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Models of Reality

by

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Abstract

"Conscious awareness of our environment is based on a feedback loop comprised of sensory input transmitted to the central nervous system leading to construction of our "model of the world," (Lewis et al, 1982). We then assimilate the neurological model at the unconscious level into information we can later consciously consider useful in identifying belief systems and behaviors for designing diverse systems. Thus, we can avoid potential problems based on our open-to-error perceived reality of the world. By understanding how our model of reality is organized, we allow ourselves to transcend content and develop insight into how effective choices and belief systems are generated through sensory derived processes. These are the processes which provide the designer the ability to meta model (build a model of a model) the user; consequently, matching the mental model of the user with that of the designer's and, coincidentally, forming rapport between the two participants. The information shared between the participants is neither assumed nor generalized, it is closer to equivocal; thus minimizing error through a sharing of each other's model of reality. How to identify individual mental mechanisms or processes, how to organize the individual strategies of these mechanisms into useful patterns, and to formulate these into models for success and knowledge based outcomes is the subject of the discussion that follows.

Forward

"This paper is centered around a methodology known as Neuro-Linguistic Programming™ (NLP) which entails using a set of specific, easy-to-learn techniques for

gathering precise information...toward ...explicit outcomes or goals, " (Brown-VanHoozer, 1995). "Its methods of pattern identification and sequencing may be generalized from individual human beings to larger order systems, from contexts involving... problem solving to those involving...extending the domain of decision variables beyond the present state for an individual or system now functioning effectively," (Bandler et al, 1980). The focus is upon the form or process and not the content.

Introduction

> Man...never perceives anything fully or comprehends anything completely. He can see, hear, touch...; but how far he sees, how well he hears, what his touch tells him...depend upon the number and quality of his senses...No matter what instruments he uses, at some point he reaches the edge of certainty beyond which conscious knowledge cannot pass.
>
> (Carl Jung)

Our three major sensory systems (visual, auditory and kinesthetic modalities) dictate the significance particular representation functions will have on individual behavior, learning, experiences, and so forth. That significance is dependent upon how external information is gathered, constructed, and organized (deleted, distorted, or generalized) to fit our model of the world to initiate behavioral outcomes

A discovery of NLP is that, "...the sensory systems have much more functional significance than is attributed to them than by classical models in which the senses are regarded as passive input mechanisms," (Bandler et al, 1980). These systems are the basic elements by which strategies and patterns of human behavior, experience, etc., are formed and by way of which we arrange our representational systems to operate on and within our environment. All of our previous and ongoing experiences consist of the use and organization of some combination of these sensory systems constituting the structural parameters of human knowledge. This has an added effect of providing an individual with the psychophysiological understanding of how external stimuli can be impactful at an unconscious level. It is from these systems (and their filters) that representational models

of reality are formed and coded to determine the strategies used by individuals in the external world.

Representational Systems (RS)

"Every individual channels information differently based on our preference to the sensory modality of representational system (visual auditory or kinesthetic) we tend to favor most (...our primary representational system (PRS)). Therefore some of us access and store our information primarily visually first, some auditorily and others kinesthetically (through feel and touch), which in turn establishes our information processing patterns and strategies and external to internal (and subsequently vice versa) experiential language representation," (Brown-VanHoozer et al, 1998). They are the foundation of how our capabilities are developed, the driver(s) of our responses to a stimulus, the mechanism for forming our belief systems and eventually our personality or identity. Identifying these primary states is the basis for using NLP techniques.

RS are the information storage and retrieval systems into which experience can be coded to describe all of our previous and ongoing experience. Consequently, the manner in which we sequence these representations will dictate the significance that a particular element (either externally or internally) will have on our behavior or response. For example, a person sees a phrase or word (an external stimulus - V^e) which stimulates an *internal dialogue* ($A^{d,i}$) followed by an *internal* search of *remembered sounds* ($A^{c/r,e}$) from previous experiences. A series of *internal images* ($V^{c,i}$, $V^{c,i}$, $V^{c,i}$...) are constructed which are compared to an image in *"memory"* ($V^{r,i}$). This image is then checked against *feelings* (K^i) to determine if the image is "correct." If so, the individual exits (A^e - external auditory response) the decision making process; otherwise, the individual loops through the decision process again ($K^i \rightarrow A^{d,i} \rightarrow K^i$) or at some other point in the decision making process (a-g), see Figure 1.

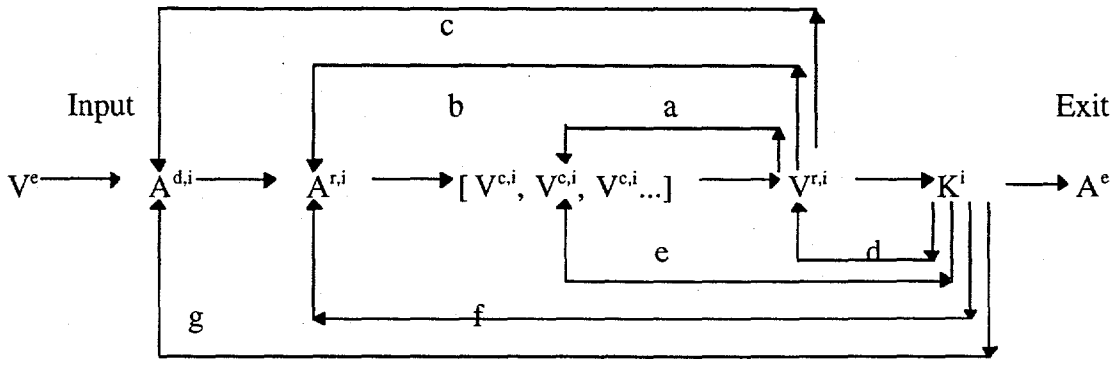

Fig.1 The arrows show that the feedback loop occurring at any point in the decision strategy.

The individual in our example has the option to loop back through the decision making strategy at any point in the sequence of the representation system. An observation can be made based on prior research and studies (Human Learning Dynamics, LLC™, (HLD) 1998), that if the individual's preference for processing information is visual based, he or she would most likely loop back using the 'd or e' paths. Depending on the feedback, the individual may then exit after checking to see if the consciously chosen decision felt correct or may loop to other decision points to verify the image. Whereas, the individual who is auditory may use the 'f or g' paths (since auditories tend to need to start at the beginning of a process) (Bandler, 1980) (HLD, 1998). The kinesthetic individual may start at any decision point.

Let us now interject a random external stimulus as the feedback loop occurs. What could be introduced is a new strategy sequence. See Figure 2.

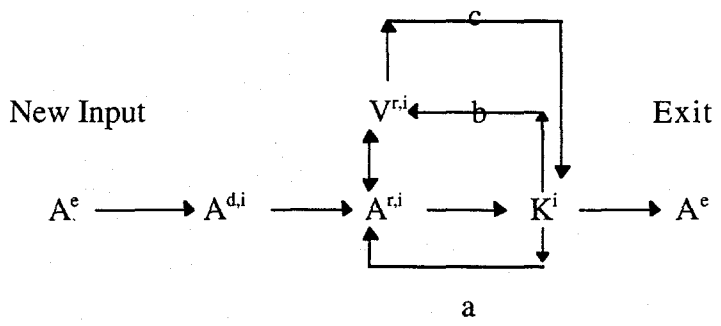

Fig.2 The series of constructed images are deleted (V^c) and the added state (A^e) input stimulates the remembrance states for both visual and auditory processing.

An external auditory stimulus (A^e), e.g., someone *telling* the reader the meaning of a phrase or word, has been added to the scheme. The new strategy sequence now replaces (or is added to) the old strategy sequence with strictly visual ($V^{r,i}$) and auditory ($A^{r,i}$) memory state strategies. Several paths can now be chosen for making a decision. Path 'a' checks what has just been heard externally against familiar sounds that he or she remembers ($A^{r,i}$). The individual then determines whether this feels (K^i) correct and exits; otherwise, the process is repeated through the same path or another path is selected. Loop or new choice. If one, then not the other.

At the $A^{r,i}$ decision point of path 'a,' the individual takes the path where he or she recalls an image of a similar phrase or word; then recalls familiar sounds associated ($V^{r,i} \longleftrightarrow A^{r,i}$) with the image. This is then compared to feelings, and based on how the representation feels to the individual, the phrase or word is then spoken (A^e); otherwise the process is repeated.

Rosen's predictive model (Rosen, 1985) appears to relate to sequencing of strategies recognized as a decision pattern. His example of meeting a bear along a path and making a predicative model of the *foreseeing of consequences* of confronting the bear is a description, in essence, of a TOTE ("test-operate" on the decision, "test-exit" if the decision is correct) function, (Miller et al, 1960) (Bandler et al, 1980).

Rosen identifies his decision as an *anticipatory* response based on the external stimuli of how *he* would process the information. Let's assume that Rosen used visual-kinesthetic states to form his decision strategy to vacate the premise. From prior experiences or through vicarious programming, Rosen internalized an image (or a series of images) in relationship to what he considered a predicative event if he encountered the animal. He then compared his feelings with the internalized image(s) for choice of action. Someone else may utilize a kinesthetic-auditory strategy wherein the individual would check feelings; then describe to him/herself the next step to pursue. The response would different based on prior experience or vicarious programming or other belief system regarding bears.

For example, a couple from New England was traveling through Yellowstone Park when they spotted Bison. They parked the vehicle and made ready the camera. As the man stepped out onto the road, a Bison approached their vehicle, and the man continued to get out of the vehicle to take pictures. After a couple of camera shots, the animal turned around to walk away. Apparently, this so upset the man that he began to beat on the animal's rump in hopes of getting the animal to turn around. Luckily, the result was an "ass chewing" from a local resident while the animal moved on. What was the thought from New England? Understanding the predictive model would require a transderivational search[1] of the thought process, and conscious comparative analysis of the seven categories of that particular experience. (Both NLP techniques to be explained later in the paper).

By examining the pattern of the internal processes, one can readily establish the sequence of the strategy process used by the New Englander in responding to the animal in the manner that he did. Therefore, in knowing the strategic patterns accessed by the man, a model of his behavior could be coded, examined, and taught to another (although the situation where this would be useful escapes this author).

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[1] transderivational search is a search from the surface structure (e.g., written material) to that of the deep structure (e.g., the meaning of what has been written).

Strategies/Patterns

> "The structure of meaning... occurs in the specific sequence of the representational systems a person uses to process information. These representational system sequences are called **strategies**,"
>
> (Bandler et al, 1980).

Strategies are formal structures independent of content, (Bandler et al, 1980) . They identify, (a) the class of experience at each step of the decision process in which the representation of the states (V-A-K) takes place, and (b) the sequential relationship each representation has to others in the same strategy, e.g., she looked up (V), tapped her pencil against her lips (A/K), and began to draw (K) what she imaged (V) her dream house (V/K) to look (V) like. Throughout the process it is obvious that one representational system is more significant than the others - the visual state. This is known as the primary representational system (PRS) - the representational system we tend to favor most.

> "The concept of a 'favorite representational system' asserts that many individuals tend to value and use one representational system; visual, auditory or kinesthetic, over the others to perform their tests and operations. This kind of preference is often generalized to many different types of tasks, even to those for which the preferred representational system is inappropriate or inadequate.'
>
> (Bandler et al, 1980)

Thus, some of us access and store our information primarily visually first, some auditorily and others kinesthetically (through feel, touch, olfactory and gustatory), which in turn establishes our information processing patterns and strategies and external to internal (and subsequently vice versa) experiential language representation, [Brown-VanHoozer et al, 1998].

"How finely we tune or calibrate our neural and physiological systems to accept the information from a particular representational system, as we go through the steps of a strategy, will determine the amount of overlap or interference we get from our other representational systems," (Bandler et al, 1980). For example, a person whose representational preference for gathering and processing their information is 'auditory' may

have difficulty constructing internal mental images of the information being presented. This appears to be usually due to the internal interference of sounds and words being used to describe the external input(s) which prevent an image from being constructed within the same time span. Since some auditories are generally in a constant state of internal dialogue, this process tends to interfere with imagery processing, (Brown-VanHoozer et al, 1998).

HLD has discovered that as auditories age they become more habituated in the auditory state and very closely associated with the kinesthetic state. This makes creating or constructing internal images more difficult. Therefore, the model of reality established by such an individual is grounded in internal sounds, continuous dialogues, and a check-feelings feedback loop. How does a visual communicate to such a person? How does such a person operate within and on their environment?

By knowing an individual's strategy, we can understand how a person creates his or her models of reality, and we can utilize this to obtain reliable and precise information about how they sequence their thought processes in the design of advanced systems, graphical user interfaces, artificial intelligence, teaching methodologies, etc.

Eliciting the Strategy

Gathering the Information

The models we create of our environment, our experiences, our belief systems, will differ from the world of reality in three major ways. "Some part of our models will be deleted, other parts will be distorted and still others will be generalized to represent an entire category of which it is only an example, (Bandler et al, 1975)." Because of the enormous amount of information that is presented to us from the external world, we are not capable of consciously processing every piece of sensory input; thus we modify the information through deletion, distortion and generalization to fit our model of reality, (Bandler et al, 1980) (Miller et al, 1957).

These modifiers are performed without our conscious awareness. Deletion allows us to pick and chose those parts of the experience that we are most comfortable in accepting into our reality of the world. Distortion is the means by which we vary in our experience of the sensory data. "Where generalization...allows us to operate more efficiently from context to context...and keep recoding our experience at higher levels of patterning. Generalization is what allows us to advance in knowledge and technology in all areas of human functioning," (Bandler et al , 1975).

Therefore, in order for one (trained in NLP) to collect the information required for the development of an "expert system," one uses such techniques known as the *meta model* and *seven categories of an experience* to reconstruct an individual's experience. Knowing how and what to ask, one observes the sensory based processing that individuals use at the unconscious level, and from this cooperatively constructs the framework of the experience.

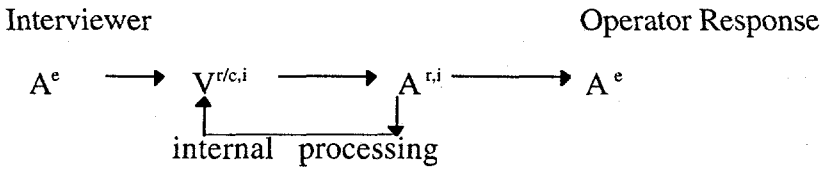
Keys to the Thought Process

Individuals unconsciously demonstrate non-verbally how they are thinking. Visuals (or someone in the visual state) see an internally stored image. Their eyes will go up and to the left or right, their hands may go up above their shoulders or their hands may be at chest level with the palms upward. Their predicates will consist of such verbs, adverbs, adjectives, etc., as: *look, my point exactly* , *imagine rainbow* colors; their breathing will be shallow and their voice pitch - high.

As an individual describes an experience he or she will illustrate neurological, verbal and non-verbal strategies used to access and convey a particular experience. A research study conducted at Argonne National Laboratory in 1994 (Brown-VanHoozer, 1994), showed variations of thought processes by reactor operators in describing the primary and secondary reactor coolant pumps and the process of removing or installing subassemblies into the core of the reactor. (Background: The Argonne reactor was a sodium liquid metal cooled reactor in which the internal workings could not be viewed

from the outside. For 30+ years the operators transferred subassemblies from the core to the basket and vice versa based on what they saw on a control panel and through tactile sensations generated by the manipulator arm used.)

When one of the participants was asked to describe how the primary and secondary coolant worked, his internal process for accessing stored memory ($V^{r/c,i}$ / $A^{r,i}$) was:



Where,

A^e - are the questions being asked based on the neurological cues given.

$V^{r/c,i}$ - is the neurological response given by the operator/participant. The participant is seeing the image of what he is describing.

$A^{r,i}$ - is the neurological response to the sounds the participant is associating with the description.

A^e - is the oral response.

The operator's PRS was visual, and he related the operation of the primary and secondary pumps in visual and auditory predicates. He described the location of the pumps and how they looked to him based on what he recalled from blue prints, photos and a training manual. Though the operator described the reactor as quiet, he associated sounds with the pumps (distorted processing). He imagined the sodium coolant having a sound that was fluid, but swishing, or a sound similar to that of "low air" that crosses a windshield of a vehicle (distorted processing). He realized that he had not been consciously aware of the sounds until he started to describe the operation of the pumps.

The operator related that for those pieces of reactor equipment that did not move quickly no sound was associated with them. Also, by providing sounds, the pumps were more real to the operator. (The description of his sounds were based on prior experiences with external pumping systems which is a generalization formed from of prior

experiences.) In reality, pump sounds did not exist due to the insulation of the media: sodium liquid metal.

Observing the operator's neurological (i.e., eye movements), verbal (i.e., predicates) and non-verbal cues (e.g., breathing, voice tones, pitch, hand gestures), provided the means with which information could be gathered very precisely.

Neurological Cues: Pattern of eye movements used by the individual when accessing or processing information. The individual's thought process are chunked into sequences or patterns which can be observed or coded in the states of V-A-K. For example, a normally oriented right handed individual will look up and to their left when accessing a visual memory (V^r), and up and to their right for visual construct (V^c) of representations of images never seen before. The individual's auditory memory (A^r) will be horizontal and to their left and auditory construct (created sounds) will be horizontal and to their right (A^c). Their eyes will go down and to their right when accessing feelings (K^i) and down and to their left when conducting an internal dialogue ($A^{d,i}$). See Figure 3.

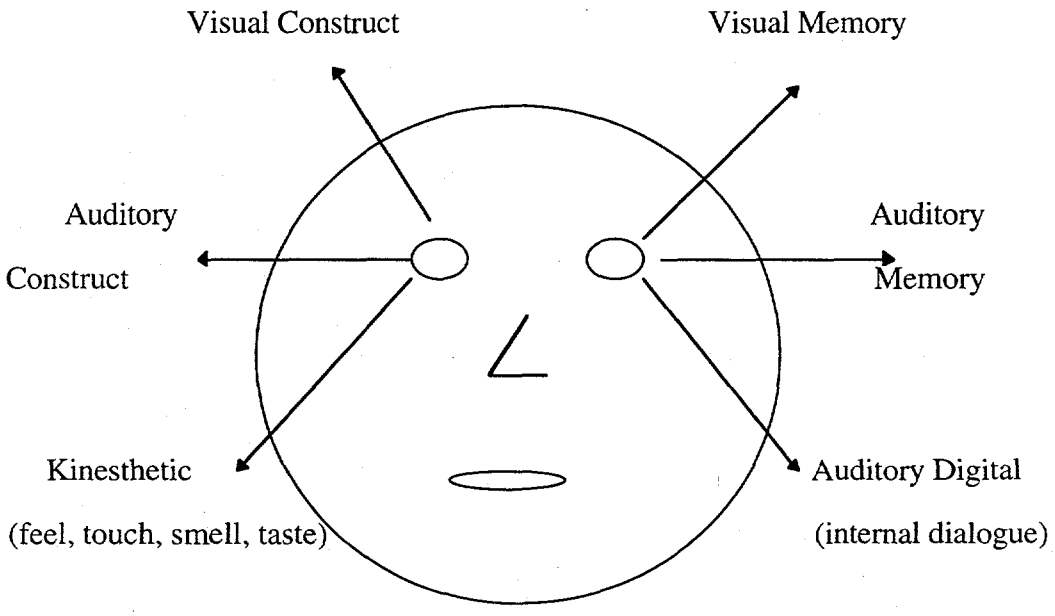


Fig. 3 Eye accessing cues for a normal oriented right handed individual.

For those individuals who are normally oriented left handed, the author discovered in her study of 1993[2], the top two modalities and/or the bottom two modalities could be switched. HLD (1998-present) has discovered individuals who are ambidextrous may switch one, two, or all of the modalities.

Verbal Cues: The words we use to relate our experiences, thoughts, concepts, beliefs, etc. will be an accurate progression or transition of the way an individual represents his or her experience. These words are known as our predicates, e.g., verbs, adverbs, adjectives, etc.

Visuals will tend to use words or phrases that are sight oriented, e.g., look, point of view, observe, red sleek wagon, see, saw, and so forth. An example would be, "*From my point of view* (V), *I saw* (V)*it as a huge* (V)*waste of time on the part* (V) *of the company.*"

Auditories, on-the-other hand construct phrases or sentences using words that are hearing oriented, e.g., sounds good, bang, tell, listen, loud, and so forth. An example would be, "*Listening* (A) *to loud noises* (A) *on a continuous basis may weaken your hearing* (A) *and you will have difficulty understanding what is being said* (A)."

Kinesthetics construct sentences or phrases with words that are feeling oriented, e.g., felt, comforting, hot, quietly and slowly, and so forth. An example would be, "*He was quietly* (A) *sipping* (K) *his hot* (K), *steaming* (K) *coffee when she cupped* (K) *her strong* (K) *fingers over his eyes* (V).

Knowing whether the predicate refers to an internally and externally generate experiences will depend sentence structure and/or time-line of the experience. For example, "I *notice* what is going on," may define an external activity versus, "I *imagine* what is going on," may define an internal activity.

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[2] *Design of Visual Displays Based on the User's Model Using Neuro Linguistic Programming Methodology*, University Microfilm, May, 1995, Doctoral Dissertation.

Non-verbal cues: These cues cover the areas of breathing pattern changes, body gestures or movements (not body language), posture and muscle tone changes, voice tones and tempo changes, and vocal noises, e.g., humming, licking, smacking of the lips, etc. "People will often (consciously or unconsciously) point to or touch with their hands those sensor organs (e.g., eyes, ears, mouth, etc.) for the particular channel of representation that they are using, " (Bandler et al, 1980). These gesture can occur with or without speech, and will usually be congruent with the neurological and verbal cues.

These cues provide "windows" into the thought processes of an individual. Eye movements and verbal predicates require the minimum number of distinctions necessary to uncover or decipher of any strategy. If a person is congruent in what they are describing, all three modalities will be congruent (e.g. verbs, eye movements and non-verbals)

" *As I scan this paper...* " (eyes moving across the paper (V), she pauses, takes a shallow breath (V), then moves her eyes up and to the left (V) away from the paper), *"... I see here that Sentor.X.."* (moves eyes horizontal and to the left (A), tilts head (A) to the right side, hands are at mid-chest, palms downward (A), and breathing is at mid-chest) *"...may be saying that the US..."* (moves eyes downward and to the right (K), hands move below chest level (K), breathing shifts below the stomach) *"...feels secure in its actions..."* (Looks up and to the left (V), and hands come up as though drawing a picture (V) in the air followed by shallow breathing (V)) *"...after Congress saw last night's poll."*

The decision strategy identified by the cues shows the individual starts out with visual activity deriving internal images of what she has scanned, then tests the images with an internal dialogue and confirms the results kinesthetically and exists auditorily by saying what she sees Congress' position to be based on her feelings.

Decision Strategy: $V^{e} \longrightarrow V^{e,i} \longrightarrow A^{r,i} \longrightarrow K^{i} \longrightarrow V^{c/r,i} \longrightarrow K^{e}/A^{e}$

Knowing what was specifically represented within the sequence of the decision allows us to become more cognizant of how the individual organized his or her thought patterns. Knowing what to ask when an individual is in specific states or modalities is application of the meta model.

Meta Model

> This model " is a linguistic tool for using portions of a person's spoken or written behavior to determine where the person has generalized, deleted, or distorted experiences in his model of the world."
>
> (Lewis & Pucelik, 1982)

The meta model is "a model of a model," or a "model of language," (the Milton Erickson model) (Bandler et al, 1975). It is a technique which makes explicit those semantic and syntactic contexts in which the communication or language structure, e.g., sentence, phrase, etc.) is unclear. The meta model works to replace or repair insufficient information with more explicit, accurate descriptions that are then used in the construction of the design model of the system being experienced. It is a model that supports in the search of defining the *meaning* of the content.

There are three categories under which these meta model violations occur: gathering data, expanding limits and changing meanings. Within each of these categories is a set of eight linguistic variations: *referential index, nominalizations, unspecified verbs, modal operators, universal quantifiers, mind reading, cause and effect and lost performative.* It is these processes that limit the user's ability to provide high caliber responses during the interview process all based on the deletion, distortion and generalization models. Below is an example of an unspecified referential index violation under the gathering data category.

Speaker: They are red-yellow in color.
Response: What are red-yellow in color?

Speaker: The subassemblies.
Response: What part(s)?

Speaker: The tip.
Response: What do you call the tip?

All the time the listener is gathering information based on verbal, non-verbal and neurological responses provided by the cues through the modalities. The framework from which the listener approaches the individual is the *seven category of an experience.*

Seven Category of an Experience

Seven categories of an experience is a framework from which an individual can elicit detailed descriptions of experience in order that sufficient, high quality, reproducible data, *insofar as that it is possible when dealing with human subjects*, is obtained for unpacking strategy patterns (Brown-VanHoozer, 1995).

It is believed that this calibration process was inspired by Miller's theory of seven plus or minus two bits of information possible to be processed by humans. It is designed to evoke responses to supply specific answers describing:

1. External behavior - what the person is doing;
2. Internal Computation - how that information is stored in sensory based distinctions in the brain;
3. Internal State - what impact the experience has internally;
4. Context - the precise situation in which the person is involved, which includes, but is not limited to: location, time, persons other than subject with whom engaged, etc.
5. Criteria - how important the experience is in personal terms for the subject - a rank ordering;
6. Cause-Effect - what, exactly, makes the experience occur, and
7. Complex Equivalence - what it all *means*, to the individual.

Focusing on content can open the door to error. Concentrating on what you consciously notice and observing what is actually being said leads to a focus on *what* rather than *how* a process works. As humans, we use language to represent our experiences and, thus, our reality of the world. However, most individuals do not use a sufficient vocabulary to express their experience in a specific enough manner to ensure clarity in communication. Therefore, we center our observation on the eloquence of the non-verbal language (eye movements, breathing, hand gestures, muscle tones, etc.). It is at this level that we can begin to determine how the models of reality are constructed for application in dealing with others.

Knowing what to ask, when to ask, and how to ask, are the key elements in knowing someone's experience as far back as one wishes to travel or as far forward as one wishes to progress. One must step into the other's model of reality before understanding how to get there (wherever *there* is).

Conclusion

> The meaning of any communication is the response elicited regardless of the intention.
>
> (NLP)

Because of the three universal models of human experience, models of reality do not accurately portray the map of the territory. In other words, the map is not the territory.

These models are for our benefit in dealing with and on our environment. It is only our perception of our reality of what is and isn't. The limitations of what is learned and understood is determined only by our own willingness to experience new ideas or concepts that are in conflict with our models of the world. Stretching boundaries of belief systems invites conflict and change.

By replacing missing information given by an individual in its most specific possible form, concise details that are required for "error free" systems are gathered and

incorporated into a system's model. This endeavor provides the optimum in reliable knowledge that can be extracted from willing users and provides a foundation from which calibration of the paired relationship of language and non-verbal behavioral indicators can be accomplished. Developing systems that learn and have "conscious awareness" requires that we are cognizant of our own language skills... (Brown-VanHoozer, 1995), both at the conscious and unconscious level.

"What we believe is...not intended to match existing reality. ...beliefs are intended to provide a motivation and a vision so that your actual behavior can begin to develop and rise to meet them," (Dilts, 1990).

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