IDEALOGIX INSIGHTS

To Err is Human:

The Importance of Evolutionary Change

why errors are not merely failures, but essential signals for learning, adaptation and evolutionary change in complex systems

At Idealogix, we take the view that systems technologies bring together systems thinking, identifying the right problem, and systems engineering, building the right solution. Central to this perspective is an appreciation of how systems evolve over time, and how change is introduced, absorbed, and stabilised.

In this context, one of the most persistent and often misunderstood characteristics of human activity systems is this: error is not an exception. It is an inherent feature.

'To err is human' is a familiar phrase. Less familiar, but more revealing, is how organisations respond to that reality.

Early in my career, a notice appeared on a company board stating: 'To err is human. To forgive is not company policy.' It was no doubt intended to promote discipline and accountability. In practice, it revealed something else entirely. It reflected a belief that error could and should be eliminated, rather than understood and managed. That belief is not only unrealistic. It is counterproductive.

ERROR AS A FEATURE, NOT A FAILURE

In any system involving human judgement, uncertainty, and interaction, errors are inevitable. They arise not from negligence alone, but from the very capabilities that make intelligent action possible. Decision-making requires interpretation. Interpretation involves assumptions. Assumptions are, by definition, imperfect.

> *"Error is not a deviation from intelligent behaviour. It is a consequence of it."*

More importantly, error is not merely unavoidable. It is valuable. Each error provides information about how the system behaves in reality, rather than how it was expected to behave. It exposes flawed assumptions, incomplete understanding, and hidden interactions.

> *"An error is a data point that could not have been obtained in any other way."*

From this perspective, the role of the system is not to suppress error, but to surface it early, understand it quickly, and use it to improve performance.

EVOLUTIONARY CHANGE AND THE VALUE OF ERROR

This is where the distinction between evolutionary and revolutionary change becomes critical. Evolutionary change introduces adjustments in manageable increments. Each step provides an opportunity not only to observe outcomes, but to learn from errors before proceeding further. Revolutionary change attempts to move from one state to another in a single step. In doing so, it compresses or removes the opportunity to learn from intermediate mistakes.

A simple analogy illustrates the point. Crossing a stream can be approached in two ways. One might attempt to leap from one bank to the other in a single movement. Alternatively, one might cross using stepping stones, placing each step carefully and adjusting as conditions require. A misstep on a stone can be corrected. A misjudged leap may not be.

> *"The stepping stones are not a sign of caution. They are a mechanism for learning through small, recoverable errors."*

In complex systems, the ability to learn from small errors is far more valuable than the ability to avoid them entirely.

WHY REVOLUTIONARY CHANGE FAILS IN HUMAN SYSTEMS

Revolutionary change is attractive because it appears decisive and efficient. It promises rapid transformation and clear outcomes. However, in systems characterised by uncertainty, interdependence, and human behaviour, it introduces a significant risk. It removes the opportunity to detect, understand, and learn from errors before they propagate.

When errors occur under evolutionary change, they are typically localised, visible, and instructive. They contribute directly to improved understanding. When errors occur under revolutionary change, they are often systemic, harder to diagnose, and more costly to recover from.

> *"Errors that are small and early are assets. Errors that are large and late are liabilities."*

DESIGNING ORGANISATIONS THAT LEARN FROM ERROR

The ability to benefit from error does not happen by accident. It must be designed into the system. Organisational structures and processes can either encourage learning or suppress it.

In particular, short tenure roles can create incentives that work against evolutionary learning. Fixed-term executive roles and democratic political cycles, for example, often create pressure for rapid, visible change. In such environments, there is a tendency toward *new broom* behaviour, where change is introduced quickly to demonstrate impact. This is not a failing of individuals. It is a feature of the system.

> *"Where tenure is short, the incentive is to avoid small, visible errors, even if that increases the risk of larger, systemic ones."*

From a systems technologies perspective, organisations should be designed to encourage the early exposure and constructive use of error. This may involve maintaining continuity of knowledge across leadership transitions, rewarding learning and adaptation rather than disruption, and embedding mechanisms for incremental experimentation. The objective is not to eliminate error, but to ensure that it occurs in a form that is visible, manageable, and informative.

CHECKS, BALANCES, AND LEARNING AT SCALE

There are circumstances in which revolutionary change is necessary. When a system is unsafe or unsustainable, incremental change may not be sufficient. In these cases, the opportunity to learn through small errors is reduced. It must therefore be replaced by other mechanisms. Independent assurance, rigorous testing, simulation, and staged validation become essential. These mechanisms attempt to surface errors before full-scale implementation. Even here, the principle remains the same. The objective is to expose and learn from error as early as possible.

> *"Where we cannot learn through iteration, we must learn through scrutiny."*

IMPLICATIONS FOR SYSTEMS TECHNOLOGIES

From a systems technologies perspective, the value of error reinforces a consistent theme. Systems thinking enables us to understand the problem space, including the assumptions that may later prove incorrect. Systems engineering enables us to develop solutions that can be tested, refined, and improved. Both rely on feedback.

> *"Effective systems are not those that avoid error, but those that learn from it faster than their environment changes."*

This aligns closely with the Perceive–Plan–Act construct explored elsewhere in this series. Each cycle provides an opportunity to generate insight from action, including the identification and correction of error. Designing for evolutionary change is therefore, in large part, designing for learning.

BEYOND HUMAN SYSTEMS: INTELLIGENT AGENTS AND AI

The argument extends beyond human systems to intelligent agents more broadly. Any system capable of acting under uncertainty, whether human or artificial, must make decisions based on incomplete and imperfect information. As a result, it will produce errors.

For AI systems, this has direct implications. Errors are not simply failures to be eliminated. They are signals that reveal the limits of the model's understanding. Well-designed AI systems treat these signals as opportunities for improvement. They monitor outputs, detect anomalies, and incorporate feedback to refine performance over time. In this sense, the value of error is not diminished in artificial systems. It becomes even more important.

> *"To err is not uniquely human. It is intrinsic to intelligent behaviour."*

CONCLUSION

Error is not a flaw in human systems. It is a fundamental characteristic of intelligent action, and a primary source of learning. Attempts to eliminate error entirely suppress the very mechanism through which systems improve. They create an illusion of control while increasing the risk of larger failures.

Evolutionary change recognises the inevitability and value of error. It provides a structure within which errors can occur early, be understood quickly, and be used to drive improvement.

> *"Progress is not the absence of error. It is the effective use of it."*

Within the Idealogix Systems Technologies perspective, this is a central principle. Understanding evolves. Solutions evolve. Systems evolve. The challenge is not to avoid error, but to design systems and organisations that can learn from it continuously and effectively.

FURTHER READING

For readers interested in exploring the concepts that underpin this article:

Human Error: James Reason's classic work examines why errors occur in human activity and technical systems, and why error should be understood systemically rather than treated simply as individual failure. https://www.cambridge.org/highereducation/books/human-error/281486994DE4704203A514F7B7D826C0

Risk Management in a Dynamic Society: Jens Rasmussen's influential paper explores risk management as a control problem across interacting social, organisational and technical levels. It is particularly relevant to the argument that errors and failures often emerge from system structure, not isolated acts. https://www.sciencedirect.com/science/article/pii/S0925753597000520

The Fifth Discipline: Peter Senge's work on the learning organisation places systems thinking at the centre of organisational learning, adaptation and long-term improvement. https://www.penguin.co.uk/books/391744/the-fifth-discipline-the-art-and-practice-of-the-learning-organization-by-senge-peter/9781905211203

Double-Loop Learning in Organizations: Chris Argyris' work on single-loop and double-loop learning helps explain why organisations must not only correct errors, but also challenge the assumptions, policies and mental models that give rise to them. https://theisrm.org/documents/Argyris%20%281977%29%20Double%20Loop%20Learning%20in%20Organizations.pdf

Sensemaking in Organizations: Karl Weick's work provides a useful foundation for understanding how people and organisations interpret ambiguous situations, construct meaning, and act under uncertainty. https://books.google.com/books/about/Sensemaking_in_Organizations.html?id=nz1RT-xskeoC