Adaptive Redundancy in Documentary Systems: A Complex Systems Model of the Book of Mormon's Transmission Architecture

Abstract

How do documentary traditions maintain informational continuity despite loss, corruption, and incomplete transmission? Historical and literary traditions rarely develop through simple linear copying. Instead, they evolve through networks of textual witnesses, editorial interventions, abridgments, translations, and partial information loss. This paper develops a complex systems model of documentary resilience and applies it to the transmission architecture described in the Book of Mormon, a nineteenth-century American religious text that presents itself as a translation of an ancient documentary tradition. Within its narrative, multiple records are produced and transmitted across generations before being selectively abridged and ultimately translated into English. Among these records are two distinct documentary traditions—the Large Plates and Small Plates of Nephi—which are described as serving different purposes while preserving overlapping aspects of the broader tradition.

The model draws on the distinction between redundancy and degeneracy developed in information theory and complexity science. Shannon's information theory established redundancy as a mechanism for maintaining reliable communication in the presence of noise (Shannon, 1948), while subsequent complexity research distinguished redundancy from degeneracy, in which structurally different components perform overlapping functions (Tononi et al., 1999; Edelman & Gally, 2001). Degeneracy has subsequently been linked to robustness and evolvability in complex adaptive systems (Whitacre, 2010). Building on this distinction, the paper proposes documentary degeneracy as a framework for describing structurally differentiated documentary channels that preserve overlapping informational functions. The Large Plates and Small Plates provide a case in which documentary specialization and functional overlap coexist: the former emphasizes historical and political information, while the latter emphasizes theological and prophetic material, yet both contribute to the preservation of narrative continuity and collective memory.

The narrative account of the loss of approximately 116 manuscript pages during the English translation is modeled as a perturbation within this documentary network. Rather than reproducing the lost material through an identical backup, the described transmission architecture contains an alternative documentary pathway with a different structure, content, and editorial

purpose but overlapping informational functions. The episode therefore provides a conceptual stress test of the proposed model, illustrating how system-level continuity may be maintained through functional overlap among differentiated components rather than through exact textual replication.

The broader contribution of the paper is to extend the concept of degeneracy from biological and other complex systems to the analysis of documentary transmission. By integrating information theory, complexity science, and textual analysis, the proposed framework shifts attention from the fidelity of individual textual witnesses toward the distribution, overlap, and persistence of informational functions across a documentary network. Documentary degeneracy provides a conceptual basis for investigating how documentary systems achieve resilience through differentiated but functionally overlapping transmission pathways, with potential applications to comparative and computational studies of documentary evolution, cultural memory, and information persistence.

References

Edelman, G. M., & Gally, J. A. (2001). Degeneracy and complexity in biological systems. *Proceedings of the National Academy of Sciences, 98*(24), 13763–13768. https://doi.org/10.1073/pnas.231499798

Shannon, C. E. (1948). A mathematical theory of communication. *Bell System Technical Journal, 27*(3), 379–423; *27*(4), 623–656. https://doi.org/10.1002/j.1538-7305.1948.tb01338.x

Tononi, G., Sporns, O., & Edelman, G. M. (1999). Measures of degeneracy and redundancy in biological networks. *Proceedings of the National Academy of Sciences, 96*(6), 3257–3262. https://doi.org/10.1073/pnas.96.6.3257

Whitacre, J. M. (2010). Degeneracy: A link between evolvability, robustness and complexity in biological systems. *Theoretical Biology and Medical Modelling, 7*, 6. https://doi.org/10.1186/1742-4682-7-6