. Therefore, it is more likely that storage and industry will move below ground long before our apartments do—freeing up space for a more comfortable life on the surface.

How we commute to work is also likely to change. Cities such as London and New York have made great strides in encouraging commuters to walk or bicycle to work, which promotes healthy living, reduces strain on public transportation, and cuts down on pollution and traffic congestion. These kinds of efforts are likely to spread as cities around the world deindustrialize and become cleaner and greener. A proposal by architects NBBJ could take this concept further by combining the benefits of walking with the speed of public transport. The company has drawn up plans to replace the Circle Line, a 27-kilometer loop of the London Underground that is more than 150 years old, with a moving walkway. The new people-mover would boost walking speeds, like current mechanisms in airports, but would be considerably faster: with a top speed of twenty four kilometers per hour. This speed, along with the addition of the average walking speed of five kilometers per hour, will make this moving walkway a faster way to commute in London than their subway system—after accounting for the additional time the subway takes to stop at stations.

As new cities appear, they are likely to have such innovations built in. Eventually, they may even match our utopian sci-fi fantasies. For now, though, interventions are likely to be subtle. While not always seeming revolutionary, they require revolutionary thought; this will be essential in maintaining the urban lifestyles we have become so used to.

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| **Unit 12 Lesson 2** | **URBAN PLANNING** |

**The Need for Green Spaces**

The University of Guelph-Humber in Toronto, Canada, is gaining recognition in the world of academia because of its indoor “living wall.” Students, employees, and visitors to the campus praise the four-story plant construction made up of more than one hundred different plant species for its visual appeal and ingenuity. The university’s decision to build the living wall coincided with studies that show the positive impact green spaces have on learning and working environments. For example, scientific data indicates that plants enhance student and employee satisfaction, which results in decreased absenteeism and increased productivity.

The positive impact of greenery on school environments is only one aspect of the green revolution that has been taking place over the past few decades. Increasingly, green spaces are changing the character of cities and enriching people’s lives in various ways. The challenge now is to persuade all city planners to offset the concrete coldness of many downtown neighborhoods with areas of greenery, such as parks, gardens, and arboretums.

Unfortunately, the sections of cities with the greatest need for greenery are also the places where it is most difficult to implement it. Thus, city planners must be creative and inventive when incorporating greenery into existing infrastructures.

Green roofs are an innovation that is becoming more commonplace in major cities. A famous green roof in the US is found on top of the Chicago City Hall building, covering an area of 20,300 square feet with native plants from the Midwest region. There is also the International Hall in Fukuoka, Japan. This government building is made up of fifteen terraces with 50,000 plants representing 120 different species.

Another example is an award-winning design in Bratislava, Slovakia, called the Parkhill. Architects were tasked to meet the city’s need for more housing and public spaces without taking away the urban forest surrounding the city center. Their solution made use of green roofs similar to those in Chicago and Fukuoka and included courtyards and vertical gardens, along with 350 apartments, dozens of offices, and a hotel—all built on a hillside.

Green spaces do more than just create better conditions for learning and working; they also offer many advantages for cities and the environment. Certain plants act as natural filters by removing chemicals and toxins from the air, and they help decrease indoor temperatures by providing shade, saving on energy costs. Additionally, vegetation absorbs water and prevents sewer systems from overflowing in cities that receive heavy rainfall. And because leaves can trap sound, plants can act as a noise reducer, so having green spaces in densely populated areas helps muffle street noise.

Experts have even found a connection between the amount of greenery in the environment and crime rates. Green spaces, it seems, decrease stress, anxiety, and aggression in people, which in turn leads to a reduction in the occurrence of violence. Indeed, a study of apartments conducted by the city of Chicago found that greenery can lessen crime by as much as fifty percent, including littering, vandalism, and other acts of criminal misconduct. Part of the reason for this reduction is that residents have more appreciation for the area they live in.

Besides reducing crime, green spaces can actually support the local economy. Research from the University of Washington indicates that shopping districts with trees and gardens appeal more to customers. In particular, surveys determined that customers spent nine to twelve percent more time in shopping districts with greenery than in those without. Psychologically, landscaping makes people think that the quality of goods and services is higher because it creates the impression that extra attention is being given to the shopping environment.

As the human population grows, cities expand—and it’s become increasingly clear that green spaces are an essential element of a livable and attractive urban environment. City planners should find innovative ways of building green spaces into urban designs because the benefits to our society are too great to ignore. With such impressive green spaces serving as models, it will be interesting to see how people will use nature to transform cities in the future.