The school of "hard knocks" doesn't teach much if cause and effect are blurred

Collapsing time and space may be the best way to change people's understanding and behavior

New software makes it easier to design games

IS SIMULATION BETTER THAN EXPERIENCE?

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MANY CORPORATIONS design major change programs in the pursuit of competitive advantage, only to find them frustratingly difficult to implement. That's because a successful program depends not only on a carefully conceived strategy, but also on a culture that accepts change. No matter how well designed a program or how committed a CEO, transformation efforts are likely to founder unless every individual in an organization is prepared to change his or her behavior. Managers

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1. CROSSFUNCTIONAL COMMUNICATION

A converting division of a major pulp and paper company had been underperforming in a way typical of the industry, with a 2.5 percent return on capital, 50 percent capacity utilization, and mediocre productivity. To increase utilization and raise productivity, the company decided to transform itself by reorganizing, pursuing a new strategy, and replacing some managers. It set tough financial targets and resolved to improve the skills of nearly 40 general managers, each of whom ran a standalone profit center.

The situation

These managers needed a better understanding of the manufacturing costs and effects on productivity of different kinds of customer orders. Since the plant was now expected to run at full capacity, the whole plant team had to appreciate the interrelated dynamics of productivity, order flow, and capital and noncapital debottlenecking. The new strategy required that managers price orders to maximize the plant's cash-generating potential. This meant that its general manager had to balance the demands of his sales, production, and customer service managers.

Previously, managers had believed that the higher the price of an order, the higher its profitability. It was hard for them to grasp that price is not the sole driver of profitability, and that a complex set of factors like cost and capacity also play an important role. But these were things they had to assimilate if they were to make the plant more profitable. Crossfunctional information sharing and decision making were a crucial part of the learning process.

Though the change plan was well designed, executing it proved a tough challenge. Accustomed to a fair degree of autonomy, the general managers were hardly likely to respond positively to a mandate from division headquarters. Something was needed to help them understand the dynamics of the new strategy and build confidence in their ability to implement it.

The simulation

The company had a simulation designed with a board that gave a transparent view of the plant's business system from sales to production. The four members of the plant's management team – sales, customer service, production, and general managers – controlled sections of the board corresponding to their functional areas. Each round of the simulation represented one month's operations.

in particular need to develop new skills to help other employees alter ingrained working habits.

Unfortunately, change does not come readily to adults. Lectures, training modules, and workshops may lay bare the mechanics of organizational change, but they are unlikely to revolutionize people's work practices. Most of the time, we learn only through experience. But everyday business is seldom conducive to such learning, since delays and the complexity of most companies tend to obscure the link between decisions and their consequences. Under normal conditions, managers are rarely able to see the full effect of their actions.

The impact of, say, hiring an extra sales representative may not become apparent for several months – by which time other managerial decisions will have muddied the picture. To make things worse, most managers possess only a limited perspective of their organization as a whole. And since their

Participants were asked to make decisions that would have major repercussions for the plant's performance. An interactive computer stood in for the marketplace and assessed bids for new orders, indicating which accounts had been lost and which won.

Lessons learned

By collapsing time and space and discounting the influence of unexpected external events, the simulation was able to show participants the impact of their actions immediately and directly. It allowed them to work out solutions to their problems and consider delays in the system when making decisions. Players' results in terms of contribution, volume, and productivity were plotted on large charts for all to see at the end of each round.

The design of the board game highlighted inefficiencies in the system, demonstrated the need for change, and pinpointed improvement opportunities. Players gradually realized that some customer orders were more profitable than others despite being priced below average – and that in order to identify and capture these orders, they had to share information.

The simulation also gave participants an insight into the outlook and decision-making processes of other managers at the plant. Before, they had focused exclusively on their own functions, paying little attention to how their actions influenced the plant's overall performance. The simulation forced them to consider the plant as a whole in both the short and the long term. They learned the importance of a coordinated strategy and a shared understanding of current performance and ultimate goals.

This new knowledge led to a breakthrough in the way the plant management teams worked together. They began to hold regular planning meetings to decide which business to target, how to bid for (and retain) it, and what kind of plant improvement projects to undertake.

Since the simulation, the division has made impressive progress. Throughput increased by over 7 percent per year for four consecutive years. Capacity utilization grew by 25 percent over the same period, and profitability more than tripled. Best of all, managers are now confident that their decisions have a much greater effect on performance than external factors ever could.

performance is usually judged on near-term results, they have little incentive to contemplate the long-term outcome of their decisions.

In recent years, simulations have gained popularity as a means of overcoming these barriers to learning. A deep body of theoretical literature asserts the power of simulations to change behavior by giving managers the opportunity to experiment, test their assumptions, and learn from their mistakes in a risk-free environment. But the literature has little to say about how the theory can be applied in real corporate situations.

In fact, over 60 percent of US corporations have used some sort of simulation. The bad news is that many of these efforts have failed to deliver genuine and lasting change. As a result, simulations are sometimes dismissed as having more entertainment than educational value. All the same, if they are properly designed, they can play a critical role in successful transformations.

2. MAINTENANCE

Simulations can help managers understand the complex, sometimes counterintuitive lessons that business dynamics modeling reveals.

The situation

A major electric utility developed a sophisticated business dynamics model to identify the primary levers for upgrading performance at its plants. Senior management decided that the numerous improvement opportunities identified by the model could best be explained to plant managers via a simulation.

The simulation

Using a game board, participants had to operate an imaginary generation plant. Careful maintenance of its machinery was vital to maximizing throughput – and, ultimately, revenue. Players took the roles of planner, operations manager, and engineering manager, deciding how resources should be allocated between machines and what kind and quality of maintenance activities should be performed.

Lessons learned

Though each operated autonomously, participants learned that open communication and a clear strategy helped the team achieve the best results. Their strategy was to focus maintenance efforts on the machines that had the greatest impact on overall throughput or were most in need of repair.

The simulation taught participants three things in particular. First, the only way to improve the performance of the whole system was to identify bottlenecks and then eliminate them by invoking a well-organized process. No single action would suffice.

Second, high-quality maintenance was vital. Managers had previously been tempted to do substandard maintenance work so as to get broken machines back online as soon as possible. The simulation showed them that better maintenance actually reduces machine failures.

Third, although high-quality maintenance consumed more money and time, it would cut overall maintenance costs by reducing the frequency of machine failures, and raise revenues by preventing interruptions in power generation.

The maintenance game can be applied in any operations-intensive company in which maintenance is a critical issue.

Designing a simulation

A simulation may be run on a computer or played out on a board; in either case, its aim is to show participants how effective their decisions really are. In a good simulation, managers will be able both to see the results of their usual behavior and to experiment with the impact of new working practices. Many of the simulations available on the market are generic and thus of questionable value, since managers will find it hard to learn from games that do not relate to their own business. If the designer of a simulation is not able to forge a clear link with the dynamics of a real company, the players are unlikely to do so either.

A successful simulation will be tailor-made for a specific organization. Devising a customized simulation is a costly and time-consuming endeavor. The designer will need an intimate understanding of both the company and its industry in order to assess the fundamental drivers involved. To gain such an understanding, he or she might conduct interviews with senior and

3. INDUSTRY RESTRUCTURING

The senior management team of another electric utility had to face up to the restructuring of power generation, which was about to be transformed from a regulated monopoly into a fiercely competitive commodity industry.

The situation

Competition meant the company would have to sell its output on the open market, so it would have to reconsider its pricing policy. To gain a deeper understanding of the new environment, senior managers took part in a simulation.

The simulation

Each of the thirteen participants represented one generating unit with fixed capacity. Combined, this capacity exceeded market demand. On each "day" of the simulation, the generating units submitted pricing bids to PoolCo, a body acting as an intermediary between buyers and sellers. Played by a computer, PoolCo ranked the bids by price and set the market price at the marginal bid that would meet market demand. All the units whose bids fell at or below the market price received that price for their energy; the rest stood idle, losing money because of their fixed costs.

The simulation consisted of 10 "days" of bidding, during which no conferring was allowed. At the end of each day, players were shown their cash balances, which summed up their fixed costs and margins, if any. By the end of the simulation, several players had gone bankrupt.

Lessons learned

Taking part in the simulation helped managers understand what competition entailed and how the commodity nature of electric energy would affect market price. They learned that competitors were likely to price close to their marginal production cost to ensure they would not stand idle. They also discovered that marginal cost was the main factor determining how competitive they could be.

The simulation demonstrated that fixed costs absorb cash supplies even when a generating unit is not running. Above all, it convinced players that they needed to be low-cost producers to compete in a commodity market.

middle managers, perform industry analyses such as benchmarking, use economic models like cost curves, and research best practices.

Whatever the methods used, a thorough grasp of the industry's past causal relationships is vital. To fine-tune the simulation, the designer must rigorously test its parameters by inputting real-world decisions and checking the accuracy of the simulated outcomes. Although it must be comprehensive enough to capture the complexity of a real business, the simulation should not be so intricate that it cannot clearly show the results of a set of actions. Designers may be tempted to continue adding variables in the effort to mimic reality, but every extra variable obscures the lesson. The trick is to find the right balance, simplifying the decision-making process yet keeping it detailed enough to represent the range of each manager's responsibilities.

A properly designed simulation exhibits only the principal features of a business system: in other words, the variables that drive the core business dynamics. A simulated hiring process might, for example, reflect the time it

takes to recruit a new employee and the way an individual's contribution improves with experience, yet exclude differences in performance among employees of equal tenure. The simulation must also establish a direct link between actions and performance to prevent participants questioning the validity of its results. There should be a logical connection between, say, the pricing and delivery terms of a bid and the prospect of its winning a customer order.

The more visible the logic, the better. If participants can understand not only their own area of expertise but also the dynamics of the entire business, they will realize how their decisions affect the rest of the organization. Simple devices like handwritten notes or poker chips representing employees, sales calls, or capacity can be passed between the players to help ensure transparency and reinforce learning.

After a successful simulation, participants will be keen to continue testing the system, pushing the limits, and improving their performance

The advantage of simulations based on board games is that they foster a team spirit that will help participants apply their learning in the real world. Though useful in their place, computer simulations can sometimes obscure the logic of causal relationships and isolate participants, depriving them of shared experiences.

Above all, simulations must be a challenge. At the end of a successful simulation, participants will not want to stop: they will be keen to continue testing the system, pushing the limits, and improving their performance. When their full attention has been captured in this way, learning will be automatic.

The case studies in the boxed inserts illustrate how simulations have changed managers' behavior and improved business performance in three real companies.

When to play

Simulations do not work in every situation. Since creating a tailored simulation is costly and time-consuming, and there are limits to the number of real-world complications that any simulation can incorporate, it is crucial to identify the kind of business that will derive most benefit.

Simulations are especially valuable when the decisions of many people have to be coordinated before an organization can be effective. Another criterion is a degree of dynamic business complexity, whereby gaps in time and distance have the potential to create misunderstandings between managers. In addition, delays between decisions and their effects should be inherent

in the real business system so that they can be collapsed in its simulated representation.

Done well, simulations can bring enormous benefits. Indeed, corporations using traditional management training programs may be wasting time and money by comparison. A well-designed simulation will yield much better results and prove more cost-effective, despite the initial expense of design and facilitation.

Simulations are also an ideal way of leveraging the experience of senior managers. When best practices developed over years are built into a simulation, multiple participants gain.

Until recently, few companies would have considered running a simulation designed specifically to meet their needs. Today, however, the software needed to create and support simulations is readily available, user-friendly, and continuously improving; moreover, top-level executives are growing more receptive to new approaches to implementing strategy. For their part, senior and middle managers are seeing their responsibilities expand in scope, and they are becoming more aware that doing the job properly means understanding and managing business dynamics issues. Once senior managers recognize their true power, simulations may come to play a crucial role in every successful corporate transformation. Q