Paradigms and Methodologies for Knowledge Building

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Abstract: A diversity of methodologies can be utilized for knowledge building in social sciences, particularly in education. Nevertheless, in order to give meaning to the research findings and progressively create theories, an awareness of the epistemological framework appears to be necessary. The aim of this article is to present the main epistemological paradigms and their coherent correspondence with respective ontologies and corresponding methodologies. This article supports and describes four paradigms or epistemological traditions: logic empiricism, constructivism, conceptualism or Aristotelian tradition, and phenomenology. Understanding the diverse possible epistemologies as well as the coherence with methodologies is a necessary step for presenting well-informed research. Knowledge building requires comparison, replication, generalization or integration of results in theories, and all these processes need the critical instance of the epistemological and methodological coherence. Additionally some concrete examples of methodologies have been detailed to illustrate the diversity of available ways of knowledge building in education. The Review of Educational Theory, as a new journal that aims to create a scientific community, will increase the research quality by enhancing the epistemological and methodological awareness of their pieces of research.

Keywords: Knowledge building; Epistemologies; Research methodologies; Ontologies; Logic empiricism; Constructivism; Aristotelian tradition; Phenomenology

1. Introduction

The aim of a scientific journal is to serve research groups or individuals by publishing their original research or theoretical advances. The result is a progressive creation of a scientific community compromised in knowledge building within the scope of a field of human scientific endeavor. If the scientific community is involved in disciplines of social sciences, a diversity of methodologies has to be welcomed in today's potential methodological diversity. Nevertheless, in order to share properly theoretical advances, it's necessary to develop collective consciousness about ontological, epistemological and methodological matters. Otherwise the necessary critical discussion would be too poor and weak to support collective progresses.

When, in addition, the scientific community has different backgrounds, and/or the field scope is wide, the need to share epistemological unified languages increases. The required critical stance needs it. The comprehension and integration of different findings, coming from diverse research traditions, need accurate epistemological and methodological languages.

On the other hand, considering a single research piece and the need of communicating it with the maximum of quality standards, it seems appropriate present it as a coherent piece. By coherent we mean that explicitly or implicitly the correspondence between ontology, epistemology and methodology is appropriately articulated. Otherwise the repeatability and comparability of the findings would not easily be made, nor the relevance appropriately established.

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Additionally there is a need in our postmodern times to integrate findings in order to make comprehensive approaches to explain complex problems and situations. The integral theory[1] is widely used in different fields: medicine, leadership, political science, or education, among many others. To make possible the advances, the integral theory needs at the same time to differentiate and to integrate[2], which are two independent dimensions of complexity[3]. This can be done only after being aware of the epistemological and methodological reasonableness of the diverse findings.

The purpose of this article is to inform the use of research methods and techniques, providing their source of validity and relevance, as well as their interpretative framework. The declared objectives of providing a rationale for making possible dialog inside a critical community, presenting coherent and suitable pieces of research, or having an informed framework to contextualize research, converge in a single research, and what is immediately interesting to researchers: to increase the research quality.

The study of paradigms started with the work of Guba & Lincoln.[4] Creswell emphasized the paradigmatic way of thinking in the research design.[5] Additionally Mertens and Mackenzie & Knipe applied the paradigmatic rationale to educational research.[6] Although the important impact of these contributions, a systematic rationale for the paradigms in knowledge building remain to be done. In particular it's necessary to enhance the intra-paradigmatic coherence between epistemological, ontological and methodological rationales. The paradigmatic thinking is relevant to create methods and mixed methods.[7] In the design of a particular research, when is time to select the method (mixed or not), the appropriate understanding of paradigms for knowledge building can be a valuable tool in the decision-making process.

2. Rationales for the Paradigms

Following a phenomenological methodology we present four ways to substantiate the traditions or paradigms developed. These ways can be understood as rationales for the paradigms, which serve to sustain them, and to understand in depth their foundations and differences.

2.1 Aristotelian Philosophical Rationale

Aristotle[8] systematized the diverse and distinct forms of knowledge under the word episteme. But although episteme is usually translated as science, their meaning was broader than the definition that we use today. The broader sense could be translated as to know, to understand or to be acquainted with. Aristotle distinguished between three

kinds of episteme: theoretike, praktike and poietike.[9] In the first one the focus was the research of truth and their necessary character, as in mathematics, physics or ontology. In the case of the episteme praktike the object of knowledge was the human behavior, and was centered in the perfection of the agent. It's the Aristotelian practical knowledge of ethics or politics oriented to the phronesis. The episteme poietike in turn was oriented to productive knowledge. This kind of episteme was guided by the poiesis and, unlike the two previous ones, more than one potential outcome is possible. The poiesis guides the perfection of the work. This kind of knowledge was identified by the word tekhne, which in Latin was translated as ars: a kind of rational human way of constructing knowledge, productive knowledge. Aristotle introduced also the nous, a direct intuition of truth. All those modalities together form in his system the Sophia, which requires therefore the contribution of different modalities of knowledge.
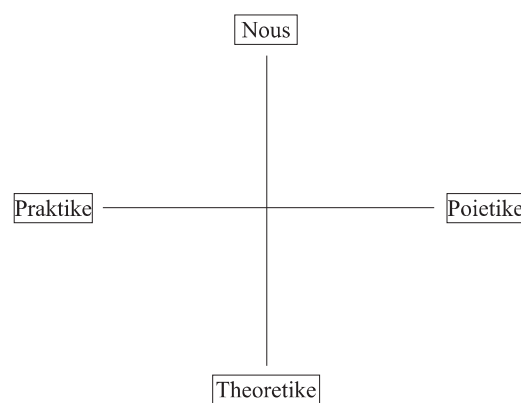

Figure 1. Aristotelian ways of knowing. Episteme and Nous.

The first statement in the path toward the identification of the paradigms is that, in correspondence with the Aristotelian view, they are four. In addition it seems reasonable to set up a correspondence between the epistemological paradigms and each one of the three episteme and the nous.

2.2 Wilber and the Comprehensive Rationale

Wilber (2001, 2005, 2007) presented a map of the human consciousness with four dimensions or quadrants and the different levels, lines, states and types characterizing all human consciousness manifestations. The quadrants are:

Table 1. Quadrants of the Wilber Theory

Upper left (UL): Subjective, I	Upper right (UR): Objective, It
Lower left (LL): Intersubjective, We	Lower right (LR): Interobjective, Its

Besides other considerations and advancing toward the map of knowledge or the epistemologies that the

Wilberian perspective implies, it has to be explained that the upper right quadrant (UR) refers to the objective world, that is, the material body and everything that can be observed in time and space, open to the knowledge of the positive sciences. The upper left quadrant (UL), the subjective world, includes thoughts, emotions, memories, states of mind, perceptions and sensations. The lower left quadrant (LL), in turn refers to the intersubjective world, including values, meanings, language, relationships and culture. And the lower right quadrant (LR) includes the interobjective world, comprising networks, systems, technology, government and the natural environment. As far as ontology is concerned, the meta-theory exposed allows situate pre-modern metaphysical perspectives as the result of the predominance of the subjective world (UL); the modern ones as the result of the emphasis on the objective (UR) and the postmodern ones as the result of the preponderance of the intersubjective character (LL). All the perspectives contribute but by themselves are insufficient, in Wilber view, to give account of the whole.

Considering the interior and exterior of each quadrant, eight zones can be created that define the different methodologies:[10]
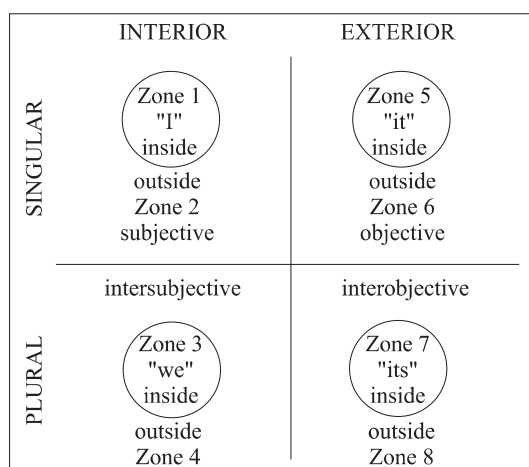

Image from Helfrich PM. Ken Wilber's AQAL metatheory: An overview; 2008.And from Wilber K, Integral spirituality; 2006, p. 36

Figure 2. Definition of zones in the Wilber's quadrants

- Top left quadrant UL (Subjective intention)

• Zone # 1: Introspection, phenomenology.

• Zone # 2: Structuralism

- Lower left quadrant-LL (Intersubjective cultural systems)

• Zone # 3: Hermeneutics

• Zone # 4: Cultural anthropology

- Right upper quadrant - UR (Objective behavior)

• Zone # 5: Autopoyesis

• Zone # 6: Empiricism, behaviorism

- Right lower quadrant-LR (Inter-objective social systems)

• Zone # 7: Social autopoyesis

• Zone # 8: Ecological sciences, systems theory, anthropology

These epistemological approaches constitute a map that is presented to summarize the totality of the human desire to create knowledge. Using a map does not mean that all dimensions are always going to be used, but all are considered as valuable ways of accounting for the phenomena and each one complements each other. The map helps to situate perspectives, to know in which way they contribute and how they can be complemented.

There is a meaningful correspondence with Aristotelian presented ways for creating knowledge:

Episteme theoretike: #6, empiricism, behaviorism

Episteme praktike: #3 #4, hermeneutics, cultural anthropology

Episteme tekhne: #8, but will require more refinement

Nous: #1 #2, phenomenology, structuralism

It has to be noted that autopoyesis (#5 and #7) are not ways of creating knowledge, because is the objective reality itself in the Wilber's model. The knowledge in these quadrants is only in the external dimension (#6 and #8). The knowledge must be separated respect to the object. In our purpose we are interested in knowledge creation.

On the other hand, Wilber proposes the interobjective quadrant (#8) social, as separated from the intersubjective (#3 #4) cultural. These two dimensions seem difficult to be separated, given their representational character. For this reason Gallifa (2018) placed them in the same Lower left quadrant. The interobjective world was characterized as the relations between objects. If objective knowledge corresponds to cognition, in the inter-objective quadrant, the correspondence is with metacognition, and with strategic, tacit, practical knowledge.[11] Gallifa (2018) proposed a redefinition of the interobjective quadrant approaching it to the Aristotelian tekhne. Wilber included also these relationships in that quadrant.[12]

2.3 The phenomenological rationale with the holonic theory.

Wilber supported his system in the concept of holon, which will help in our purpose of the progressive refinement of the paradigms. Wilber, after presenting the involution-evolution rationale, introduced the concept of holon that previously Koestler[13] formulated. "Reality is not composed of things or processes, it is not composed of atoms or quarks. It is not composed of 'wholes', nor does it have any 'parts'. Rather, it is composed of whole/part or holon units".[14] For example, an atom, a grain of sand, an animal, a symbol, are examples of holons. Holons can be considered themselves by definition as a whole and at the same time as part of another wider reality. Holons help to explain the hierarchical and heterarchical relationships within the evolutionary spectrum of physics, biology and consciousness.

A holon is therefore a "fundamental structural element common to all reality. Its definition as a whole or as a part will depend on the context. It is always complete and incomplete so, trying to maintain its identity or express its potential, it flows and extends into becoming. It could be said that a holon is a construct, but also it is a self-evident revelation, resulting from a natural phenomenology. Its symmetry provides structure and stability and its lack of definition provides asymmetries and movement. It is the 'root' event and the structural basis of the forms and of all the other events".[15]

2.3.1 Detailed dimensions of holons

Wilber synthesized what holons of any kind have in common. Every holon has four characterizing dimensions:[16]

Agency.Tendency to be a whole. Aristotelian entelechy, morphic unit/field (Sheldrake), canon (Koestler), self-asserting, relative autonomy and wholeness, yang. It manifests the tendency towards self-preservation, autonomy, self-responsibility, self-esteem. It assumes in this sense fixed forms or patterns, among which there are the 20 tenets. Wilber named this dimension deep structure. In pathological forms it manifests as alienation and repression.

Communion. Tendency to relationship, participatory, bonding, joining tendencies, expresses its partness, the ability to be part of a whole, attract other parties, relationship with something larger, self-adaptation, yin. Pathological forms: fusion and indisociation.

Self-transcendence, Self-transformation, creative novelty, creativity (Whitehead), each holon becomes a new whole/part that has its own new forms of agency and

communion. It is about the impulse to experience freedom, to find cohesion and unity through a greater, deeper and broader totality. Articulated by 'symmetry breaks' (Prigogine) not equivalent rearrangements of the same stuff. Evolution is the result of self-transcendence at all levels: It is also called as 'Eros', that is, Spirit manifested in something else: matter, body, mind, soul, etc. In this dimension the 'telos' or purpose is manifested. If self-transcendence is not achieved, 'phobos' (fear, regression, panic, contraction and repression) is experienced.

Self-dissolution-autoinmanence. Self-dissolution of transcendence that can be termed as autoinmanence. Morphogenetic gradient in the manifest field. This means not only a manifest reality with some kind of support in the manifested reality, but also potential to evolve. Preservation of the current level or regression to previous levels. Wilber conceptualizes it as an instinct of death or Thanatos, a force opposed to Eros.

The four properties can be represented in axes, as Wilber proposed.[17] The simple representation of a holon is therefore:
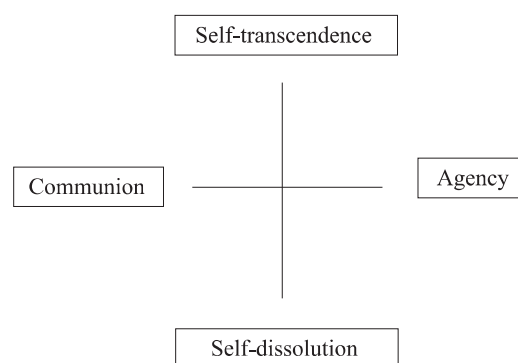

Figure 3.

Regarding our purpose, especially relevant is to find out whether or not in a paradigm for constructing knowledge the dimension of transcendence is implicated. When there is no transcendence the system collapses in a predictive system and phenomenological process is unnecessary. Another aspect from the observation of the holonic structure is that there is a correspondence with the paradigms that we are characterizing. For example the communion dimension is related to the intersubjective cultural vector and the implicit values that are the central part in hermeneutics and cultural anthropology, etc.

2.4 Constructivist Rationale in the Definition of the Paradigms

There are three questions around which to analyze the paradigms for constructing knowledge:[18]

Ontological: What is the form and nature of reality and what is there that can be known about it?

Epistemological: What is the nature of the relationship between the knower or would-be knower and what can be known?

Methodological: How can the inquirer (would-be knower) go about finding out whatever he or she believes that can be known?

In a given paradigm, or epistemological tradition, coherence in the response to these questions is expected to be a paradigmatic trait. Guba & Lincoln proposed that paradigms are human constructions, composed by sets of basic beliefs. "They are not open to proofs in any conventional sense. Advocates in any particular construction must rely in persuasiveness and utility rather than proof in arguing their position".[19]

Guba & Lincoln (1994) advocated for four paradigms. In our case we'll consider also four paradigms, following the rationales developed. The four traditions are: logical empiricism, and constructivism, in coincidence with Guba & Lincoln (1994), but we defined differently the other two: conceptualism and phenomenology, in correspondence with our development and as we'll justify appropriately in the presentation of the paradigms.

Once developed Aristotelian, integral, holonic and constructivist ways of reasoning, and putting together the considerations made, it can be easily observed a coincidence in the cited four traditions, which are developed in the next part. The traditions according to Guba & Lincoln (1994) can be named as paradigms or traditions for knowledge building.

3. Paradigms for Knowledge Building and Corresponding Methodologies

3.1. Logic Empirical Science

The logic empirical paradigm, also denominated as Galilean tradition or positivism/neo-positivism. The ontology is realism, which means that there is an external and objective reality (object-objectivity) separated from the subject that creates knowledge. The epistemology departs from the view of the natural world as opaque. Repetition of observations is needed in order to identify trends and inductively create hypothesis and theories. Logical deductive confrontation is also used to test theoretical consistence with the data (Popper). Changes of interest in scientific communities can be explained as change of paradigm.[20] Logical empiricism discarded the Aristotelian arguments from authority and relied in repetition of observations

and criticism instead of particular cases. The single case doesn't have wisdom. The methodology is observational and experimental, with the use of quantitative methods to characterize the reality though measurements. Finally the aim is the establishment of scientific laws that are relationships between variables or formulas. All the forms of behaviorism but also psychometrics fall in this vision of science.

3.1.1 Experimental and Observational Methodologies: Quantitative Methodology

Quantitative methods within an observational or experimental framework are used to test theoretical consistency and to propose new theories in education. This tradition need to start off from existing theories, identifying a gap in the knowledge and proposing observations, measurements, indexes or design experiments to test new hypothesis, and construct a theory sustained with empirical data, open to criticism. There are many methods, and educational research may use a wide diversity of them,[21] for example the movement of evidences-based research,[22] which is influencing many school reforms. The detailed description of concrete approaches is outside the purpose of a single article.

3.2 Constructivism

Constructivism is a paradigm of knowledge construction. Guba & Lincoln (1994) explained that this paradigm emerged at the same time of the evolution of social sciences in postmodernity, and was opposed to positivism and neo-positivism. Synthetizing, the ontology of the paradigm can be summarized in the sentence that the reality is a construction of the subject. In that sense the truth is relative and has contextual validity. The laws are not nomothetic but idiographic. Instead of the mechanistic metaphor of the previous paradigm, organismic metaphor is preferred, with evolutionary reasoning incorporated. The relative character of the knowledge is a trait of the epistemology of this paradigm. The methods are qualitative or a mixture of quantitative and qualitative. Rationality and criticism is present, and the paradigm is consistent with postmodern worldviews.

Constructivism applies a wide diversity of methods inside hermeneutics or ethnomethodology. Hermeneutics is the interpretation of experience and its meaning. Ethnomethodology comes from cultural anthropology and emic-etic visions[23] and sustains a wide range of methods. Methodological rationale in constructivist paradigm favors the systematization and use of qualitative techniques.

3.2.1 Ethnomethodology

Ethnographic research examines shared patterns of be-

havior, beliefs and language in cultural groups. Diverse subtypes of ethnography with different theoretical orientations and aims have been developed: "structural functionalism, symbolic interactionism, cultural and cognitive anthropology, feminism, Marxism, ethnomethodology, critical theory, cultural studies and postmodernism".[24] Two main forms emerged:

The realist, which is an objective account of the situations typically written by the researcher in third-person, reporting the "facts" and remaining in the background. This approach was described by Van Maanen.[25]

The critical approach, which includes in the research an advocacy perspective in response to current society, in which different systems serve to marginalize individuals from different classes, ethnic origins or gender. In this case researchers advocate for the emancipation of groups marginalized in the system.[26] For example critical ethnographers can study schools that provide privileges to certain type of students or counseling practices that serve to overlook the needs of underrepresented groups.

There is no a unique way to conduct Ethnography, but some common procedures may include the following steps:[27]

Appropriateness of ethnography, which is the appropriate methodology when there is a need to describe how a cultural group function and to explore the beliefs, language, behaviors, and issues such as power, resistance and dominance.

Identification and location of the culture-sharing group to be studied.

Selection of the cultural themes or issues to study about the group. May include topics as enculturation, socialization, learning, cognition, domination, inequality or child or adult development. The ethnographer begins the study by examining people interactions in ordinary settings and attempting to discern pervasive patterns such as lifecycles, events and cultural themes. Description about group's history, religion, politics, economy and environment, within the social structure, kinship, political structure and social relations among members of group may be described.

Study of the cultural concepts, using the particular ethnographic approach, being realist or critical oriented.

Fieldwork. Gather information where the group works and/or lives. Diverse kind of data, using diverse techniques, can be obtained. The time to data collection is extensive, involving prolonged time in the field. Participatory observation and description of patterns or topics about the group culture are different activities. Research issues like respecting people, reciprocity, deciding who owns the data, and ethics in all research aspects are central.

Final product. Narrative writing. Holistic cultural portrait of the group that incorporates the views of participants (emic) and the views of the researcher (etic). Final report incorporates the particular style (realist or critical).

3.3 Conceptualism, Productive Science

Tekhne, in the conceptualization of Aristotle, is the episteme oriented to the poiesis. More than one possible creative solution is possible. Tekhnes can be denominated as productive or applied sciences or simply arts (from the latin ars).[28] An example is tekhne retorike, the art of eloquence and persuasiveness. Therefore the interobjective epistemological dimension can be named as Aristotelian applied or productive science. Spence (1994) refers to it as Aristotelian tradition or the conceptualist way of building knowledge.

Aristotelian tradition was predominant in premodern traditions in Middle Age Europe. It was pervasive in scholastics were the seven major arts (trivium and quatrivium) organized curricula in the flourishing newborn universities. The main point of this episteme is that the nature is completely intelligible. The 'form' reveals the essence. There is no distinctiveness between them (hylemorfism). But only some trained observers can see the essence in the form. When the discovering is made truth is self-evident. A favorite case (specimen) represents the discovery. There is reliance in the authority sources coming from a given tradition.

The ontology was creationism (relationship creator-creature, as a similar relationship artist-artifact). The general methodology of the doctrine of signatures helped to create a tradition in a particular episteme. The doctrine of signatures was popular in Renaissance, and was discredited by Bacon and his emphasis in empiricism. In this way of constructing knowledge the nature of things is no other than his similarity. The similarity is only visible in a network of signs. Steps to obtain knowledge:[29]

Determination of the Aristotelian categories (substance, quality, quantity, form…)

To find out the truthful essence using similitudes (convenience, emulation, analogy and sympathy) between two realities: one well known and other unknown. Similitudes help in projecting knowledge from the known reality to the unknown.

This methodology helps to create traditions of knowledge. It works like a "guild", in which the novel appren-

tice is integrated to learn from the authority previously established. Spence (1994) considered Freudian Psychoanalysis as an example of Aristotelian episteme or conceptualist science.

3.3.1 Design-Based Research

Design-based research (DBR)[30] is a research based in a systematic process of analysis, design, development and evaluation of an intervention (a training program, a product or a process) as a solution to a complex educational problem.[31] The characteristics of the DBR, following the contributions of different authors, can be defined in different points:[32]

• Focuses complex problems in real contexts.

• Involves intensive collaboration between researchers and practitioners.

• Integrates recognized and hypothetical design principles to provide solutions to complex problems, but possible to be solved.

• Allows developing rigorous and reflective studies to experience and to create better innovative learning environments as well as to define new design principles.

• It requires long-term involvement that allows continuous improvement of protocols and issues.

• Maintains commitment both: to the theoretical building and extension of the theory and to the resolution of problems in the real world.

At the same time, DBR follows three principles. The research is:

Recursive (iterative): The iteration supposes a design and developmental process that allows the practitioners and experts to participate, in a complemented way, to the revision and reformulation of the process.

Reflective: Assume that most of the problems in the professional practice can't be solved with preconceived solutions.

Participative: reflects the change of perspective of considering the expert, the researcher and the designer as part of the same team with similar attributions at any of the stages of the research process.

The DBR is considered a mixed and dynamic methodology since there are decisions already taken and others that are taken during the research process. This justifies that some methodological concretions can't be defined or explained "a priori". The DBR is not defined by the methods it uses, but by the objective that pursues that is the sustained innovation.[33] The research process through

DBR is structured in phases and has a cyclical nature.[34] Next we define the different phases:

Preliminary phase: the research problem and the characteristics of the context are analyzed at the same time that a consistent conceptual framework is developed based on a good review of the literature and on the real needs of the context to be studied.

Phase of prototype: where a prototype of intervention (program or product) is designed, developed and reviewed. These three steps are repeated cyclically. Thanks to that a more advanced and more complex prototype is progressively being achieved.

Evaluation phase: the effectiveness of the intervention is analyzed. The principles of the design are documented and elaborated.

Nieveen[35] (1999) states that in order to guarantee quality in the application of a DBR methodology, four criteria must be taken into account: relevance (validity of content), consistency (construction validity), feasibility or functionality (practicality) and efficacy (effectiveness). In order to achieve the four, it will be necessary to define the corresponding mechanisms and verification strategies.

3.4 Phenomenology

Phenomenology is the study of phenomena and their essences. Distinctively phenomenology studies 'lived experience', which is how we immediately engage with a given phenomenon or aspect of human life.[36] The assumption is that we can only understand the world through our conscious awareness and experience of it. Usually phenomenology is considered a methodology or a single method inside the constructivist paradigm. We'll consider phenomenology not only as a methodology but also as a paradigm as we appropriately will justify.

Phenomenology was initiated by Husserl who wanted to discover a methodology to find the truth or the essence, but without following the path and corresponding worldview of the conventional science. Some mental habits of researchers for being trained inside the modern "scaffolding"[37] made research influenced by the prevailing categories of science. The problem is the implicit 'modern' science renouncement to the study of the subject and the subjective phenomena, as well as the study of the consciousness. This happen because the prevalence of the declared positivist statement to reject any kind of introspection.

Merleau Ponty (1945) systematized the alternative process for knowledge building. According this, phenomenology is based in four interrelated processes:[38]

1) Description: Process of constructing a narrative of the studied phenomena. Phenomenologist researcher gathers new data and returns one time and another to the description of the phenomena, which is manifested richer and complete each time that is described.

2) Phenomenological reduction: It's the intention of don't close quickly the research in a final theory, the need to retard and resist making quick theoretical interpretations to explain the phenomena. This trait is a self-imposed one, because the scientific bias of the mind of the researcher. It's very necessary to return to the description and to limit the interpretation and to apply existing theories. This reduction is made in order to respect the phenomena, which have to be manifested as pure as can be, without simplifications.

3) Eidetic reduction: Is the search for the essence, the aim of any phenomenological method. This phase requires the use of imagination and symbolic capabilities: It's the moment where the discovery is made. Sometimes all the data fit in an idea, an intuition a vision. Comes and it's imposed as a self-evident reality.

4) Intentionality: It's a trait of the consciousness. The transcendental subject, not the individual subject, once the previous points have been developed, is manifested in the researcher consciousness. The phenomenological path allows the manifestation of the transcendental dimension of the consciousness, which is an objective reality. This trait means that transcendence from the existing theories and models is possible, as well as the objective character of the findings.

When these four traits are present we'll consider the corresponding approach as belonging to he phenomenological tradition or paradigm. Fully phenomenological inspired methodologies are very different of the constructivist approaches and their manifest lack of concern for objective knowledge. That distinction is important and has been underestimated by some, possibly because some qualitative researchers share the common postmodern worldview and their characteristic relative lack of concern about objectivity.

Nevertheless a distinction can be made between phenomenology as a philosophical method that has for object the consciousness of the transcendental subject, and phenomenology as a constructivist method available to any field of knowledge. Giorgi (2012) developed a phenomenological method for researching humans in a psychological way. He explained that psychologically phenomenologist are interested in specifically human consciousness, and because of that limited interest, the phenomenological method needs to be pretranscendental. Psychology, in effect, is interested in how a human consciousness relates to a specifically human world.[39] Van den Berg emphasized that "insights into experience as lived, or the phenomenal level, was what was critical for psychologists to understand".[40] "The criteria necessary in order for a qualitative scientific method to qualify itself as phenomenological in a descriptive Husserlian sense, one would have to employ (1) description (2) within the attitude of the phenomenological reduction, and (3) seek the most invariant meanings for a context".[41] This kind of minimization of phenomenological general approach can be denominated as applied phenomenology. "In applied phenomenology reality is comprehended through embodied experience. Through close examination of individual experiences, phenomenological analysts seek to capture the meaning and common features, or essences, of an experience or event. The truth of the event, as an abstract entity, is subjective and knowable only through embodied perception; we create meaning through the experience of moving through space and across time".[42] Phenomenology as a method can be situated inside the constructivist paradigm. Otherwise when there is intentionality of the consciousness acting, it can be traced a parallelism with the nous and with the holonic transcendent dimension. These correspondences justify our proposal: the consideration of phenomenology as a paradigm.

An example of phenomenology applied to psychoanalysis is the psychology of Jung. Hostie[43] recovered Jungian psychology for the phenomenology, after explaining the problems to consider Freudian psychoanalysis as a phenomenological based methodology.

3.4.1 Grounded Theory

The same as in other epistemological paradigms or traditions, a diversity of methods can be included as phenomenological. The Huserlian phenomenological method itself can be an example, but another example of phenomenological inspired method is grounded theory. We'll present it and at the same time justify why we consider it as phenomenological. Grounded theory didn't come directly from phenomenology, but their methodological path accomplishes the phenomenological minimum requirements of an applied phenomenology and can be considered, when is well developed, as a fully phenomenological methodology. Grounded theory methods emerged from the collaboration of sociologists Glaser and Strauss during the 1960s. Glaser and Strauss challenged "the arbitrary division of theory and research; the prevailing view of qualitative research as primarily a precursor to more 'rigorous' quantitative methods by claiming the legitimacy of

qualitative work in its own right; the belief that qualitative methods were impressionistic and unsystematic; the separation of data collection and analysis phases of research; and the assumption that qualitative research only produced descriptive case-studies rather than theory development. They articulated explicit analytic procedures and research strategies that previously had remained implicit among qualitative researchers".[44] "Grounded theory originates from sociology, specifically from symbolic interactionism, which posits that meaning is negotiated and understood through interactions with others in social processes. These social processes have structures, implied or explicit codes of conduct, and procedures that circumscribe how interactions unfold and shape the meaning that comes from them".[45] "Glaser and Strauss portray their methods as compatible with traditional positivistic assumptions of an external reality that researchers can discover and record".[46] This separates grounded theory from constructivism.

"Grounded theory is a general methodology for developing theory grounded in data, systematically gathered and analyzed. Theory evolves during actual research, and it does this as continuous interplay between analysis and data collection. A central feature of this analytic approach is 'a general method of [constant] comparative analysis'",[47] hence "the approach is often referred to as the constant comparative method".[48] "Theory consists of 'plausible' relationships proposed among concepts and sets of concepts (Though only plausible, its plausibility is to be strengthened through continued research)... They do not believe it sufficient merely to report or give voice to the viewpoints of the people, groups or organizations studied. Researchers assume the further responsibility of interpreting what is observed, heard, or read".[49] "Explicit mandate to strive toward verification of its resulting hypotheses (statements of relationships between concepts). This is done throghout the curse of a research project, rather than assuming that verification is possible only through follow-up quantitative research. Enhanced also by its procedures is the possibility of developing theory of great conceptual density and with considerable meaningful variation. Conceptual density refers to richness of concept development and relationships –which rest on great familiarity with associated data and are checked out systematically with these data. Researchers in psychology and anthropology are increasingly using grounded theory procedures. Researchers in practitioner fields such as education, social work, and nursing have increasingly used grounded theory procedures alone or in conjunction with other methodologies".[50]

"Theories are interpretations made from given perspectives as adopted or researched by researchers. To say that a given theory is an interpretation –and therefore fallible- is not at all to deny that judgments can be made about the soundness or probable usefulness of it. All interpretations, whether or not they have the features or status of theory, are temporally limited- in a dual sense. First, they are always provisional, Second, like many other kinds of knowledge, theories are limited in time: Researchers and theorists are not gods, but men and women living in certain eras, immersed in certain societies, subject to current ideas and ideologies, and so forth. Hence as conditions change at any level of the conditional matrix, this affects the validity of theories –that is, their relation to contemporary social reality. Theories are constantly becoming outdated or in need of qualification".[51] In short "theories are embedded 'in history' –historical epochs, eras, and moments are to be taken into account in the creation, judgment, revision and reformulation of theories".[52]

Grounded theory methods include the following steps:[53]

1) Simultaneous involvement in data collection and analysis phases of research. Grounded theory works are empirical based studies, whether their data sources are autobiographies, published accounts, public records, novels, intensive interviews, case-studies, participant observer field notes or personal journals.

2) Creation of analytic codes and categories developed from data, not from preconceived hypotheses; Computer software (e.g., NUD.IST or ATLAS/ti) can be useful in categorization processes.[54]

3) Development of middle-range theories to explain behavior and processes. Constant comparison, repeated comparison of segments of data within and across cases, asking questions, looking for negative or disconfirming cases, 'flip/flopping' concepts, metaphors and similes, waving the 'red flag'.

4) Memo-making, that is, writing analytic notes to explicate and fill out categories, the crucial intermediate step between coding data and writing first drafts. Types of memos: Defining codes and open data exploration, identifying and developing concepts, asking questions about the data, working out relationships among concepts, refining and adjusting data collection or operations of analysis and integrating concepts or summarizing.

5) Theoretical sampling: Sampling for theory construction, not for representativeness of a given population, to check and refine the analyst's emerging conceptual categories.

6) Delay of the literature review.[55] As a result, "the empiricism inherent in grounded theory methods makes them less congenial to those postmodernists who advocate abandoning empirical research with thinking, feeling, acting human beings. These postmodernists may, however, be amenable to studying pre-established texts".[56] "A grounded theory analysis starts with data and remains close to the data. Levels of abstraction are built directly upon the data and are checked and refined by gathering further data".[57]

"Insofar as theory that is developed through this methodology is able to specify consequences and their related conditions, the theorist can claim predictability for it, in the limited sense that if elsewhere approximately similar conditions obtain, the approximately similar consequences should occur.[58] A study is more phenomenological if: It doesn't end in a definitive theory, returns to data description, uses intuition, reflections about memos, but specially if the conditions of the interaction (time, space) are part of the analysis. In that case transcendence and profundity increases and the phenomenological transcendental function operates as a manifestation of the intentionality of conscience.

Grounded Theory methodology has a long tradition in education, as Hutchinson[59] reported. Interestingly enough these pioneer studies shared the Husserlian orientation, similarly to the development presented here.

4. Conclusions

4.1 Paradigms for Knowledge Building

We developed from Aristotle, integral theory, phenomenological holonistic considerations and constructivism four paradigms for knowledge building. For each one we introduced the ontological and methodological correspondences to each epistemology. We presented a methodology in each paradigm as an example to present concretions of the theoretical approaches. Thus, different rationales converged in establishing four epistemological paradigms for knowledge building:

1) Logical empirical

2) Constructivist

3) Conceptualist or Aristotelian

4) Phenomenological

These traditions can be considered meta-paradigmatic. Within each one there are concrete paradigms, normal science (Kuhn), methodologies, methods and techniques.

Additionally these traditions cover the Aristotelian ways of constructing knowledge: Episteme (logical empirical, extended to diverse conventional sciences), the relation with praxis oriented to phronesis, related with the human behavior (constructivism), the tekhne with the orientation to poiesis (productive or conceptualist sciences or arts) and the nous (approached by phenomenology). Together constitute the Sophia, or wisdom.

The corresponding ontologies to the epistemological paradigms are: logical empiricist ontology can be realism and mecanicism (sciences from modernity), constructivism corresponds with relativism and organicism (sciences in postmodernity), pragmatic and productive sciences correspond to applied sciences and the "authority" within a tradition (premodern epistemes), and phenomenology corresponds to holism and integralism (the emerging current worldview).

4.2 Methodologies

The ways for creating knowledge, once the meta-paradigms are established, have to be coherent with each ontology and epistemology. We presented the rationale of four methodologies, and presented in detail three of them. Corresponding to each epistemological tradition, the methodologies are:

1) Experimental and observational (logical empiricism)

2) Hermeneutical and anthropological (constructivism)

3) Conceptualist and design-based (Aristotelian episteme tekhne)
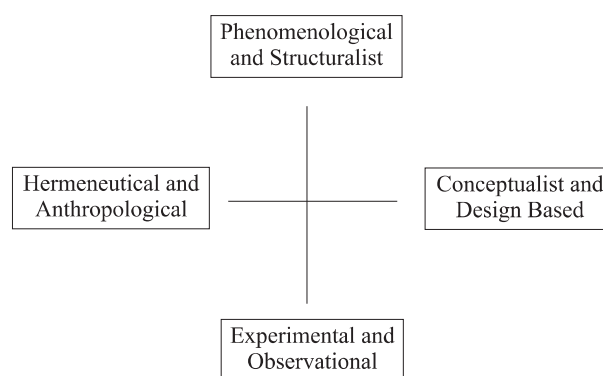
4) Phenomenological and structuralist (phenomenology)

Figure 4. Examples of research methodologies corresponding to each tradition.

4.3 Comparative Table

A comparison between the different paradigms can be summarized in the following table:

Table 2. Paradigms for knowledge building

Paradigms:	Logic empirical science	Constructivism	Conceptualism or productive science	Phenomenology
Epistemology	Episteme theoretike	Episteme praktike	Episteme poietike	Nous
Ontology	Realism. Mechanicism	Reality constructed by the subject. Organicism	Creationism artist-artifact. Authority within a tradition	Essence and intentionality of consciousness. Holism and integralism
Methodology	Experimental and observational	Hermeneutical and anthropological	Conceptualist and design-based	Phenomenological and structuralist
Examples of methodologies in education	Evidences-based research	Ethnomethodology	Design-based research	Grounded theory

4.4 Final Remark

Epistemological informed research is a need in today research projects about complex problems or when researches are proposing findings to answer the need of integral approaches. Epistemological and methodological awareness can be an asset of a research intended to have quality and impact.

References

[1] Wilber K. Introduction to Integral Theory and Practice IOS basic and the AQAL map. AQAL Journal of Integral Theory and Practice 2005; 1(1): 1-38.

[2] Wilber K. The theory of everything. Boston, MA: Shambhala; 2001. Wilber K. The integral vision: A very short introduction. Boston, MA: Shambhala; 2007.

[3] Gallifa J, Botella L. The Structural Quadrants Method: A new approach to the Assessment of Construct System Complexity vía Repertory Grid. Journal of Constructivist Psychology 2000; 13(1): 1-26.

[4] Guba EG, Lincoln YS. Competing paradigms in qualitative research. In: Denzin NK, Lincoln IS (editors) Handbook of Qualitative Research. Thousand Oaks, California: Sage; 1994.

[5] Creswell JW. Research design: Qualitative, quantitative, and mixed methods approaches. (2nd ed.) Thousand Oaks: Sage; 2003.

[6] Mackenzie N & Knipe S Research dilemmas: Paradigms, methods and methodology. Issues in educational research, 16(2), 193-205; 2006. Mertens DM Research methods in education and psychology: Integrating diversity with quantitative and qualitative approaches. (2nd ed.) Thousand Oaks: Sage; 2005.

[7] Creswell JW. op. cit.; 2003 and Mackenzie N & Knipe S. op. cit.; 2006.

[8] Aristotle. Metafisica (6a. Ed.) (Spanish) [Metaphisics]. Barcelona: Iberia; 1984.

[9] Gallifa J. The Tekhne-logic revolution. Rethinking the 'interobjective' dimension of the Integral Theory. Consequences and relevance to Education. Creative Education 2018; 9(7): 1084-1104.

[10] Helfrich PM. Ken Wilber's AQAL metatheory: An overview. Castaic, CA: Wildfire Media; 2008.

[11] Brown AL. Metacognition, executive control, self-regulation, and other more mysterious mechanisms. New Jersey: Lawrence Erlbaum Associates; 1987.

[12] Helfrich PM. op. cit.; 2008; p 21.

[13] Koestler A. The ghost in the machine. New York, NY: MacMillan; 1967.

[14] Wilber K. Sex, ecology and spirituality. Boston, MA: Shambhala; 1995. p 41.

[15] Piazenza G. El Holón: Dualidad inicial de la complejidad y de la Teoría Integral en relación a un Kosmos Vivo (Spanish) [Internet]; 2013 [updated 2017Aug 10; cited 2018 Jun 22]. Available from: http://www.monografias.com/trabajos94/holon-dualidad-inicial-complejidad/holon-dualidad-inicial-complejidad.shtml#brevesrefa

[16] Wilber K. op. cit.; 1995. p. 48-52 and 132-134.

[17] Wilber K. op. cit.; 1995. p. 54.

[18] Guba EG, Lincoln YS. Competing paradigms in qualitative research. In: Denzin NK, Lincoln IS (editors) Handbook of Qualitative Research. Thousand Oaks, California: Sage; 1994. p. 108.

[19] Guba EG, Lincoln YS. op. cit.; 1994. p. 108.

[20] Kuhn TS. The Structure of Scientific Revolutions. Chicago IL: University of Chicago Press; 1970.

[21] Salvador F, Gallifa J. Introducció al disseny d'experiments en Psicologia (Catalan) [Introduction to experimental research in psychology]. Barcelona: Fundació Enciclopèdia Catalana; 1997.

[22] Slavin RE. Perspectives on evidence-based research in education—What works? Issues in synthesizing educational program evaluations. Educational researcher 2008; 37(1): 5-14.

[23] Harris M. Antropología cultural (Spanish) [Cultural anthropology]. Madrid: Alianza Editorial; 1990.

[24] Creswell JW. Five qualitative approaches to inquiry. In: Creswell JW, Poth, CN (editors) Qualitative Inquiry and Research Design: Choosing Among the Five Traditions. Thousand Oaks, CA: Sage Publications ; 2007. p. 69.

[25] Van Maanen J. Tales of the Field: On Writing Ethnography. Chicago: University of Chicago Press; 1988.

[26] Thomas J. Doing critical ethnography. London: Sage publications; 1993.

[27] Creswell JW. op. cit; 2007. pp. 71-72.

[28] Gallifa J. op, cit.; 2018.

[29] Spence D. The Rhetorical Voice of Psychoanalysis. Displacement of Evidence by Theory. Cambridge MA: Harvard University Press; 1994.

[30] Akker JVD, Gravemeijer K, McKenney S, Nieveen N. Educational design research. NY: Francis & Taylor; 2006.

[31] Plomp T, Nieveen N. An introduction to educational design research. Enschede, the Netherlands: Netherlands Institute for curriculum development (SLO); 2009.

[32] Reeves TC, McKenney S, Herrington J. Publishing and perishing: The critical importance of educational design research. Australasian Journal of Educational Technology 2011; 27(1): 55-65.

[33] Bereiter C. Design Research for Sustained Innovation. Cognitive Studies 2002; 9(3): 321–327.

[34] McKenney S. Computer-based support for science education materials developers in Africa: Exploring potentials [PhD thesis]. University of Twente, Enschede; 2001.

[35] Nieveen N. Prototyping to reach product quality. In: Dalam J. Van Den Akker J, et. al. (editors). Design approaches and tools in education and training. London: Kluwer academic publishers; 1999.

[36] van Manen M. Researching lived experience: Human science for an action sensitive pedagogy. Albany: State University of New York Press; 1990.

[37] Toulmin SE. Cosmopolis: the hidden agenda of modernity. New York: Free Press; 1990.

[38] Merleau Ponty M. Phénoménologie de la perception (French). París: Gallimard; 1945.

[39] Giorgi A. The Descriptive Phenomenological Psychological Method. Journal of Phenomenological Psychology 2012; 43(1):9-10.

[40] Giorgi A. The Phenomenological Psychology of J.H. van den Berg. Journal of Phenomenological Psychology2015; 46(2):141.

[41] Giorgi A. The Theory, Practice, and Evaluation of the Phenomenological Method as a Qualitative Research Procedure. Journal of Phenomenological Psychology 1997; 28(2):235.

[42] Starks H, Brown TS. Choose your method: A comparison of phenomenology, discourse analysis, and grounded theory. Qualitative health research 2007; 17(10): 1374

[43] Hostie R. Religion and the psychology of Jung. London: Sheed & Ward; 1957.

[44] Charmaz K. Grounded theory. In: Smith JA, Harré R, Van Langenhove L. (editors). Rethinking methods in psychology. London: Sage Publications; 1996. p. 29.

[45] Starks H, Brown TS. op. cit.; 2017. p. 1374.

[46] Charmaz K. op. cit.; 1996. p. 30.

[47] Glaser BG, Strauss AL. Discovery of grounded theory: Strategies for qualitative research. London: Aldine transaction; 1967. p. vii.

[48] Strauss A, Corbin J. Grounded theory methodology: An overview. In: Denzin NK, Lincoln YS. Handbook of qualitative research. London: Sage publications; 1994.p.273.

[49] Strauss A, Corbin J. op. cit.; 1994. p. 276.

[50] Strauss A, Corbin J. op. cit.; 1994. p. 276.

[51] Strauss A, Corbin J. op. cit.; 1994. p. 279.

[52] Strauss A, Corbin J. op. cit.; 1994. p. 280.

[53] Charmaz K; 1996 and Strauss A, Corbin J; 1994.

[54] Strauss A, Corbin J. op. cit.; 1994. p. 277.

[55] Charmaz K. op. cit.; 1996. p. 28.

[56] Charmaz K. op. cit.; 1996. p. 31.

[57] Charmaz K. op. cit.; 1996. p. 28.

[58] Strauss A, Corbin J. op. cit.; 1994. p. 278.

[59] Hutchinson SA. Education and Grounded Theory. In Sherman RR & Webb RB (Eds.). Qualitative Research in Education: Focus and Methods. London: Falmer Press; 1988, p.122-139.