

Fitness Landscapes for Academic Libraries

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Academic Libraries don't get no respect. Just ask Bill Crowley. Throughout the nineties, academic libraries in Canada were subject to cutbacks in funding and support at a time when competition from other information sources was increasing. Several authors have tried to lay blame for this situation on university administrators and public sentiment (Crowley, 1997; Stoffle, 1996). The blame, however, lies with the library. The administrators of academic libraries need to turn around and pay attention to the landscape around them.

The value of academic libraries is being called into question:

“Funding stagnation and cuts are not simply the results of temporary downshifts in the economy, but represent a shift in priorities and a public disillusionment bordering on hostility for what is seen as unnecessary and self servicing academic privilege.” (Stoffle, 1996)

It seems that academic libraries lack the ability or resolve to change the current environment. Stoffle tells us that a “transformation” is required and that library administration needs to adapt and evolve. Vague calls for updating and improving the entire gamut of library operations counters the laws of nature as described by the Fitness Landscape Paradigm. As this paper will demonstrate, Fitness Landscapes suggest that focused intervention efforts will be more successful at overhauling the entire system.

The notion of Fitness Landscapes evolved from the engineering concept of entropy: energy will flow from high to low until no energy differential exists. This dynamic is represented as Figure 1. The spike represents an area of high energy (Heylighen, 1999).

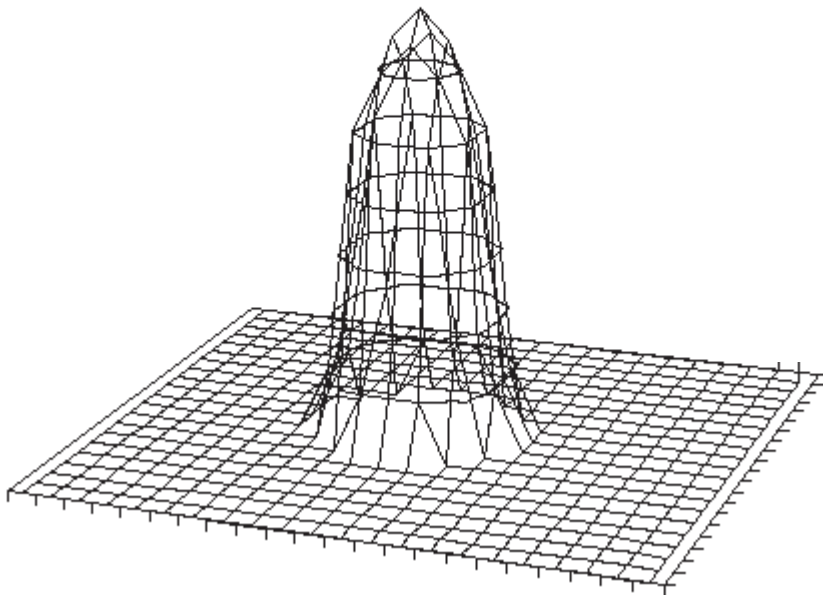


Figure 1 Idealized Fitness Landscape

This notion of entropy has been extended to biology. In evolution, life forms climb the spikes of the Fitness Landscape in order to control more energy. The landscape is not static. As a life form evolves, the local peak it is evolving toward may collapse due to a changed environment or the valley between peaks may suddenly heave as Kuhn has hypothesized with his Paradigm Shifts (1962). It is

obvious, however, that the evolutionary success of the life form is not dependent just on how well it adapts to the local peak but how it adapts to the entire Fitness Landscape.

Applying the principles of Fitness Landscapes and complexity to everyday problems is well documented in fields such as business administration and product management (Brown, 1997; Coleman, 1999). There is even a journal devoted to the topic (*Emergence*). It is appropriate to apply these principles to the administration issues of academic libraries.

The Library Landscape

Crowly's assertion that "excellence in academic library science" has become "commonplace" and less likely to attract support shows faith in the local peak of the library's fitness landscape. It also shows a dangerous level of apathy for the landscape that will ultimately define the longevity of the academic library: funding. Crowly's fitness landscape can be represented by Figure 2. Note that the entropy of the organization is very low and it is threatened by the surrounding environment.

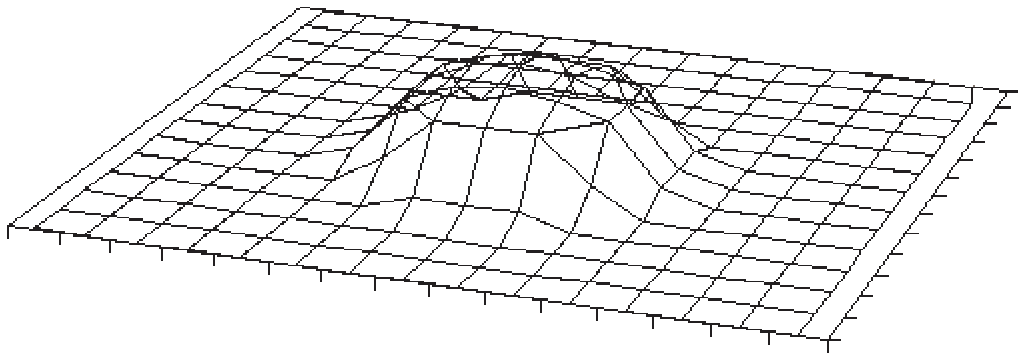


Figure 2 Fitness Landscape of Academic Libraries

The environmental threat has been noticed by authors such as Stoffle (1996). She attempts to restore the fitness of academic libraries by borrowing practices from the world of business such as reengineering and benchmarking. The call has been taken up by several authors: Giesecke & McNeil (1999) with Core Competencies, Deiss & Giesecke (1999) with Scenario Planning, and Patkus & Rapple (2000) with Core Values. In many ways, *Library Administration and Management* contains much of the dogma that was contained in the *Harvard Business Review* during the early nineties. Unfortunately, libraries may also experience the 80% failure rate of organization transformation projects that these practices (Harung, 1999, p. 205).

The problem with Stoffle's recommendations and the high failure rate for organizational change projects is obvious from Figure 2. Organizational change projects attempt to inflate the entire entropy dome of the organization leading to high levels of energy exerted over a large area. The energy then dissipates as radiated energy after making little change to the landscape. A better solution would be to quickly create a small but extreme localized peak. A sharp peak will require less energy to create and will radiate energy very quickly. The energy release may be sufficient to perturbate the local system and force it to change to a new regime. See Figure 3 for a visualization of this concept.

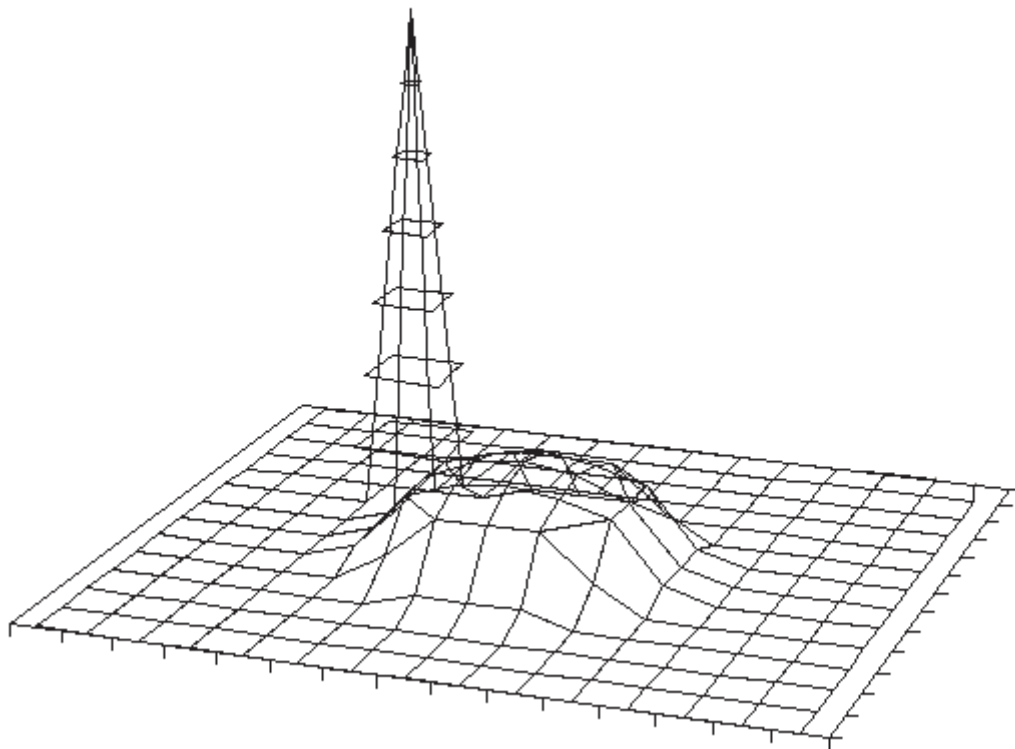


Figure 3 Fitness Landscape with Localized Peak

The notion of small peaks or outgrowths forming to dissipate energy is common in nature. Lava flows, for example, often release energy through pillows, diversions, or shoots that branch from the main flow. These local branches occur when the prevailing environment limits the extension of the main lava flow (Griffiths, 1993). The lava analogy is similar to Stoffle's discussion of "funding stagnation" and capabilities of "leaps forward and breakthrough performance." (Stoffle, 1996)

In administration terms, small and focused improvements are more achievable and have a greater chance of long-term success than complete and vague overhauls just as lava has a better chance of forming a flow rather than a massive dome.

The current business literature supports this idea of making dramatic changes to the local fitness landscape. Brodbeck (2002) recommends the use of "Pockets of Excellence" within an organization to change business models and interactions with customers. Business has interpreted these pockets as special teams devoted to particular projects or skunkworks. Library administrators may create pockets by creating special library divisions that are more amenable to customer requirements for funding demands.

Pockets of library excellence already exist at the University of Western Ontario. Unfortunately, these collections are not listed in the OPAC but they receive rigorous use by patrons and are the result of grants and endowments. Examples of collections are those contained at The Center for Research on Violence Against Women and Children and at The Institute for Catastrophic Loss Reduction.

A practical example of an academic library overcoming the funding constraints of its fitness landscape by applying Pockets of Excellence is the Queen's University Belfast library (Latimer, 1996). Due to the funding constraints and the local political economy, the university library required external sources of financing. They created a value-added for-fee information retrieval service for several professional associations. The popularity of this Pocket of Excellence grew and the library began to offer these services to many other associations. The localized peak of for-fee services essentially created a change in the fitness landscape that has resulted in an income stream for the library and increased public awareness and respect for the role of the library in the local professional community.

Competition on the Horizon

Fitness Landscapes are valuable for assessing the fiscal environment of an academic library. Fitness Landscapes are also an effective tool for recognizing the evolutionary competition faced by academic libraries. This competition has recently come from sources such as bookstores, online education, and even bibliographic database vendors (Soffle, 1996).

Competitors interact on the same fitness landscape and struggle either to attain the same fitness peaks or to create new ones. This competition results in a great deal of energy flux and interchange as demonstrated by the competing peaks in Figure 4. This profile of competing peaks is common in biology with life forms that are evolving to a similar fitness profile despite geographic isolation such as jaguars and leopards.

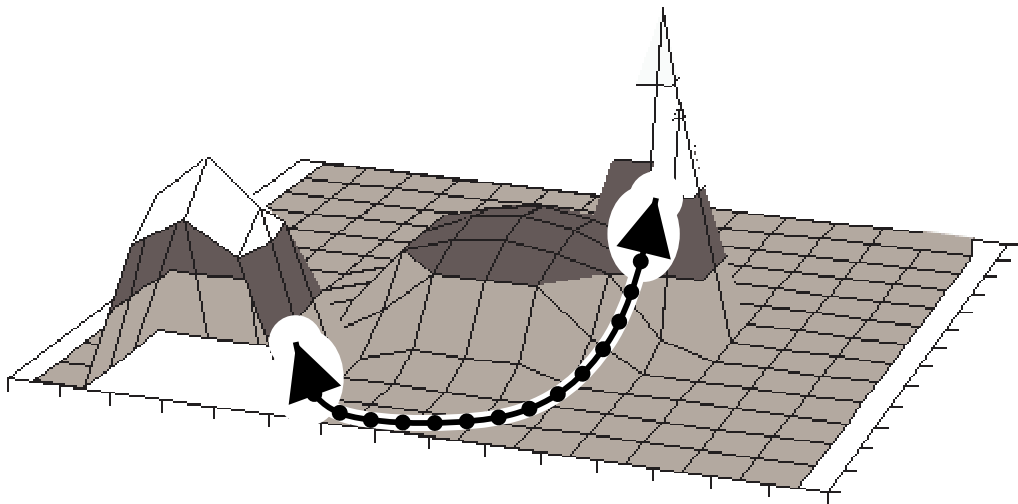


Figure 4 Fitness Landscape showing Competition and Energy Flux

Although evolving along parallel paths, jaguars and leopards never have to compete for the same resources. Fortunately, in business there is an alternative to competition: co-opetition. Co-opetition (coined by Novell founder Ray Noorda) is a scenario where erstwhile competitors agree to cooperate to attain a common goal. Using co-opetition two organizations can essentially combine their local peaks to create an uber-peak that may radiate sufficient energy to cause a paradigm shift. See Figure 5.

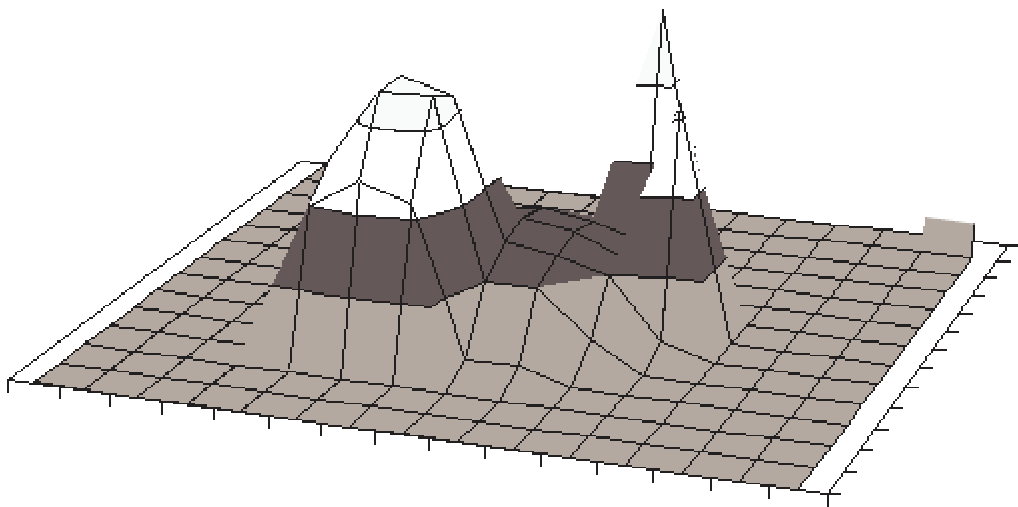


Figure 5 Fitness Landscape showing Co-opetition

It may not have caused a paradigm shift but Bowling Green State University's business library has embraced co-opetition as an operating principle (Forsythe, 1997). Due to funding pressure, library administrators agreed to cooperate with their erstwhile competitors: publishers. The library has now established a bidding process for books where the library administration essentially creates a specification of their budget and the type of collections development they require. Publishers can then bid on Bowling Green's specification. This agreement between the library and the publisher enables both parties to remain true to their strategic plan while eliminating competitive friction.

Conclusion

Academic libraries are under pressure. Large scale reengineering is not the solution. For academic libraries to survive in the future, administrators have to be aware of their environment. Fitness Landscapes provide us with a tool to interpret the prevailing conditions of the environment and to deal with competition. This tool is currently telling administrators to proceed with small and aggressive “Pockets of Excellence”. Academic libraries as massive and centralized edifices may be evolving toward smaller and nimbler organizations. Can Jurassic University’s Brontosaurus Library convert itself into the Aviary Centers of Excellence? The laws of nature tell us that survival depends on it.

References

- Brodbeck, P.W. (2002). Implications for organization design: teams as pockets of excellence. *Team Performance Management: An International Journal*, Vol. 8 (1/2), pp. 21-38.
- Brown, S.L. & Eisenhardt, K.M. (1997). The art of continuous change: Linking complexity theory and time-paced evolution in relentlessly shifting organizations. *Administrative Science Quarterly*, March 1997.
- Coleman, H.J.Jr. (1999). What Enables Self-Organizing Behavior in Businesses. *Emergence*, Vol. 1 (1).
- Crowley, B. (1997). The Dilemma of the Librarian in Canadian Higher Education. *Canadian Journal of Information and Library Science*, Vol.22 (1), pp.1-18.
- Deiss, K. & Giesecke, J. (1999). From Here to There: Moving to the Future Through Scenario Planning, *Library Administration and Management*, Vol. 13 (2), pp.335–340.
- Forsyth, J.H. (1998). Monitoring a Business Approval Plan for Balance and Numbers. *Library Acquisitions: Practice & Theory*, Vol. 22 (3), pp.335–340.
- Griffiths, R.W. & Fink, J. (1993). Effects of surface cooling on the spreading of lava flows and domes. *Journal of Fluid Mechanics*, Vol. 252, pp.667-702.
- Giesecke, J. & McNeil, B. (1999). Core Competencies and the Learning Organization. *Library Administration and Management*, Vol. 13 (3), pp. 158-166.
- Harung, H.S., Heaton, D.P., Alexander, C.N. (1999). Evolution of organizations in the new millennium. *Leadership & Organizational Development Journal*, Vol. 20 (4), pp.98-207.
- Heylighen, F. (1999). *Fitness Landscapes* [part of web site Principia Cybernetica]. Retrieved from <http://pespmc1.vub.ac.be/FITLANDS.html> on October 14, 2002.
- Kuhn, T. S. (1962). *The Structure of Scientific Revolutions*, Second Edition, Enlarged, The University of Chicago Press, Chicago, 1970.
- Latimer, K. (1996). Free To Fee: The Current Account From An Academic Library. In *62nd IFLA General Conference - Conference Proceedings - August 25-31, 1996*. Retrieved from <http://www.ifla.org/IV/ifla62/62-latk.htm> on October 16, 2002.
- Patkus, R. & Rappale, B. (2000). Change the Culture of Libraries: The Role of Core Values. *Library Administration and Management*, Vol. 14 (4), pp. 197-204.

Stoffle, C.J., Renaud, R. & Veldof, J.R. (1996). Choosing our Futures. *College and Research Libraries*, Vol. 57 (3), pp.213-225.