

Perfect Feedback, or Why the Drivers of Los Angeles County are Smarter than Quality Consultants

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The Total Quality Drivers of Los Angeles County

Companies pay millions of dollars to reach a Six Sigma level of quality, where there is one error out of five hundred million units. But there is a group of people who have reached a Seven Sigma level of quality, and they did it without consultants, or quality programs, or even even meeting.

Here's the kicker - they did it without planning.

Who is this amazing group? The drivers of Los Angeles County.

Every day, people in LA County drive 220 million vehicle miles. In 2021, they had 10,739 accidents.¹ Feed those numbers into a Six Sigma calculator, and you'll be told that's not a Six Sigma level of performance.

It's better. It's Seven Sigma.²

Ten thousand seven hundred accidents in a year seem like a lot, but when compared to the vehicle miles for the same period, it suggests a system that is extraordinarily effective at regulating itself to achieve the goal of people arriving at their destinations without accidents.

How does that happen? How does a system align itself to achieve such remarkable results without meetings, without a budget for continuous improvement, without (gasp) the help of consultants?

Perfect Feedback. It turns out that driving on a highway is very close to what I think of as a Perfect Feedback environment.

"Perfect Feedback is when the entire system sees the performance of the entire system in real time, all the time."

The two rules of Perfect Feedback are...

1. No system ever attains Perfect Feedback.
2. As systems approach Perfect Feedback, they self-regulate more effectively.

¹ <https://www.belgumlaw.com/blog/los-angeles-car-accident-statistics/>

² I used the calculator at <https://arithmeticcalculator.com/six-sigma-calculator/>. Your results may vary, but in any case, the error rate for driving the LA County highways is very, very low.

That's what's happening on the highways of Los Angeles. The system of drivers operates in such a fantastically feedback rich environment that they can achieve a stunning level of performance, without the need for formal coordination. The system self-regulates, and at a level of quality that would be the envy of any operation.

This paper explores Perfect Feedback, with some thought experiments and examples, and some ideas on how to approach seeking more perfect feedback in the systems you work in, live in and lead.

All of it is based on a radical idea, but one which experience bears out: Leaders spend far too much time planning, and far too little time creating the conditions that allow the systems they lead to regulate themselves.

You May Ask Yourself, How Do I Work This?

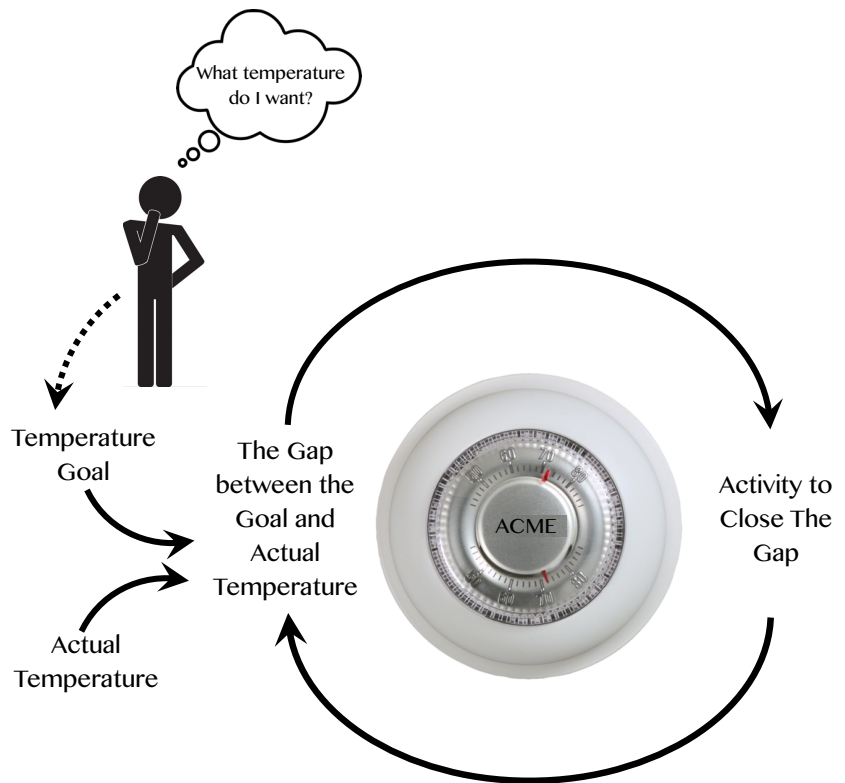
To see how Perfect Feedback works in practice, let's return for a moment to the old reliable of systems thinking teaching, our friend the thermostat.

The system story goes like this: a thermostat has a goal, set by a person, to keep a space at a specific temperature.

There is a thermometer in the thermostat that "sees" the temperature, and another part that turns on the heat or air conditioning when the temperature wanders from that goal.

Once the temperature and the goal match, the heat or air conditioning stops until the temperature wanders again.

It's a simple system with five elements. There is the person³ setting the goal, the goal itself, the actual temperature of the space, the difference between the actual



³ Everyone uses the thermostat example in teaching systems, and I'm always surprised that they all they leave the person out of the system. It's a typical error, one where we participate in a system and are blind to that participation.

temperature and the goal, and activity that moves the actual temperature closer to the goal when needed.

It's the epitome of self-regulation. And it's a good example of a system that has close to perfect feedback. Every part of the system knows what's going on all the time in real time.

Let's go back to the definition of Perfect Feedback and see how each of the elements in the definition are reflected in the thermostat system. And while we're at it, we'll also name each element to make things easier.

"Perfect Feedback is when..."

In the Definition	What This Is	What We'll Call It	What is the Direction of Goodness?
<i>... the entire system sees...</i>	All the elements that contribute to the system's functioning and self-regulation.	Witnesses ⁴	The more witnesses, the closer the system gets to Perfect Feedback
<i>... the performance of the entire system...</i>	What each of those elements is doing	Performance Data	The more the system knows what each element is doing, the closer the system gets to Perfect Feedback
<i>... in real time...</i>	What's happening to those elements right now	Feedback Immediacy	The faster the data is delivered to the witnesses, the closer the system gets to Perfect Feedback
<i>... all the time.</i>	How regularly the performance data is available	Feedback Frequency	The more frequently the data is delivered to the witnesses, the closer the system gets to Perfect Feedback

In the thermostat example, the **Witnesses** are the person and the thermostat. Each senses the temperature in the room.

⁴ Yeah... I'm not crazy about this label either, though it captures the essence. If you have a better idea, send it to me. The criterion for a good name is that it reflects the idea and make sense to average people. No academic mumbo-jumbo please. If I adopt it, I'll send you a tote bag. Honest.

There are two elements of **Performance Data**, though you would be forgiven for thinking there was only one.

The obvious one is the temperature of the room, which the person and the thermostat both witness. The other Performance Data is the comfort of the person setting the goal. If the person experiences discomfort at the temperature goal they set, they will change that goal.

The **Feedback Immediacy** is how quickly the thermostat registers a change in the room temperature, which is immediately.

The **Feedback Frequency** is how often the thermostat registers the temperature in the room. It does so continuously.

The entire thermostat system “sees”⁵ what’s going on in the entire system all the time, immediately. That’s pretty Perfect Feedback. The only way to improve the system would be to eliminate the delay between the system acting to change the temperature in the room and the temperature changing.

If we apply these categories to the drivers of Los Angeles County, we see that:

- The **witnesses** are all the drivers.
- **Feedback immediacy** is as high as humanly possible. Changes in the system are available to the witnesses the moment they happen. Witnesses may not notice them immediately, of course (hence the ban on texting), and there is a delay between noticing a change and acting.
- **Feedback frequency** is likewise as high as humanly possible.
- If they choose to, people can continuously scan the highway around them, as well as their own dashboard for **Performance Data** about their surroundings and their vehicle. Performance data is ubiquitous - every car is visible, as are the road conditions.

Imperfect Feedback on the Highways of Los Angeles

Changing any one of these four elements on the highways of Los Angeles would result in a much higher error rate - more accidents.

We can explore this with a few thought experiments⁶. To do these experiments, we need to imagine a way to control the performance data reaching the witnesses in the system - the drivers.

⁵ Obviously, neither of the witnesses actually sees the temperature change. The person senses it through their skin, and the thermostat gets that data from its internal thermometer. “Sees” is just a convenient shorthand for registering the data.

⁶ Tip of the hat to Hans Christian Ørsted. Thanks Hans. https://en.wikipedia.org/wiki/Hans_Christian_Ørsted

Let's imagine that all the cars in Los Angeles County have had their windows and dashboard replaced by screens and have had cameras mounted on their cars so that these screens display exactly what a driver or passenger would see out the windows if they were clear glass. That way we can control what people see of their immediate environment.

Imagine this. Once an hour, the window screens and dashboards go dark, but not for very long. Let's say five seconds an hour, or for just .14% of the time, and in only 1% of the cars on the Los Angeles highways. That's somewhere close to 280,000⁷ dark cars during the busiest hour of commute time, or 4,666 cars every minute.

Which cars go dark and when they go dark is random - no driver knows when it will happen. They will be driving along, and then suddenly, nothing. All the window screens and the dashboard of the car go black for five seconds.

You don't have to be a genius to imagine the chaos this change would cause, even with the change occurring so infrequently in only 1% of the cars.

Using the Perfect Feedback categories, we've reduced the system's **witnesses** by 1% for five seconds every hour, and the presence of **performance data** by the same amount. During these five seconds, **feedback immediacy and frequency** is zero. The feedback disappears, very briefly, and in a very small number of cars.

When I run this thought experiment, I imagine two things. First, the number of accidents increases dramatically, and then, the number of cars on the highways plummet. The system self-regulates by people simply refusing to drive at all.

However, we don't have to imagine such a dramatic change to imagine the system. We can adjust just one element slightly and still imagine the changes it would cause.

Imagine this. We can reduce **feedback immediacy** once an hour, for five seconds, in 1% of the cars. Everything else stays the same.

Once an hour, the screens would introduce a five second delay in the images being shown on those screens. Witnesses would be looking at highway conditions that occurred around them five seconds earlier. The screens would manage this transition seamlessly, so the drivers would not know when they were looking at the delayed scene. And as before, this would be happening in about 4,666 cars every minute during the busiest hours of commute.

It's impossible to predict what would occur, but is there any doubt that, all else being equal, there would be more accidents? Or perhaps the system would self-regulate by dramatically reducing the number of cars on the highways, or by those cars driving much slower and leaving greater space between them.

⁷ <https://www.laalmanac.com/transport/tr26.php> "Approximately 2,882,784 vehicle trips are taken on L.A.'s 650 miles of freeways and 22,000 miles of surface streets each day between 7-8 a.m. on weekdays."

Of course, none of these things could happen, but that's not the point, The point is to make obvious something that is both present and invisible all the time - the perfect feedback environment of highways - and draw attention to how even a miniscule change in that feedback would have dramatic consequences.

Perfect Feedback in Practice

When I think about having a systems perspective, I remember a song lyric...

*I'm looking at the world through rose colored glasses
Everything is rosy now⁸*

Most of the time, we look at the world through "individual-colored glasses." We see individuals and their activity, and attribute autonomy to their actions, that old free will thing. When we look at the highways of Los Angeles County through these glasses, we see individual drivers.

Having a systems perspective is like looking at the world through system-colored glasses. The world remains as it was, but different things take prominence. Instead of seeing hundreds of thousands of individual drivers on the highways, we see a single dynamic entity, a system of drivers, cars and infrastructure that regulates itself for safety.

When I began to think about Perfect Feedback, my understanding of events that had occurred years before shifted. Instead of individuals, I saw a larger dynamic entity - a system regulating itself.

Here's an example.

I worked at L. L. Bean in the 1990s when the Total Quality Movement was all the rage, and L. L. Bean got on board just as I assumed leadership of their Training and Development effort.

At that time L. L. Bean made their famous duck boot in Brunswick and Lewiston, Maine⁹. One of the Directors of the shoe factory had become a big Total Quality enthusiast, and he wanted to shut down the production line for two hours to teach the shoemakers where the cost was in the boot: how much all the individual elements cost the company.



⁸ Looking At The World Thru Rose Colored Glasses, Jimmy Steiger and Tommy Mailie
<https://geniuslyrics.net/frank-sinatra/looking-at-the-world-through-rose-colored-glasses/>

⁹ They still do.

He got push back from his leadership. Stopping production for two hours was expensive: they had to pay people to be non-productive, and they would lose however much product those shoemakers would have made in those two hours. How would they ever make that up?

But he insisted, and so for two hours one morning the machines stopped, and the Purchasing Department went through the famous Maine L. L. Bean Duck Boot, piece by piece, explaining how much each element cost. And then the shoemakers went back to work and began to apply what they had learned.

No meeting to plan actions or set priorities. They just went back to work.

Guess what happened. **By the end of the shift**, the shoemakers saved L. L. Bean what it cost the company to train them for two hours - without anyone organizing them to do so.

Look through a lens that focuses on individuals, and you see proud, skilled crafts people doing their job. But look at it through a lens that see systems, and you see one part of the system (shoemakers) seeing another part of the system (the cost of materials) for the first time, and the system self-regulating itself toward its goal (productivity) because of more perfect feedback.

Here's another example.

I led a Product Development Leadership and Learning Team, or the PDL2T, at Harley-Davidson, beginning in 1996 and running through 2003¹⁰. Once a month for eleven months a year I met with the Vice Presidents and Directors responsible for designing and building Harley-Davidson motorcycles. There were about twenty people in the group.

We began each meeting with a check-in, where each member of the group got the floor for an uninterrupted period to speak. Then we'd run through an agenda of the challenges and progress being made bringing new product to market. We'd end each meeting with a check-out, another opportunity for each person to reflect out loud.

It was a deliberately non-decision-making group. We reflected, we analyzed, and we didn't drive to decisions, knowing that groups that do so necessarily have to limit the breath of what they reflect upon. There were plenty of decision-making teams at Harley. They didn't need another one. They needed this.

A few years in, one of the members came back with a story.

One of his reports had remarked that "you guys are making a lot of decisions in that team," meaning the PDL2T. His report said that several of his peers had been sharing their observations that the members of the PDL2T had begun to act **as if they had made agreements about how to run the business**, and so logically concluded that they had deliberately planned to.

¹⁰ I want to acknowledge my colleagues Daniel Kim, who was with the group at its creation, and Marty Castleberg, who was the reflective analyst for this team, a role he invented.

They hadn't. The team had not made explicit decisions to do anything. In the presence of more perfect feedback, the system had simply begun to do what systems do. It began to self-regulate, to align itself more effectively against certain goals. It was a stunning moment.

Most managers and leaders I know spend a lot of energy directing people in their organizations to do things. Managers direct the work of their reports, and executives direct the overall direction of their organization through extensive and expensive strategic planning exercises. By comparison, they spend almost no time making performance data ubiquitous throughout the organization.

They should. Human organization are dauntingly complex systems, but they are systems nonetheless, and they will self-regulate to a surprising extent by just making performance data available throughout the system quickly and often and allowing the system to move organically "in the direction of goodness," as the engineers say. It will often do so without to-do lists or formal operational plans.

Generic Strategies

If you are leading an organization, the goal is not the get to a Perfect Feedback environment. That's impossible. The goal to get closer to it, strategically getting Performance Data to people fast and frequency to make more Witnesses, all in the overall interest of the system being able to continually align itself with its goals through more perfect feedback.

Here are some generic strategies for approaching more perfect feedback.

"Perfect Feedback is when..."

In the Definition	What We'll Call It	Generic Strategies
<i>... the entire system sees...</i>	Witnesses	To get closer to Perfect Feedback, expand the number of witnesses , the number of people who get performance data about the system
<i>... the performance of the entire system...</i>	Performance Data	To get closer to Perfect Feedback, increase the number of things that you show the witnesses about the system's performance
<i>... in real time...</i>	Feedback Immediacy	To get closer to Perfect Feedback, reduce the delay between something happening and performance data about that event being available to the witnesses
<i>... all the time.</i>	Feedback Frequency	To get closer to Perfect Feedback, increase the frequency of the distribution of performance data to the witnesses.

The two examples above illustrate these generic strategies. At L. L. Bean, a key group of witnesses got performance data for the first time. At Harley-Davidson, there were increases to each of the dimensions. More witnesses saw more performance data faster, monthly.

This is all obvious in retrospect, though it was not the intention at the time. That's not surprising. Most organizations hold a pervasive, unstated assumption that in order to manage or lead one needs to "do things," and, further, that some things we might do don't really count as doing. Reading or going for a walk to think something through are not the sorts of "doing" that count, and neither is engineering a workplace where more people know more things more often, and faster.

When considering Perfect Feedback, the core question is "What part of the system is not getting the information it needs to manage itself?", but the questions that permeate organizations are variations on "What should I do to fix this?" The assumption is that someone, or a group (like "Executives") needs to put the organization on the right path and keep it there.

Underneath **that** assumptions is another, which is that, unlike an ecosystem or the traffic in Los Angeles County, average workers in organizations are incapable of fixing themselves without constant direction. The examples from L.L. Bean and Harley-Davidson challenge that, as do dozens of examples all around you once you put on your system-colored glasses and look.

The Difference Between Theory and Practice

Benjamin Brewer broke the code when he wrote that "In theory there is no difference between theory and practice, while in practice there is."

In this case, in theory there should be no limit to the feedback elements - the entire system should see the entire system all the time, in real time. In practice, no organization can afford to do that.

Gathering performance data on every aspect of the system would bring most organizations to their knees. The organizational actors who measure performance and control access to performance data make decisions about what aspects of organizational performance they assess, how often they do so, how quickly the data can be distributed, and who gets to see it.

My experience is that these actors operate as if they believe that sharing performance data endangers them and the organization, and so the questions that leaders use to determine who sees what is some version of "Do they need to see this? What bad things might happen if this became public knowledge inside our organization?"

That mental model doesn't work when considering Perfect Feedback. Perfect Feedback argues that all else being equal, the more witnesses the better. Since the theoretical goal is

the “entire system seeing,” the question isn't “Who needs to know this?” It's “Is there anyone who shouldn't know this?”

It's impossible for any one person to know what data will enable which parts of the system to adjust effectively, so it's better to err on the side of sharing data widely and let witnesses select what's relevant to them. It's another way the system self-regulates.

I am not naïve that some organizational members may exploit performance data for their own self-interest. But my experience is that this a tiny percentage of employees, far fewer than justifies the magnitude of the concern.

The solution is not to restrict access to the data that the system needs to direct itself. This cripples the system's ability to self-regulate because of an anticipated threat that is unlikely to materialize. Instead, **managers should manage**, and use the performance management system to discipline people who use data against the interest of the entire system and separate them from the organization if they do not correct themselves. A very small, unethical minority should not be allowed to hold the entire system hostage, especially when we consider the power of a system to self-regulate: remember the Seven Sigma drivers of Los Angeles County.

Perfect Feedback seems magical. We get order, alignment, and astronomical levels of quality without plans or planning. But it's not magical. It's just the way that the world works - the way that traffic works, the way that migration works, the way the length of the security line at the airport works, the way that eco-systems work.

It's the great, unappreciated opportunity for making organizations more effective, more successful, and more humane.

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