THE PSYCHOLOGY OF INFORMATION SEARCHING:

TOWARDS A SYSTEMS SATORI FOR INFORMATION PROFESSIONALS

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ABSTRACT

Creative problem-solving in the reference process is discussed. Benefits of intuitive, non-linear thinking, reasons why information professionals should adopt new strategies, and specific creative thinking techniques are reviewed. With "systems satori" a new concept is introduced in which the synergy of a systems approach, featuring the equifinality of Bates' information search tactics, combined with insight, assisted by integrated brain maneuvers, is seen to facilitate problem-solving and information searching. Also posited are individual gains, such as personal growth and improved performance. Areas of future research are identified.

LA PSYCHOLOGIE DE LA RECHERCHE D'INFORMATION:

VERS UN "SYSTEME SATORI" POUR LES PROFESSIONNELS EN INFORMATION

RESUME

On discute ici de la façon de résoudre avec créativité les problèmes reliés au procédé de référence. Les bénéfices de l'intuition, la façon de penser non-linéaire, voilà autant de raisons pourquoi les professionnels de l'information devraient adapter de nouvelles stratégies. Des techniques créatrices spécifiques de penser sont révisées. Avec les "systèmes satori", un nouveau concept est introduit par lequel l'approche synergique du système, caractérisée par l'équifinalité des tactiques de recherche d'information de Bates, combinée avec la perspicacité et secondée par les manoeuvres intégrées du cerveau est vu comme pouvant faciliter la résolution des problèmes et la recherche d'information. Sont aussi considérés les gains individuels, tels que la croissance personnelle et le rendement amélioré. Les champs de recherche future sont identifiés.

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First let us imagine for a moment: what would it be like were all librarians sytems librarians? We see collections in impeccable order, desks and work areas neat and tidy. Files are coherent and consistent. Document and information retrieval is absolutely certain because everything is exactly where it should be. Planning predominates; analytical studies and decision support systems proliferate. In short, order prevails, for the ultimate system denies the existence of entropy, the second law of thermodynamics which states that library collections forever tend toward states of greater randomness. No, here negative entropy[1] or ever increasing organization is the norm, truly the practitioner's dream come true ... or so it would seem.

In contrast, let us now consider the other extreme. Imagine, if you will the relational, analogic, nonlinear world of the intuitive librarian. Collections are verging on chaos, books and pamphlets scattered everywhere (this is not meant to sound familiar), but this is no cause of concern, for staff are trained connoisseurs of chaos[2] who decipher disorder with uncanny skill and reconcile random arrays at a glance. Retrieval fortuitously follows memory and hunch. Haphazard searches, commonly known as browsing, consistently bring reliable results: authoritative reference works, for instance, are constantly being rediscovered. Yes, here the elation of serendipity, of chance encounters of the third kind, is the norm, and the library is a happy, homey haven for patrons and cleaning staff alike.

Doubtless somewhere between these two pictures the real world of information services can be seen to fluctuate. While systems and catalogue librarians may tend toward the former vision, reference librarians are likely to be drawn to the latter, for, as William Katz says, "reference service ... is more art than science."[3] But still this gray area in between fascinates me: what would it be like, I wonder, to combine logical analysis with creative problem-solving? Would information workers stand to improve their performance and hence their professional status? Would they become more responsive to technological change, more innovative, more involved in the future political and social role of information exchange?

To answer these questions I initially review the work of Marcia Bates on the psychology of human information searching, paying particular attention to integrated brain approaches to creative problem-solving and information seeking. I then discuss the benefits of non-linear thinking, suggest why information professionals might want to explore this direction, identify various creative thinking techniques, and conclude with suggestions for future research.

Marcia Bates pointed out that, in contrast to managers who rely on a variety of decision support systems and systems staff who regularly utilize cost-benefit analysis, information searchers have "no such science ... to draw on while they are in the process."[4] Seeking to fill this gap, Bates studied information search strategies and tactics and devised models to facilitate information searching. Inevitably her research led her to study the psychology of problem-solving, including mental structuring and mental pattern breaking. Having focused on the strengths and flexibility of human thinking processes, Bates cogently identified the need "to develop and utilize the skill of quickly achieving a mind state in which rational and intuitive capacities work together in solving search problems."[5]

Figure 1 lists complementary mental characteristics commonly attributed to cerebral hemispheric specialization.[6,7] Now, in the present context, it matters little whether thinking is actually divisible into left and right brain functions. For regardless of the nature and degree of information exchange between the two halves, thinking is commonly differentiated as logical or intuitive, and, generally speaking, most people tend to rely more on one mode than the other. Since creative problem-solving requires an interplay of these two modes of thinking, information searchers could benefit from using integrated brain approaches, some characteristics of which are suggested in Figure 2.

Creative problem-solving in work situations is, of course, quite common in fields where imaginative solutions are essential; business innovations, artistic inspiration and scientific discovery are obvious examples. But benefits also accrue to individuals when they explore their full mental potential. At times help is needed in planning careers, managing change or dealing with personal crises. Stress management courses often draw heavily on right brain literature. Counselors and therapists of all sorts commonly call upon an individual's innate mental capacities to deal with difficult decisions or crisis situations, whether personal or work-related. In fact, some feel this is the only way to achieve a lasting solution.[8]

Society also stands to gain. David Loye, a prominent futurist, sees the need for more "right-brainism" to counter the environmental stresses and pervasive political unease which have evolved from rapid technological growth and other rationalistic excesses.[9]

FIGURE 1

COMPLEMENTARY MENTAL CHARACTERISTICS

Linear	Nonlinear
Verbal language (words)	Image language (pictures)
Digital	Analogue
Behavioural	Experiential
Objective	Subjective
Manipulative	Reactive
Rational	Emotional
Tangible	Intuitive
Analytic	Synthesizing
Analytic	Relational
Analytic	Holistic
Component	Overview
Logical	Symbolic
Part	Whole
Form	Colour
Foreground	Gestalt (background)
Separate	Interconnected
Departmental	Relationships
Linear	Geometric, three dimensional
Detail	Pattern recognition
Time	Space
Real Time	Time-free
Past	Here and now
Orthodox	Creative
Intellect	Intuition
Convergent	Divergent
Secondary	Primary
Abstract	Concrete
Directed	Free
Propositional	Imaginative
Sequential	Multiple
Successive	Simultaneous

FIGURE 2

INTEGRATED BRAIN CHARACTERISTICS

Linear	Integrated	Nonlinear
LOGICAL	CREATIVE	INTUITIVE
PAST	HERE & NOW	FUTURE
ANALYSIS	PATTERN	SYNTHESIS
PARTIAL	ESSENCE	WHOLE
RIGIDITY	FLEXIBILITY	FLOW
REPETITION	IDEAS	HUNCHES
CATEGORICAL	COOPERATIVE	INTERWOVEN
SEQUENTIAL	SIMULTANEOUS	NONTEMPORAL
VERBAL	SYMBOLIC	NONVERBAL
RATIONAL	ADAPTABLE	NONRATIONAL
DIGITAL	PHOTOGRAPHIC	SPATIAL
OPAQUE	TRANSLUCENT	TRANSPARENT
ORTHODOX	CREATIVE	INNOVATIVE

Expressing this same message is Sally Grande who perceives continued emphasis on intellectual development at the expense of intuition as a loss of creativity to both the individual and to Western culture as a whole.[10]

Thus creativity can be seen to play an important role in work settings, in personal well-being and in cultural vitality. It is only natural, then, for information specialists to explore creative means to assure top performance while developing ever more efficient and effective information retrieval and delivery systems. I would therefore like to identify specific techniques and strategies which can facilitate problem-solving and information searching. But to put them in the proper perspective, to indicate why creative approaches hold such promise, let me first review the current situation of the information profession.

Right to the point is the title of Mary Berger's recent article: "The Endangered Species? Can Information Service Survive?"[11] Variously phrased, we have heard this question before, and so we are not at all surprised to hear it again midst coincident reports of the predominantly non-library development of information products, of the 25 to 30% annual increase in the number of data bases, of the likely future prevalence of remote electronic access to information which may mean a secondary or peripheral role for information specialists. Berger confronts this situation with probing questions and counters insecurity with the kind of challenge that invites an innovative, imaginative response: "A better solution is to find a way to meet these needs in non-traditional ways ... We need different kinds of thinking, different perceptions of information needs and how to meet them."[12] In this Mary Hoban would certainly concur, for two years earlier she noted the relevance of the behavioral sciences and social psychology to the information profession and advised librarians to change their outlook and use continuing education to mold a new career slot.[13]

The information explosion and the current proliferation of data bases just mentioned are not awesome obstacles only because of mere quantity, for computers, after all, are helping immensely to process information quickly and accurately. No, here the real dilemma is the overabundance of information which may have unexpected reactionary results.[14] For just as the quality of reference service declines as impatient callers queue up with querulous queries, an individual's decision-making ability is compromised by information overload. If people have difficulty coping in an information saturated society, how much more stressful will be the role of information professionals? Need we be concerned about the nature of the information packages we deliver as it affects our patrons' use of that information? Or is it enough merely to gather the information and deliver it without further ado?

To a certain extent we are operating in the dark, for "very little is known about political man as an information gatherer and

information digester under different conditions of information abundance and scarcity."[15] While it is generally assumed that freedom and decision-making ability correlate positively with information availability, it is paradoxical that quick, computerized access to information could compromise expected gains and even precipitate the opposite results.[16] With critical decision making in the balance, especially in research reference situations or in management information systems, an integrated, creative approach to information gathering would assure better results and, with the aid of neuro-linguistic programming techniques, may promote progressive and imaginative information digesting.

Doubtless some information specialists perform in such fashion. Success in these efforts is to be applauded and, if possible, documented for the benefit of others. But many are clearly having difficulty both in performing and in coping with the pressures associated with direct-serive functions. In a recent article Sandra Neville discusses the individual's need for coping strategies for job stressors such as unrealistic deadlines and expectations, anxiety and uncertainty, frustrated ambition and organizational politics, emotional interference and intolerance for ambiguity.[17] Unless we are able to successfully cope with job stressors, our performance is bound to suffer.. And, unfortunately, this appears to be the case, for recent reference studies reveal disappointingly low levels of service.

Peter Hernon reported on a survey in different kinds of libraries. Although his study was still in progress, his preliminary observation was regretfully discouraging: "it doesn't look too good."[18] And an earlier survey of public libraries revealed an amazingly low 50% success rate; that is, "about half the time the libraries delivered the correct answer to the query, and about half the time they did not."[19]

In order to remedy this deplorable situation, in order to achieve some measure of professional status through competent, reliable and effective information delivery, we need innovate approaches to persistent problems in changing times -- in short, a systems satori for information professionals. Satori is an inner perception, an intuitive looking-into, or, simply, the acquiring of a new viewpoint.[20] By "systems satori" I mean a strategy to meet change with change. Certainly the information profession is reaching a critical point.[21] In addition to rapid technological change midst a prolonged economic recession are the considerable pressures just discussed: exocentric industrial development of information products, data base proliferation and information overload, job stress and burnout, and low or inconsistent performance levels.

Nevertheless, it must be said that the challenge to meet these formidable conditions is also an attractive one, for information is the most focal and universal of contemporary industries. And there

is no doubt that it is a tremendously "exciting time to be in the library and information profession ... regardless of the type, size or location of the service one is involved in."[22] Thus for librarians to meet and live with change, for them to become agents of change, they require a reorientation, a new, unorthodox approach, a stragetic refreshening, or what I call a systems satori.[23]

Having discussed what kinds of benefits result from intuitive thinking and why information professionals might want to be receptive to new ways of information seeking, I would now like to indicate how one might deliberately cultivate integrated brain approaches. One key is simply being more aware at all times by giving full attention to detail and by maximizing biofeedback. Good results will automatically elicit positive feedback and immediate intuitive recall in future situations of comparable circumstances. Poor results will operate in a complementary fashion; ineffective action will be less likely to be repeated on future occasions. This behavior pattern is universal, something we all do every day, and we would do more of it were it not for the bewildering array of psychological stumbling blocks that tend to compromise our efforts. The following remarks pertain to helping overcome these obstacles and encouraging consistent top level performance.

In an article on business innovation, Derm Barrett lists various creative thinking techniques; these are shown in Figure 3.[24] Lacking time to go into detail, I note that some are rather self-explanatory. You may even recognize a few that you use upon occasion, such as brainstorming, divergent thinking and incubation.

Perhaps more to the point of information searching are Bates' information search tactics; these are shown in Figure 4.[25] These tactics may be undertaken to further an information search. In developing this list Bates designed a model which could serve both to facilitate information searching as well as to study the process.

In contrast, the focus of her idea tactics, shown in Figure 5, is psychological. As the term implies, idea tactics "are intended to help improve the information specialist's thinking and creative processes in searching" by helping to generate new ideas or solutions to problems encountered in the process.[26]

In looking over this list one can almost see the spatial expansion of nonlinear thinking: e.g., "focus", "wander", "skip", and "dilate". Also note the power of such terms as "break", "breach", "jolt" and "catch". The strength of these words signifies that something in cooperation with logical thought processes is needed to interrupt current mental structuring and open the way to alternative means of finding a solution. This is an important point, for "if insight is the essential element in intelligent problem-solving, fixation is its archenemy. Fixation is overcome and insight attained by a sudden shift in the way the problem or the objects involved in it are viewed."[27]

FIGURE 3

CREATIVE THINKING TECHNIQUES

1. BRAINSTORMING
2. SYNECTICS
3. MORPHOLOGY
4. FORCED ASSOCIATION
5. RANDOM WORD-PLAY
6. DELIBERATE DREAMING
7. BIONICS
8. ALPHA AND THETA TECHNIQUES
9. VALUE ENGINEERING
10. ATTRIBUTE LISTING
11. LATERAL THINKING
12. DIVERGENT THINKING
13. INCUBATION
14. IMAGERY
15. ANTITHETICAL THINKING
16. METAPHORICAL THINKING

FIGURE 4

INFORMATION SEARCH TACTICS

Monitoring Tactics

1. CHECK
2. WEIGH
3. PATTERN
4. CORRECT
5. RECORD

File Structure Tactics

1. BIBBLE
2. SELECT
3. SURVEY
4. CUT
5. STRETCH
6. SCAFFOLD
7. CLEAVE

Search Formulation Tactics

1. SPECIFY
2. EXHAUST
3. REDUCE
4. PARALLEL
5. PINPOINT
6. BLOCK

Term Tactics

1. SUPER
2. SUB
3. RELATE
4. NEIGHBOR
5. TRACE
6. VARY
7. FIX
8. REARRANGE
9. CONTRARY
10. RESPELL
11. RESPACE

FIGURE 5

IDEA TACTICS

1. THINK
2. BRAINSTORM
3. MEDITATE
4. CONSULT
5. RESCUE
6. WANDER
7. CATCH
8. BREAK
9. BREACH
10. REFRAME
11. NOTICE
12. JOLT
13. CHANGE
14. FOCUS
15. DILATE
16. SKIP
17. STOP

There are two observations I would like to note here. Bates' idea tactics represent various ways to achieve this mental shifting, this transcendence of insight over fixation. Now there is a systems concept for this: equifinality, or different means to the same end. In fact, equifinality is the first principle of general systems theory.[28] That's the first point. The second is that satori is a Japanese word for insight. Together they form the basis of a systems satori for information professionals.

We have just been considering various creative thinking techniques and mental skills, search strategies and idea tactics, but one vital element needs to be re-emphasized. Recall my earlier mention of awareness, attention to detail and the crucial role of biofeedback in effecting behavioral modification for improved information service. In order to optimize our level of performance, we merely need to facilitate feedback. And we can do this by eliminating negative self-judgements, like fear and self-doubt, and other internal distractions, such as memories of past trials, expectations of future events, and thoughts of peripheral activities currently going on. Even our internal dialogue, that most intimate and persistent of companions, must be stopped, for "learning from experience requires maximum feedback, which is only possible when the mind is 'quiet' -- free from distractions."[29]

Certain tangible gains will be achieved by combining this feedback with the wider powers of perception of integrated brain maneuvers, including greater facility in probelm-solving and improved job performance.[30,31] And there will be inner gains as well in the form of learning, self-discovery and personal growth. We all have a natural desire to express our full potential and an innate strength of will to overcome barriers to learning and growing. With self-knowledge and self-fulfillment come self-esteem and inner peace.[32,33]

In conclusion, library literature is relatively sparse of the psychology of information searching. Wagers admits that his "library applications of Gallwey's consciousness-altering techniques ... are preliminary and speculative."[34] And Bates discusses possible research directions for the further development and understanding of idea tactics.[35] I, too, favor research which could lead to more effective problem-solving in library situations.[36,37,38] In particular, visualization,[39,40] the psychology of communication,[41] and the science of research[42] offer potential contributions to the theoretical base of information science as well as to its professional practice.

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