



TO ERR IS HUMAN

The Importance of Evolutionary Change



Why effective systems do not eliminate error – they learn from it.

1. CORE PREMISE

In human activity systems, error is not an exception. It is an inherent feature of intelligent action.

The challenge is not to eliminate error, but to surface it early, understand it quickly, and use it to improve performance.



“ An error is a data point that could not have been obtained in any other way. ”

2. ERROR AS LEARNING

Decision-making requires interpretation. Interpretation involves assumptions. Assumptions are never perfect.

Errors reveal flawed assumptions, hidden interactions, and incomplete understanding.

Small, visible errors create learning opportunities.

“ Error is not a deviation from intelligent behaviour. It is a consequence of it. ”

3. TWO APPROACHES TO CHANGE

EVOLUTIONARY CHANGE

- Introduces change in manageable increments
- Allows learning between steps
- Keeps errors small, visible, and recoverable
- Supports adaptation and resilience

REVOLUTIONARY CHANGE

- Attempts large-scale change in one step
- Compresses or removes learning opportunities
- Makes errors harder to diagnose
- Increases risk of costly, systemic failure

“ Errors that are small and early are assets. Errors that are large and late are liabilities. ”

4. THE STEPPING STONES ANALOGY



- Evolutionary change is like crossing a stream on stepping stones.
- Each step provides an opportunity to adjust and learn.
- 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. ”

5. DESIGNING ORGANISATIONS THAT LEARN

- Reward learning, not blame
- Expose errors early
- Preserve continuity of knowledge
- Encourage incremental experimentation
- Design processes that favour learning over disruption

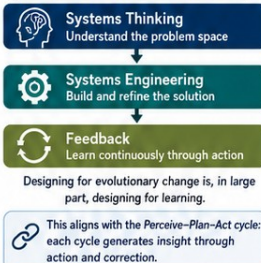
Short tenure roles can encourage rapid, visible change rather than gradual learning. The system should counter this tendency.

6. WHEN REVOLUTIONARY CHANGE IS NECESSARY

Sometimes radical change is unavoidable. When we cannot learn through iteration, we must learn through scrutiny.

- Independent assurance
- Rigorous testing
- Simulation
- Staged validation

7. IMPLICATIONS FOR SYSTEMS TECHNOLOGIES



8. BEYOND HUMAN SYSTEMS

- The principle extends to intelligent agents and AI.
- Any system acting under uncertainty will produce errors.
- Well-designed AI systems use error signals as opportunities for improvement.

“ To err is not uniquely human. It is intrinsic to intelligent behaviour. ”

PROGRESS IS NOT THE ABSENCE OF ERROR. IT IS THE EFFECTIVE USE OF IT.

Effective systems do not try to suppress every error. They create conditions in which small errors appear early, are understood quickly, and drive continuous improvement.

