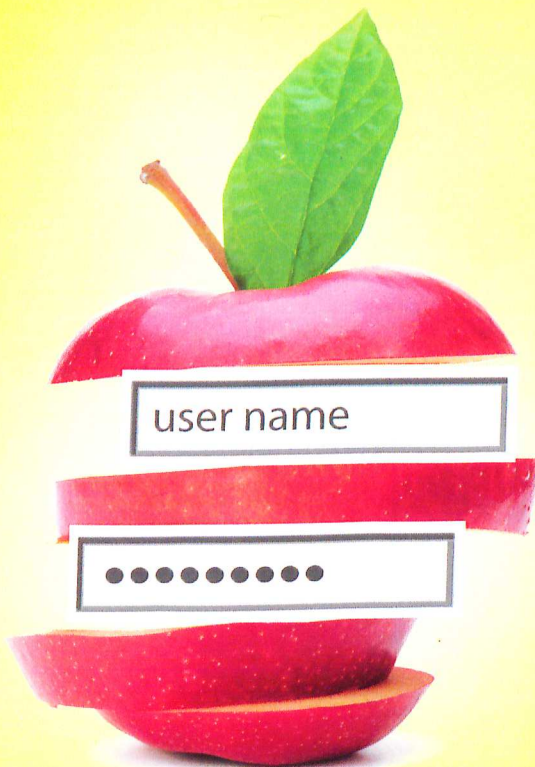


# THE ANTI-EDUCATION ERA



Creating Smarter Students through  
Digital Learning

# JAMES PAUL GEE

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## Imagined Kin

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### IN THE LAST CHAPTER WE DISCUSSED AN IMPOR-

tant pathology of the human mind, the need to tell and believe Pseudo Empirical Stories. Here we will discuss another pathology, the desire to bond with others who we believe are “like us” even to the detriment of other people. Bonding with others is, of course, a good thing. But it has forms that are pathological because they readily lead to greed, corruption, hatred, and disdain for others.

All humans feel a bond with kin. The basis of this feeling is undoubtedly biological. People who are biologically related share genes with each other. However, all societies have gone beyond biology in defining who constitutes kin. Marriage allows non-kin (an “outsider”) to enter a family and become a legal or socially sanctioned kin. Humans often treat close friends as if they were kin. And some ethnic groups and even some countries have tried to tell their members that they are all kin, related in the long-ago past in terms of their origins. This creates wider fields of bonding and mutual help in a group. It allows humans to define insiders (“us”) against outsiders (“them”), something that is helpful in times of war, but not necessarily at other times.

Just as our immune systems can tell “us” (our bodies’ cells) from “not us” (molecular invaders of our bodies), so, too, we humans can and want to tell who is “one of us” or “like us” from those not “one of us,” not “like us.” However, this sense of who is and who is not “us” can be manipulated by social and cultural processes and systems to include or exclude more or fewer people.



It is in this way that “white people” become a group of “people like us” (fictional kin) and “black people” become another such group, even though there is more genetic variation within these groups than there is across them.

The reason, by the way, that groups that might seem biological (like white, black, or Jewish) are not is that they have interbred with “outsiders” so much over history, even though they may deny it in their stories. President Obama counts as “black” not because he shares any more genes with blacks than he does with whites (he does not), but because of a kin-like category (“black”) made up by and enforced by society.

Any society faces a major problem: humans will, all things being equal, favor themselves and their kin (the people they view as “one of us”), but a society needs people to cooperate with others—and to have respect and regard for others—who are not their kin, not “one of us.” This is why societies sometimes make up stories that everyone in them is “related,” shares a common origin, and is, in some deep past, all biological kin. Of course, there are other ways to seek such cooperation, such as laws, force, or the creation of non-kin groups that seek to recruit people’s loyalties in terms of shared goals (e.g., passionate environmentalists or free-market proponents).

Society is never fully successful at this. In all societies we know, greed and corruption are common. People at all levels of a society, if left to their own devices, will often favor themselves and their kin group, or the people they feel are “like them,” over others. There are certainly individuals who are just simply greedy and corrupt. However, most humans are, when being greedy and corrupt, actually trying to advantage not just themselves but their families and others they consider “one of us.” In fact, at some level, they will often tell themselves that what they are doing is not being greedy or engaging in corruption so much as fulfilling their obligations to themselves and their families.

Now it is certainly the case that humans can and often do “feel bad” when they hurt others, even others who are not related to them. It is also the

case that few humans take pride in being seen as greedy, corrupt, and harmful to others. To alleviate such feelings, humans often define their actions, which others might see as greedy and corrupt, as, in reality, actions in support of “their people,” a group they often define as superior to others.

The old Irish mayors of Boston, especially the immortal James Michael Curley, who once ran the city from jail, are excellent examples. They saw themselves as social service agencies and support systems for a group of people (Irish immigrants) who did not receive respect or help from the “elites” who looked down on them. In the name of such a higher goal of aiding (extended) kin, they could see what others saw as corruption in different terms. The deathbed scene in Edwin O’Connor’s great novel *The Last Hurrah*, which is based on the life of James Michael Curley, says it all (there is a good movie adaptation as well, made in 1958, directed by John Ford and starring Spencer Tracy). I don’t want to spoil the novel or the movie for you, but the old mayor makes it clear on his deathbed that he would have done nothing different and is dying with a clear conscience.

Humans have a great capacity to form and re-form in their minds who counts as “one of us,” the people whose interests take precedence over others for them. Humans are also quite capable of changing sides and switching allegiances. They can move from seeing one group as “people like me” to seeing another group that way and even come to disdain the earlier group. In extreme cases that earlier group can even be one’s biological family.

The human capacity to believe in groups of kin defined as “people like us” can even transcend biological relatedness altogether. Many a member of a religious group has come to see family as “false” and their fellow members as “true family.” Consider this quote from the Gospel of Matthew 10:35–39 where Christ says the following (from the New Living Translation):

- 35 I have come to set a man against his father,  
a daughter against her mother,  
and a daughter-in-law against her mother-in-law.

- 36 Your enemies will be right in your own household!
- 37 If you love your father or mother more than you love me, you are not worthy of being mine; or if you love your son or daughter more than me, you are not worthy of being mine.
- 38 If you refuse to take up your cross and follow me, you are not worthy of being mine.
- 39 If you cling to your life, you will lose it; but if you give up your life for me, you will find it.

While it is unlikely that the historical Jesus said this, it is nonetheless in a canonical book of the New Testament and captures the common tendency for religions to define their members as “family” or “people like us” even against biological kin or others who are not believers.

Let’s use the term “imagined kin group” for any group someone sees as people “like me” (people with whom they feel bonded and to whom they feel obligated in some sense) when the group goes beyond actual biological or legal kin. So, in the passage from Matthew above, Christ is speaking in the name of an imagined kin group: all of his followers. According to this passage, this imagined sense of relatedness and mutual obligation transcends biological and family relationships.

Political appeals to “real Americans,” usually rural or small-town Americans, is an attempt to get people to accept and act on (at least in terms of voting) an imagined kin group. Hitler’s claim about a Nordic super race was a blatant attempt to get people across different countries and languages to see themselves as imagined kin. So, too, appeals to “Western people,” “Islamic people,” “born-again Christians,” or “Southerners” are sometimes attempts to create an imagined kin group. People will then die in the name of “Western culture,” “Islam,” “Christianity,” or “the South,” defending their “own,” just as they would fight to defend their families.

Imagined kin groups need not be pathological. Indeed, lots of work in the world gets done via such groups. But such groups can readily turn



pathological when people feel threatened, lack a sense of agency and control, or are manipulated by media and politicians to divide themselves from others. Humans have a strong tendency to define their humanity in terms of the groups to which they belong.

The human mind is made in such a way that it is heavily prone to thinking in terms of binary distinctions or dichotomies. People tend to define who is "like us" in opposition to those people who are not. They readily engage in "us" versus "them" thinking. Since they partially define their own humanity or sense of human worth in terms of the groups that are "us," they can easily slide into viewing those who are "them" as less human or, at least, less worthy.

None of this is news to anyone. We are all well aware that people like Hitler tried to divide Aryans as "us" from Jews as "them." Such dramatic examples, however, can hide from us less dramatic, but still damaging, appeals to imagined kin groups or groups with shared interests.

Imagined kin groups can become dangerous when the people in them isolate themselves from critique and different perspectives. It is, perhaps, all right for a group to fight for its shared interests and values or defend itself from perceived threats. But the situation becomes problematic when and if they cease to allow multiple opinions and perspectives. When a group contains too little diversity in opinions and perspectives and seals out the viewpoints of contrasting groups, they can polarize and come to share extreme and quite narrow views. This makes it all the easier for people in such a group to engage, without guilty consciences, in manipulation and underhanded tactics on their own behalf against the interests of others.

What polarizes a group and makes its members reject multiple perspectives and critique? One thing that can do it is a feeling of being oppressed or not appreciated, of being "cheated" of their rightful due. Another is when, for some reason, voices and viewpoints from outside the group are sealed off and go unheard. Little or no outside input comes into the group to refresh it and challenge it. And, of course, politicians, media, and various "special interest groups" can manipulate people to feel oppressed or cease to listen to others.

In the politics of the United States, so-called working-class people once bonded in unions in terms of their shared economic interests in fair wages and job benefits. Unions became, for some, kin-like groups. Thanks to the clout of unions, working-class people in the United States saw themselves as middle class and, indeed, for all practical purposes, were.

Today, unions have been greatly weakened by the global competition for jobs. Working people now often labor for poor wages with no benefits. Indeed, some people have argued that we are entering a new age of serfdom as companies bid down wages and benefits to the lowest possible level by moving jobs overseas and encouraging politicians to remove regulations and protections for workers. Workers today face a shortage of good jobs and little help from unions. One would have expected that, in the face of such shared economic woes and oppression, workers would bond together to demand better pay and a great share of the wealth of their country, a country that is progressively pooling wealth into an ever smaller share of the population. One would expect that workers would vote as a block against the interests of global corporations and the rich and for their own shared economic interests and even survival. But they actually do no such thing.

Just as global competition began to erode workers' wages and protections, they were addressed by politicians and the media as if it were their cultural and religious values, not their wages and benefits, that were under attack by "elites." They were told that they should see themselves as bonded around these cultural and religious issues—and vote accordingly—not around their economic interests connected to things like jobs going overseas and unions dying.

In turn, they were told that people who advised them to fight for their economic interests were "socialists" or anti-capitalists. They were encouraged to think and act as though cultural and religious conservatives, not their fellow low-wage workers, were their imagined kin group. In turn, they voted for conservative politicians who had sent their jobs overseas, destroyed their unions, and enriched corporate and financial industry elites. Whether you like unions

or not, this would seem to be “stupid” from the point of view of people who have lost their jobs or are working at several and are still below the poverty line.

Workers and the diminished US middle class are told that giving more wealth and tax breaks to the very rich will make money and jobs “trickle down” from the top to their level and eventually enrich them. There is really no good reason to believe this. Little actual evidence supports this view. You would at least expect working-class and middle-class people to offer a trickle-up theory in the name of their own interests. But they do not.

It is often hard to tell whether members of a group see each other as “one of us” because they really share a common fate or because they have been manipulated by other groups to think so. Is the real common problem that working people share in the United States economic extinction or cultural extinction? Is the right to a living wage less important than the right to carry guns or to keep mosques out of their towns? I have shown how I feel about the claim that working-class people should bond more over cultural and religious issues than economic ones. But others will disagree with me. They will say this is not manipulation, but a discovery by working people themselves of their own “real interests.” We will have to argue, appeal to evidence, and be willing to change our minds, but in a heavily polarized society like ours today, that is just what we won't do.

All people share a great many different interests with others over which they could bond. How they judge or are manipulated to judge which of these are predominant enough, at a certain time and place in history, to constitute an imagined kin group is a question for deep research. And, of course, the constitution of a group can represent, at one and the same time, people's sincere judgments and manipulation from others.

Having conceded all that, it is nonetheless clear that whom humans perceive as imagined kin is crucial for the health of society. When people come to see others in ways that harm their own very real interests or allow them to engage, with no moral qualms, in underhanded tactics and corruption in the name of group survival and solidarity, society loses its cohesion,



and is in danger of disintegrating into tribal wars in which some tribes will be manipulated by others to fight on the wrong side. In the end, the "last man standing" may be, in the United States, a small group of very wealthy people, the winners in a winner-take-all society. This is a very privileged and elite imagined kin group indeed.

In the Gospel of St. Luke (10:25–37) Christ tells the famous parable of the Good Samaritan. I reprint it below (translation from the New International Version):

- 25 On one occasion an expert in the law stood up to test Jesus. "Teacher," he asked, "what must I do to inherit eternal life?"
- 26 "What is written in the Law?" he replied. "How do you read it?"
- 27 He answered, "'Love the Lord your God with all your heart and with all your soul and with all your strength and with all your mind'; and, 'Love your neighbor as yourself.'"
- 28 "You have answered correctly," Jesus replied. "Do this and you will live."
- 29 But he wanted to justify himself, so he asked Jesus, "And who is my neighbor?"
- 30 In reply Jesus said: "A man was going down from Jerusalem to Jericho, when he was attacked by robbers. They stripped him of his clothes, beat him and went away, leaving him half dead.
- 31 A priest happened to be going down the same road, and when he saw the man, he passed by on the other side.
- 32 So too, a Levite, when he came to the place and saw him, passed by on the other side.
- 33 But a Samaritan, as he traveled, came where the man was; and when he saw him, he took pity on him.
- 34 He went to him and bandaged his wounds, pouring on oil and wine. Then he put the man on his own donkey, brought him to an inn and took care of him.

- 35 The next day he took out two denarii and gave them to the innkeeper. ‘Look after him,’ he said, ‘and when I return, I will reimburse you for any extra expense you may have.’”
- 36 “Which of these three do you think was a neighbor to the man who fell into the hands of robbers?”
- 37 The expert in the law replied, “The one who had mercy on him.” Jesus told him, “Go and do likewise.”

The Jews despised the Samaritans and looked down on them despite the fact that they were historically related to the Jews and practiced a very similar religion. The Samaritans claimed that their religion was the true religion of the ancient Israelites prior to the Babylonian exile, as opposed to Judaism, which they viewed as a related but somewhat changed religion brought back by those returning from exile. The Jewish people listening to Jesus would have been quite shocked to hear him speak of a Samaritan in a positive way.

Jesus was saying that the Samaritan saw correctly who was his “kin,” and the Jewish people who passed by the man in need of help were misled when they saw no kinship with Samaritans or the needy man in the ditch, a man who may or may not have been Jewish. The Samaritan could cross the Samaritan-Jewish divide and see who was kin, who deserved help, in a more expansive way. Jesus leaves it vague whether the man in the ditch was Jewish or not. He thereby suggests that it does not matter and that, in the end and when we are in need, we are all kin.

In the next chapter we will see a new fad that tells us we are not all kin, but, rather, that each of us is a very special island. Modern digital technologies are leading to a proliferation of customization wherein we all get what we want, how we want it, when we want it, with the least hassle (if we can afford it). We can all be in “Schools for One.” However, we have argued throughout this book that one can be a lonely and stupid number for us humans when we are left alone to “be me” and “do it my way.”



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# Lonely Groups of One

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HATING AND FIGHTING IN THE NAME OF IMAGINED kin groups is an old pathology for humans. In this chapter, we will discuss another old problem. This is a problem that has become much worse in the face of new technologies.

Over the last decade I have worked on research on how video games can be used to create good learning. I got into this because I played a game for children called Pajama Sam with my then six-year-old son Sam. I wondered what a video game for adults would be like. So I bought one and played it. I was simply amazed by how long and how hard it was. I was amazed, too, that people paid good money for this degree of difficulty in the name of entertainment.

I came, after much frustration and persistence, to love playing video games, games like Half-Life, Deus Ex, The Elder Scrolls, Rise of Nations, Halo, Grand Theft Auto, Chibi-Robo, and From Dust. I came to understand that such games are problem-solving spaces. As such, they must do a good job at teaching the player to master the problem-solving skills necessary to play and win the game. But, more importantly here, such video games are designed to challenge players and make them work hard to succeed.

One problem video game designers have, however, is a tendency seemingly inborn in human beings to optimize their chances of success. Gamers will often seek all possible advantages and use any tactics they can to win. They will, for example, engage in what gamers call “cheats.” Cheats are

pieces of code or hacks that can make the game easier or advantage the player in some way. The problem is this: gamers will often seek to optimize their chances of success up to the point where they undermine the game's design and even ruin the game by making it too easy.

Good game designers encourage optimization up to a point, as a creative and proactive activity of the gamer. However, they must forestall it from undermining the game and ruining the player's experience. It is a tricky balance and part of the art of good game design.

This human urge to optimize is, of course, old, and it applies much more widely than just to video games. Faced with significant challenges in the "state of nature," humans who survived were good optimizers. They did all they could to increase their chances of success (survival) and lower the level of difficulty they faced. Those who did not optimize in this way were selected out of the gene pool for good Darwinian reasons. In the state of nature, one could optimize only so far. The level of difficulty always remained high. One could not cheat death. Ultimately, every human "lost" the game.

Modern technologies allow the human urge to optimize and lower the level of challenge full rein and near endless application. In modern times, the human urge to optimize takes the form of customization. Modern technologies increasingly allow each of us, if we wish, to customize many things to fit with our skills, styles, desires, and beliefs in such a way as to leave us less challenged and feeling more "successful." This process goes ever forward with each new technological advance.

For example, today there are adaptive artificial (computer-based) tutors to teach algebra. Based on how the learner is faring, these tutors (which do quite well) customize presentation, problems, and the order of problems to each individual learner. They can also be equipped with sensors that tell the system when the learner is bored, confused, or frustrated, and adapt instruction accordingly. Each learner proceeds based on his or her favored style of learning in a way that lowers the level of frustration as far as possible. Artificial tutors do not care where you start, how long you take to finish, or



how smart or stupid your initial answers are. They are far more tolerant than most humans.

There is nothing wrong with, and lots right about, such artificial tutors. They are just one device among many that seek to transform education into “a school of one.” But they represent a perfecting of the human urge to optimize that can go too far and end with bad consequences. People who never confront challenge and frustration, who never acquire new styles of learning, and who never face failure squarely may in the end become impoverished humans. They may become forever stuck with who they are now, never growing and transforming, because they never face new experiences that have not been customized to their current needs and desires.

There is, in fact, an organization called School of One. Here is what they say about their approach:

School of One learns about the specific academic needs of every student and then accesses a large bank of carefully reviewed educational resources, using sophisticated technology to find the best matches among students, teachers, and resources.

School of One’s learning algorithm helps to ensure each student is learning in his or her educational “sweet spot.” As it collects data, it learns more about the students and becomes more effective at predicting the playlist that will be most effective for each.

I am sure (sort of) that all this is fine, though I wonder what happens when people with different “sweet spots” have to learn, solve problems, and collaborate with others who have different “sweet spots,” as people so often have to do in modern workplaces. I wonder what would happen should, God forbid, children run into learning situations in the world that cannot be optimized for them individually. What if the world changes and the problems that arise just do not afford solutions that fit their sweet spot? What if their sweet spot is just no good for certain types of learning and problem solving?

In any case, we can use digital tools to create not just Schools of One, but, as odd as it may sound, “Groups of One.” Let me hasten to explain. In the last chapter we discussed imagined kin groups. There is another, usually less intense, form of human bonding that is common, namely sharing interests with others. Humans can see themselves as members of groups not in terms of kin-like bonding, but in terms of common shared interests, values, and experiences. I will call these “shared interest groups.”

For example, as a long-time academic, I see other academics, in some respects, as “like me,” sharing with me certain interests and ways of being in the world. Academics are a shared interest group for me. The same is true for me of bird watchers, gamers, and lovers of nature, as well as other groups.

There is always a problem of level here. Is it just linguists who are “like me,” share my interests and values, or is it even just discourse analysts, a subgroup of linguists? Is it social scientists? Or is it all academics? Is it academics as researchers or teachers whom I feel camaraderie with, or both? What about academic administrators like deans and provosts—do they count as academics?

People are often willing to die for both real and imagined kin groups, but they are rarely ready to sacrifice their lives for their shared interest groups. This does not mean, by the way, that they are not willing to favor such groups by behaviors that others might find greedy and corrupt. Furthermore, if circumstances force people in a shared interest group into an embattled common cause, and if they come to feel deeply challenged and oppressed, they can mutate into an imagined kin group for which they will fight and die.

For example, as the earth is increasingly destroyed, people who are “lovers of nature” will more and more fight alongside each other in the name of the earth and come to feel a sense of bonding, camaraderie, and kinship. Edward Abbey’s novels capture this sense of shared interests carrying over into imagined kinship in the name of fighting for the environment quite well. Amy Waldman’s wonderful novel *The Submission* captures perfectly how an



American Islamic architect comes to feel kinship with other Islamic people (heretofore, at best, a shared interest group for him) only after he is attacked for being Islamic by people who assume he must feel such kinship even when he does not.

Today, digital media allow an unbelievable proliferation of shared interest groups. If a small number of people across the world have a very rare disease, in the past they could never have found each other, and their common interest in finding a cure could never have been pooled. Today, they can find each other via the Internet. They can start a group, relate to each other in terms of their shared interests, and agitate for their cause.

It is close to impossible to name a group that has not formed an interest-driven shared space on the Internet, spaces that sometimes spill over into real life. For example, to test this point, I tried to think of something odd and Googled it. I came up with avocado carving. Well, I found sites devoted to decorative avocado carving and sites devoted to carving avocado pits for art. I found sites that expanded this interest to “vegetable carving” more generally. There was even, at least for a while, an avocado carving friends group on Facebook.

The Internet allows each person to join shared interest groups that fit their sweet spots. You can customize what you see and whom you interact with in as fine a way as you like. You can, if you want, ensure that you never see or hear viewpoints you do not like or face people who do not share your values, interests, and viewpoints. You can customize your politics, just as you can customize everything else, and always hear arguments you already agree with and news reports that never venture far from or challenge your worldview. You can also do this via television, thanks to cable news.

This phenomenon of carving out the groups that are “like us” and do not violate our sweet spots for politics, interests, and activities goes on in the world outside the Internet as well. People can, and more and more do, live, shop, and interact only in spaces filled with “people like them,” people who share their views on politics, the environment, and how to behave and live.

Shared interest groups can get ever more specialized. I can leave the neo-conservative fundamentalist Christian political group, from which I have been getting most of my news of late, to join an even “better” neo-conservative fundamentalist Christian end-times-centered rapture-focused anti-environmental group (Who cares about the environment anyway, since the elect will all soon be gone to heaven?). If no such group exists (don’t worry—it does), I can start one myself.

When people join groups or live in spaces in which everyone around them agrees with them and shares the same values, people start to polarize and develop extreme versions of their values and beliefs. Within groups, since everyone is alike, the only way to gain distinction, to stand out from the crowd, is to embrace extreme viewpoints. Groups splinter as interests, values, and beliefs become ever more extreme or customized. In the end we get Groups of One, not in the sense that they contain only one person, but in the sense that they contain only one kind of person.

Why is this a problem? Why isn’t it a good thing that each person and group can “do their own thing”? The essential issue here is the health of the public sphere. The public sphere is composed of all those spaces in a society where all people are welcome and belong just because they are all parts of the “public”—members of the society at large—and not just because they are members of specific subgroups of that society. In any society there are restrictions on who counts as a member of the larger public. Perhaps, in one society, only Jews or Muslims count as members of the public, or perhaps only Orthodox Jews or Shiite Muslims. We can readily see that if the public sphere is restricted enough, it can become no more than a shared interest group.

In a healthy society diversity is honored because diverse people and viewpoints serve the same purpose as variation does in evolution. Such diversity expands the possibilities for new discoveries and survival in the face of change. A closed society, like a species with little genetic variation and too much inbreeding, is doomed.

In a society like the United States, the public sphere is meant not to be segregated by class, race, gender, sexual orientation, ability, or religion; since people of different classes, races, genders, sexual orientations, abilities, and religions all together constitute the "public" in the United States, the pool of variation gives us hope that we will always be able to adapt to change. When people seek to avoid such public sphere spaces, when they seek to segregate themselves with others "like them" and not see themselves as vital members of the "public" with others, then the public sphere is diminished and may, for all practical purposes, disappear.

Today, many Americans seek to avoid the public sphere. They send a "runner" to the Department of Motor Vehicles, or they use the Internet, so they do not have to stand in line with their fellow citizens. They avoid channels of communication where they would have to argue and debate, rather than just demonize, people who disagree with them and have very different life experiences. They drive through parts of town they don't like (meaning they don't like the people in them) to get quickly to those parts filled with people like themselves. This process has gone so far in the United States that words like "public park," "public bathroom," "public space," and "public meeting" have, for many people, a somewhat negative connotation.

A rich person in Concord, Massachusetts, feels more camaraderie with rich people in other such wealthy and beautiful suburbs across the country (maybe even the world) than he or she does with working-class or poor people in post-industrial Worcester, Massachusetts, and vice versa. Such working class people no longer seem to count as "fellow citizens," fellow members of a public sphere with whom the rich vote and argue to solve the state's or the nation's problems collaboratively.

Beyond the public sphere there is also the concept of global citizenship. This concept involves seeing oneself as a member of all humanity, regardless of where in the world that humanity resides. It involves seeing all humans as citizens with rights and responsibilities in a global, pan-human world. Today, ironically, it is easy to join global groups with quite specific interests



and shared sweet spots. In terms of such groups, even people in one's own country can come to seem more foreign than "foreigners." This is, of course, not global citizenship—not a global public composed of humanity—but, rather, a global customization of life.

The public sphere sees the world in expansive terms. The proliferation of "Groups of One" sees the world in ever more specific niches, lifestyles, belief enclaves, and "values communities." We come to get inbred groups filled with people who share all the same ideas, interests, and values. Like inbred animals, they are in danger of "retardation" and stupidity of the sort that may leave all of us with no real future. Muscles hurt a bit when we exercise outside our sweet spot. Minds bend a bit when we think outside our comfort zone. These are the signs of growth. If people optimize such "pain" away, they become stunted.

If one is often a lonely and stupid number for us humans, we can often get smart when we partner with smart tools and other people in well-coordinated and well-resourced teams facing a meaningful and complex challenge. But today, in an age of highly interacting and high-risk complex systems, an old friend is a new enemy: "the expert."