

The significant-heuristic model, a path towards conscious exploration of natural / cultural reality from categorical thinking and autonomous learning

El modelo heurístico-significativo, un camino hacia la exploración consciente de la realidad natural/cultural desde el pensamiento categorial y el aprendizaje autónomo

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Abstract

A path to significantly penetrate the object of study was proposed, from a socio-cultural, humanistic and categorical approach, the heuristic-significant model (HSM). It is based on theories and concepts such as meaningful learning, the development of thinking, the heuristic function, heuristics, the investigative process, the educational process, the conceptual pedagogy and logical methods. A significant-heuristic method, of categorical character, was formulated, with certain characteristics of the object of study such as culturality, complexity, particularity, situationality, interaccionality, transformability, implicability and globality. With the application of the model, it is intended to describe, interpret, explain, argue, generalize and propose ways of conscious inquiry, that contribute to the generation of relevant cultural codes in the academic and research environment, with

an epistemological, ethical and productive rigor similar to the tutorial support. It was concluded that the heuristic-significant model is a strategic way to serve the human being as a builder of culture, innovation and change; it is useful to promote autonomous learning, as required in academic practice and research; and favors the critical, rational and conscious thinking of the cultural doing and recognizing its implications in an environment that tends to be more sustainable every day.

Keywords: categorical thinking, object of study, autonomous learning, heuristic

Resumen

Se propuso un camino para incursionar significativamente en el objeto de estudio, desde un enfoque humanístico, socio-cultural y categorial, el Modelo heurístico-significativo (MHS). Se fundamenta en teorías y conceptos como el aprendizaje significativo, el desarrollo del pensamiento, la función heurística, la v heurística, el proceso investigativo, el proceso didáctico, la pedagogía conceptual y métodos lógicos. Se formuló el método heurístico-significativo, de carácter categorial, con unas características del objeto de estudio como la culturidad, la complejidad, la particularidad, la situacionalidad, la interaccionalidad, la transformabilidad, la implicabilidad y la globalidad. Con la aplicación del modelo, se propende por describir, interpretar, explicar, argumentar, generalizar y proponer formas de indagación conscientes, que contribuyan en la generación de códigos culturales pertinentes en el ambiente académico e investigativo, con un rigor epistemológico, ético y productivo similar al acompañamiento tutorial. Se concluyó, que el modelo heurístico-significativo es un camino estratégico al servicio del ser humano como constructor de cultura, innovación y cambio; útil para promover el aprendizaje autónomo, tan requerido en la praxis académica y el hacer investigativo; y, favorecedor del pensamiento crítico, racional, consciente del hacer cultural y conocedor de sus implicaciones en un ambiente que se propende sea cada día más sostenible.

Palabras clave: pensamiento categorial, objeto de estudio, aprendizaje autónomo, heurística

1. Introducción

The heuristic-significant model (HSM), consistent with Halliday's heuristic model of the child's language, proposed a path of conscious exploration in the natural/cultural reality and autonomous learning; "heuristic" due to the capacity for human inquiry and inventiveness; and "significant" because this search has a clear purpose that guides the construction of knowledge through reading and/or experience (Bruner). It makes use of notional, propositional, conceptual, and formal or categorial thinking; cultural categories; complex systems; flowcharts; thematic organigrams; concept maps; and the heuristic V, among other resources to represent the natural/cultural reality.

2. Theoretical Framework

The acquisition of knowledge is often the result of an exploratory, investigative, confrontational, or verificatory endeavor, one that stimulates a cognitive structuring of reality in the human mind (Vygotsky).

Reality has been linguistically categorized in order to facilitate its identification and recognition, as well as communication that refers to it. Education is considered the human activity created and socially recognized to engage with humanity's knowledge, to acknowledge ourselves, and to grow as integral and social beings, learning to live and to channel our creativity (Bruner; Zubiría).

Consequently, we need an education in which it is possible to learn how to explore, investigate, and discover knowledge in reality, and to communicate our experiences effectively. An education that is concerned with knowledge itself—its concepts, principles, theories, laws, disciplines (Novak & Gowin); that is interested in the knowledge of the human being as an integral being; in the practice of social coexistence and reflection upon it; in an educational experience aligned with the learner's age; in the orientation of human creativity as a deepening or application within a thematic field of preference, whether scientific or not, social or personal, artistic or technical. What is required is a significant heuristics of reality as a way of apprehending knowledge and cognitively structuring reality, and communication as a strategy

to socialize the educational experience and the acquisition of knowledge.

In this type of educational problem, proposals and models that provide pathways toward conscious understanding and support the student's autonomous work are well received. The notion of "model" in a research and educational environment is understood as an "interpretive scheme of a real system" (Pérez, 220), configured from symbols or verbal statements that can coherently and systematically describe the data collected about the situation or reality under investigation.

Consequently, it became the purpose of our collective to engage significantly with objects of study in a conscious and detailed manner, making possible the creation of a way to traverse and explore the natural/cultural reality that could be replicated and materialized into a model. This inquiry, carried out rationally, began to be recorded and contrasted through the study of what is cultural, complex, particular, situational, interactional, transformational, implicational, and global; as well as through description, interpretation, explanation, argumentation, generalization, and

theoretical, teleological, and methodological propositions from a motivational, cultural-imaginative, heuristic-categorial-significant, reading-writing, and ethical-communicative perspective. The aim was to interpret reality culturally in favor of research, socialization, and education.

This process made it possible to identify the macrostructures and categories that are pertinent and essential to the research process; to highlight strategies for socializing heuristic-significant categorization according to the nature of the object of study; and to underscore the networks of cultural categories (Vanegas & Ramón, 2019) that are fundamental in the study of disciplines, facilitating processes of comprehension, appropriation (study), and cognitive incorporation.

This intention to delve into reality through the study of beings, relationships, events, and situations materialized in the heuristic-significant model (HSM), which is defined as "a pathway of significant exploration and inquiry of the natural/cultural reality from a humanistic-socio-cultural perspective."

It was based on theories such as Ausubel's (1976) meaningful learning, the development of thinking (Zubiría), the heuristic function (Halliday), Gowin's heuristic V (Novak & Gowin), the process of formative research (Vanegas, Becerra & Ramón, 2020), the pedagogical-didactic process, conceptual pedagogy, and constructivism. The model has also been generated through careful observation of the reality of nature, the human, and the cultural. This has been made possible thanks to notional, propositional, conceptual, and logical or formal thinking (Zubiría, 2000).

These types of thinking take place in cognitive development as flexibly organized instruments that are nourished through continuous interaction with reality and with others, in an ever-increasing demand, with gains in complexity and logical reasoning (Ramón, Vanegas, Monroy & Castellanos, 2020). This process must be meaningful (Ausubel, 1976) insofar as it is contextualized, conscious, experiential or lived; and, therefore, humanistic-socio-cultural. Given the close relationship between language development and the

development of thought, it is necessary to emphasize this aspect.

Notions are composed of categories 1 and 2 (nouns and adjectives), called classes. When two notions (noun and adjective) are joined through a node (verb), it is said that a proposition has been formed (Zubiría, 2000).

Example:

Proposition 1: "All men are mortal" (Relation of being). Propositions are the cells of human thought (Zubiría, 2000), integrating the cognitive life of human beings from the age of 6 or 7. They are thoughts. They are condensers of knowledge. Each library is equivalent to a gigantic warehouse of thoughts. Writing transmutes thoughts into words and sentences. To write is to materialize thoughts. To read is to filter and extract the thoughts contained in writings.

The concept is formed by the relationship among propositions (Zubiría, 2000). Science works with theories to describe and explain reality. A theory is composed of concepts, which are related in such a way that they give meaning to the theory. Concepts are conveyed in texts through

words; thus, the reader must learn to identify them and understand how they are related. This requires distinguishing in the text which concepts are primary and which are secondary. This is the process of constructing conceptual networks that make it possible to account for what a text conveys.

Conceptual pedagogy has considered and characterized the types of thought around the notion, the proposition, and the concept, providing a logical organization to the mental operations and cognitive processes of which they are a part (Zubiría, 2000). The transition from notional thought to formal thought requires a process of chronological and psycholinguistic maturation of the cognizant individual.

Another epistemological aspect is the consideration of reality as organizable into certain previously mentioned supracategories: beings, relationships, events, spatial situation, and temporal situation.

Note: Figure 1. Heuristics of reality based on interaction. At the end of the article.

In relation to the categories, classes, or aspects of general reality, they help to

guide the interest or expectation regarding the selection of a specific object of study. Within natural/cultural reality, supracategories can be considered that group together categories similar in their nature. According to thematic organigram no. 8, these general categories are:

BEINGS. This supracategory encompasses subjects, organisms, objects, structures, places, times, rhythms, images, perceptions, feelings, motivations, games, attitudes, principles, criteria, decisions, emotions, thoughts, explorations, research, knowledge, techniques, processes, activities, personality, environments, groupings, cultures, communications, situations, events, experiences, artistic, technical, scientific, technological, linguistic-textual or non-linguistic-textual creativity. Beings that are susceptible to being explored, investigated, and understood through research and education guided by the HSM.

From these beings, it is necessary to consider their properties—or what is inherent to the being—from its notion to

its transcendence and importance. The recognition of these qualities is what allows us to affirm or make statements about the being under study; that is, one begins with notional thinking about a being and arrives at propositional thinking about it (Zubiría, 2000). At this point, the guidance of the heuristic V (Gowin) is highly useful, as it makes it possible to guide the knowledge of the being in a sequential and coherent way, gradually broadening the vision one has of the being. The functioning or operation of the heuristic V will be clarified later. For now, the aim is to highlight its importance in the transition from notional thought to propositional thought, a step often neglected in the educational environment (Zubiría, 2000). By facilitating this transition from notional to propositional thought, rote learning of concepts is eradicated, since concepts lose relevance if they are not significantly connected to the notional and propositional thinking that both the student and the researcher can progressively account for on their own.

Properties such as notion; representation; perceptibility; objective; characteristics such as nature, state, form, color, smell,

sound, taste, texture, size, surface, temperature, aeration, humidity, illumination, energy, movement, duration, dissolution, balance, etc.; perception; functions; location; environments; context; spatial and temporal conditions; orientation; definition; origin and evolution; composition, parts and elements; structuring, levels, techniques, criteria, skills; sustenance, nourishment; functioning or behavior, processes, stages; measurement; forms and styles; diversity, grouping, classification; drawing, design, plan, elaboration or execution, evaluation; communication; experientiality, functionality; reproduction; industrialization; commercialization; consumption; transcendence; importance. Generally, these properties prompt the question *what*. For example: industrialization of what, duration of what, texture of what; while beings prompt the question *which*. For example: which emotions, which knowledge, which perceptions. Properties may become part of beings when they are considered as *which* and not as dependent on *what*. Such is the case with: which perceptions, perceptions of what; which environments, environments of what—

leading to a play of positioning that prevents considering them as isolated categories, favoring instead the establishment of a strong relationship between beings and properties, as indicated in the guiding thematic organigram.

Another major supracategory is **RELATIONSHIPS**. Here we find the grouping and interaction among beings, giving rise to what has been considered as nature, in which links, races, chains, cycles, phenomena, actions, changes, constructions, creations, concomitances, transgressions, confrontations, conflicts, crises, wars, expeditions, migrations, immigrations, invasions, colonizations, exploitations, liberations, independences, etc. can be taken into account. Other relationships that give rise to phenomena and experiences include categories such as perception and imagination, perspective, affectivity, playfulness, ethics, emotionality, mental operations, types of thought, cognitive functions, science, philosophies, technology, praxis, sports, the personal, the social, the environmental, the cultural, communicative situation, interaction,

history, research, technology, art, and literary language.

Beings are discovered within relational behavior and not merely in their singularity. Both the supracategory of beings and that of relationships, as well as the other supracategories to be considered, share the properties outlined for the supracategory of beings.

A third supracategory corresponds to **EVENTS**. Beings, in their relationships, lead to changes or new situations that are perceived as events. In this supracategory, we can find origin, evolution, consolidation, formation, growth, development, diffusion, disintegration, pollution, destruction, depredation, creation of instruments to perceive reality, science fiction, fantasy, religions, creation of companies dedicated to play, leisure or tourism, criticism, shows, films, novels, music, generalizations, concepts, theories, laws, disciplines, methods, approaches, models, promulgations, constitutions, regulations, constitutions, scientific meetings, encyclopedism, reforms, creation of companies, growth or indebtedness, technification, industrialization, technology, commercialization, capitalization,

modernization, systematization, acculturation, emergence of cultures, civilizations, urbanization, development, religious gatherings, organizations, creation of means of transport, mass media, internet, globalization, experiences (facts, causes, consequences), historians, records, history, celebrations, scientific discoveries, creation of instruments, technology, informatics, creation of works of art, trends, creation of verbal and non-verbal language, planning or programming, inquiry, evaluation, recognition, projectivity.

In reality, most beings and relationships with their properties—if not all—have experienced or gone through this supracategory of events.

In the supracategory **SPATIAL SITUATION**, whether of beings, relationships, or events, what is considered is the adverbial and spatially orientative, as well as the geographical. It refers to physical space and its projection in the mind, to a psychological space, to the space referred to in a text, and even to a space within time.

In the supracategory **TEMPORAL SITUATION**, beings, relationships, and events are conceived historically and

within an adverbial time. This supracategory makes it possible to view the other categories in continuous change, requiring consideration of both synchronic time (a specific or stable moment) and diachronic time (across time).

This heuristics of reality is presented in a summarized way, suggesting only a few categories which, in themselves, are inexhaustible, given the cultural heritage that humanity has created. However, it is not a matter of considering it in its generality, but rather of situating, in a didactic way, where the object of study and the knowledge of it may arise. It does not matter whether the study is undertaken on an object such as a “needle” or an entire civilization; one will discover that by inquiring into the categories of properties and the supracategories of relationships, events, spatial situation, and temporal situation, a profound, thorough, and creative study of the chosen subject will emerge.

A young person, an adult, or a researcher will find guidelines to carry out their inquiries in a personal and secure manner because their interests and expectations

will be what guide their pursuit of knowledge.

The quantitative and qualitative models gave rise to forms of evaluation according to their immanence. In the HSM, evaluation would be grounded in the logic and creativity with which exploration and inquiry are carried out in order to acquire knowledge and communicate it. In this model, support does not rest solely on what is presented in Thematic Organigram No. 8. It is also based on a humanistic conception of knowledge, as proposed in Organigram No. 9, which reflects the environments and disciplines consistent with human characteristics. A person who explores, inquires, and seeks to know is guided not only by the need to know but also driven by the predominance of certain characteristics over others—an aspect that should be accepted and valued. It is necessary to continue investigating this model in order to uncover its human dimension.

The subcategories corresponding to the transition from notional to propositional thought are: notion of the object of study, representation, perceptibility; objective; characteristics such as nature, state, form,

color, smell, sound, taste, texture, size, surface, temperature, aeration, humidity, illumination, energy, movement, duration, dissolution, balance, etc.; perception; functions; location; environments; context; spatial and temporal conditions; orientation; definition; origin and evolution; composition, parts and elements; structuring, levels, techniques, criteria, skills; sustenance, nourishment; functioning or behavior, processes, stages; measurement; forms and styles; diversity, grouping, classification; drawing, design, plan, elaboration or execution, evaluation; communication; experientiality, functionality; reproduction; industrialization; commercialization; consumption; transcendence; importance.

From propositional to conceptual thought, concepts are regarded as networks of propositions (Zubiría, 2000); constructs are understood as the orientation given to a concept according to the object of study, the discipline, and the methodology chosen to obtain knowledge. Also considered within this mode of thought are conceptual networks, that is, the relationships among concepts that interact with one another. At this point,

organizing ideas is crucial, discarding what is not useful to a knowledge purpose. That is, it is better to opt for specialized knowledge, which requires greater abstraction and very clear interests. This does not necessarily imply more “reasonable” criteria, since these may well be criteria based on affect, playfulness, or experientiality, reflecting the versatility of the model. It departs from the merely rational to validate knowledge not only in its scientific form but also as knowledge that accounts for cognizable reality, making it applicable to any discipline.

The transition from conceptual thought to formal or logical thought is grounded in the management of conceptual networks and the understanding of principles, theories, laws, disciplines, methods, approaches, models, philosophies, and universal visions of reality (Gowin in Novak & Gowin), as the learner experiments in order to obtain replications of what has been read or even to arrive at new contributions to science, technology, or art. The development of these types of thought relies on a supporting tool: Gowin’s heuristic V, expanded and reformulated to achieve the

significance that is intrinsic to the HSM. *See Figure 2: Heuristic-Significant V as a guide for research and education.*

Following the types of thought and the structuring of reality into categories, certain subcategories or orienting elements are organized for inquiry, to be assumed or discarded depending on whether they appear pertinent given the discipline guiding the study. In the proposed model, the logical, the linguistic, the humanistic, and the socio-cultural converge to foster research, communication, and education that take into account all human characteristics. Research that does not endanger human existence or the permanence of the species, and communication and education that recognize the human being as an integral being—corporeal, perceptive, affective, playful, ethical or value-oriented, emotional, knowing, and cognitive.

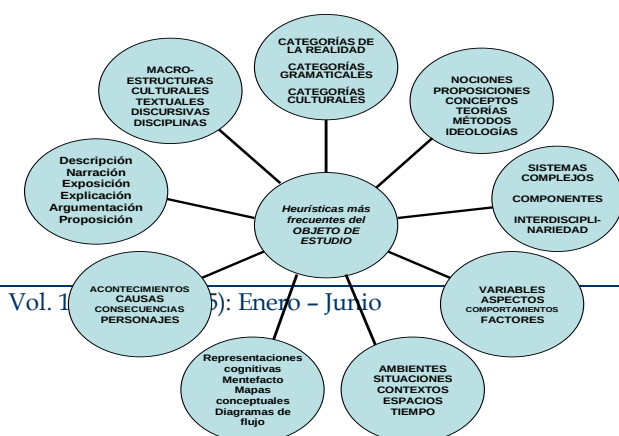
Note: See Figure 2. Heuristic-Significant V as a Guide for Research and Education, at the end of the article.

Note: See Figure 3. Environment and disciplines based on human characteristics. At the end of the article.

In this broad incursion into natural/cultural reality, the HSM takes into account principles inherent to reality itself, such as explorability, complexity and interdisciplinarity, categorizability, representability, predictability and projection, simulability, and replicability. It also considers principles inherent to the human being, such as meaningfulness, imagination, creativity, metacognition, and conventionalization.

The object of study, its categorization, and the cultural imaginary required for this purpose become units of study as the heuristic is typified. This is evidenced by the thematic organigrams, the heuristic-significant Vs, and the written cognitive representations.

See Figure 4. Most frequent heuristics of the object of study.



Source: Own elaboration

The components of this form of conscious incursion into natural/cultural reality include the inquiring subject, the knowable natural/cultural reality, the object of study, the focal questions it generates, the levels of thought, the cultural categories, the inquiry plan, the stages of inquiry, the cognitive representations, dialogical reading-writing, the culture of recording, and the forms of expression such as description, narration, exposition, argumentation, explanation, among others.

It is useful to detail the characteristics of the HSM for a better understanding of the model:

i. **“Humanistic nature”**, as it finds its meaning within philosophy, a discipline recognized as the love of wisdom and the pursuit of knowledge for its own sake (Zubiría, 1998). From the perspective of Western culture, it also contributes to epistemology as a theory of knowledge, to research, and to education, making knowledge an experience that may well be motivated, playful, passionate, value-laden, and contextualized.

ii. The HSM is a **“promoter of a meaningful environment for thought and knowledge”**, since it helps guide those who explore and inquire into a reality by offering them pathways of search and the necessary methodology to distinguish the relevant from the irrelevant.

iii. This model **“orients the construction of thought and knowledge”** because it favors the mental structuring of knowledge of reality and a complete structuring of the knowledge acquired.

iv. The model is characterized as **“exploratory and investigative of reality.”** Once the object of study has been selected as a result of an initial exploration, it proceeds to inquire into that object placed at the core of the study.

v. It is **“guiding in research and education”**, insofar as the purpose and method are directed toward one of these two dimensions.

vi. **“Generated by human creativity and textuality”** (Halliday). The act of naming everything that can be known by human beings corresponds to their creative spirit, their power of imagination (Vygotsky), and their need to account for their achievements through linguistic or

non-linguistic textual communication. However, these characteristics are best reflected in the functions that the HSM fulfills in human life.

vii. In this sense, the functions of the HSM can be enumerated as follows:

viii. **Contextualizing function** of the human being within the reality of which they are a part. A function not fully carried out by either the quantitative or qualitative models, even though it is didactic in nature, as it is intended to guide teaching and learning in an increasingly complex world.

ix. **Methodological function** in the research and educational environment, since it not only situates the individual in reality and in knowledge but also guides them in deepening their understanding of that reality.

x. **Cognitive function**, because it contributes to the strengthening, organization, and construction of the human being's cognitive structure, of their cognitive capacity, and of the imagination that stimulates creativity, giving rise to a **creative function**, for by knowing their world more accurately, it provides them with the basis to think

divergently, to create, and to produce on their own.

It also fulfills a very profound experiential function, because the individual who constructs knowledge in this way will be able to experience a high degree of motivation, emotion, and strengthening of self-esteem. The very fact of being able to engage in the acquisition of knowledge in a guided and secure manner will very likely make them different from a person who passively absorbs what others say about a reality in which they do not feel committed.

It has not yet been defined which disciplines may benefit from this HSM. In reality, given its general nature, it can be said that it is applicable to any science or discipline, by assuming and discarding the categories that best fit the object of interest. What becomes clear is that the purpose of the model is to serve as support and guidance for anyone wishing to inquire into knowledge of reality, whatever its nature.

“To guide structured, progressive, and creative thought from the human being for the human being.”

3. Method

It has been based on the inductive-deductive method, the analytical-synthetic method, and the heuristic-significant, categorial method, which presupposes certain characteristics of the object of study, such as culturality, complexity, particularity, situationality, interactionality, transformability, implicability, and globality. It makes primary use of questioning, categorization, classification, representation, inquiry, induction, and analysis.

The materials are usually concepts, methods, and even ideals. Work is carried out with thought, with human cognitive functions, and with their capacity for contextualization.

To explore natural/cultural reality, certain phases or stages of the heuristic process are defined: pre-configuration, grouping-configuration, review, confrontation, and optimization. In these stages, it is useful to have evaluation criteria such as the discrimination of categories (differentiation), the grouping of similar categories, grouping by level of complexity, logical configuration

according to relationships, functions, and interactions, and conventionalization.

One can discriminate and evidence notional, propositional, conceptual, and formal or categorial thoughts; categories in relation to characteristics, relationships, functions, and interactions; and levels of complexity of the constructs according to the categories related.

In the heuristic process, the culture of recording, tabulation, categorization, classification, and the use of mental operations—from the most concrete to the most abstract—are of great utility.

The following presents a synthesis of the heuristic process. *See Figure 5. The heuristic-significant model: a path toward conscious exploration of natural/cultural reality and autonomous learning.*

Application

Table 1. The heuristic-significant model: a path toward conscious exploration; the application process takes place from the bottom up.

THE HEURISTIC-SIGNIFICANT MODEL: A PATH TOWARD CONSCIOUS EXPLORATION <i>A path toward reflective awareness and cultural contribution.</i>	
Nº	Description
15	Communication and Reflective Awareness Strategies. Contribution to the

	Cultural Code.
14	From a research perspective, an object can be viewed as a problem (analysis with problem and objective trees). Logical framework matrix: specification of population and sample; selection and application of methods, instruments, observation, and recording; data coding and tabulation; statistical and qualitative results; behavior of variables in observation–intervention–metacognition; results and discussion; conclusions; review of impacts; statements of knowledge and value; strategies for communicating progress and results; and publication–dissemination.
13	Discursive transcendence toward description, explanation, argumentation, and proposition.
12	Theoretical, methodological, and teleological understanding (formal thought: concepts, contrasts, representation of the theoretical construct regarding the object of study).
11	Clarification: definitions, concepts, and their cognitive representation (conceptual thought: propositions; formal thought: concepts); concept map/mentefact/heuristic; formulation of new focal questions from the theoretical (behavior, functioning, events, processes, phenomena); from the teleological (philosophies, ideologies, approaches); and from the methodological (procedures, methods).
10	Textual-referential reading (comprehension) – contextual-inferential reading (interpretation) – intertextual-critical reading (argumentation) – transtextual-interactive reading (proposition). Reading and recording strategies for comprehension–interpretation–argumentation–proposition: recognition of cultural, disciplinary, and discursive categorial networks; networks of thought, authors, macrostructures, aspects, variables, principles and criteria, norms and rules, methods, procedures, application, background–state of the art.

9	Ideas of the object of study: affirmations, negations, questions (propositional thought: notions).
8	Inquiry plan for basic cultural categories: notional thought and conceptual basis.
7	Prior knowledge and cultural imaginary (representation of the object of study: images, attitudes, notions, concepts, procedures, methods, ideological thought).
6	Formulation of focal questions from the notional to the formal.
5	Selection of categories: heuristic-significant use of notional, propositional, conceptual, and formal thought.
4	Selection of cognitive tool according to the nature of the object: heuristic-mentefact-complex system.
3	Selection of the object of study.
2	Inquiring subject – being situated in a knowable world – with heuristic, cognitive, communicative, cultural, and linguistic function.
1	Knowable world: beings (properties), relationships, events, spatial-temporal situation.
SCOPE: RESEARCH – EDUCATION	

Source: Own elaboration

The heuristic-significant model: a path toward conscious exploration of natural/cultural reality and autonomous learning. In the implementation of these studies—both theoretical and methodological advances—the use of Gowin’s heuristic V (Novak & Gowin, 1999), the categories of reality, the *mentefact* implemented at the Alberto Merani Institute, and cultural macrostructures stand out.

In conducting heuristic studies, activities are usually carried out such as the discrimination of disciplinary categories,

the recognition of objects of study as complex systems, conceptual and methodological grouping, written or pictorial representation, and conscious reading and writing through the use of cultural macrostructures.

In addition to what has been presented so far, it is the humanistic vision of reality that will guide the formulation of the model, perceiving the world as categorized (classified) (Bruner) through functional or communicative language and as susceptible to being organized through discursive structures corresponding to the thematic configuration carried out in the human mind. Hence, written cognitive structures are defended, such as thematic organigrams, *mentefacts* developed by conceptual pedagogy, generalizable concept maps (Novak in Novak & Gowin), and Gowin’s heuristic V (Novak & Gowin), which guides the synthesis of theoretical knowledge and the procedures or methodology for obtaining knowledge.

4. Results

The proposed model transcends the grammatical coding-decoding of reality toward a cultural coding-decoding: the

networks of cultural categories that investigate beings, study objects/subjects, properties—characteristics, relationships, events, temporal situations, and spatial situations, among others.

Based on cultural categories, it has been possible to represent objects of study and to develop a prospective consideration of variables of observation, intervention, and evaluation, as well as indicators. This applies whether it involves:

- i. **Categorial heuristics** of object—subject, their characteristics, structure, elements, functions, behavior, endogenous relationships, and interactions;
- ii. **Causal heuristics** of events, processes, actions, occurrences;
- iii. **Discursive heuristics** of lexical constellations, semantic networks, textual macrostructures;
- iv. **Situational heuristics** of space, time, contexts, exogenous relationships, interactions;
- v. **Experiential heuristics** of the everyday, the scientific, the lived experience;
- vi. **Comparative heuristics** of contrasted realities and texts;

- vii. **Pictorial heuristics** of images such as photographs, drawings, serial records (evidence of change and movement of things), microscopy, macroscopy, and virtual images.

With the application of the model, description, interpretation, explanation, argumentation, generalization, and proposition of objects of study are fostered in a conscious manner, with the capacity to contribute to the generation of relevant cultural codes in the academic and research environment with epistemological, ethical, and productive rigor.

This is the case with the generation of cognitive macro-tools for comprehension, interpretation, argumentation, and proposition that take place in research, communication, and education. The research project developed from the HSM—*Heuristics of Didactics, The Knowledge of the Written Text, the clarification of reading levels, the implementation of protocols for discursive production and literary text commentary, the proposal of workshops and cognitive tools useful in the research, communicative, and educational*

environment—stands as evidence of this application.

Through the application of the model, a heuristic-significant method was obtained that begins with natural/cultural reality and with an inquiring subject who, through the selection of objects of study, undertakes the path toward knowledge in a defined way, without deviating from the purpose. This process unfolds step by step, aided by questioning, thought processes, cultural categories, and representations (cognitive tools), as well as conscious and dialogical reading—writing, in which the individual expresses their experience in diverse ways, even with a research character (Vanegas, Ramón & Valencia, 2015).

Finally, the HSM resulted in a coherent and cohesive step-by-step process of the research project that was taken as the object of study in the related application.

5. Conclusions

The heuristic-significant model was presented as a strategic pathway at the service of the human being as a builder of culture, innovation, and change; useful for promoting autonomous learning, so necessary in academic praxis and research practice; and as a promoter of critical,

rational, and culturally conscious thinking, as well as of its implications in an environment that is increasingly oriented toward sustainability.

From the perspective of the representability of reality, the model demonstrates that the world is categorizable, representable, configurable, and demonstrable—linguistically, logically, and culturally. It is a model capable of guiding reading and writing, and of contributing to more conscious research, socialization, and education.

The proposed model has fostered the development of thought and significant discursive production as it accompanies the processes of inquiry, thinking, research, and communication. It has thus become a strategic mechanism to support academic and research processes that sometimes lack the necessary mediation. It is, therefore, a qualitative, observational, descriptive, explanatory, and demonstrative research approach.

The heuristic-significant model has revealed a pathway toward the conscious exploration of natural/cultural reality and autonomous learning through this

document, based on sequential, integrated moments that increase in complexity day by day. In classrooms, rather than memoristically learned disciplinary branches, there should be educational daily moments that lead to socio-cultural knowledge through diverse pathways: moments to learn science according to disciplines; moments to consider and value the human being in their integrality;

moments to know and live personally; moments to know and live in society; moments to explore and inquire into reality; moments to create; and moments to communicate or share what has been experienced and learned through strategies.

References

- Ausubel, D. (1976). *Psicología educativa. Un punto de vista cognoscitivo*. México: Trillas.
- Bruner, J. (1984). *Acción, pensamiento y lenguaje*. Madrid: Alianza.
- Halliday, M. A. K. (1982). *Exploraciones sobre las funciones del lenguaje*. Barcelona, España: Médica y Técnica.
- López, A., & Vanegas, D. (2005). El conocimiento del texto lingüístico y su trascendencia en la Didáctica de la Lengua y la Literatura. *Bordón*, 57(3), 397–405.
- López, A., Vanegas, D., & López, M. (2007). Una competencia texto-lingüística en permanente desarrollo. *El Guiniguada*, 15–16, 31–42.
- Novak, J. D., & Gowin, D. B. (1999). *Aprendiendo a aprender*. Barcelona: Martínez R.
- Pérez, G. (1994). *Investigación cualitativa. Retos e interrogantes I. Métodos*. Madrid: La Muralla.
- Ramón, A., Vanegas, D., Monroy, N., & Castellanos, Y. (2020). Instrumentalización correlacional para el desarrollo del pensamiento de estudiantes de preescolar y de primaria desde la formación del espíritu investigativo y de la comprensión textual. *Revista Tecnológica-Educativa Docentes* 2.0, 9(2), 108–118. <https://doi.org/10.37843/rted.v9i2.153>
- Vanegas, D., Becerra, J. S., & Ramón, J. A. (2020). La formación investigativa del

docente. En C. J. Mosquera, D. F. Silva & S. E. García (Eds.), *Reflexiones metodológicas y epistemológicas en torno a las prácticas pedagógicas contemporáneas* (pp. 35–62). Editorial Universidad de Pamplona. ISBN: 978-958-53020-2-0

Vanegas, D., & López, A. (2005a). Experiencia didáctica en el desarrollo de la competencia textolingüística como orientadora de la lectura y la escritura (estudio experimental). *Diexpe. Experimenta Pedagógicamente*, 5(6), 15–24.

Vanegas, D., & López, A. (2005b). Heurística de una didáctica general. *Diexpe. Experimenta Pedagógicamente*, 5(7), 15–27.

Vanegas, D., Ramón, J. A., & Valencia, J. D. (2015). Aplicación del modelo heurístico-significativo en la interpretación de la cultura ambiental. *Revista Face*, 15(2), 107–116.

<https://doi.org/10.24054/01204211.v2.n2.2015.1913>

Vanegas, D., & Ramón, A. A. (2019). Categorías culturales en la instrumentalización del proceso lector y escritor. *Revista Enunciación*, 24(2), 267–275.

<http://doi.org/10.14483/22486798.14137>

Vygotsky, L. (1995). *Pensamiento y lenguaje*. Barcelona: Paidós.

Zubiría, M. de. (s.f.). *Inteligencia y creatividad*. Bogotá: Instituto Alberto Merani.

Zubiría, M. de, & Zubiría, J. de. (1996). *Biografía del pensamiento*. Bogotá: Magisterio.

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Figure 1. Heuristics of reality based on interaction.

HEURÍSTICA DE LA REALIDAD A PARTIR DE LA INTERACCIÓN DE:					
(PROPIEDADES)	SERES	RELACIONES	ACONTECIMIENTOS	SITUACIÓN ESPACIAL	SITUACIÓN TEMPORAL
Noción	SUJETOS	NATURALEZA	ORIGEN DE...	Aquí, acá	ahora, ya
representación	ORGANISMOS	Cadena, enlaces,	EVOLUCIÓN DE...	allá	en este momento
perceptibilidad	OBJETOS	ciclos, fenómenos,	CONSOLIDACIÓN	arriba	en la madrugada
objetivo	ESTRUCTURAS	acciones, cambios,	DESARROLLO	abajo	en la mañana
características:	LUGARES	construcciones,	MOVIMIENTO	al lado	a mediodía
percepción	TIEMPOS	creaciones,	DIFUSIÓN	dentro	en la tarde
funciones	RITMOS	concomitancias,	DESINTEGRACIÓN	fuera	en la noche
ubicación	IMÁGENES	transgresiones,	CONTAMINACIÓN	sobre	ayer
ambiente	PERCEPCIONES	confrontaciones,	CREACIÓN DE	debajo	mañana
contexto	SENTIMIENTOS	crisis, guerras,	INSTRUMENTOS	derecha	anteayer
condiciones	JUEGOS	conflictos,	PARA PERCEPCIÓN	izquierda	pasado mañana
espaciales	ACTITUDES	expediciones,	DE REALIDAD	delante de	todos, todas
temporales	PRINCIPIOS	migraciones,	FANTASÍA	detrás de	estas semanas
definición	CRITERIOS	inmigraciones,	CIENCIA FICCIÓN	alrededor de	este fin de semana
origen	DECISIONES	invasiones,	RELIGIONES	en el centro de	esta quincena
evolución	EMOCIONES	colonizaciones,	CREACIÓN DE	en medio de	este mes
composición	PENSAMIENTOS	explotaciones,	EMPRESAS	en frente de	esta estación
partes/element.	EXPLORACIÓN	liberaciones...	CRÍTICA	cerca de	este bimestre
estructuración	INVESTIGACIÓN	PERCEPCIÓN	ESPECTÁCULOS	lejos de	este cuatrimestre
niveles	CONOCIMIENTO	IMAGINACIÓN	PELÍCULAS	por encima de	este semestre
técnicas	TÉCNICA	AFECTIVIDAD	MÚSICA	a través de	este año
criterios	PROCESOS	LÚDICA	CONCEPTOS	norte	este aniversario
habilidades	ACTIVIDADES	ÉTICA	TEORÍAS	sur	este bienio
sostenimiento	PERSONALIDAD	EMOTIVIDAD	LEYES	oriente	este lustro
alimentación	AMBIENTES	OPERACIONES	ORIGEN DE...	occidente	esta década
funcionamiento/	AGRUPACIONES	MENTALES	DISCIPLINAS,	grados según	este siglo
comportamiento	CULTURAS	TIPOS DE	MÉTODOS,	latitud	este milenio
procesos y	COMUNICACIÓN	PENSAMIENTOS	ENFOQUES	grados según	esta época
etapas	SITUACIONES	CIENCIA	MODELOS	longitud	más tarde
medición	HECHOS	FILOSOFÍA	PROMULGACIONES	en este sitio, lugar	con frecuencia
formas y estilos	EXPERIENCIAS	TÉCNICA	CONSTITUCIONES	en esta ciudad	nunca jamás
diversidad	CREATIVIDAD	ARTE	REGLAMENTACIÓN	en esta región	rara vez
agrupación	ARTES	PRAXIS	ENCUENTROS	en este país	cada vez
clasificación	TÉCNICAS	DEPORTES	REFORMAS	en este continente	siempre
diseño o plan	CIENCIAS	LO PERSONAL	TECNIFICACIÓN	en este mundo	un rato
elaboración o	TECNOLOGÍAS	LO SOCIAL	INDUSTRIALIZAR	en este planeta	pronto
ejecución	TEXTUALIDADES	LO AMBIENTAL	COMERCIALIZAR	en esta galaxia	hace tiempo
valoración	LINGÜÍSTICAS	LO CULTURAL	CAPITALIZACIÓN	en este universo	antes
comunicación	TEXTUALIDADES	SITUACIÓN	MODERNIZACIÓN		después
vivencialidad	NO	COMUNICATIVA	SISTEMATIZACIÓN		cuando
funcionalidad	LINGÜÍSTICAS	INTERACCIÓN	CULTURIZACIÓN		ora
reproducción		HISTORIAL	INTERNET		tiempo sincrónico
industrialización		INVESTIGACIÓN	GLOBALIZACIÓN		tiempo diacrónico
comercialización		TECNOLOGÍA	VIVENCIAS		
consumo		LENGUAJE	CELEBRACIONES		
trascendencia		VERBAL	CREACIÓN DE		
importancia		Y NO VERBAL,	ARTE,		
		LITERARIO	TEXTOS		
			LINGÜÍSTICOS		
			Y NO LINGÜÍSTICOS		

Figure 2. Heuristic-Significant V as a Guide for Research and Education.

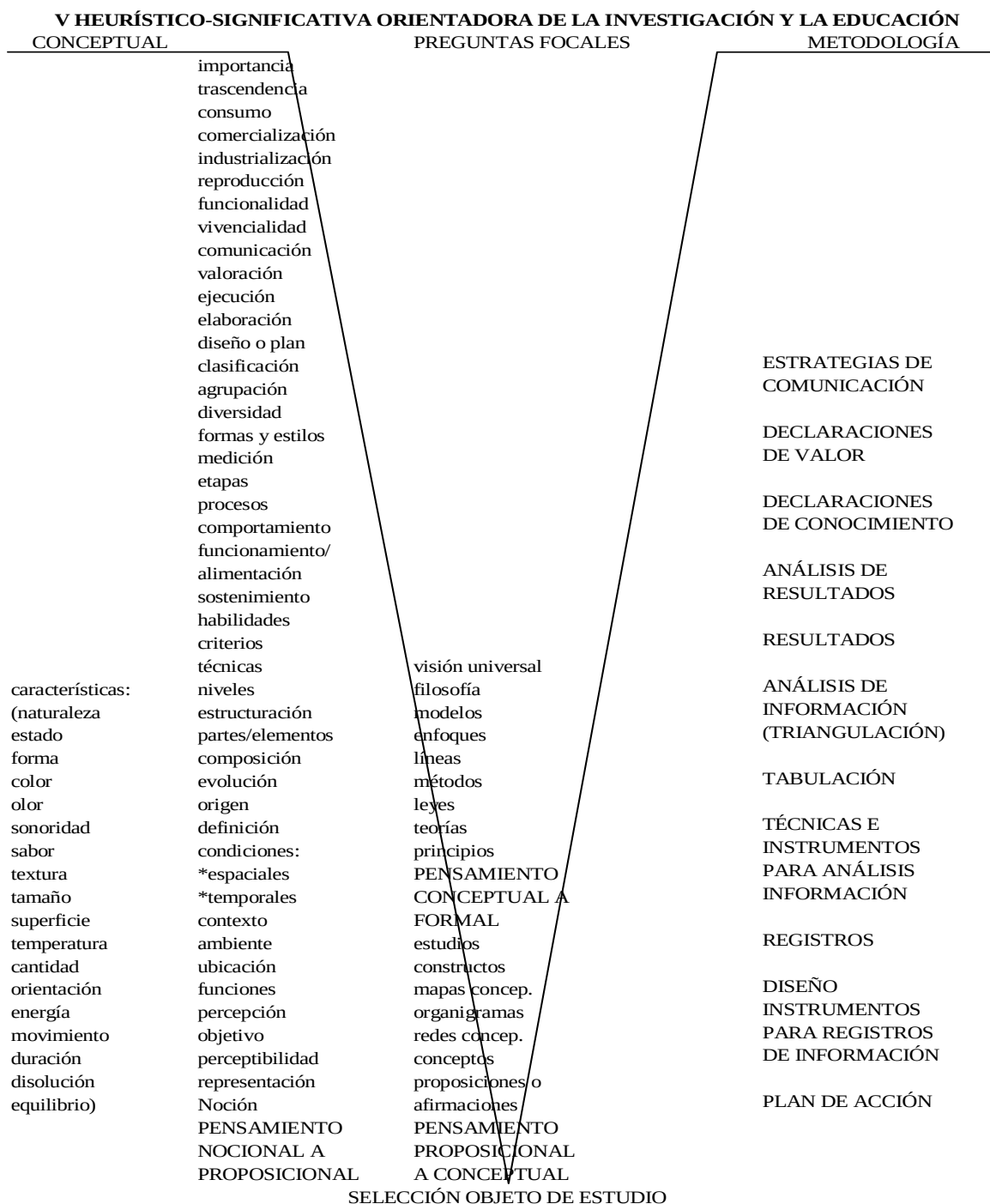


Figure 3. Environment and disciplines based on human characteristics.

AMBIENTES Y DISCIPLINAS A PARTIR DE LOS CARACTERES HUMANOS				
CARACTERES HUMANOS	CORPORAL NATURAL Situado en espacio tiempo	→	Madurez según edad, sexo, situado en Espacio y tiempo	AMBIENTE NATURAL Disciplinas: Ciencias naturales, Química, Geología, Arqueología, Paleontología, Cosmología, Biología, Ecología, Ciencias salud, Medicina, Biomédica, Fisioterapia, Dietética y nutrición, Odontología
	PERCEPTUAL Sensitivo	→	Percepciones Sensaciones	VIRTUAL, FORMAL Ciencias formales: Matemáticas, Física, Geometría, Astronomía, Geografía Física, instrumentación, Percepción y medición, Temporalización espacial
	APECTIVO Espiritual Motivacional	→	Afectos (preferencias) sentimientos espiritualidad sensibilidad	APECTIVO, ESPIRITUAL Religiones, Misiones, Hogar
	LÚDICO Diverso Entusiasta	→	Pasatiempos (entretenimiento) diversión relajación afición competición celebración vacaciones	LÚDICO Entretenimiento y diversión (juegos, competencia, eventos deportivos, culturales, celebración, fiestas, ferias, vacaciones, recreación, juegos electrónicos, hostelería y turismo, juegos azar
	ÉTICO Actitudinal (Valorativo)	→	Actitudes Criterio personal	ÉTICO Ética (Cosmovisión, criterio personal)
	EMOTIVO (Anímico)	→	Emociones Autocontrol	EMOTIVO Psicología
	COGNITIVO (Procesos de pensamiento)	→	Pensamiento Conocimiento	CIENTÍFICO Filosofía, Ciencia, Investigación
	PRÁCTICO (Habilidades)	→	Haceres Habilidades	TÉCNICO, ARTÍSTICO, DEPORTIVO Técnica, Tecnología, Arte, Comercio, Publicidad, Electrónica, Navegación espacial, Ingeniería, Industria, Obras civiles, Arquitectura, Música, Pintura, Escultura, Deportes
	PERSONAL (Relacional, social)	→	Personalidad Carácter Forma de relacionarse Lo social	RELACIONAL, SOCIAL Ciencias sociales, Geografía política, Política, Leyes y derechos, Empresa, Administración, Economía, Protección civil, Salubridad, Agua potable, Salud pública, Educación
	COMUNICATIVO (competencia comunicativa)	→	Forma de comunicarse Competencia comunicativa	COMUNICATIVO Comunicación: Periodismo, Radio, Televisión, Telefonía, Internet
	VIVENCIAL (biografico-histórico)	→	Vivencias, Experiencias historial	VIVENCIAL RELIGIOSA CULTURAL Biografías centrales, Religión, Creencias, Costumbres, Culturas, Civilizaciones
	TEXTUAL (Competencia textual)	→	Textos Competencia textual Semiótica y lingüística Lectura del mundo Signos Oralidad y escritura	TEXTUAL Textos visuales, virtuales o formales, orales, escritos, Semiótica, Lingüística, Literatura, Textolingüística, Pragmática, Semiología, Documentación, Bibliotecol.