Vector

HISTORY OF THE INTERNET

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Letter From the Editors

The 90s brought with it two things that are relevant to this issue of Vector - the rise of widespread internet usage in the average american household, and us. Our generation has grown up alongside rapid technological changes, and despite this, some things are still the same. We still date, engage in politics, and strive to keep fit, but the platforms we use to do so have changed. Gone are the days when our friends and family would set us up on blind dates; instead, we meet strangers on dating apps like Tinder and Bumble. The articles in this issue cover the ways technology is changing the way we live, and they explore how we are redefining what it means to engage with each other in the modern day.

Also in this issue: our #ootd fashion spread featuring fellow students, a review of Pixar's most recent films, and our new logo! Go ahead, turn to the cover and take a look.

On behalf of our staff and our directors, thank you for picking up our magazine - we hope you enjoy it.

Caroline & Brendan

the digital

a tribute to

As time progresses the internet becomes something we increasingly take for granted. Frequently the internet is thought of as a magical and resourceful tool, but that idea far understates its true value. The internet has become a way of life. The internet has revolutionized the way we consume information, but it has also revolutionized the way we interact with people. It allows us to connect with people regardless of time and place, and a neglected successes of the internet are its virtual communities.

Forums and chat rooms have been with the internet for ages, and some of them have existed from before most of us were even born. What makes them differ from their social media counterparts is their sincerity and nearly insane obsessions. Most people have probably heard of the larger forum platforms like; 4chan, Facebook groups, Reddit, 8chan, 9GAG, and the list goes on, but most people only see a fraction of what occurs on these websites. There exists a forum for practically anything. If you like Legos, you've got brickset.com. If you like anime, you've got myanimelist.com. If you intensely like to chew on ice and really want to talk about it, there is icechewing.com. These communities can become incredibly specific because of the internet's ability to connect countless people over immeasurable distances. The internet is a blessing to the inner freaks within all of us. We all have these strange obsessions or fears that define us, but sometimes it is impossible to talk about them within our real world community, but on the internet distances and identity are irrelevant. You can be Thomas Smith in real life, but on the internet you can become xXPokeGODXx, and you can spend hours arguing what the best starter pokemons are without suffering scrutiny (by the way it's mudkip). These forums are safe havens that are cherished by people all over the world, yet borders, ethnicity, gender, politics, and cultures are all either irrelevant or cherished for a further sense of community. The anonymity of the internet has allowed for our personal identities to rise past our physical bodies and manifest themselves as the profiles we create online. These profiles are a reflection of our identities, but they also can have positive and negative impacts in our real lives.

Websites like 4chan are infamous for their power over the real

Windows 95 error

the internet has broken :/

ok   i miss you   'aesthetic' is the
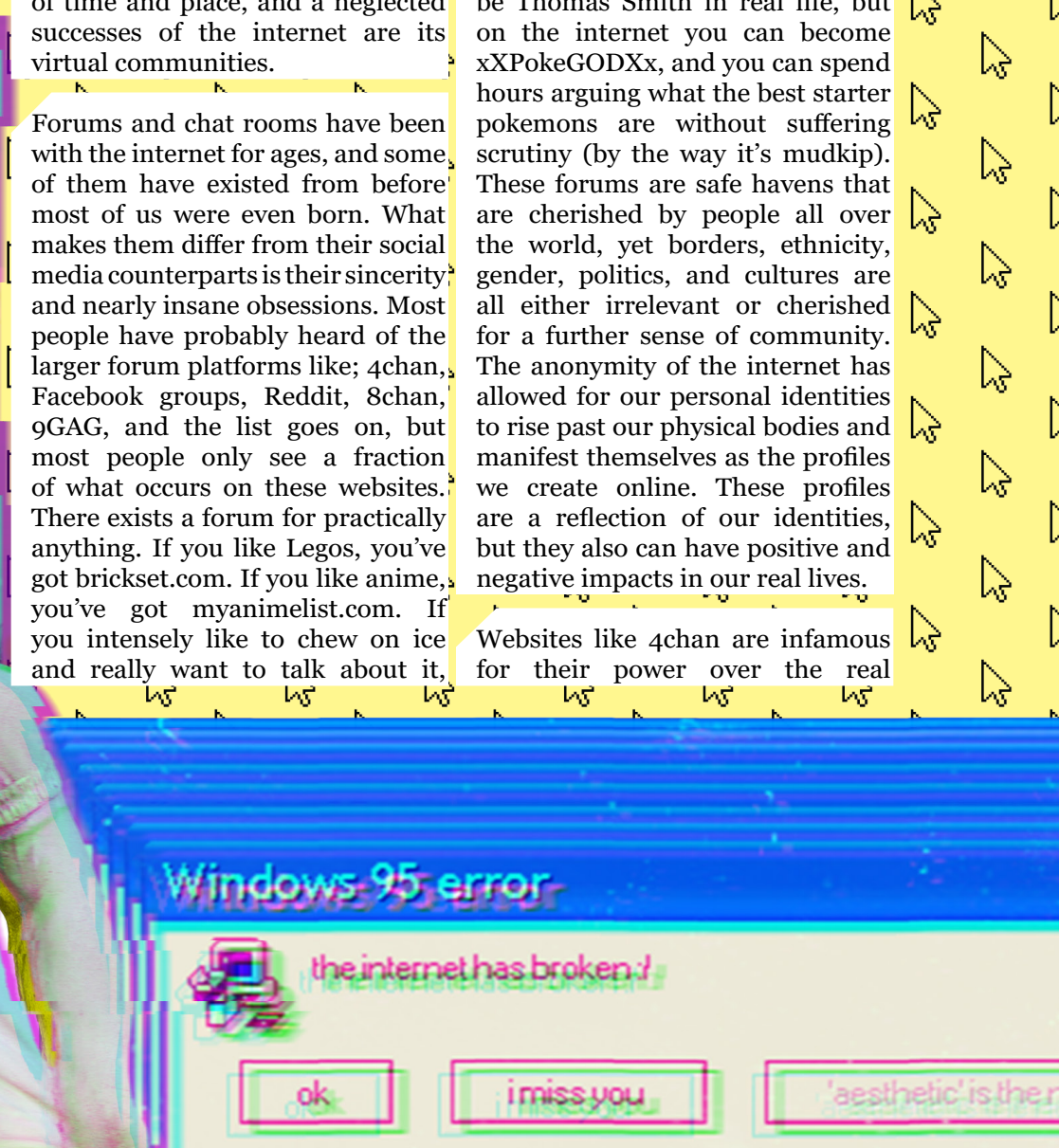
dreamland

virtual communities

world. Their impacts range from swatting people (calling the police on strangers addresses online) to creating and spreading the increasingly politically incorrect meme of Pepe. In many cases these impacts can be attributed to online humor, but on occasion these online communities can have malicious intent. Recently one internet community made headlines for a tragic reason. A member of Involuntarily Celibate (often referred to as Incel) committed a terrorist act and killed 6 people while injuring many more. This community, born from platforms like 4chan and Reddit, embodies the potentially dark side of the anonymous internet. It is an ugly reality when angry sexually frustrated people can come together to self inflate their rage without fear of social persecution, but this is an intrinsic cost of the internet's freedom.

Even though there is plenty of room for the internet to be used to propagate hatred, there are plenty of case where its sense of community can be used for social good. For example, A study published by BMC Psychiatry, conducted a survey across multiple depressive internet communities

across Europe to study the possible benefits and effects of participation in such communities. It showed that 36% of users who sought out medical attention did so because of the support found in their internet community. This shows the camaraderie and support that can be found on these forums and countless others as well.

The support and community created by these forums allow all of us to pursue sides of ourselves we may never have been willing to if we believed we were all alone. It is like the character Paprika says in the japanese film of the same name, "Don't you think dreams and The Internet are similar? They are both areas where the repressed conscious mind vents". Much like dreams, the internet travels through the weirdest aspects and obsessions of the worlds inner consciousness, but unlike a dream, it is experienced as a community. This makes the internet emblematic of something larger than any one individual, it is a thriving reminder that in our insanity, we are never alone, no matter what barriers stand in your way.

written by:

maurizio marcotulli

photos by:

ritu shirali

layout by:

vinay soni

is the new 'aesthetic'

the earliest online communities.

Written by: Nick Blackley
Layout & Illustrations by: Carlos Villapudua

Today, we take social media for granted. We assume that everyone has a social media account, and that everybody participates in the online community. But this wasn't always the case. Social media developed over time and has a long lineage. Before even MySpace was founded in 2003, one of the earliest modern social medias, online communities existed and thrived. As early as the 1980s, people were using the internet to chat with netizens around the globe on websites similar to the modern day forum. These sites are known as Bulletin Board Systems or BBSes, and they are the great-grandfathers of Facebook, Twitter, and social media as we know it.

70s   80s   90s
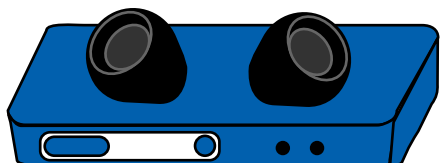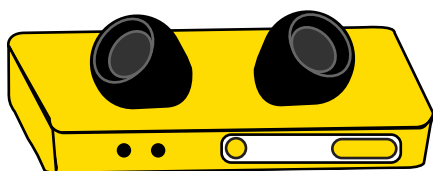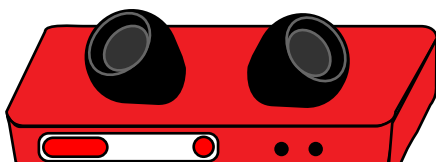
The Bulletin Board System had humble beginnings. In 1978, Ward Christensen and Randy Suess of the Chicago Area Computer Hobbyist were snowed in during a blizzard. As the snow fell outside, they developed 'Ward and Randy's Computerized Bulletin Board System,' the first 'BBS.' The system was in essence a very basic forum website. A user would call the modem attached to a computer server owned by Ward and Randy, and post messages on a communal forum. You had to navigate through hotkeys only, and the backend system was so primitive that each user could only connect one at a time, and the system rebooted after each user disconnected just in case it crashed or ran into bugs during the session. But it was easy to use, so the barrier to entry was low for a computer hobbyist. The system also inspired other hobbyists across America to create their own BBSes and the ecosystem evolved quickly.

Several years after the first Bulletin Board System in Chicago, other communities started to build boards of their own. At this point, most of these young virtual communities were formed by people who knew each other in real life, and were often in the same local community to begin with. A big reason for this was economic, as connecting to a BBS out of town could rack up a nasty phone bill. If you wanted to connect to the BBS, you had to give it a call which meant that the farther away the server was, and the longer you stayed connected, the more the telephone company would bill you. The fundamental idea of a virtual community where you didn't know the face of the person you were talking to was completely new as well. So the BBS communities embraced their local nature, and the admins of these sites encouraged frequent in-person meetups. This would remain the case throughout the rest of the 80s, but a major breakthrough in Bulletin Board technology in 1984 started to change that. FidoNet, created by Tom Jennings, automated many of the systems inherent to the BBS. Several servers and modem connections were supported, and geographically distributed systems could call each other automatically and exchange data. As a cost-cutting innovation, these automated calls would happen in the middle of the night when call rates were lowest. FidoNet and other similar systems allowed distributed networks of BBS sites to develop across the country, and opened the floodgates for widespread BBS development.

The early 90s saw a diversification in the subjects that people discussed on Bulletin Board Systems. While the BBS phenomenon started for computer hobbyists to discuss hardware and software, special-interest BBSes developed to cover a huge variety of topics. There were BBSes for law enforcement officers, for LGBT communities, for your favorite band, for sex, for different religions, for politics. If you can think of a topic, there was a BBS for it. The falling prices for computers also made the net more accessible than ever. In 1993, Boardwatch magazine, a magazine that emerged specifically to cover BBS websites, estimated that there were over 60,000 BBSes in the US alone. Each board had its own community of users that could be anywhere from a tightly knit group of a dozen to huge communities of several thousands. The technical scope of a BBS also grew from just posting messages on a forum to including things like email and live, multi-user chat rooms. But as the boards grew more distributed, they lost some of the personal feeling of the old boards in the 80s. Gone were the days where you the person you were talking to could be driving next to you on your morning commute or wait your table at the local restaurant. But replacing it was a way for people around the globe to communicate with each other faster and in a greater capacity than was ever possible before. But, as many well loved things do, the BBS communities died off with the advent of the subscription internet as we know it today.

the end.

The peak of the BBS community came in 1995, when The Atlantic reports there were over 35,000 nodes on FidoNet. But since BBSes were built on an ad-hoc, peer-to-peer relationship, the development of subscription online internet services like Usenet or the World Wide Web killed off Bulletin Board Systems quickly. Subscription internet meant that you didn't have to call into the BBS and you could also maintain multiple connections at once. It was a case where the internet had such a large technological lead over the network of BBSes that they evaporated. Many tried to evolve into Internet Service Providers or ISPs, while many others simply closed their doors. Today, those who do remember the days of calling into their favorite board remember it with a fond nostalgia. They remember genuinely caring about the person on their computer screen. They remember emotional attachments to the "virtual village" and being able to do nearly anything you could do in real life without the attachment of your physical body. People used the boards to do many of things we are familiar with today: political activism, finding a date, running meetings and more. The legacy of the Bulletin Board is that it introduced society to the idea of a community with no faces, where you are known only by an alias. It demonstrated the incredible power of a virtual community where ordinary people had access to vast resources for almost no cost. Even though there are still nearly no active BBSes in existence, their DNA is present our daily lives. People find dates on Tinder, organize political rallies on Facebook, and theorize about last night's episode on Reddit. The life blood of the old board still thrives and has revolutionized the world under many different new names.
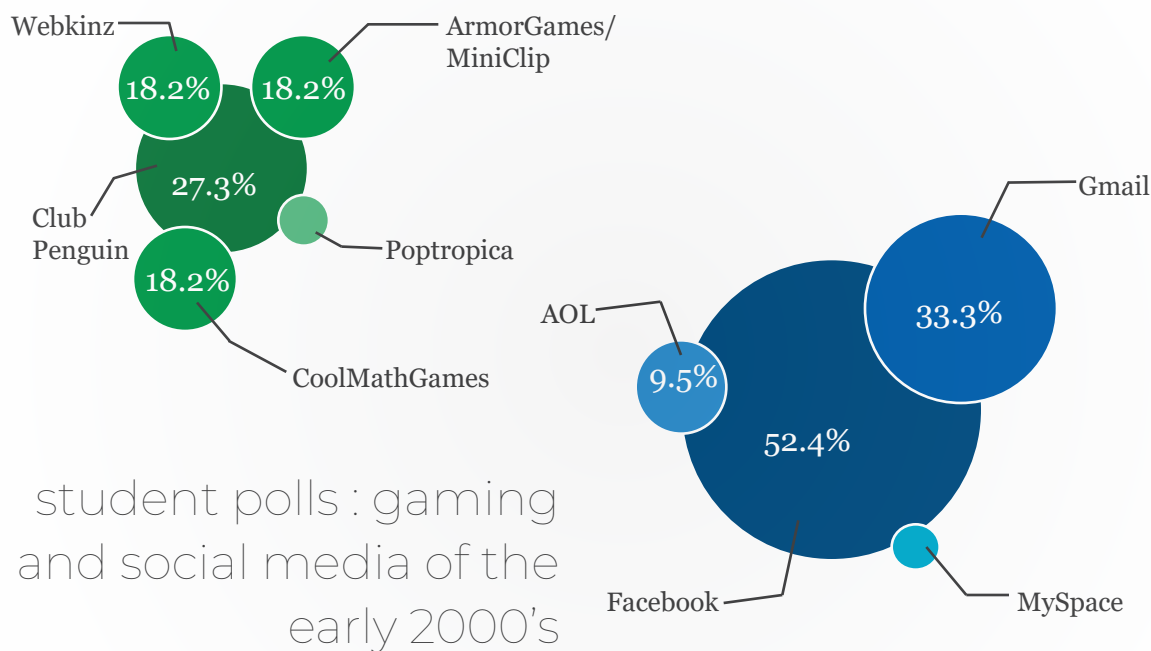
the WELL.

The best known BBS back then was the WELL. The Whole Earth 'Lectronic Link was started in 1985 by the owners of the Whole Earth brand Stewart Brand and Larry Brilliant as just a bulletin board. The paid-to-access service was like many other BBSes at the time. It included chat rooms, email, and what they call 'conferences' to discuss any topic you wanted. Some ideas fundamental to the modern internet likely developed there too as Steve Case, founder of AOL, and Craig Newmark of Craigslist fame both browsed the WELL. The online communities also often coalesced into physical meetups known as 'flashmeets.' The following around the WELL was so furvent that it still exists today, and you can buy a membership to the community for $15 a month.

nostalgic thoughts: what did the internet mean to you before 2010?

writing & layout by: Neha Krishna | photography by: Megan Reynolds

student polls : gaming and social media of the early 2000's

Webkinz — 18.2%

ArmorGames/ MiniClip — 18.2%

Club Penguin — 27.3%

Poptropica

CoolMathGames — 18.2%

Gmail — 33.3%

AOL — 9.5%

Facebook — 52.4%

MySpace

Dr. Thomas A. Edison (ChE)

My whole university had 2-3 computers, and a different school had a mainframe, where 50 students could use one computer at a time by connecting different terminals. The first time I used the internet was in 1994 or 1995. Only universities used to have it and I was a graduate student at that time. Initially, I didn't use it for much. You could see maybe 20 webpages and that was it. It was fascinating and slowly in a year, it just exploded. But the main problem was having connection. At home you had to dial in, and it was very slow and you could only see a few files. But in that sense, the internet has come a long way.

Dr. Matthew J. Hall (ME)

I remember the first time I saw the internet. [My colleague] was running a browser called Mosaic – maybe 1993? He was accessing information off of it...some obscure texts someone has posted at universities about different topics. I mean, I realized that this was going to change everything, that you could access anything from anywhere and anything. Anyone could post and you could search for it. When email came out in 1990, it made communication with people so much easier than notes or phone messages, but now the problem is that you're connected all the time, because you never really "leave" work. But the fact is that it's much easier to convey information now.
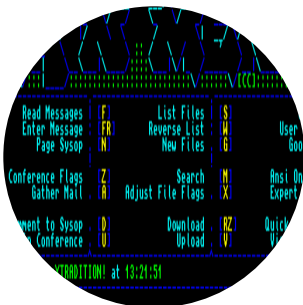
the evolution of social media

writing & layout by:
rosemarie pousset

1+ million subreddits (2018)

peak 75.9m monthly users (2008)

15+ million job listings (2018)

2005

Reddit is founded. Classified as a "social news and media aggregation", Reddit allows users to post content, comment, and up- or down-vote.

2003

MySpace is released. Attracting young users with a "hip" design, MySpace was once the favorite. Some musical artists today still use the site.

2002

LinkedIn is founded. The site was later launched in 2003, including features like the ability to upload a resume. It took a more professional approach to networking, and still maintains its original purpose.

1993

AOL launches email and Internet access. At first created as a BBS for owners of Commodore 64 computers, AOL became the largest Internet provider in the US by 2000.

1997

SixDegrees is released. One of the first sites to allow users to create profiles, "friend" other users, and find school affiliations all in one place, SixDegrees is widely considered the first social network by modern definitions, although it later failed.

1978

The first Bulletin Board System (BBS) goes online. BBS software allowed users to post short messages online, and later join chatrooms and play games, via dial-up modems. Although the market crashed in the mid-90s, BBSing is still around for hobbyists and nostalgists.

1995

Classmates.com is launched, first as a way to reconnect with other users from high school via lists. Members could later create profiles and upload yearbook pages.

3.5 billion snaps sent per day (2017)
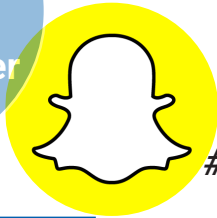
2011

Snapchat is released. Based on the idea of disappearing pictures, Snapchat is meant to address the fear of permanent online content.

2013

#BlackLives Matter first appears on

Twitter after the death of Trayvon Martin. Usage of this hashtag has tended to spike after similar events, and other activism hashtags like #MeToo have also appeared.

1.1+ million times in one day record high (2016)

2010

Instagram is released, marking a distinct shift toward more visual social media.

2013

Vine is launched. Faced with backlash when they shut down in 2016, Twitter (who owns Vine) launched an internet archive of previously filmed Vines in 2017.

326+ million monthly users (2018)

2006

Twitter is released. Initially founded on the idea of an SMS-based social media service, Twitter gained popularity after SXSW 2007 and has grown rapidly since then.

2012

Facebook buys Instagram. Had Instagram remained an independent company, it's estimated to be worth $100 billion today.

$1 billion

2011

Merriam Webster adds "social media" to the dictionary, in addition to a new definition of "tweet". According to their dictionary, the first known use of "social media" as it is defined was in 2004.

2004

Facebook is released. Originally "The Facebook", a campus-oriented site for Harvard students only, it is now a social media giant, worth over $400 billion.

2.2 billion monthly users (2018)

so•cial me•di•a (*noun*)

forms of electronic communication through which users create online communities to share information, ideas, personal messages, and other content

The Digital DIVIDE

Written by:

Lauren Gaggini

Layout by:

Kat Walters

Photography by:

Samir Riad & Ritu Shirali

Imagine doing your homework without the internet. No Chegg, no Course hero, not even Wikipedia or Google. Suddenly the perfunctory task of looking up an explanatory YouTube video or some known, tabulated constant becomes an almost impossible search through books and encyclopedias. This may seem unrealistic or overdramatic, but there are many students in the U.S., and even in Austin, who face these challenges.

Inequalities in internet usage start to show themselves early in a person's life. Nowadays, most secondary school teachers incorporate online homework submissions and social media into their course material. This means that students who don't have access to the internet at home will be at a disadvantage from a young age. Also, it could be argued that the continuous use of the internet as a teenager is part of what cultivates skills and interests in tech fields such as computer science and electrical engineering. Students who cannot access the internet will not gain valuable experience that can influence them later on in college and job seeking.
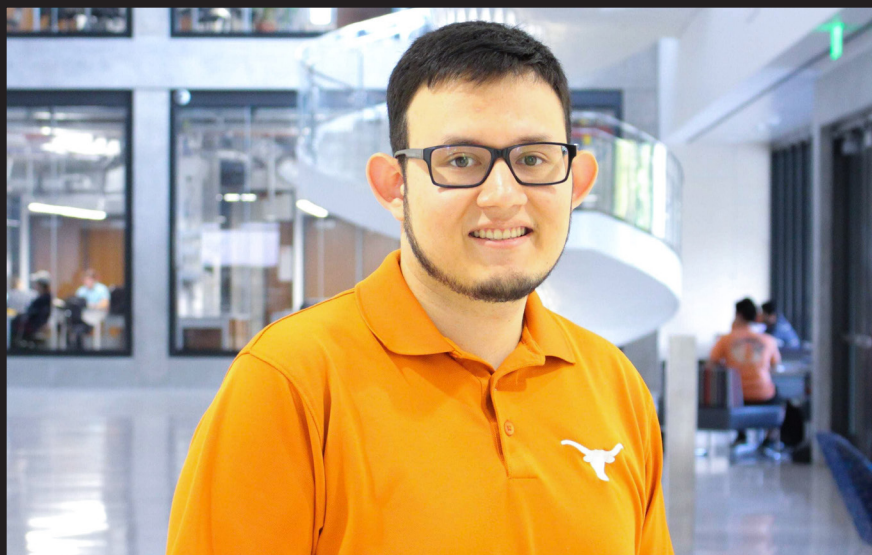
UT Austin itself did not provide unlimited free internet access to students a year ago. Students would have to pay to get more data, and if they ran out they would face inoperably slow speeds that made homework, streaming, and social media impossible. This summer saw a change in policy. UT Austin decided to completely remove the cost of the internet to students. Santiago Moreno, a sophomore at UT Austin and the student responsible for submitting the petition that got the ball rolling on this change said "As a freshman, I would always run out of data. This was frustrating because having data to use the internet is a necessity in college". He and countless other students at UT have had the experience of working on an assignment when all of a sudden the internet speed drops off to a snail pace. This is undoubtedly an obstacle when the assignment is due at midnight, and to students with limited financial resources, paying extra for more internet might not be an option. According to Moreno, his petition got over 700 signatures. UT Austin's decision to change policies in internet access shows the schools desire, similar with the city of Austin at large, to eliminate any disadvantages that might occur to students who don't have the same privileges as others.

Access isn't the only issue that arises with internet inequality. Students' ability to use the internet and various computer tools in a savvy manner is a huge decider in academic success, particularly in college. Many students are expected to have certain computer skills before even coming to college, despite these skills not being required curriculum at school or part of standardized testing. Laila Kamel, a student at UT Austin, said: "In my department, personal computers are a requirement." Additionally, she mentioned that a significant portion of a class she took freshman year, including tests, required the use of a laptop. Having experience with computer software such as Microsoft Excel, and having a high-end laptop that can handle heavy-duty software, is an undeniable advantage in these cases. Additionally, having experience with internet skills such as searching the web for the information you need, or sending an email to a professor when you have important questions, are more subtle but nonetheless important skills to have in college.

The internet is a bottomless pit of information and eccentricities. It has altered the lives of billions and created opportunities to learn faster, connect to others, and gain important skills for the professional world. The internet, despite its advantages, has also created stark disadvantages for anyone who doesn't have the access or skills to use it. Despite this, if people come together and provide resources for students to overcome these obstacles, then maybe one day every person, regardless of their socioeconomic situation, will have a better shot at achieving their dreams.

THE DEEP WEB

the deep web

search results. Deep web pages are hard or impossible for "crawlers"—automated site-finding scripts used by search engines— to find. This isn't because these web pages and addresses are nefarious— in fact, the vast majority of these deep web locations are innocuous services that many of us use everyday. Any page hidden behind a login, captcha, or paywall is part of the deep web. Pages within databases, such as academic journals, are also often hard for web crawlers to find.

A small subset of the deep web includes web addresses that are intentionally not accessible via traditional web browsers. These hidden sites are the "dark web", and require special software to initiate connections to the servers on which they are hosted. One well-known software program used for this purpose is Tor, short for "The Onion Router." Tor is an Internet protocol that obscures a user's identity when browsing, and allows access to sites using an ".onion" domain name.

There are two main steps to ensuring Internet anonymity. First, the content of a message (called a "packet" in networking lingo) must be obscured. This is achieved via normal encryption, such as Secure Socket Layer (SSL). This is akin to sealing a letter in an envelope that can only be opened by the recipient.

Next, data about the origin and destination of a packet has to be hidden. This is what Tor is used for—while normal web browsing using HTTPS will encrypt data, it will not hide your IP address or destination URL.

A 1999 paper from the U.S. Naval Research Laboratory describes how the "onion routing" protocol used by Tor works. When a packet is sent from a user's computer, it is accompanied by multiple layers of encryption, each with a different key. The packet then passes through several servers (or "nodes") located all over the world. Each node removes one layer

You may have heard the terms "deep web" and "dark web" thrown around by the media, describing a part of the Internet full of seedy criminals and hackers who sell Bitcoins and break the law. In reality, while there are certainly less-savory parts of the Internet, the truth behind the deep web (and by association, the dark web) is a little more complicated.

The term "deep web" simply refers to anything not indexed by traditional search engines. In other words, pages in the deep web will not appear in Google

of encryption, revealing the address of the next node in the packet's journey. For extra security, nodes take in multiple packets at once, then randomize the order in which those packets are sent out.

These steps of randomization and encryption make it incredibly difficult to track any one packet's journey through the network of Tor nodes. According to the Tor Project's FAQ, many agencies, notably the NSA (National Security Agency) have tried unsuccessfully to crack the Tor protocol.

Because of the anonymity it provides, the Tor protocol is utilized for a variety of services - both legal and illegal. Data from a 2016 article in the journal Survival shows that slightly over half of hidden sites involve piracy, illicit drugs, financial crime, hacking, and other illegal activities. Among the most notorious of these sites was the Silk Road, a dark web marketplace mostly used for illegal drug sales. In 2013, the FBI shut down the Silk Road and arrested its founder, Ross Ulbricht, on charges of money laundering and drug trafficking.

However, Tor does have many legitimate uses. Onion routing was actually developed by the U.S. Naval Research Laboratory, as a means of securing communications between intelligence operatives. In addition to its use by spies, Tor sees extensive use by whistleblowers, activists, journalists, and others who need to communicate securely or bypass government snooping. According to data from Tor Metrics, the software's second-largest user base (after the U.S.) is citizens in countries where the Internet is censored or monitored - such as China, Russia, or the Middle East.

Because of these use cases, Tor is endorsed by a variety of nonprofit and government agencies as a useful anonymity tool. In fact, the Tor project website lists the U.S. government as a major funding source.

Like any tool, Tor, and the hidden Internet it gives access to, can be used in any number of ways, by any number of people. Some will use it for crime. Some will use it to spread democracy. Most of us will never use it at all, which is probably a good thing. But even though we might never dip below the surface of the great ocean that is our Internet, it's nice to know what's down there in the depths—just in case.

"WHILE THERE ARE CERTAINLY LESS-SAVORY PARTS OF THE INTERNET, THE TRUTH BEHIND THE DEEP WEB IS A LITTLE MORE COMPLICATED"

WRITTEN BY: JAMES SCALES
LAYOUT BY: EMMA GORDON
PHOTOGRAPHY BY: RILEY SANDERS

The FUTURE of FITNESS

For the most part, the internet has made us more sedentary. It's 2018, and we can watch Netflix on our laptops, communicate with our friends, and even go grocery shopping all without leaving our couches. Many would argue that the internet is detrimental to human health because it makes it easy to not be active, but that's not always the case. Strava, a fitness app popular with runners and cyclists, uses social media and big data analytics to digitize the fitness experience and use the internet as a tool for athletes to enhance their training.

Ryan Bjellquist-Ledger, UT Austin alumnus and personal trainer, says he uses Strava to track his fitness and connect with friends across state lines. Bjellquist-Ledger, originally from New Jersey, explained how Strava has reconnected him with his old cross country friends from high school. "Most of my friends who I've connected with on Strava are people I ran with in high school, so I haven't been able to talk to them or see what they've been up to for at least the past five or six years," Bjellquist-Ledger remarked. He went on to point out how the Strava social media feature can be a tool to hold runners accountable by connecting them to other runners who can see logged runs and workouts. "The notion that I can see what my friends are doing makes me feel a little bit less like I'm doing everything alone and more like I'm actually still a part of a team," added Bjellquist-Ledger, who believes the accountability Strava gives him to be

a "game changer" for him.

Even though it has helped him reconnect with old friends and track his fitness, Bjellquist-Ledger acknowledged some drawbacks of Strava's digitized fitness experience. "When people stop listening to their body, that's when things tend to, in my opinion, go a little bit haywire," he explained. "Some of these apps, I've noticed, they'll spew out numbers that are based off of formulas, like, standard formulas, without really taking [other factors] into account." He thinks that these algorithms, which aren't specifically tailored for individual people, may explain why, as found by a study at the University of Pittsburgh, it is unclear if fitness apps even help people stay in shape.

Strava seems to be aware of the limitations and flaws with its data science, and is working to address flaws. Strava's website claims that the "Relative Effort" feature, a purchasable add-on to the app released in April 2018, is an improved, more accurate way to measure the intensity of a workout. "Keep working out with a heart rate monitor and we'll do the rest," reads Strava's description of the Relative Effort feature. The feature uses heart-rate as a metric and runs it through complicated algorithms developed by testing real athletes running and cycling. Then, the app will spit out a "relative effort score," which tells the athlete how objectively hard the workout was.

Bjellquist-Ledger finds the relative effort feature particularly helpful as a gauge to help keep his training consistent. "It sort of calculates that out for the level of stress that I've been putting in for the week. It's based off of wrist-based heart rate, so it's more accurate for my distance runs that are just steady state, than for my high intensity intervals on the track," he pointed out.

Strava's user data has more potential than we may even realize. According to Drew Robb, a data engineer at Strava, the company had 150 TB of stream data as of April 2017. That's a lot of data, all coming from Fitbits and other devices synced to the Strava app. With this data, Strava

data specialists have been able to create features like the "Global Heat Map", a map of physical activity. On the map, places where people exercise the most are lit up orange while the rest on the map remains black.

Besides pet-projects like the Global Heat Map, Strava is harnessing user data to create enjoyable, efficient routes for runners and cyclists alike. By leveraging algorithms that balance shortest possible length with the popularity of certain routes and elevation change, your Strava app can tell you the "best" possible route to take while running or cycling

between two arbitrary points. This process, called "Route Builder" by Strava data engineers, makes it easier for an athlete in an unfamiliar neighborhood or city to find suitable routes to exercise on.

While there are certainly limits to Strava's data analytics capabilities, many athletes like Bjellquist-Ledger use Strava and apps like it to increase accountability and to gauge their training. As our world becomes increasingly digitized, expect to see more and more athletes integrating math, science, and social media with their exercise.
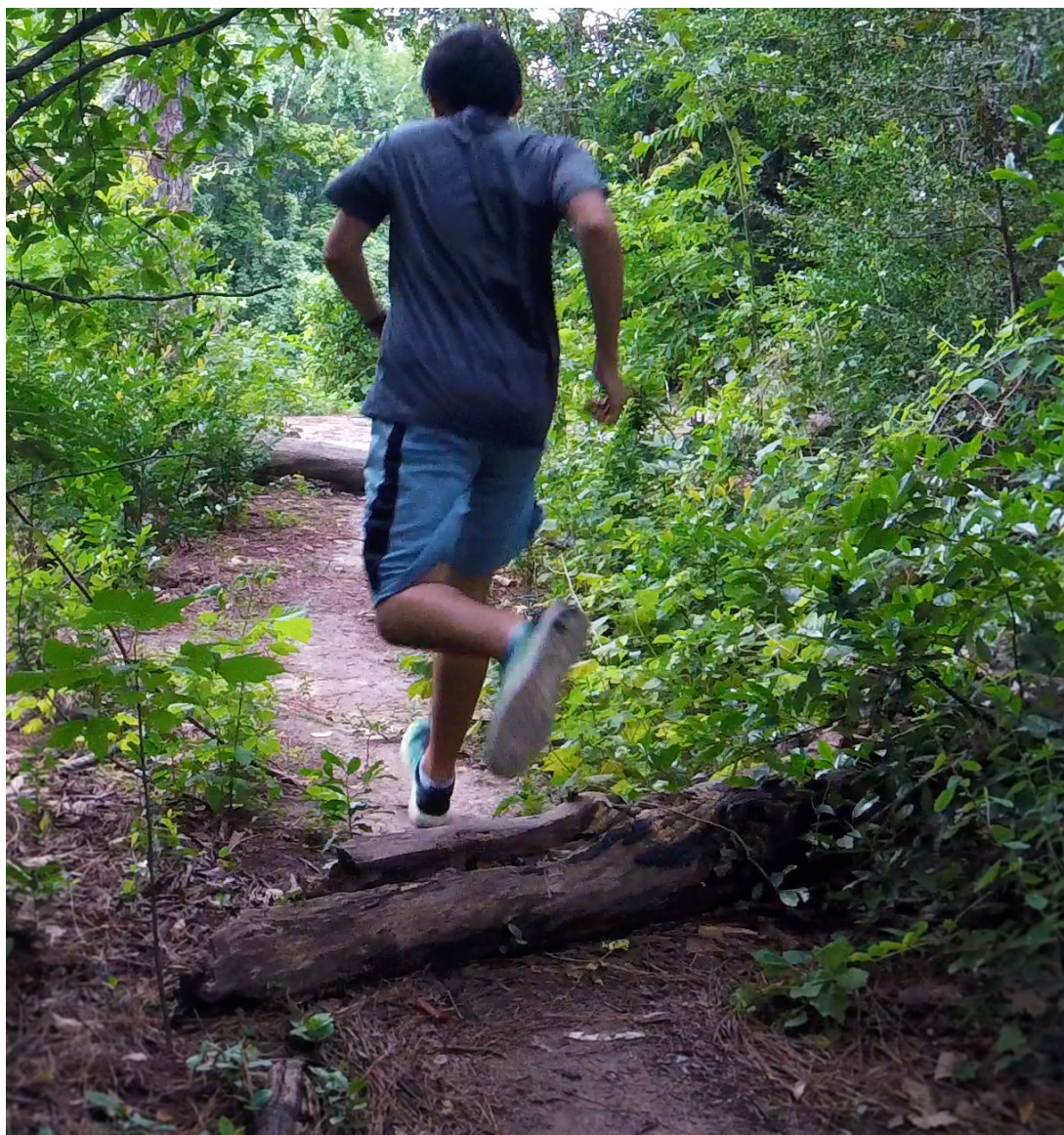
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layout by: Kat Walters
photography by: Hannah Myers & Chris An
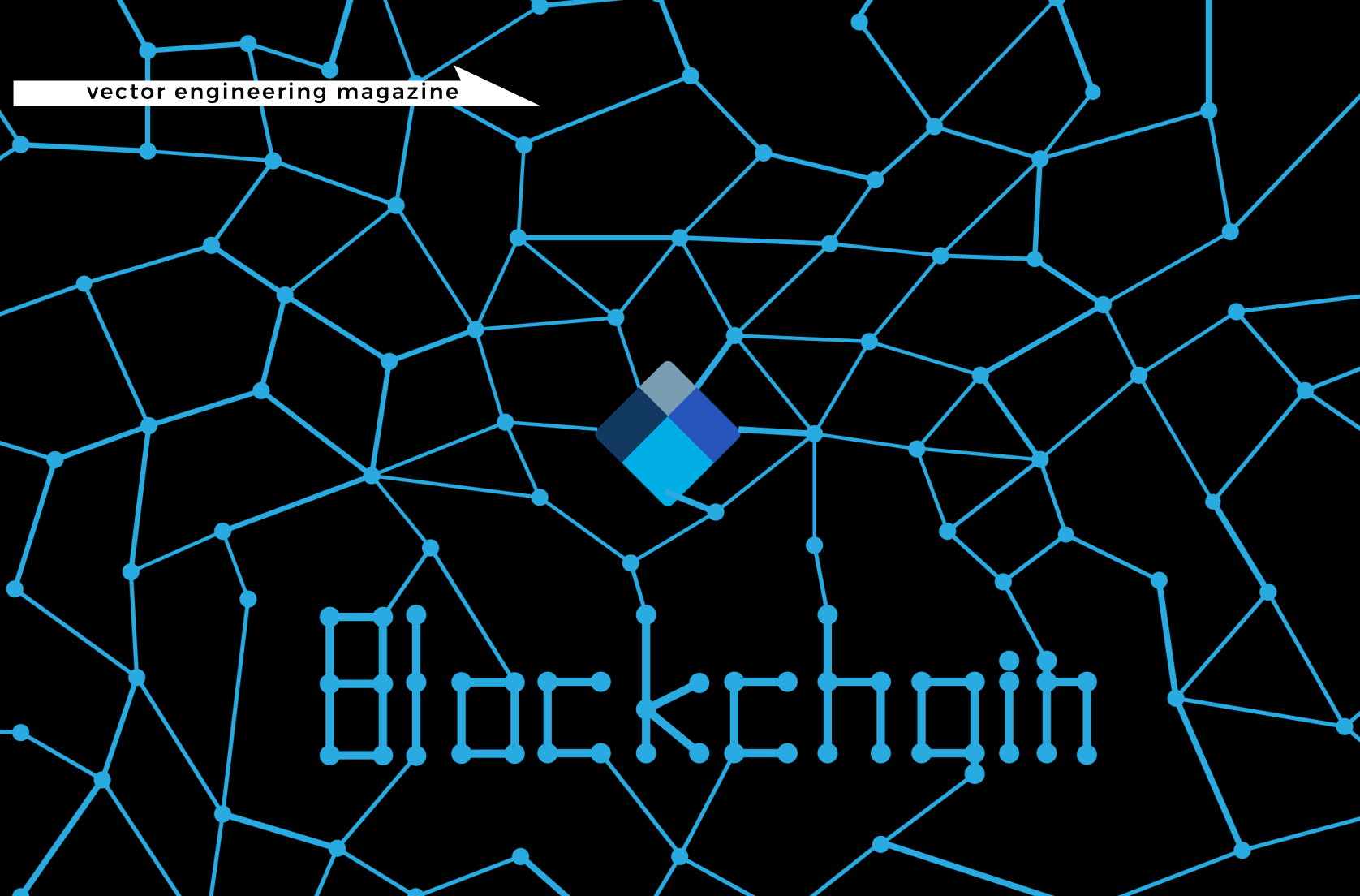
Blockchain

Cheap. Safe. Effective.
What could go wrong?

Blockchain is an invention that has already begun to transform the world; it's a technology that allows for distributed decision making. A growing system of ledgers--called blocks, blockchain, in its nature, is resistant to change. Each block is linked to another through cryptography and contains a mathematical algorithm called a hash, a timestamp, and the transaction data of the block. This interconnected nature of the chain would require a network majority to manipulate recorded date, which provides users with security. Since most of modern society is centralized--such as in democratic governments and resources--decisions are made by or through a system of representatives since an absolute consensus by the population is nearly impossible. However, blockchain is a system based upon decentralized consensus that stands out in a centralized world.

"In blockchain, there's no representative," Dr. Sriram Vishwanath, a professor of electrical and computer engineering, said. "We all can make our own decisions, but we play by a common set of rules. It is a decentralized consensus mechanism, where there are incentives built in to ensure people follow the protocol."

Because the rules in a blockchain system are distributed among the users, the system lacks a central authority to enforce the rules. However, the regulations of the blockchain are simple, strict, and agreed upon by an absolute consensus of all the members of the system.

"It incentivizes people to follow the rules because it benefits [the people] directly," Vishwanath said. "It is very hard to break the rules. If you attempt to do so, you'd require what is called a 51% attack. You'd need so many resources—equivalent to the resources of a small country—to break the rules."

Because of the linked nature of the blocks and the way the system is set up, transactions between parties will be recorded in the chain in a permanent, and verifiable manner. Once a transaction has been recorded, the information cannot be modified without the network majority. This is why blockchain has become the basis for many cryptocurrencies, as it allows for secure, verifiable trade that enforces both parties to follow through with their end of an agreement. The McCombs School of Business has also recognized the possibilities of blockchain technology and has created the Blockchain Initiative to promote further research on the topic.

"UT is in the business of teaching students about different types of technology," Dr. Cesare Fracassi, director of the Blockchain Initiative, said. "We want to teach our

students about the new technology that is developing that are hopefully going to be very important in the future."

Cryptocurrency and blockchain technology crept into prominence shortly after its creation in 2008. Originally created to allow for the transfer of money in an inexpensive, secure, and decentralized fashion, it grew quickly once people recognized its possibilities for anonymous money transfer. As it gained momentum, research for other uses of blockchain technology began.

"That's why we started this initiative to provide support to people to do research, to teach, and to connect with local companies," Fra-

"If you're trading with an unknown party, and if that unknown party ran away with your money, blockchain could enforce that they follow through on their end of the deal or the money would disappear."

-Dr. Sriram Vishwanath

cassi said. "Blockchain technology and cryptocurrency as an application are interesting new technologies that are most likely going to be used in the future in businesses."

Not just limited to large-scale use for corporations, blockchain also has its benefits for personal investments and interactions.

"[Blockchain] is popular in a trustless setting," Vishwanath said. "It is a mechanism that ensures that if you were to not trust somebody, you can still take care of very important tasks such as bank records, health care records, and other legal and financial records. You can share those in a trustless manner, but I know that you won't be able to fake it, because if you try, the system won't allow it to

happen."

Because of the complex technological nature of blockchain, research on the subject requires close collaboration between the departments it encompasses.

"Blockchain is an example of something that is absolutely interdisciplinary," Fracassi said. "That's the reason why, with the initiative that we started, we want to involve every college on campus."

While the project started in the McCombs School of Business, the Blockchain Initiative has spread to include members from the Cockrell School of Engineering to the Dell Medical School. Blockchain's complicated technology and its possible widespread impact has made it a prominent subject in all disciplines. However, despite massive growth and increasing amounts of research, critics and researchers alike have their concerns.

"Some people think that it will end poverty and revolutionize everything in the world, and some other people think that it's a scam and that nothing's going to come out of blockchain technology and cryptocurrency," Fracassi said. "I think that the true answer is that we don't know. It's still a very early-stage technology."

Furthermore, the very aspects of blockchain that make it so powerful also bring about issues. The decentralized nature of blockchain requires immense processing power from the user to store, compute and interact with the network's information. Also, contrary to popular belief, blockchain technology does not ensure absolute anonymity. Through the transfer of information or money in the network, the entire network learns of this transfer, and only the predetermined rules of the system help preserve some degree of assumed, partial anonymity.

Yet, Vishwanath remains hopeful: "Blockchain could lead to a new type of internet. Today's internet is a simple protocol that enables people to collaborate. In a very similar way, blockchain will be a new internet; a trustless internet. So just like you would use Venmo today, or go on the internet to pay your bills, you'll be able to share money, resources, and your time with people, and you'll be able to track what happens, and if they're not following through by contract, you can make whatever you give them disappear. Blockchain will add another layer of trust, so you won't have to trust the other party, but you can trust the protocol."

Writing & Layout by: Alan Jiang
Photography by: Ethan Lim

Blockchain Technology is used in many ways—its current most popular feature is the transfer of money via cryptocurrency such as Bitcoin, Ethereum, Litecoin, and Bitcoin Cash, which this roadside ATM offers. As the technology spreads, more blockchain based services will appear in our everyday lives.

Pictured: James

Pictured: Finlay Scanlan

Pictured: Dolapo Akintunde

#OOTD

Vector took a trip around campus to find some of the best of UT Austin fashion. Take a look at how fellow Longhorns are inspired to look their best every day.

Written by:
Shezaz Hannan
Layout by:
Shalini Das
Photography by:
Hannah Meyers
Allie Runas
Jakin Cordova

Pictured:
Dean Sharon Wood

Pictured: Boyi Li

Siji Deleawe

The internet has changed many facets of our lives, including what we wear. Fashion has changed faster than ever before, and, while there have always been people who are more willing to play around with fashion, social media has allowed each of us the chance to look at trends from around the world and to easily customize our wardrobe. Fashion is no longer determined solely by big name brands showing us what's "trendy"; now, we can go on Instagram and see an outfit we like and make it our own.
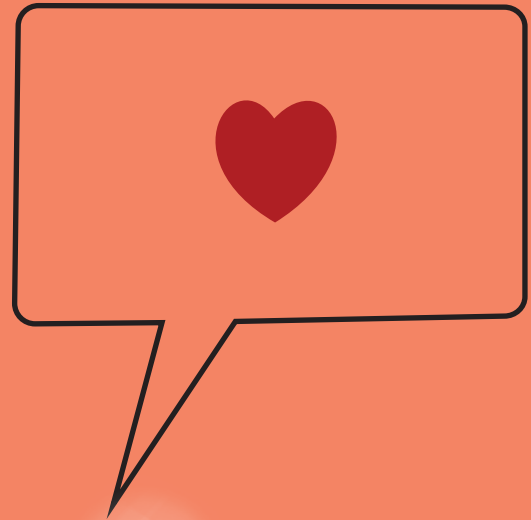
Pictured:
Bianca Ramirez

Pictured: Ara Cadena

Nikki Lopez

modern dating

Written by: Maurizio Marcotulli
Layout & Illustrations by: Nick Blackley

The internet may seem to facilitate casual sex, but this change in culture is actually part of a larger secular trend in society...

relationships in
the internet age

The internet has slid into our relationships as easily as many people slide into the DMs. Without us noticing, the internet has transformed and evolved the ways in which we perceive and pursue our relationships. It has changed the way we communicate ourselves to the world and in our relationships. It has even altered what we expect from relationships to begin with. The internet has changed dating in unique ways only possible due to its infinite nature. It has allowed for distances to be nullified, and it has drastically increased the amount of people we could ever possibly know. Many people fear these drastic changes to the nature of dating because they correlate them to larger trends of casualness in dating.

In society there is a growing moral terror towards the rise of what has been called "hookup culture", and frequently this terror is directed towards the internet and dating apps in particular. They serve as the perfect symbol for what embodies a new fear for our generation. The fear of the "hookup culture" is no longer about the amount of sex that is happening in younger generations, because the current trend, proven by a study done by the CDC, is that the amount of sex occuring in younger generations is only decreasing. The new fear is that the sex that is occuring is now more casual and lacks commitments. The superficial nature of dating apps makes them an easy target for people in fear of hookup culture. The internet may seem to facilitate casual sex, but this change in culture is actually part of a larger secular trend in society. The internet has grown alongside new feminist and modern ideals towards marriages and relationships. People are no longer looking to get married at as young of an age as they used to because of societal reasons, and because the nature of marriage has changed. With the invention of birth control it is easier to avoid pregnancies that would've resulted in marriage in the past. Also women are now becoming increasingly independent in the workplace. Because marriage is no longer always the end goal for our generation, it is easier to pursue relationships without forced expectations. It is easier to look for people to date without the heavy pressures of a relationship. The internet has simply become the perfect tool for the new rise in casual relationships.

Communication has always been key in relationships, but the internet has emphasized the value of language. Language is used for a variety of reasons on the internet and it has even altered the meaning of certain language. For example, the word hookup is incredibly vague, and it may be intentionally. It can possibly mean anything from, meeting up for the first time to having sex on the first date. There is no consensus on its meaning besides the fact that one is open to anything that doesn't entitle commitment. The internet has created this word as a way for people to communicate a certain intent without being overtly sexual. By creating words like "hookup" and ideas like "sliding into the DMs" (essentially flirting with someone over direct message), the internet is clearly becoming an integral part of how we view relationships. This language shows that even outside of a the internet's context, relationships are still viewed in relation to it.

Being able to use language is integral to the internet, and the way it is used to flirt could be considered an

> "The significant changes happening in people's actual sexual behavior is that there is less sexual behavior happening among young people than there was in previous generations"

Dr. James Slotta
UT Austin Liberal Arts

> "[Online flirting] has become a very, very important art form ... it's up to each individual to communicate preliminary interest"

Dr. Elizabeth L. Keating
UT Austin Anthropology

> **"The term hookup highlights a sexual relationship that is not part of a more committed heterosexual or homosexual relationship... it is not part of an ongoing social relationship"**

> **"People's media behaviors are also signals to other people about who that person is, how you use media and what you do with it tells me something about you"**

Dr. James Slotta
UT Austin Liberal Arts

artform. Texting is in many ways different from flirting in person. Unlike real life, one has time to think about what to say and and what the other person might respond, thus adding another level of nuance to texting. Texting isn't the only way of communicating with the internet though. Each form of communication on the internet has a unique significance to it, for example, FaceTiming someone may be taken more seriously than just sending a text. The significance of each method is tied to its weaknesses as a platform for communication. The cost of having time to think over texting is that we lose context clues like body language and intonation. This may lead to misinterpretation of what one is trying to say or depending on the subject it may even come off as disingenuous.

The lack of context in communication also leads to problems with personal boundaries. Since communication has become widespread and instantaneous, people are expected to constantly be available or open to communication. This openness has all sorts of consequences. It has allowed for long distance relationships to possibly preserve themselves better, but it has also led to the reduction of privacy. Because communication has become so easy, by not responding, you are in reality still sending a message. It can be interpreted in many ways, but mainly it shows a lack of effort and interest, or as anthropologist Professor Keating says, "it just the same as greeting somebody, and they don't greet you back, you don't think to yourself that this is the 5% of greetings that are not responded, you think it means something about the relationship". As relationships grow interconnected with the internet, not doing many things may unintentionally send a message.

For example: it's easy to make a lot of assumptions about someone who has no social media accounts. The ways we use, or don't use, the internet tells many things about us. The profiles people see are usually highly curated by the creator to project a certain image of themselves. These images may not be genuine but they send a message to whoever is looking. It is an idealized version of oneself that many people are curious to know. That is why internet stalking is becoming increasingly popularized. It has become normalized for someone to search for a person they are interested in online to see what kind of profiles they have. It is a new step of dating that has been created by the internet. The most interesting part about their idealized profiles is that they are not consistent across different platforms or even accounts. The image of oneself that is put on Facebook is completely different from the one that is put on Bumble. This is because one is intended for showing to family, friends, and colleagues, while the other is meant for people you're romantically, or sexually, interested in. Even the tools provided by the platforms are emblematic of this change in purpose of the profiles. In the case of dating apps, images take up far more space, and the room to describe oneself is far more limited. This is meant to make the experience of the app a lot more like a blind date, but it also increases its apparent casualness.

The internet has become key to the way we present ourselves to people we are interested in through our profiles and the new ways in which we communicate. It has grown alongside the cultural changes in our society, and it has become emblematic of a generation with an evolved view on relationships. Even though it is feared for its connection to hookup culture and it has many issues, it has also allowed people plenty of opportunity to find love in new ways. It is hard to tell whether the internet has changed relationships for better or for worse, all that is clearly evident is that it will have a lasting impact on our experience with relationships.

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PERSONALIZED ADS: RAD OR BAD?

Written By: Rebecca Lin
Layout by: Carlos Villapudua
Photography by: Lane Chen

You're scrolling, scrolling, scrolling... until suddenly on your Insta Feed, you spot that lint roller you were looking at minutes before beginning to study! Distracted as you are, you are severely tempted to take a quick break from not-studying to run an errand that you weren't planning on running. This situation describes the concept of Personalized Advertisements: the same thing that social media, search engines, and your friend's startup website all rely on to generate an income. By analyzing your clicks on websites and search history, they can easily target your necessities, preferences for items, and aesthetic gifts that you might spend your next paycheck on.
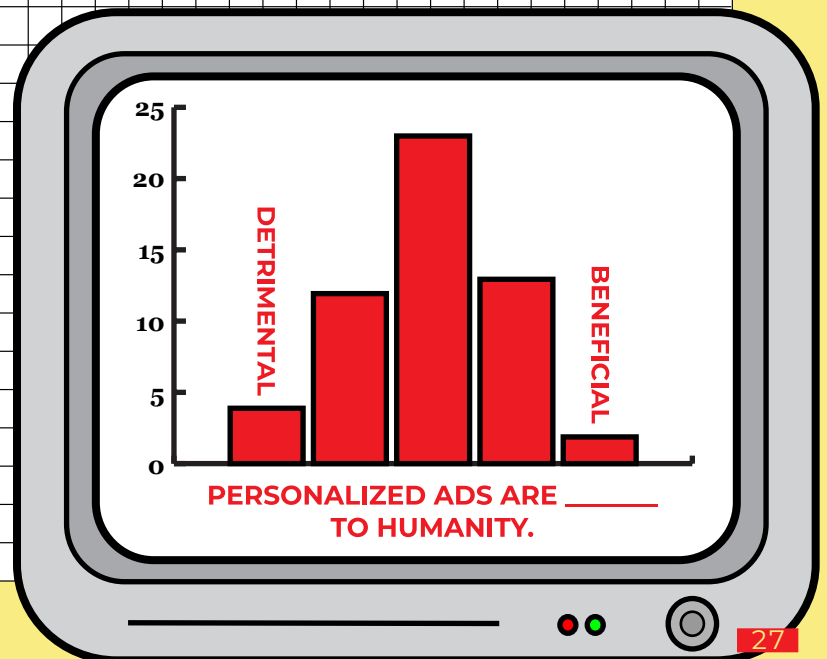
But how ethical is it? How does it work? Finally, does anyone else notice that caffeine pills come up on their feed a bit too often? We asked over 50 members of the UT Austin community about how they felt about personalized advertisements. Our sample was primarily Cockrell Students, given how attuned to technology's positives and negatives they are. With their educated responses towards the ethics and thoughts about personalized advertisements to society, we examine the data behind the effect of personalized advertisements.

Pie chart (top left)

0 TIMES
1-2 TIMES
3-6 TIMES
7-10 TIMES
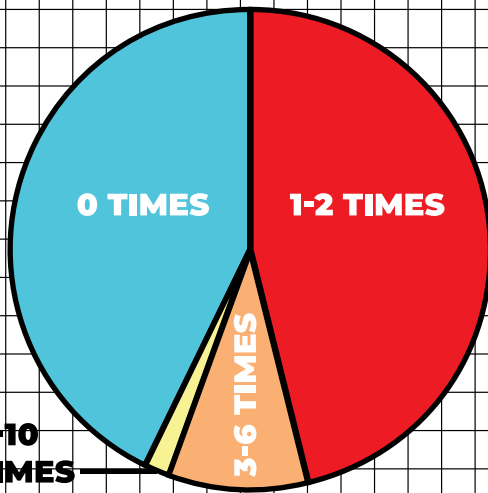
HOW MANY TIMES HAVE PERSONALIZED ADVERTISEMENTS RESULTED IN ONLINE PURCHASES?

HAVE YOU HAD THAT MOMENT WHERE YOU/A FRIEND IS TALKING ABOUT A PRODUCT AND A SECOND LATER IT POPS UP ON YOUR SOCIAL MEDIA FEED?

NO
YES

Bar chart (top right)

NOT ENGAGING
VERY ENGAGING

PERSONALIZED ADS ARE _____ TO ME.

Bar chart (middle right)

STRONGLY DISAGREE
STRONGLY AGREE

I AM WILLING TO SACRIFICE MY ONLINE PRIVACY IF IT MEANS I RECEIVE ADS FOR PRODUCTS THAT INTEREST/CONVENIENCE ME.

Bar chart (bottom right)

DETRIMENTAL
BENEFICIAL

PERSONALIZED ADS ARE _____ TO HUMANITY.
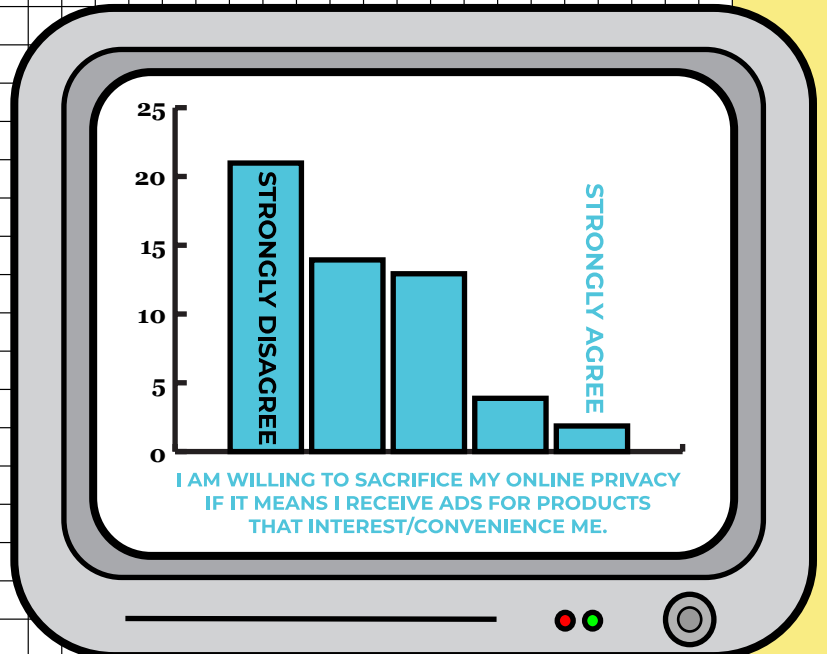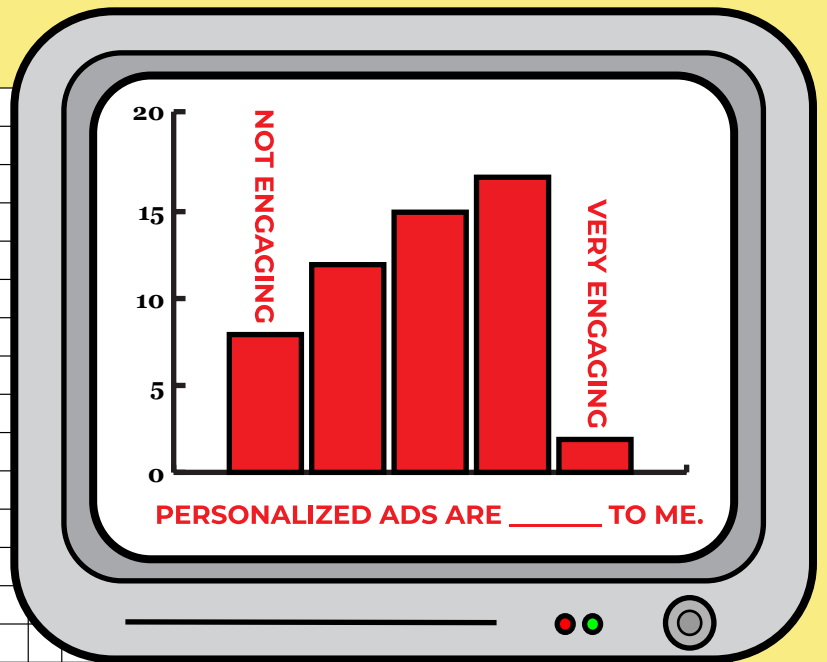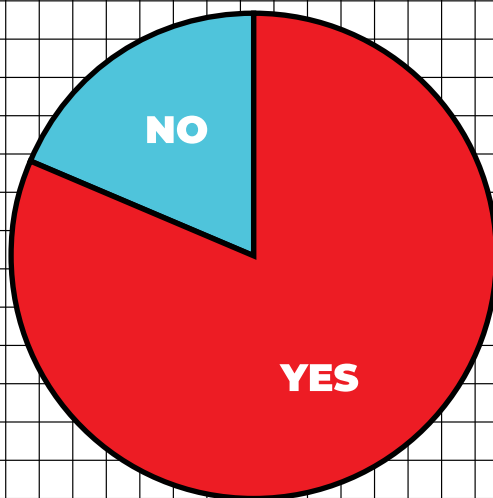
DISNEY AND PIXAR TAKE THE WEB

written by: Shruthi Avantsa | layout by: Jared Cormier
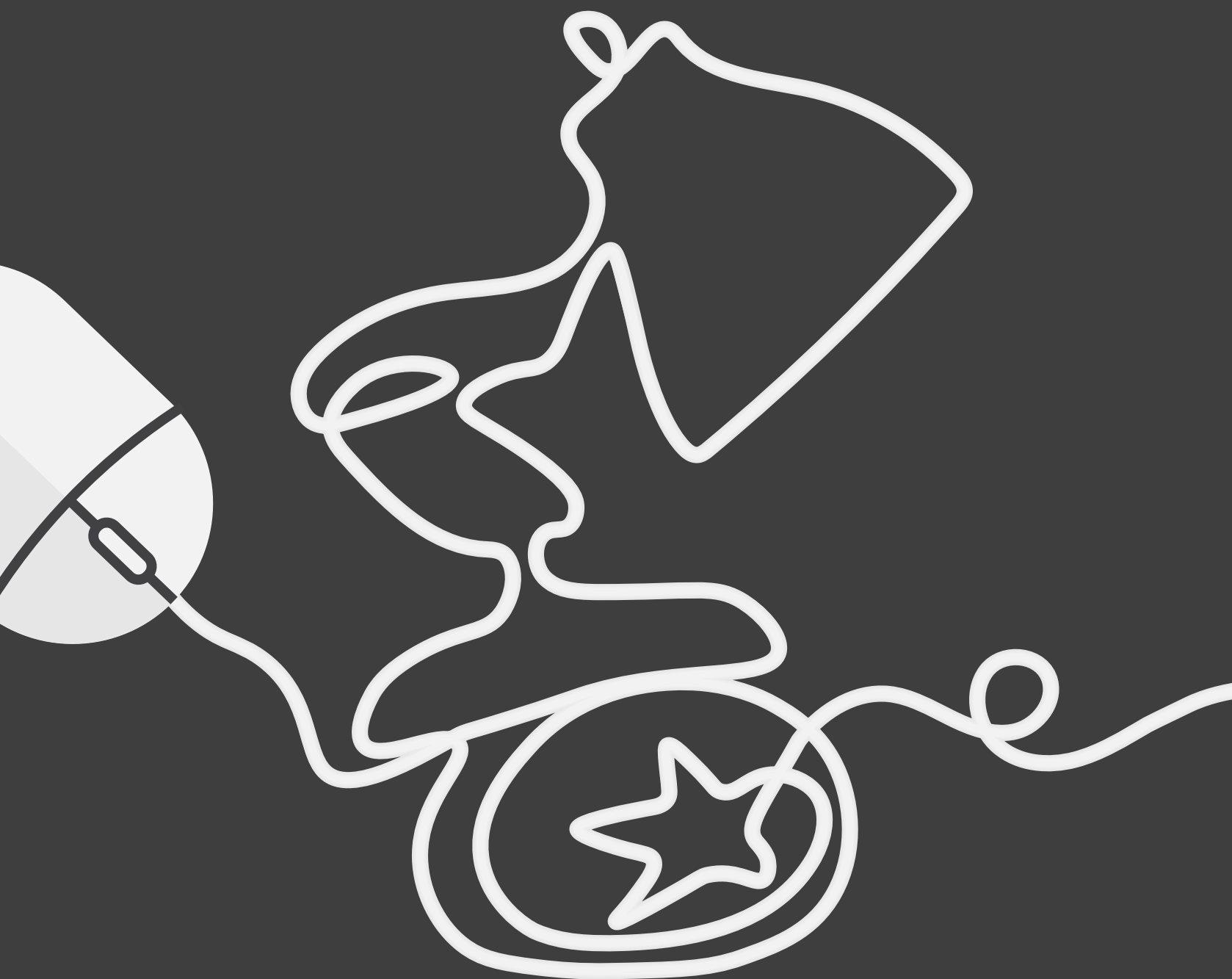
We've all noticed the surprisingly adult commentary that Disney and Pixar manage to sprinkle into their films- Toy Story's innocent innuendo when Bo Peep asks Woody, "Whadda ya say I get someone else to watch the sheep tonight?" or Car's subtle billboard reading "All Convertible Waitresses". Although Disney and Pixar excel at humor and feel-good moments to accommodate all ages, they also used their clever inside jokes to criticize a universal society vice- our addiction to the internet. The following box office toppers are examples of how Disney and Pixar provide valuable insight into our relationship with the internet.

Even in a story set in the 80s, Pixar manages to point out our dependency on technology. We first meet Wreck-It-Ralph in an arcade where the video game heroes and villains come to life. Originally confined to the arcade, Ralph and his friends can only interact with the other characters in games nearby. However six years later, in the much-anticipated sequel, Ralph and Vanellope are transported through what can only be assumed is an ethernet cable to the internet in search of a remedy to their broken arcade game. Even in the short snippets released to the public, it's clear this film over-glorifies the internet. Upon arrival, Vanellope is immediately drunk with lust for the bigger and better virtual reality, Slaughter Race, for its edge and danger compared to her tame arcade game, Sugar Rush. Vanellope's clear out with the old and in with new mentality represents our own tendency to toss aside old technology in favor of the newest advance. The internet is further portrayed as the sole reservoir of answers and solutions. Not only is the internet the only way to salvage Vanellope's racing career,

but the personified search bar, another character who acts as a receptionist, also sheds light on our "millennial" tendency to consult Google for every little inquiry. Ralph isn't given an opportunity to even articulate his thoughts when approaching the overzealous receptionist who anticipates his questions based on the first uttered syllable. Albeit exaggerated, this interaction parodies our inclination to ask the internet rather than exercise rational thought or even open a dialogue with someone else.

Next, Pixar brings us to modern day, where working moms provide for stay-at-home dads and high maintenance children. This relatable setting gives ample opportunity for Incredibles 2 to further criticize our devotion to the internet. The story predicates on an eerily relevant conflict between the Screenslaver, a villain who believes we are all enslaved to mass media and consumption, and a wide eyed idealist who assumes super powers can only help the public. We as an audience are prompted to weigh induced laziness and dependence versus progress and idealism that the internet provides. The concern of relying solely on men and women in capes to protect us as opposed to self-sufficiency is not far off from the question we ask ourselves today- what happens if we become so complacent and literally cannot function without the comfort of our technology?

Such a future is well-described in WALL-E. The story of the not so far-off future stars the last robot on earth who still attempts to clean up our landfill of a planet. Monotonously compacting garbage that humans have abandoned, WALL-E discovers another robot and the community she serves- obese hu-

mans who sit on mechanical chairs all day and idly watch as technology lives life for them. There are a couple of frightening similarities to be noted between our community and those aboard the spaceship. First, humans in WALL-E have no recollection of the history they left behind on earth. A common concern about the "millennial" generation is our lack of general knowledge since accessing information with the press of a button is far more convenient than retaining dates and figures. Why bother learning when everything you need to know is on Wikipedia? Second, our dependence on the internet is not unlike the futuristic human's dependence on robots like Eve. The ship is utter chaos when the robots malfunction, and we all know our reaction when the wifi cannot be accessed. Finally, despite an extended life expectancy, the transformation of the characters' body type hints toward a realistic future. According to public health.org, most of the workforce spends the day sitting at a desk, and as a result, Americans burn 120 to 140 fewer calories a day than they did 50 years ago .This goes to show how new releases of technology probe us towards less activity and greater reliance on a screen until we're simply floating along for the ride.

Feigning innocence through friendly faces like WALL-E, Elastigirl, and Ralph, Disney and Pixar has essentially attacked a core of our being, calling into question our dependence on the internet while suggesting a particularly concerning future. Although sometimes the blue light really is just blue, these motion pictures are worth a thousand words when it comes to society's relationship with the internet and beyond.

Politics in Cyberspace

Written By: Allie Runas | Photography By: Jakin Cordova | Layout By: Shalini Das

If you've ever seen campaign literature, chances are it had the candidate's website on it. But it hasn't always been that way. Print media, TV ads, phone banks, radio, and good old-fashioned door knocking are nothing new to campaign season, but the addition of campaign websites and social media has made candidates and elected officials more accessible to constituents than ever.

Travis County Tax Assessor and Collector, Bruce Elfant, has been in the game for more than 25 years as a civil servant, and running campaigns is nothing new to him. Aside

from the staples of campaign season, Bruce uses his website to expand on his campaign points and Facebook to reach voters. "For 25 years, I held these annual ice cream socials...with the increase of social media, I mailed only to the high dollar sponsors, the rest of it was Facebook, social media, and email," Elfant explains.

For Elfant, the shift, "dramatically reduced the cost of talking to people, and it made talking to people a lot more efficient and effective." Most government websites, be they local or federal, now include emails on top of the already vast amounts of information that previously had to be accessed in person. If you can't find what you're looking for, it's as easy as hitting send to ask your burning questions.

Social media has also become a new tool for serving the public. Elfant, like many elected officials, uses Facebook to share important information and answer questions. He claims, "I get immediate feedback, and immediately I can find out I'm off the mark. I get to recalibrate what I'm doing." Elfant embraced the use of social media after he posted his thoughts on his Congressman in the early days of Facebook. Not only did his friends see his post, but so did his Congressman: "That's when I realized what a powerful tool social media could be."

Politics is moving at the speed of information, and savvy voters are changing how and where they get their information. We have the

> ## "That's when I realized what a powerful tool social media could be."

ability to search for any candidate we're interested in and find volumes of information. For Elfant, being a voter has "dramatically changed. There's just so much more information out there." This way of distributing information immediately and directly to where people are unique to how we use the internet today. Previously, people would only have the opportunity to get this information in the paper, in person, or other printed materials.

Elfant also sees the internet as a tool to help modernize internal government operations. Texas voter registration is still done by manual entry from paper applications, but pushes for online registration means "we won't have incomplete cards, we won't have cards that are unreadable, we won't have cards without signatures, we won't have to run the risk of typing something in wrong," says Elfant. In the digital age, it's hard to imagine a future where we aren't able to fully participate with our government online.

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Layout by: Brendan Towlson & Caroline Kung
Photography by: Dhairya Soni

About Vector

Our Mission

Hello! We are Vector Student Engineering Magazine.

We are a publication devoted to covering topics interesting and relevant to the engineering students at The University of Texas at Austin. Consisting of makers, creatives, innovators, and all-around goofs, Vector serves as a creative outlet and collaborative platform for engineering students to explore writing, photography, and design. We create opportunity for engineering students, provide exposure for cool projects, and inspire our readers to change the world.

Not Pictured but Loved

Ethan Lim
Rebecca Lin
Ritu Shirali
Samir Riad

do
incredible
things.