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VISUAL DISPLAYS
and
NEURO LINGUISTIC PROGRAMMING

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Abstract - Advancement of computer technology is forthcoming at such a rapid pace that the research concerning the interplay of humans and computer technology is lagging far behind. One area of particular concern is the design of visual displays that are pragmatic, "user friendly," and "user assisting."

When engineers design visual displays, they generally do so methodically and logically, but only from within their own individual perspective or "model of the world." They select the human aspects which make sense to them and not necessarily to non-engineers, operators, and others. The model design is what the engineer chooses to relate, based on his or her perspective of reality. These choices limit the model design thereby excluding the users' perspective.

A set of techniques which can be used to assist the designers in expanding their choices and include the users' model, is *Neuro-Linguistic Programming (NLP).*

1. Introduction

NLP entails using a set of specific, easy-to-learn techniques for gathering precise information, assimilating that information into useful patterns, and then using the information toward completion of explicit outcomes or goals. If the design engineer incorporates the use of these techniques into the design process, then steps will have been taken toward initiating a successful communication link between human and computer. So, by including these conceptual models in the design process and meeting the needs of the individual user, a smoother transition between the computer model and the user can be made.

These techniques involve observing neurologically based responses of the eyes to ongoing stimuli provided by the investigator . Continued observation with respect to linguistic patterns paired with the eye accessing patterns elicited during an information gathering session, coupled with recognition of the use of favored predicates, reveal a person's representational system preference. These representational systems are defined as sensory based categories of : Visual, Auditory, Kinesthetic, Olfactory, and Gustatory. These sensory based categories are represented in the brain and fed back in the form of pictures, sounds, feelings, smells, and tastes, respectively.

Once general patterns can be detected, then more explicit distinctions can be generated which reveal strategies that are outside the normal, conscious awareness of the subject. These strategies can then be utilized in assessing the applicability and feasibility of a variety of necessary categories of information with respect to the users' total experience of vocational competency with maximum attention directed to the individual concerned and his or her comfort.

Further, elicitation of detailed descriptions of ongoing experience is necessary in order that sufficient, high quality, reproducible data, *insofar as that is possible when dealing with human subjects*, be obtained for the calibration process. Within the NLP model, there exists a framework to describe an experience.

This framework is called **the Seven Categories of An Experience.** We believe this model was inspired by Miller's plus/minus seven bits of information possible to be processed by humans theory. Contained in this model , are questions designed to evoke responses to supply specific answers describing: *External behavior; internal computation; internal state; context; criteria; cause/effect, and complex equivalence*, of any experience. These terms are used to depict, respectively: (1) what the person is doing; (2) how that information is stored in sensory based distinctions in the brain; (3) what impact the experience has internally; (4) 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) how important the experience is in personal terms for the subject - a rank ordering; (6) what, exactly, *makes* the experience occur; and (7) what it all *means*, to the subject.

The means by which all of this information is gathered is through utilization of another plank within the NLP platform: **the Meta Model.** The meta model consists of a range of interrogatory challenges to the *three universal processes of human modeling*, namely: **deletion, distortion,** and **generalization.** These processes limit the subjects' ability to provide high caliber responses during the description feedback process or interview. The meta model works to replace or repair the deficient communications with more explicit, accurate descriptions.

It is by replacing the missing information, in its sharpest, most specific possible form, that quality details are gathered to be incorporated into the database of the research. This exercise provides the optimum in reliable knowledge that can be extracted from willing subjects. Additionally, it provides a foundation from which calibration of the paired relationships of language and nonverbal behavioral indicators can be accomplished.

Extracted from all of these efforts is the development of a general model for the design of graphic displays in the computer technology field via the following research study.

2. Research study.

A research study was conducted to develop a general model which can be incorporated in all design models that will

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encompass the general comfort parameters of all users. These comfort parameters will be formed by how people access and process information based upon their favorite representational system: Visual, Auditory, or Kinesthetic (kino).

It was suggested that people who are visually oriented tend to favor more graphically (pictorial) representational displays that are "busy" and which use a high density of characters and multiple colors for contrast and highlighting of information. People who are auditorily oriented tend to favor speech recognition systems where the visual representation is "less busy," and involves fewer characters and colors. The kinesthetically oriented people lean more toward colors that make them *feel* good and *touch*-screen vivid representation that presents the process "flow."

Each subject's favored representational system was determined through a video-taped interview and calibrated against both a written instrument and a visual examination of the tapes. The focus of the examination was the establishment of individual-specific eye accessing patterns associated with other non-verbal cues and linguistic usage patterns (predicates). The survey provided a crude profile of the person and a basis for speculation on the information that was obtained. The subjects were then asked to evaluate six different graphic displays from which their comments were correlated with their favorite representational system. The findings show that all three representational systems overlapped in certain areas, i.e., color, and were divided in others, i.e., amount of information displayed.

Discoveries from the research study show that all three representational systems preferred iconic or symbolic graphical displays over text or document style displays, though the visually oriented group reported they felt comfortable using either iconic or text style displays. Individuals from all three modalities favored color contrast, consistency, coding, standards, and colors that were "easy on the eyes."

Auditory men and women favored "pure" earth-tone colors of yellow, green, blue and orange, and disapproved of colors that were "muddy" (lower levels of saturation), e.g., yellowish-green, greenish-brown; whereas kinesthetic people favored bright colors that made them *feel* happy and were soothing, relaxing, and pleasant, e.g., greens, yellows, yellowish-green, etc. Kinesthetic people also tended to disapprove of black backgrounds, because of the "negative" feelings it generated. The visual people did not favor any specific realm of colors. Instead, they tended to be more concerned with the acuity and resolution of the colors being used. They also seemed to be able to cope with a multitude of colors per display versus the auditory group who preferred no more than four or five colors per display.

Visually oriented people found it comfortable to work with "busy" screens that were either iconic or text style displays. However, they did not approve of screens that were "complex." Complex displays were defined as screens in which the graphical representation had, "...to be completed in the (users') head." The auditory and kinesthetically oriented favored less "busy" screens. They likewise favored screens which portrayed the process or system and showed process flow or direction pictorially. The auditory and kino group specified that **only** information specifically necessary for operation be shown. Help menus or legends for the auditory and kino group were preferred to be accessible as "pop-up" or "super-imposed windows," rather than exhibited as permanent segments of the graphic display. Based on the results of this study and data to be published at a later date, we believe that a general model for designing graphic displays can be developed which will provide engineers with guidelines for designing graphic displays that can satisfy all users.

3. Conclusion.

Graphic displays can be developed based on which representational system is prominent among the users, and add what is applicable from the other two representational systems. Another method is to design the system with the means for the user to select his or her choice of comfort parameters.

Implementing techniques for such a model is feasible. The challenge comes in developing a computer system capable of matching each users' model of the world, and this, too, is promising. However, success can only be accomplished if the designer is flexible enough to change to remain in harmony with the users' needs versus his or her own agenda issues.

The findings continue to be evaluated. Ramifications of this study are significant. Our evaluation of the results suggests that a number of follow up studies regarding favored representational systems and colors; information layout; icon versus picture symbols; abstract models vis-a-vis concrete models; decision making performance; virtual reality applications; user plant models, and so forth, should be conducted using NLP techniques.

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