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INFORMATION TECHNOLOGY AND THE COMPLEXITY CYCLE

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ABSTRACT

Aim/Purpose	In this paper we propose a framework identifying many of the unintended consequences of information technology and posit that the increased complexity brought about by IT is a proximate cause for these negative effects.
Background	Builds upon the three-world model that has been evolving within the informing science transdiscipline.
Methodology	We separate complexity into three categories: experienced complexity, intrinsic complexity, and extrinsic complexity. With the complexity cycle in mind, we consider how increasing complexity of all three forms can lead to unintended consequences at the individual, task and system levels. Examples of these consequences are discussed at the individual level (e.g., deskilling, barriers to advancement), the task level (e.g., perpetuation of past practices), as well as broader consequences that may result from the need to function in an environment that is more extrinsically complex (e.g., erosion of predictable causality, shortened time horizons, inequality, tribalism). We conclude by reflecting on the implications of attempting to manage or limit increases of complexity.
Contribution	Shows how many unintended consequences of IT could be attributed to growing complexity.

The full paper has been published as the following and is being presented at this conference:

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Findings	We find that these three forms of complexity feed into one another resulting in a positive feedback loop that we term the Complexity Cycle. As examples, we analyze ChatGPT, blockchain and quantum computing, through the lens of the complexity cycle, speculating how experienced complexity can lead to greater intrinsic complexity in task performance through the incorporation of IT which, in turn, increases the extrinsic complexity of the economic/technological environment.
Recommendations for Practitioners	Consider treating increasing task complexity as an externality that should be considered as new systems are developed and deployed.
Recommendations for Researchers	Provides opportunities for empirical investigation of the proposed model.
Impact on Society	Systemic risks of complexity are proposed along with some proposals regarding how they might be addressed.
Future Research	Empirical investigation of the proposed model and the degree to which cognitive changes created by the proposed complexity cycle are necessarily problematic.
Keywords	complexity, task complexity, information technology, homophily, punctuated equilibrium, systemic risks, information overload, fitness, rugged landscape, unintended consequences

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