
It's summer, 1991. The glacial structures of the cold war have breached. The first Gulf War has ended. A young Democrat from Arkansas is eyeing a run for the White House. The UK is in the middle of recession and interest rates rocketing, with a moribund government. History doesn't repeat itself, but it does rhyme. Perhaps, this is the resonance of a vast complex system?

A few weeks previously the way in which I understood the world changed. By watching a football match. Yes, it was that transformative.

The FA Cup Semi Final between Arsenal and Tottenham is most remembered for a superlative free kick scored by Paul Gascoigne. To me, Gazza, was the larger than life character, the hero, playing the game like I wanted to. He cast spells that were mesmerising. That day he bamboozled David Seaman too, the Arsenal goalkeeper, as he curled the ball into the top corner from 35 yards. This was a moment of genius, it was iconic, but it wasn't the transformative moment I look back on.

Later in the game, TV presenter and twitter aficionado, Gary Lineker scored. In itself, this was not remarkable at all. At that time Gary did a lot of it. It did, however, change the way I would forever see the world. Allow me to explain.

Lineker picked the ball up in the centre circle, picking up a ball shovelled off to him by defender Gary Mabbutt. Lineker turns and runs towards the Arsenal defence. There were two other Spurs players running either side of him. There is a well organised line of three Arsenal defenders with other players chasing back. There is nothing immediately that looks like there is a good goal scoring opportunity in the offing. Lineker progressed and the defence edged backwards. Now near the edge of the box, Lineker shifted to his right, evaded a limp tackle from Strictly Come Dancing's Tony Adams and shot past Seaman. 3-1. It was a fine goal aided by some poor defending. It was the commentary from Barry Davies that struck me. In 17 words he changed everything.

"Nayim to the left. Samways ahead. And Lineker uses him by not using him. Good try. Scored"

The reason why Lineker shifted to the right is because Vinny Samways ran from the space he had been occupying and one of the Arsenal defenders followed him. This created space for Gary to move into and evade a tired lunge from Tony Adams. Without that movement the goal isn't scored. Samways was instrumental and yet never touched the ball. He barely even looked at it throughout the play. Yet it was brilliant. Lineker got the goal and the plaudits and technically, Gary Mabbutt got the assist. But for me, it was Samways that was the star. What makes a difference to performance in complex systems is not easily measurable. What we measure is often not particularly insightful.

The beautiful game provides plenty of examples of this point. Take, for example, the following post match performance data.

	Team A	Team B
Possession	52%	48%
Corners	7	5
Tackles won	5	1
Lost balls	69	76
Shots	18	14
Shots on target	13	12

We might reasonably deduce this was a tight game. Perhaps narrowly edged by Team A although not impossible to think Team B snooked the result. A draw also a good option. As it happens, Team B won. They won quite easily. 7-1 in fact. This is the post match performance data from the World Cup Semi Final in 2014, when Germany thrashed Brazil. It clearly provides us with no real insight into performance. It creates an illusion of understanding and analysis.

If we fast forward thirty years, the way we understand performance in complex systems hasn't changed significantly. It is still a world where performance is seen as a discrete output. A world of goals and assists. An ocean of data with only a pool of insight.

Barry Davies recognised there was more to it than this. He was looking at the nature of the ocean, not that fact that Lineker was wet. If we recognise that local rationality is important, and the need to shun the bias of hindsight by considering why decisions made sense at the time, we need to do more than listen to people's stories. If we continue to understand performance without true consideration of the context we will fail to learn. We may listen and learn from Lineker's excellence. We may date a fatigued mistake from Adams. The crucial movement of Samways remains invisible. Complexity Science understands this as Ecological Dynamics. Ecological Dynamics considers performance as an emergent phenomena founded in the relationships between agents and the environment. It is the intricate ecosystem of relationships, of actions taken and rejected that creates our performance reality. We need to consider what the environment afforded the agent at that time, based in part on individual capabilities and constraints.

In 1992, the young Arkansas Democrat got the keys to The White House on the back of a campaign arguing that "it's the economy stupid". Perhaps now is the time for those in safety science to apply rigorously what Barry Davies saw thirty years ago. To understand performance in complex systems, it's the ecology.