Call from the South for a Transparent Higher Education (THE) Part 2: Extended Conceptual Framework of Transparent Thinking Approach (TTA)

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The world sailed in the new millennium with a heavy burden of problems. This series of three articles is a call from the south to relieve these burdens by building a conceptual framework for a Transparent Thinking Approach (TTA). Part 1 covered Transparent Orientation (TO) and Transparent Solution (TS) evolution in preparation to present the core of TTA conceptual framework. Part 2 covers Transparent Presentation (TPr) tools in preparation to present the extended TTA conceptual framework. Part 3 covers the implementation of the Extended TTA in constructing a Transparent Higher Education (THE) with Math, Science and Engineering Education examples.

TRANSPARENT ORIENTATION (TO)

In part one of this series of articles the generic core conceptual model of Transparent Thinking Approach (TTA) was presented. In this 2nd part of the series, the tools of Transparent Presentation (TPr) are presented in preparation for the expansion of TTA Conceptual Framework. Transparent Diagnosis (TDg) and Transparent Modeling (TMd) are the most important innovative tools devised to expand the core conceptual framework of TTA. Transparent Diagnosis (TDg) is applied to investigate failures in development and educational Systems. These developed presentation tools will be the infrastructure for the evolution of Transparent Perspective (TPv) as an essential tool for the extension of TTA.

IMPLEMENTATION OF TRANSPARENT PRESENTATION (TPR)

Transparent Way of Presenting a New Thinking Approach

Transparent Thinking Approach (TTA) is a generic way of thinking that entails devising a transparent way of presenting it. Seeking a proper presentation , implementation and application of the TTA conceptual framework result in developing a Transparent Presentation (TP) methodology. TP methodology consists of two major tools: (1) Transparent Diagnosis (TDg) and (2) Transparent Modeling (TMd), as illustrated in FIGURE 1.

Main Features and Tools of Transparent Diagnosis (TDg)

Diagnosis is the act of identifying a disease, illness, or problem by examining someone or something. Diagnosis is used in many different contexts with variations in the use of logics, analytics, and experience to determine the cause and effect relations between parameters affecting a certain entity. In systems engineering and computer science, it is typically used to determine the causes of symptoms,

mitigations, and solutions. In TTA context, Transparent Diagnosis (TDg) is devised in away to transparize a wide spectrum of processes and entities. The nature of Transparent Diagnosis (TDg) will be clarified through real practical examples. The most important tool of Transparent Diagnosis (TDg) is Dynamic Maneuvering (DM).

FIGURE 1
THE STRUCTURE OF TRANSPARENT PRESENTATION (TP) TOOLS

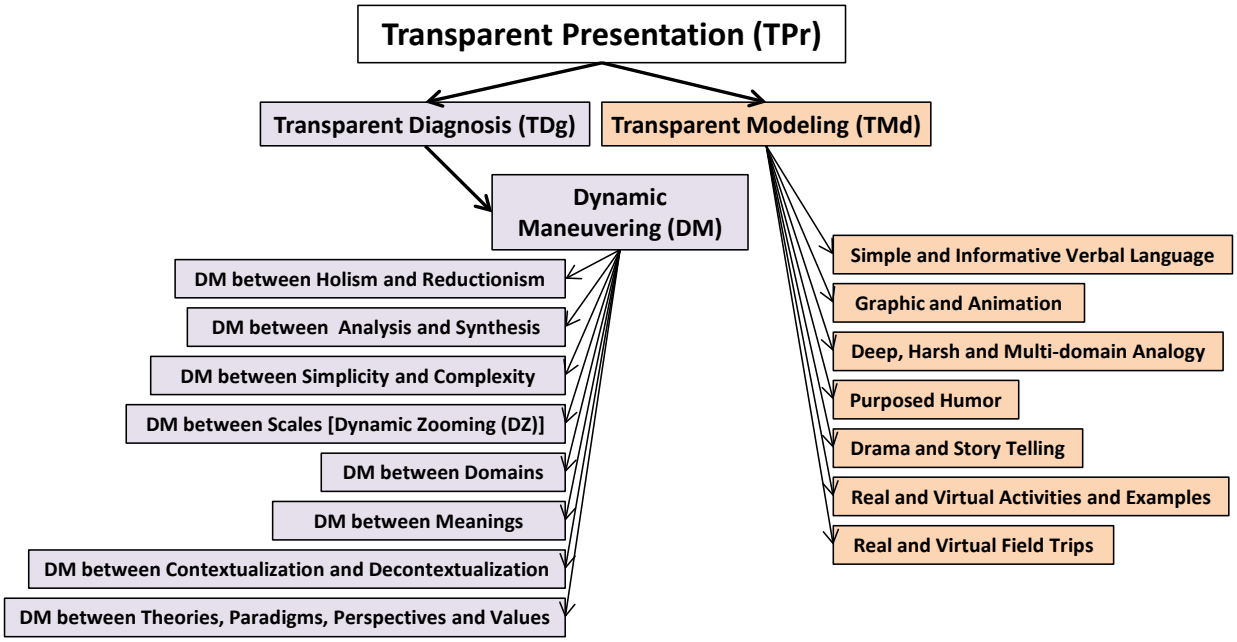
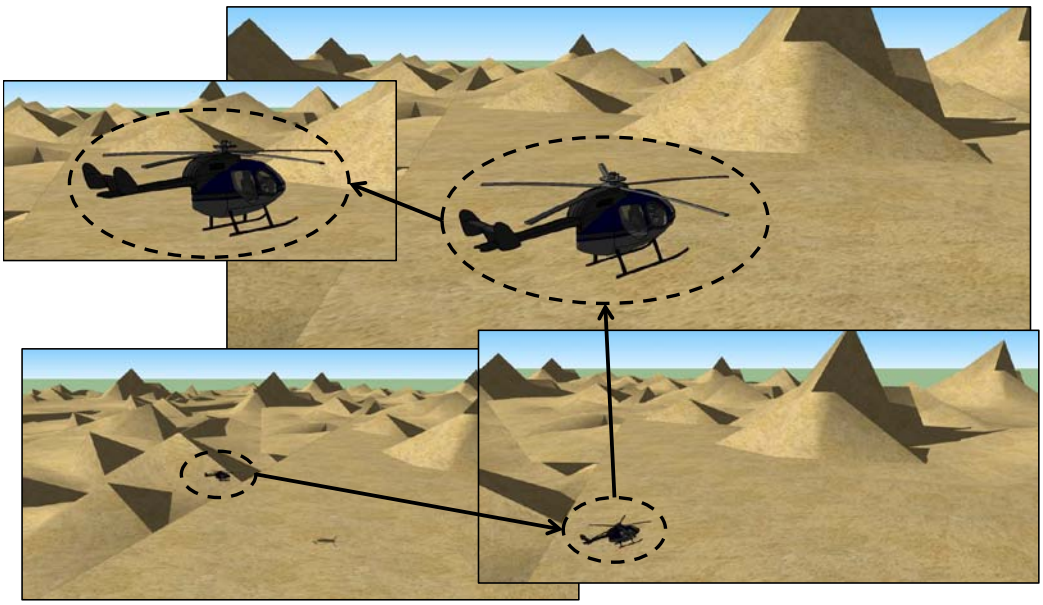


FIGURE 2
HELICOPTER'S MANEUVERING OVER A TERRAIN

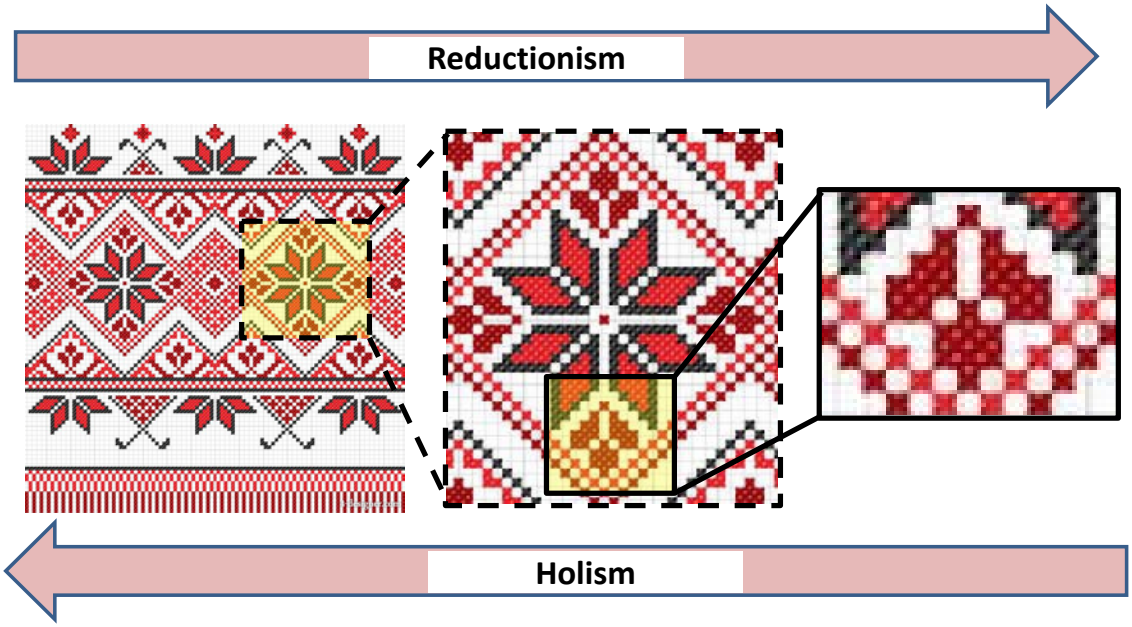


Dynamic Maneuvering (DM)

Maneuvering can be defined as the clever or skillful action or movement. In order to deeply feel DM, FIGURE 2 illustrated the original use of the word maneuvering in the context of a helicopter flying over a terrain to explore it. DM is adopted as a generic term that describes the skillful action or movement in any terrain whether it is physical or hypothetical. In this highly interrelated, connected and complex life, humans are required to skillfully act, change their positions and perspectives (physically or abstractly), and manipulate parameters to achieve their goals. The fast pace of change in our life, in this new millennium, entails us to dynamically maneuver our plans, actions, perspectives, and positions according to circumstances. DM is devised as a tool to help the Transparent Thinker (TT) to accomplish the following maneuvers (see FIGURE 1):

1) DM between Holism and Reductionism
2) DM between Analysis and Synthesis through showing Connectedness
3) DM between Simplicity and Complexity to achieve Depth
4) DM between Scales (Dynamic Zooming (DZ) to zoom in and out between the big and the small pictures)
5) DM between Domains to Show the Road Map
6) DM between Meanings to experience different perspectives
7) DM between Contextualization and Decontextualization
8) DM between Theories, Paradigms, Perspectives, and Values

FIGURE 3
AN ANALOGY CLARIFYING THE RELATIONS BETWEEN REDUCTIONISM AND HOLISM BY ZOOMING IN AND OUT OF STITCH PATTERN

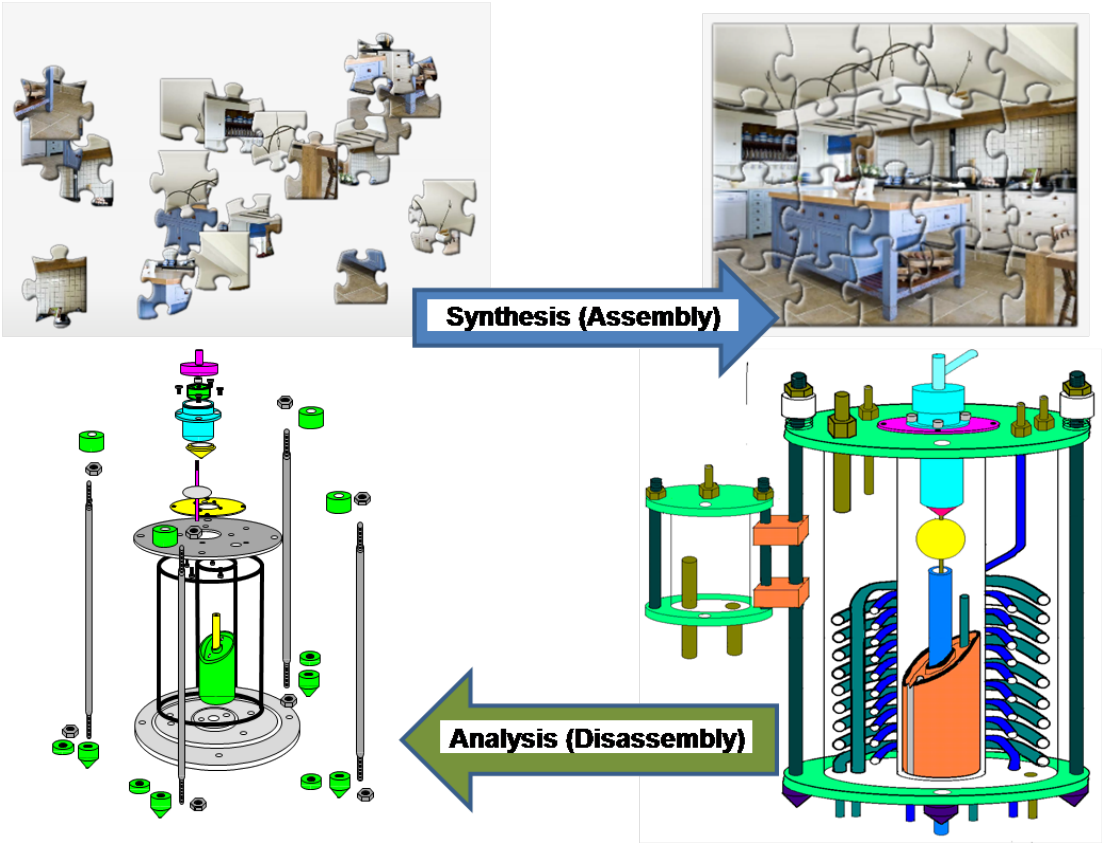


DM Between Holism and Reductionism

Holism is a concept that centers on a notion that complex system's behavior and properties are not determined only by the behaviors and properties of its component parts. Holism focuses on the interaction between system's components that immensely adds to overall performance of any complex system. On the other side, reductionism tries to analyze the system into its components and then understand the separate component behaviors. Reductionist thinking assumes that the sum of these behaviors will represent the whole complex system performance. Both approaches are considered complementary and

supportive to the effort of formulating a full picture of system's performance. DM between holism and reductionism aims to reap the benefits of both approaches in revealing the full picture of system's performance. FIGURE 3, illustrates how DM between holism and reductionism can be implemented while dynamically zooming in and out of a cross stitch panel to show both the big picture of the whole panel and then to zoom down to focus on the smaller stitch patterns to see the small picture. FIGURE 3 is a simplified analogy of the deep relationship between reductionism and holism.

FIGURE 4
ILLUSTRATIVE EXAMPLES OF ANALYSIS AND SYNTHESIS PROCESS



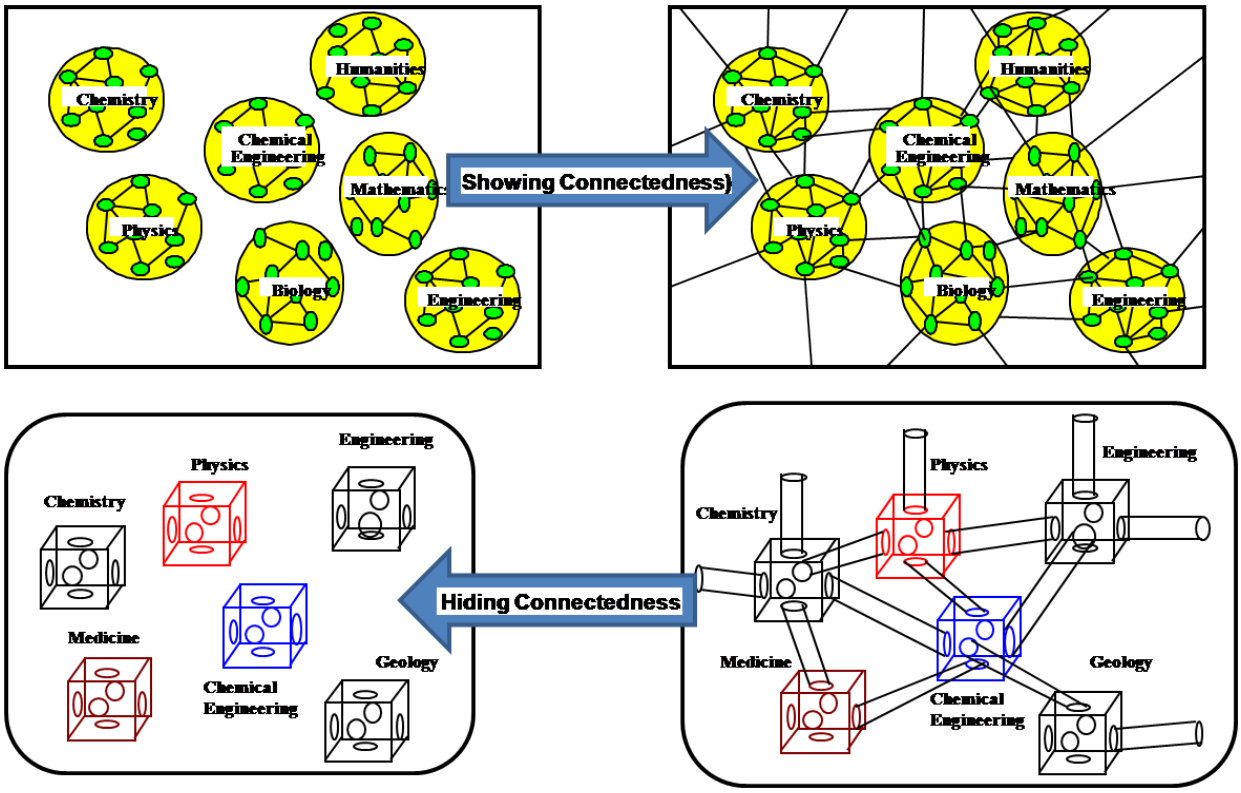
DM Between Analysis and Synthesis

Analysis is breaking down an entity that you are examining in order to understand its individual parts, as illustrated in FIGURE 4. Analysis is like taking an already arranged jigsaw puzzle apart or breaking down a chemical compound to look at the individual components that make up that compound. The goal is to look at the individual pieces that make up the whole. On the other hand, Synthesis is the process of combining these individual parts into a whole in order to understand the collective qualities that these parts share, as illustrated in FIGURE 4. It is like taking individual puzzle pieces and putting them together to make a complete picture. These two processes are opposite and complementary to each other. When fixing a car or a machine we are in need to dissemble a certain part into its components in order to be repaired and then reassemble it again.

Showing connectedness is an inherent process that intimately accompanies the analysis and synthesis processes. The analysis of an entity is basically based on understanding the connectedness between its components, and its synthesis is also accomplished based on the same understanding. As illustrated in FIGURE 4, the pieces of the puzzle are connected by relationships needed to be understood in order to form the whole picture. Similarly, the apparatus shown in FIGURE 4, also cannot be assembled or

disassembled unless the connectedness between its parts is completely understood. Therefore, understanding the connectedness of any system is an essential requirement for its analysis and synthesis.

FIGURE 5
SHOWING THE CONNECTEDNESS OF KNOWLEDGE IS AN INHERENT PROCESS IN ANALYSIS AND SYNTHESIS



Showing connectedness in any content knowledge domain is a very important educational activity. The basic process of constructing a knowledge map for any field is to reveal the interconnectedness between the concepts or entities. FIGURE 5 illustrates the importance of showing connectedness by applying it to Chemical Engineering and the surrounding content knowledge structures in other neighboring disciplines. 3D compartments are employed in FIGURE 5 to represent fields of knowledge and the tunnels that connect between them to represent the connectedness between these fields. Tunnel-compartment analogy is a simplified and effective tool to clarify the importance of revealing connectedness between knowledge fields.

DM Between Simplicity and Complexity

> *"If you can't explain it to a six year old, you don't understand it yourself."*
> *Albert Einstein*

> *"It is true intelligence for a man to take a subject that is mysterious and great in itself and to unfold and simplify it so that a child can understand it."*
> *John H. Taylor*

Simplicity can be defined as the quality of being easy to understand or use; plain or not fancy or complicated. Simplicity is the opposite of complexity and both can be used to describe the quality of systems and entities.

In current age of human civilization, complexity is overwhelming our life in all its strands due to the technological advancement that get humans all over the world to be highly connected as an inhabitant of a small village. Using the huge advancements in ways of communication, a person can lively interact with people and actions happening at any place in the world. The highly connected world created a highly complex one, but it is amenable to be simplified.

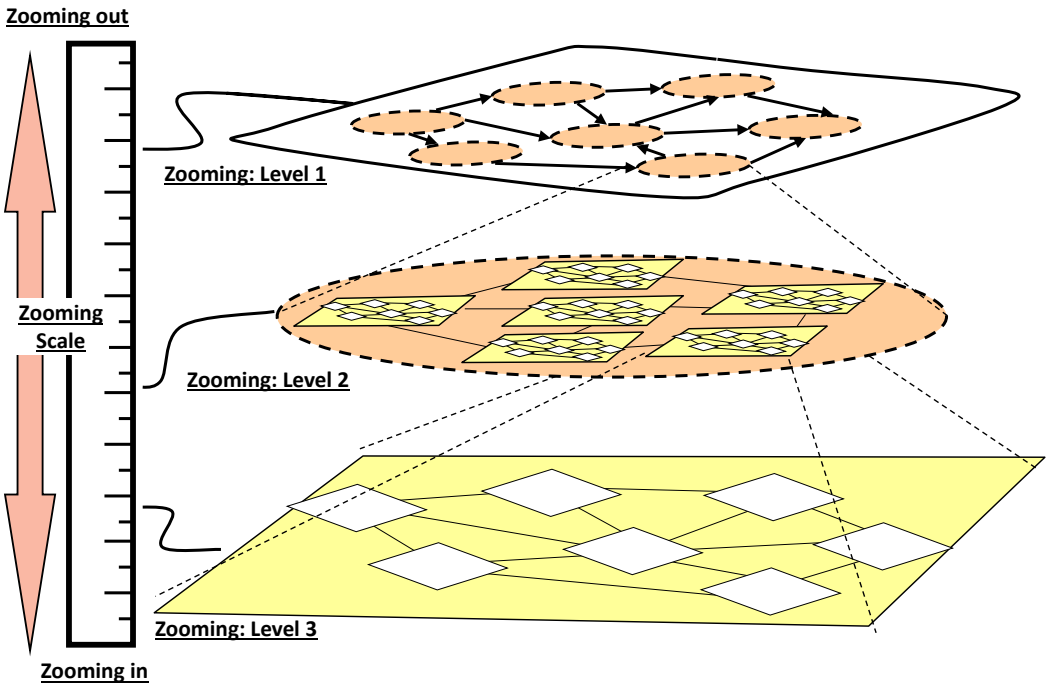
Simplicity and complexity are relative and depend on the case under study. It is believed that the surrounding universe with all its constituents is comprehensible. The ability of our thinking machines to comprehend the behavior of numerous systems in this universe is considered a fact proved over the long history of humans on this globe. Attacking complexity by simplicity is our main job on this life. But, it is important not to confuse simplicity with superficiality and triviality. The continuous attack of complexity by simplicity should be insightful and maintain rigor and depth.

DM will be used as a "hit and run" methodology to transform gradually the complex into simple without losing rigor and depth, or being slid into triviality or superficiality. I believe that the whole article is an embodiment of simplicity and complexity DM seeking to reach simplicity, rigor and depth.

DM Between Scales

DM between scales (can be called Dynamic Zooming (DZ)) is the essential type of DM. FIGURE 6 is drawn to illustrate the idea of zooming in and out of a complex system to either show a micro details or a macro picture. Each level of zooming will give the observer a different perspective. DM between zooming levels will help the observer to understand structure and behavior of a studied entity. Knowledge is transferred between zooming levels which result in getting a better insight about a studied entity. Sticking with a certain zooming level (Macro, mezo or micro-scale) will limit the ability of the observer to get insight and to transfer knowledge by revealing structure, behavior and meaning.

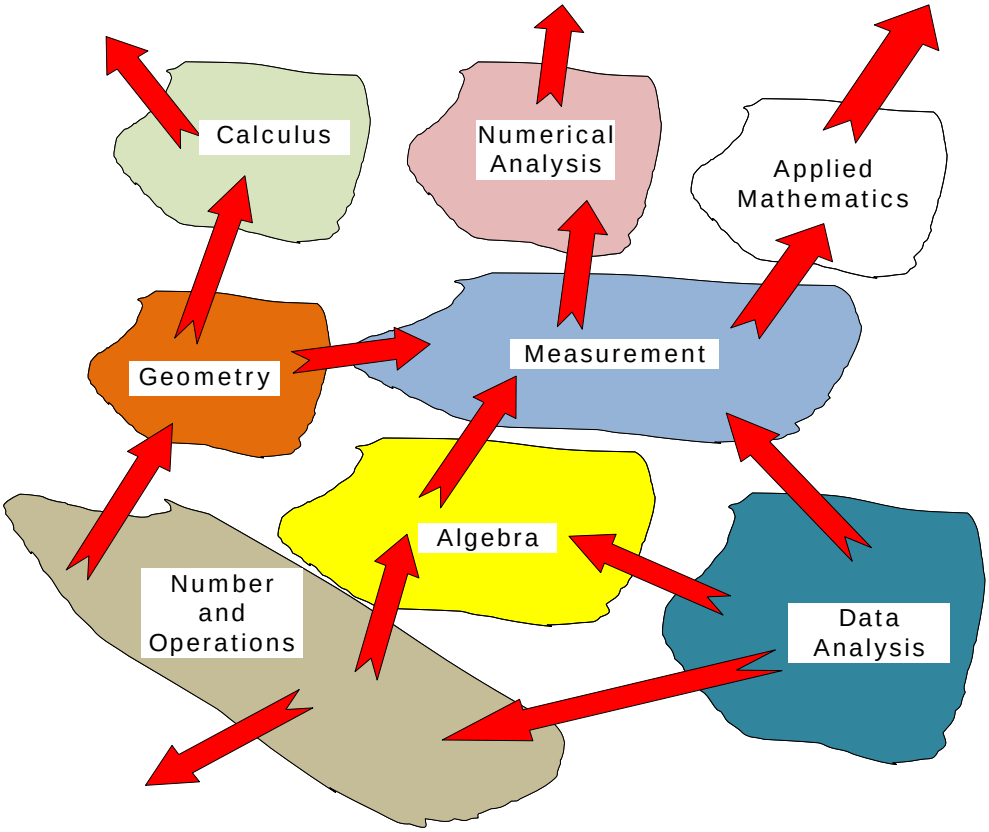
FIGURE 6
DYNAMIC ZOOMING BETWEEN ZOOMING LEVEL ON THE ZOOMING SCALE



DM Between Domains

DM between domains is another type of DM that aims to make connections between the knowledge structures in different domains while seeking to see the big picture. FIGURE 7 illustrates clearly the importance of DM in making connections between different sub domains of mathematics starting from number operations and ending in applied mathematics. DM over mathematics terrains will help the learner understand the connectedness of these diverse topics and how the seed counting concepts evolved to fruit this huge amount of knowledge. DM between domains will be the cure for fragmentation and blinding by creating coherent, integrated, structured, and connected mental models in the minds of learners.

FIGURE 7
DYNAMIC MANEUVERING (DM) BETWEEN DOMAINS

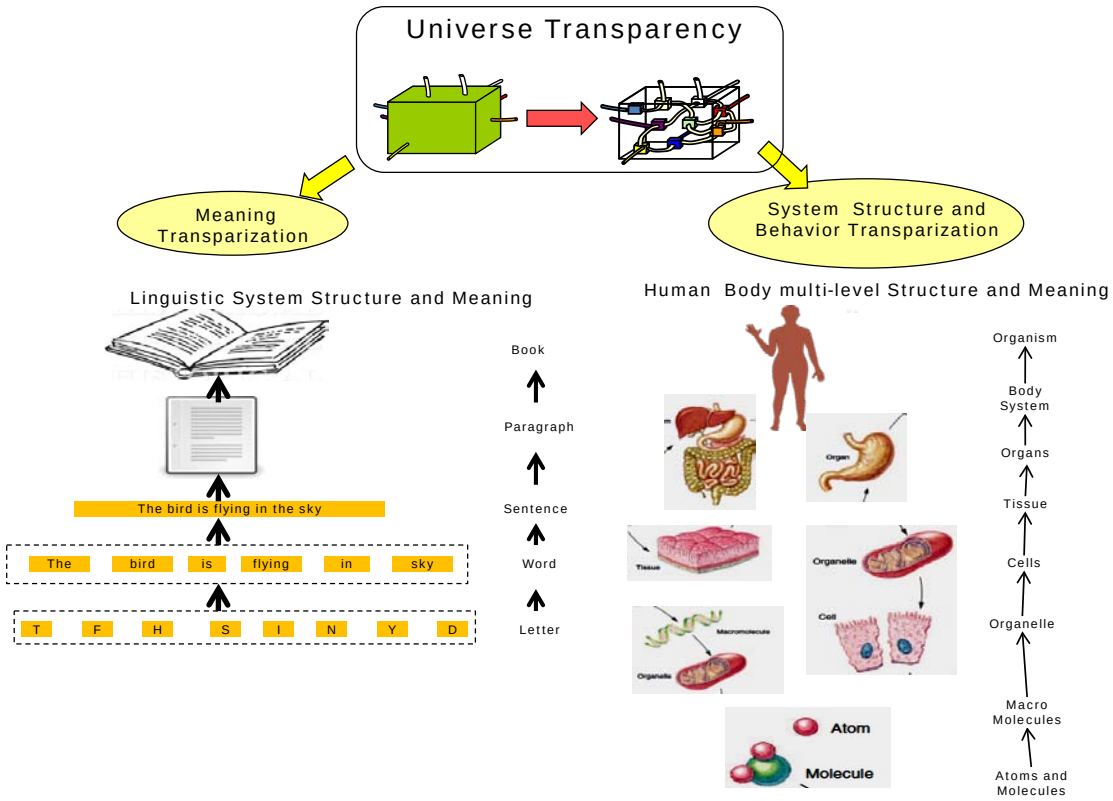


DM Between Meanings (Process of Making Connections)

Pursuing meaningful life is one of the most important needs for humans. Researchers believe that acquiring a meaningful life is associated with greater levels of human satisfaction in life, enjoyment of work, happiness, positive effect, hope, better physical health, lower level of stress, low incidence of depression (Crescioni and Baumeister in Hicks, 2014). Crescioni and Baumeister (2014) stressed that modern societies are suffering a state of decline in the perception that life has a meaning due to the erosion of the societal influence of religion as a central source of meaning in people's life by creating a value gap. Crescioni and Baumeister also reports some successes and failures in modern societies' trials to fill this value gap. Modern societies are facing the greatest challenge in their search for meaningful life. The future necessitate modern societies to formulate a new framework of relationship with religion based on cooperation and inclusion not enmity and exclusion for the benefit of creating meaningful life .

Humans make meaning through building their own meaningful mental constructs, sharing social meaning constructs with the group that they belong to, or interact with the physical or metaphysical environment that surrounds them. Language is the most prominent communication tool for making meanings by using letters and sounds to form words, words to form sentences, and paragraphs and passages to form publications (see FIGURE 8). A Concept has no meaning without being encoded in verbal language form. Economic systems create meaning through dollars, pounds, Euros and other physical markers of economic worth Sharing (Hicks, 2014). Language and currency are rarely considered as contributors to the general sense of meaning in life, but it is essentially a hidden part of the big construct of meaning that humans try to possess. The need is crucial at this point to offer an extended framework of meaning making at different scales, levels and domains of life. FIGURE 8 is showing how transparization of multi level human body can create multi level meanings, and also transparization of language structure can also create similar multi-level meanings.

FIGURE 8
MULTI-LEVEL SYSTEM STRUCTURE AND MEANING TRANSPARIZATION



Baumeister (1991), proposed four needs of meanings making that humans possess: (1) sense of purpose in their life, (2) seeking justification of their actions based on a system of values, (3) sense of self-efficacy, and (4) sense of self worth. These four needs are tangled together with the complication of modern life in the human complex meaning construct to create multi-level and multi domain meaning making process that is digested together to create a state of meaningfulness in life.

Meaning and culture mutually interact and constitute each other (Chao and Kesebir, in Hicks 2014). The complex cultural construct of any society is mainly consist of processes of meanings making by interacting physical, metaphysical and social entities in the form of webs of meanings (Chao and Kesebir, in Hicks 2014). Baumeister (1991), defined meaning as "shared representation of possible relationships

among things, and events". Chao and Kesebir (as stated in hicks 2014) defined culture as a shared network of meanings between interconnected individuals in a society. The web of meanings created in a community culture includes norms, values, beliefs and schemas. The ability of community members to create, share and transmit meanings results in the accumulation of culture (Chao and Kesebir, in Hicks 2014). Webs of meaning in cultural construct is extracted while seeking comprehensibility (called small-m-meaning) or while seeking significance and worth (called big-M-meaning). The small-m-meaning centers on facilitating individual understanding of different types of entities in social, physical and phenomenal domains, while the big-M-meaning is extracted in search for an answer to questions of significance and worth. Small m and big M meanings are both constitute the complete webbing of meanings in the cultural realm as conceptually illustrated in FIGURE 9.

The concept "Web of meaning" clearly indicates that meaning making is a process of making connections. Baumeister and Vohs, (2002), state this fact clearly by writing that "connection is the essence of meaning." Small m meanings, mentioned above, is a form of making simple and lower level connections, whereas capital M meanings connects more complex, higher-level, abstract entities (values, beliefs, self and the universe) (Chao and Kesebir, in Hicks 2014).

FIGURE 9
MULTI-LEVEL AND MULTI-DOMAIN MEANINGFULNESS

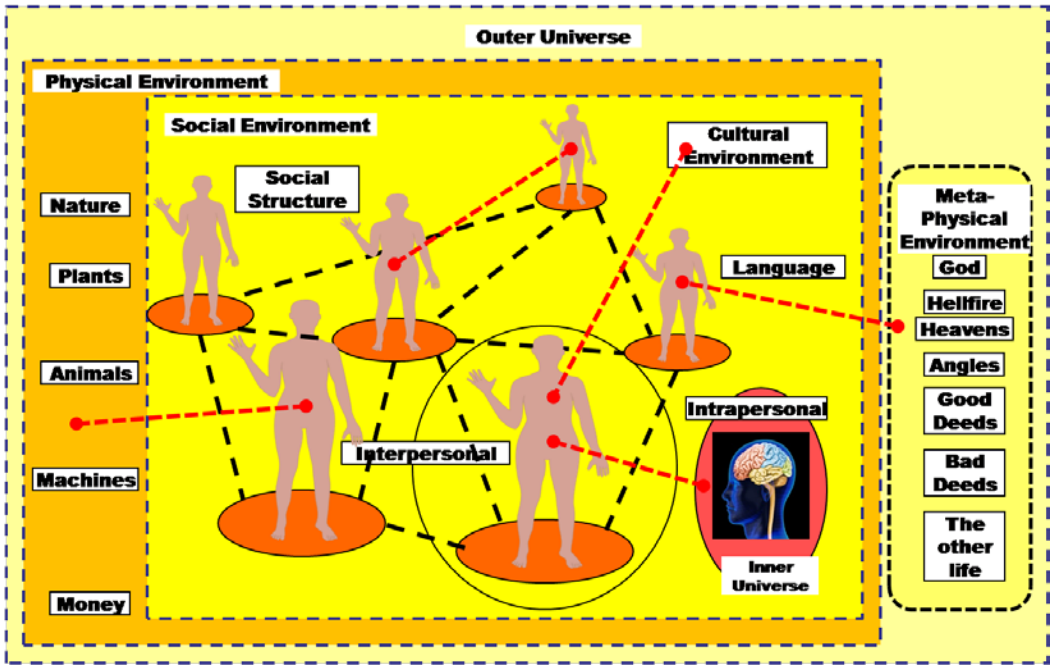
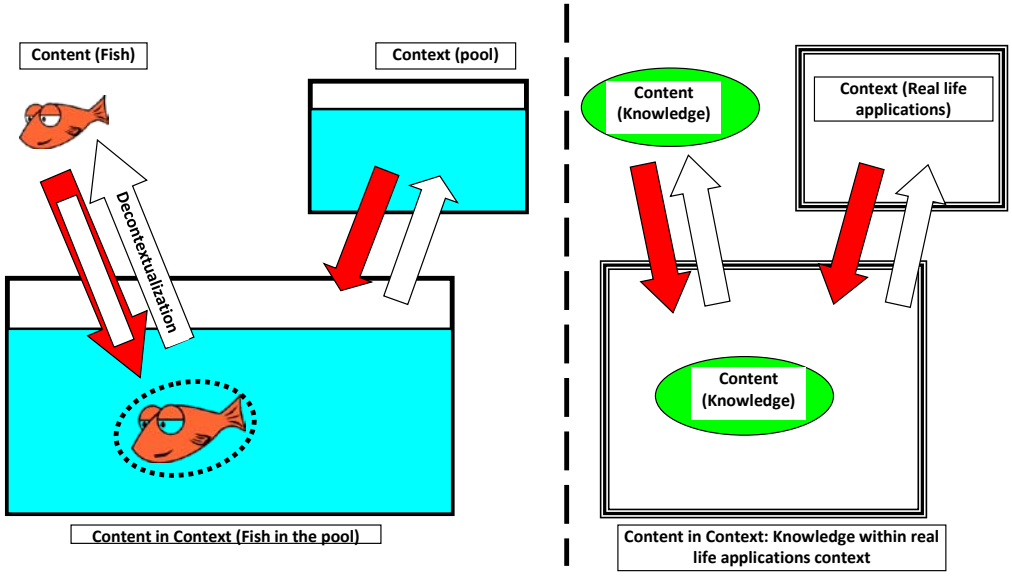


FIGURE 9 is a trial to clarify the multi-level and multi domain webbing of meanings that humans try to construct in their life. These meaning connections can be either a mind body connection (intrapersonal), interpersonal or social connection, cultural connection, physical or metaphysical connections. All these meanings are fused together to formulate the big picture of the human meaning construct. DM between these different levels and domains to create numerous meanings is one of the most important characteristics of Transparent Thinker (TT).

FIGURE 10
EMPLOYING ANALOGY TO GET A DEEP GRASP OF DM BETWEEN CONTEXTUALIZATION AND DECONTEXTUALIZATION



DM Between Contextualization and Decontextualization (Genericness)

Context is originally a linguistic term that is used to describe the part of a text or statements that surrounds a particular word or passage and determine its meaning. Also, context has another important meaning which is the circumstances in which an event occurs. Different types of contexts can be identified: historical, psychological (inner), symbolic, relational, situational, cultural, social, and physical.

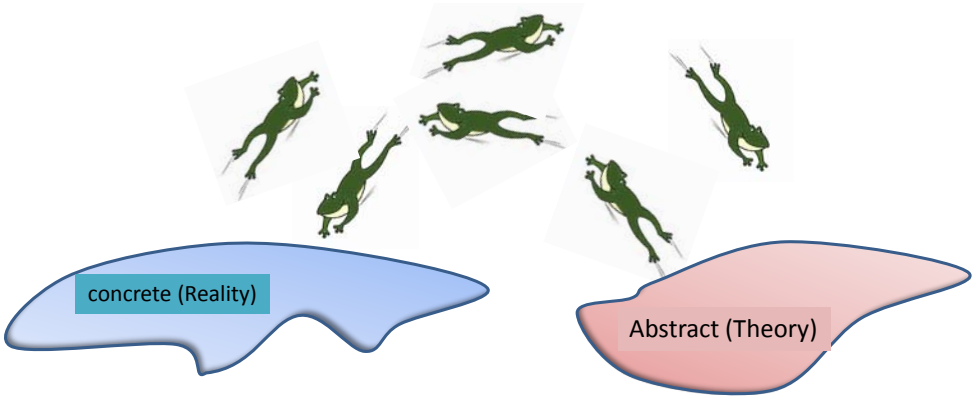
In the educational domain, context (setting) is considered as one of the most important factors in affecting the performance of the learner. Learning is a function not only of the activity itself but also of the context and culture in which it takes placed in (Gillespie, M. K., 2002a). McKusick described in details how educators can implement educational setting to realize effective learning. Cultural context is considered as one of the most important contexts in enhancing the effectiveness of the learning process (Maynard, A. E. & Martini, M. I., (2005), King, L., (1999), Park, Y. (August 2001)).

Using a simple analogy, FIGURE 10 is used to transparize the meaning of contextualization. The analogy between fish-water relationship and content-context relationship is deeply clarifying the intimate relationship between the two entities. Decontextualization is the opposite process of contextualization. Decontextualization process is used to transform an entity from context-specific form to be generic form. Both of the context-specific form and the generic form are important in different situations. Therefore, DM will be used to maneuver between the two forms based on the case studied.

DM Between Theories, Paradigms, Perspectives, and Values

DM between theories, paradigms, perspectives and values are a common practice in scientific thinking. DM between theory (Abstraction) and reality (Experimentation) is one of the most important scientific thinking practices, as ironically depicted by frogs leaping shown in FIGURE 11.

FIGURE 11
LEAPING BETWEEN CONCRETE (REALITY) AND ABSTRACT (THEORY)



DM can be manifested in the form of Dynamic Tuning (DT) (similar to tuning between radio frequencies). FIGURE 12 shows that dynamic tuning is practiced between capitalism and communism; holism and reductionism; theory and experiment; constructivism and behaviorisms; etc… Therefore, we have a continuum or tuning scale and we should be able to choose the appropriate scale point that is appropriate for the case under study.

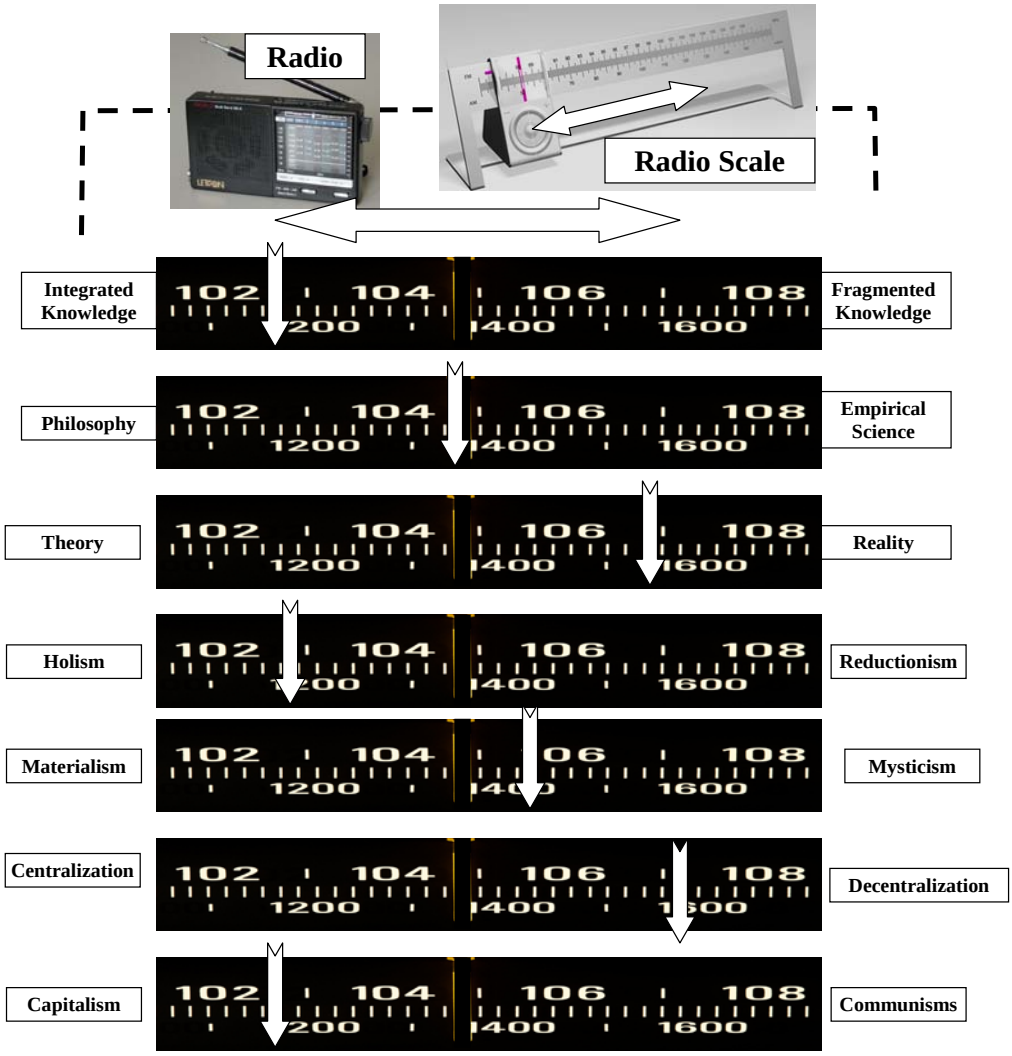
Main Tools of Transparent Modeling (TMd)

Modeling is the process of representing an entity using a model. The model can be either abstract (theoretical, mathematical, simulation, or symbolic) or physical (prototype, scale model, 3D model, fashion manikin). TTA basic concepts, constructs, features and tools need to be modeled (represented) using appropriate types of models. TTA will be in need for developing Transparent Modeling (TMd) tools that will be used to represent new concepts, constructs, and features. The main basic tools of Transparent Modeling (TDg) are as follows:

1) Simple and Informative Verbal Language
2) Graphic and Animation
3) Deep, Harsh and Multi-domain Analogy
4) Purposed Humor
5) Drama and Story Telling
6) Real and Virtual Activities and Examples
7) Real and Virtual Field Trips

This set of articles is considered a living example of how most of these modeling tools are implemented to convey the deep concepts, constructs, and meanings that is included as a part of TTA conceptual constructs.

FIGURE 12
TUNING AS A PROCESS LOCATING THE OPTIMUM POINT ON A CONTINUUM OR SCALE



TRANSPARENT DIAGNOSIS (TDg) OF DEVELOPMENT SYSTEM'S FAILURE

Transparent Diagnosis (TD) is developed within Transparent Thinking Approach (TTA) framework as one of its most important tools. This way of diagnosis is needed to be implemented to transparently convey the deep structure, meaning and implications of the current global problems.

Borrowed Syndrome Approach

In environmental analysis field, human and ecological factors interact in a very complicated way to affect a global change. This makes it difficult to present a unifying explanation of the diverse phenomena that interacted to create a certain global change. Global change syndromes, a new conceptual approach, has been proposed by Potsdam Institute for Climate Change Impact (PIK) (Scellnhuber et al., 1997; Lueke et al 2004; Bordogna, et al, 2012) to help in modeling the functional patterns that exists in the human civilization-nature interaction process. This methodology is inspired by the medical practice of using syndromes in showing the clinical picture for diagnosis and proposing treatment.

Due to the complexity of development process and the numerous players, factors, and processes that share in creating development, a similar syndrome approach is developed in this paper. Syndrome Approach (SA) reveals the hidden functional patterns that exist in all domains of development process and shows how they interact to formulate development outcomes. Based on the literature review, this research is the first in applying SA to the domain of development, in general, and educational development in specific. In the following sections, specific illustrating syndromes are presented to reveal the hidden dynamics in some of our global and local problems.

"Loneliness" Syndrome

For several years, the topic of relevancy and utility of research is considered seriously and equally in both developed and developing countries. This topic is of paramount importance for developing countries due to their limited resources and numerous pressing demands that require establishing an optimized research system that is able to invest every penny in a proper way.

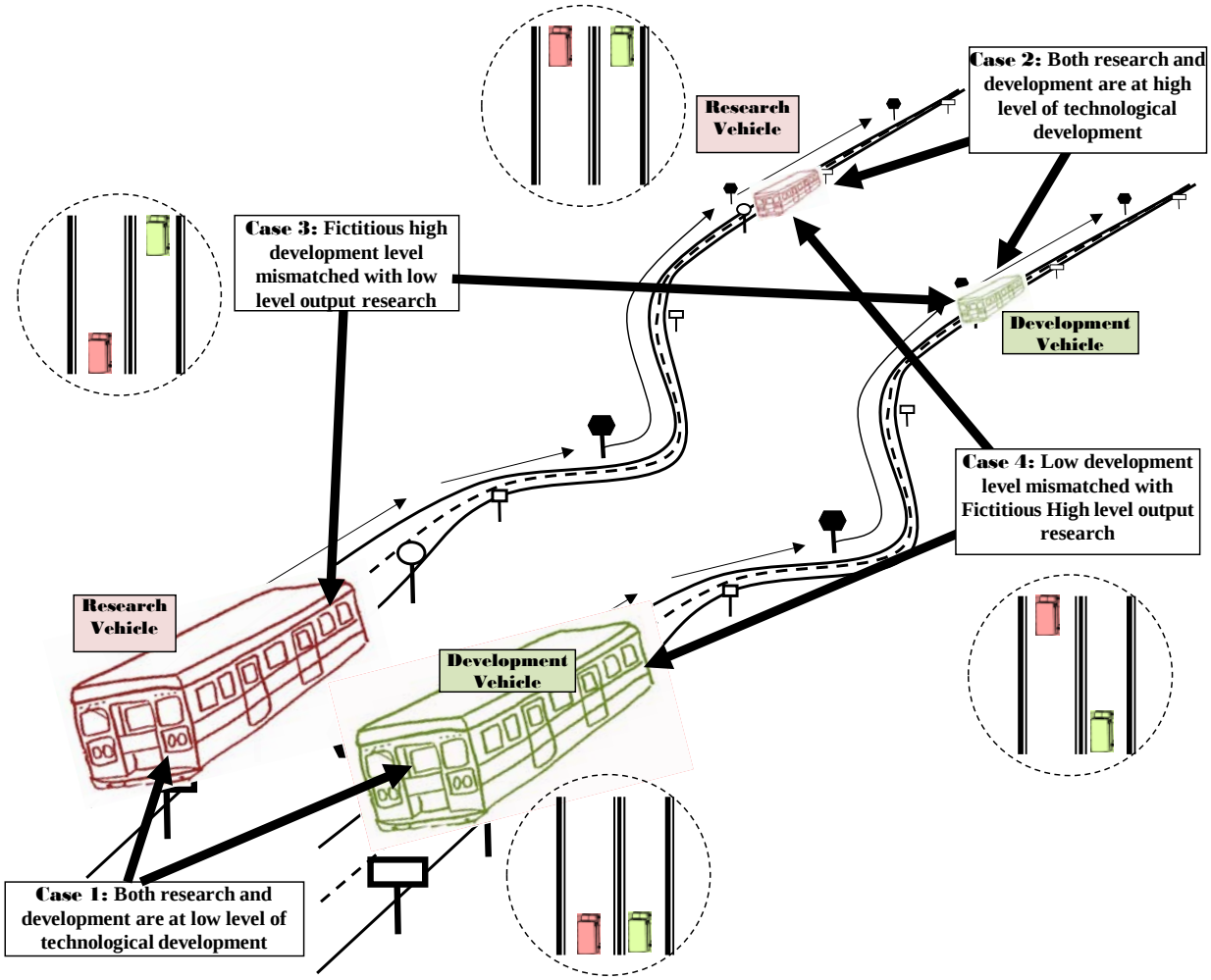
It is evident that development is a lifelong learning process that is accomplished by generations, and that research process is inherently contextual. To deeply illustrate the relation between research and development, FIGURE 13, shows two vehicles, one of them represents development process and the other one represents research process. Research process is singled out to show its importance in supplying knowledge and human capital to the development process. The analogy used in FIGURE 13 helps us to deeply relate the importance of relevancy, interaction, synergy and harmony between research and development. The two vehicles (representing research and development, FIGURE 13) can exist in four different positions (called here cases) which are illustrated in FIGURE 13. Two of the four cases are favorable (Cases 1 and 2) because both research and development in those two cases are at the same intellectual level (relevant) and therefore research is capable of promoting development by directly feeding appropriate and relevant supplies to the development process. However, the other two cases (Cases 3 and 4) are not favorable because either research or development is lagging behind the other, which is hindering mutual profitable interaction between them. In addition, the one a head (in Cases 3 and 4) is surpassing the other one. The best scenarios are to have both research and development at the same intellectual level in which both can support each other mutually and profitably. On the other hand, the worst scenarios are to have research or development distant from each other and in a situation that does not enable them to mutually interact and get benefited.

Based on the above analogy (FIGURE 13) depicting the nature of the relationship that may exist between research and development, Case 1 and 2 are favorable and represent a developed country in which research and development are in harmony, or a developing country which strives based on its resources to build a research capacity directly translated into development, respectively.

Some developing countries suffer from what is called "loneliness syndrome" which is an "illness" that can infect the relationship between research and development (Juma, et al 2005). This syndrome is represented by Case 3 and 4 (FIGURE 13), in which there is a mismatch between research agenda and development requirements. This mismatch results in either a fictitious research or a fictitious development. A fictitious research is a research that is unrealistically getting a head of a country's low level development status and is working in isolation of the real development needs. Similarly, fictitious development is a fake type of development that builds packed imported development which reflects negligible contribution from local research process.

In conclusion, research should be relevant and in harmony with the needs of development. In addition, researchers should not be isolated in an ivory tower looking down at development or accept to have a fictitious unsustainable development that is not based on local capabilities and needs. Based on the above analysis of the relationship between research and development, Jordan may be considered as an example of case three (FIGURE 13) in which development is lagging behind a fictitious research.

FIGURE 13
GRAPHICAL CONCEPTUAL MODEL ILLUSTRATING THE DYNAMIC AND SYNERGETIC RELATIONSHIP BETWEEN RESEARCH AND DEVELOPMENT



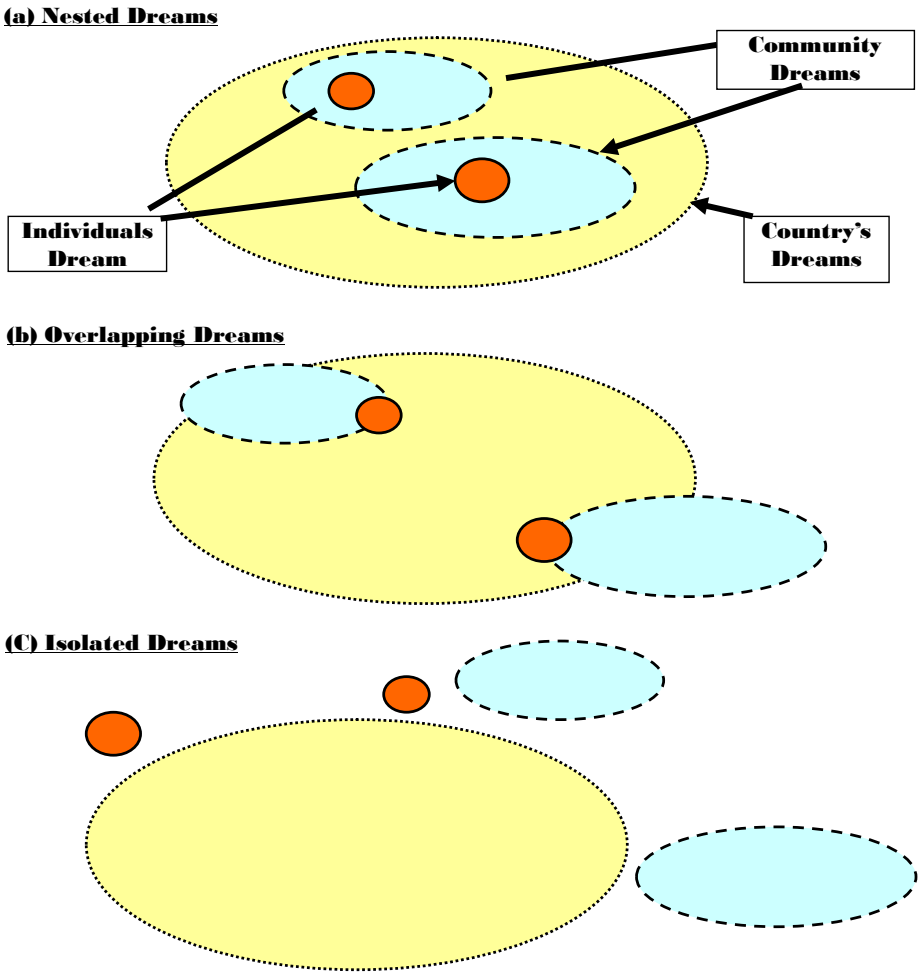
Jordan's Educational System "Loneliness" Syndrome

Jordan is a developing country of limited physical resources, but it is generous with human resources that have been supplied mainly to Arab Gulf Countries for decades. The scarcity of Jordan natural resources (like oil and gas) in the middle of a very rich region in fossil fuel resources creates a motive for the people of Jordan to concentrate and invest in education. Therefore, Jordan educational system is considered one of the best educational systems in the Arab region. This creates a fertile environment for the higher education to expand under the pressure of limited capacity of local market and a regional need for human resources. The rigorous math and science curriculum in Jordan enabled the Jordanian graduates to continue graduate studies in western countries. When those graduates return to get a university positions in the Jordan, they started to imitate what they have experienced in the western developed countries and apply it blindly to their local environment. In addition, they are not aware that they are replicating a research that has a high technological level serving highly developed countries. It is time to realize that a very different type of research is needed to be established in order to serve a developing country like Jordan. Jordan suffers from "Loneliness" Syndrome in the form of a fictitious research. Fictitious research in this case is a research that is blinded from its contextual requirements. This

kind of fictitious research is ironically creating problems to be solved, while its main job is to search for real local problems and then implement research to solve them.

It is painful when you see that the majority of Jordanian students are still taught in the same way as our generation (35 years ago) was taught in a superficial and regurgitated way. Then, an important question arises: Why there is no filtration of the research experience to practice? This question is one in a group of questions that motivate me to write this article and to propose this vision for change.

FIGURE 14
NESTED, OVERLAPPING AND ISOLATED DREAMS



"Ready Made Pants" Syndrome

When transferring models of development (learning models) between nations and communities, planners of development should take into considerations the fact that each phase of civilization or modernization in any society needs different types of skills and duties. All communities in this globe, share common goals, but every society has its own development priorities and requirements.

Most of the developing countries are trapped in the literal imitation (in analogy to the problem of literal translation of second language learners) and blinded application of another developed country development practices to their local societies. This phenomenon can be called a "ready-made pants syndrome" that infects a large number of developing countries. Developing countries should seek their own custom-made solutions based on their local requirements and level of development. The duties and

responsibilities of building development from scratch in developing countries are different from the duties of maintaining a certain level of civilization in developed countries.

Jordan has a similar situation to many developing countries where the development policies are not nationally engrained and it is controlled by granting countries. Developing countries and Jordan in specific is in great need to construct a vision for change that is adhered to their local requirements (Shane, S., 2005).

This description of this syndrome is considered as a call from the south (developing countries) to the north (developed countries) that we are "getting sick" of contextually non-homogeneous canned development programs that mostly result in nothing but waste of time, money and effort.

"Isolated Dreams" Syndrome

Our global community and some developing countries' communities are suffering a phenomenon that is called "isolated dreams" syndrome which is characterized by the absence or weakness of harmony or sometimes existence of enmity between the components of a country in approaching development. As illustrated in FIGURE 14, a three different oval shapes is used to represent the dreams (which sometimes may be in the form of hopes, aspirations, desires and goals) of individuals, community and country in as certain place in the world. The status of the relationship between individuals' , community's and country's dreams can be described by three cases: (1) Nested Dreams, (2) Overlapping Dreams, and (3) Isolated Dreams. Nested Dreams case represents an ideal favorable state in which the dreams of all the entities (individuals, community and country) are nested inside each other to form an overall country dream, as illustrated FIGURE 14 (a). The nesting of dreams in this case characterizes a state of perfect harmony between all these dreams and how they synergize to realize the country's development dream. The third case is called "isolated dreams" and represents a situation in which all the dream of different entities are isolated and considered as the worst state of synergy, as illustrated FIGURE 14 (c). "Isolated Dreams" case represents the other side extreme to the "Nested Dreams" case. "Isolated Dreams" case is a state in which no overlapping between entities' dreams in a certain country. The third and the most realistic and common case is the second one in which there are a certain degree of overlapping between numerous dreams, as shown in FIGURE 14 (b). "Isolated dreams" is the worst scenario and "nested dreams" is the most favorable but in reality a certain degree of overlapping exist. The harmony is strengthened by increasing the overlapping between dreams. The policy makers in a certain country should try to approach the ideal case of nested dreams. On the other hand, isolated dreams syndrome should be avoided because it is one of the major infections and obstacles that hinder real development in developing countries.

FIGURE 15
EXAMPLES OF USING "LOOKING FROM A KEYHOLE" THINKING APPROACH IN DIFFERENT DOMAINS

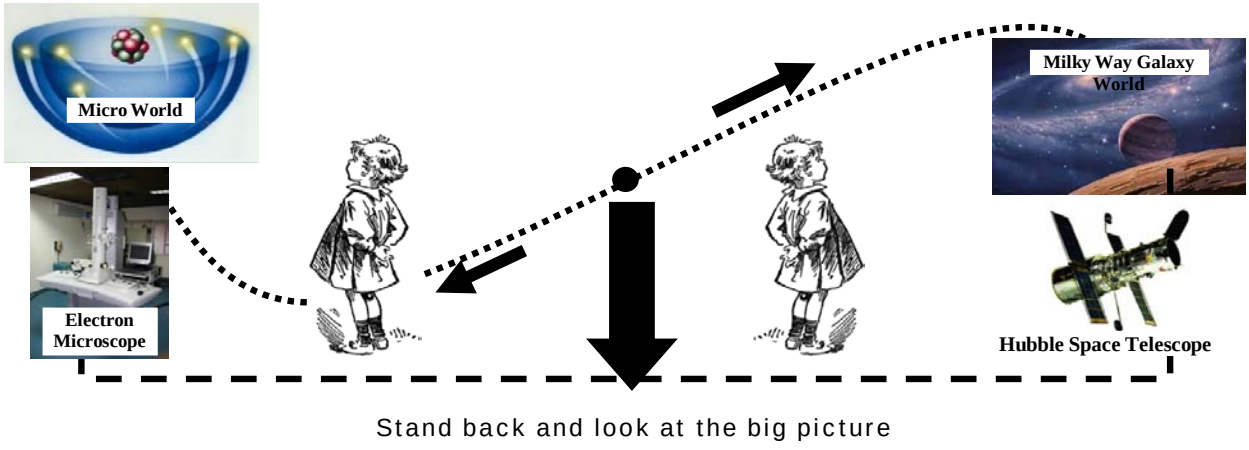
"Looking from Keyhole" Syndrome

Looking at local and global problems from a key hole is a metaphor that clearly illustrate the reductionism perspective that humanity are trapped in while seeking solutions to the big problems that are challenging our existence on this planet, as illustrated in FIGURE 15. For example, looking to the global educational problem as problem that can be solved by enabling the students to pass standard tests is keyhole analysis that trivializing and aggravating the problem instead of offering a solution for it. The educational crisis is in need for multi-scale level solution that can delve deeply to the micro scale level (learner) to reveal the real causes and solutions while being able to zoom out to see the macro scale level of the problem (global status). Zooming between scales through deep analysis is needed to be equally applied to global, financial and security problems, as shown in FIGURE 15. These are just a sample of the problems that are facing humanity nowadays and should be solved by shifting our perspective from reductionism perspective to DM between scales as needed. Looking from a keyhole represents the reductionism perspective in which we are looking at the system based on "cause and effect" approach without going deep to reveal the structural and behavioral causes.

Dynamic Maneuvering Between Big and Small Pictures

Humanity while seeking to survive and prosper over long ages used to explore the whole environment around us and to dig into its parts for more insight. Humans seek to explore the earth and the galaxy around us. In the same fashion humans tried to dig into the micro world using the newly developed instruments tell they reached the pico-scale and beyond. Humanity at this period of time with all the burdens of problems is realizing that it is time to stand back and to look at the whole picture. Some are going to the space realizing that the solution is there. And some are going deep into nano-scale research thinking that the solution is there. But humanity at this stage of development should take a deep breath and to look the big picture. Humanity should realize that in order to be able to solve all these problems that threatened our existence on this planet, we are in need to be able to maneuver our zooming ability in order to deal with multi-scale problems.

FIGURE 16
A YOUNG GIRL POSTURE SYMBOLIZES HOW SCIENTISTS STAND BACK AND TO LOOK AT THE BIG PICTURE AND IN OTHER CASES ZOOM FOR THE SMALL PICTURE DEPENDING ON THEIR RESEARCH NEEDS



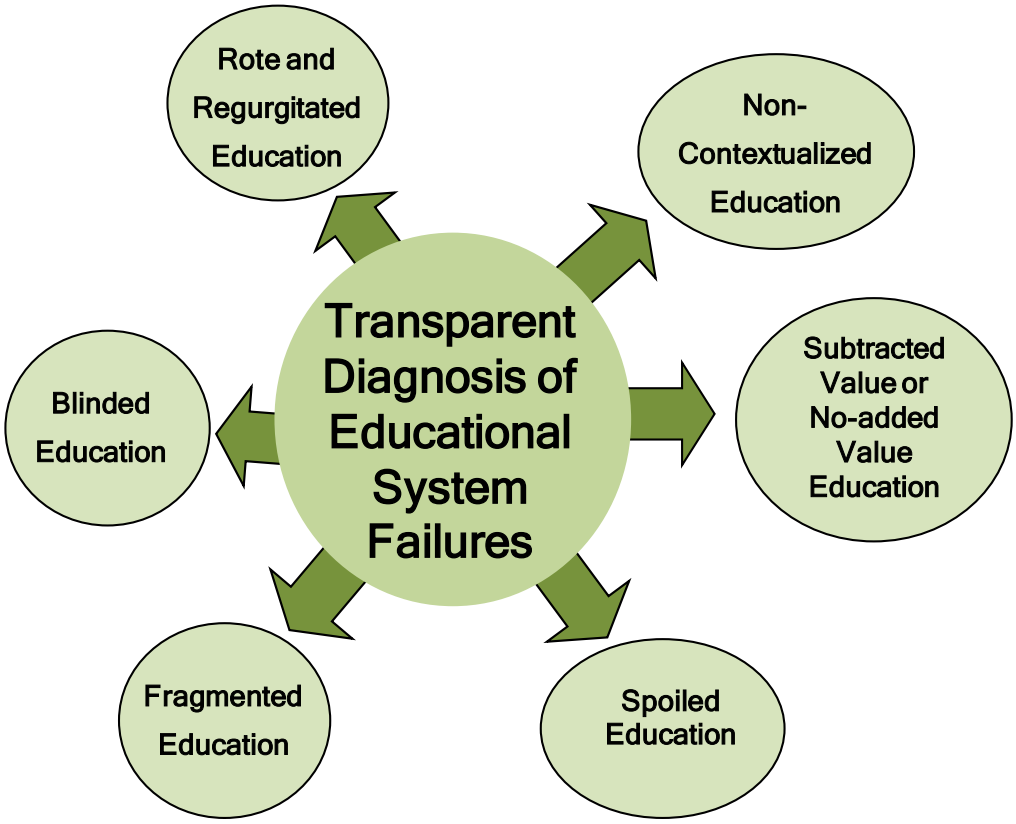
TRANSPARENT DIAGNOSIS (TDg) OF EDUCATION SYSTEM'S FAILURE

The following are some of the symptoms of educational failure in some of the developing countries, as illustrated in FIGURE 17:

1) Decontextualized Education (Absence of context)
2) Rote Education or Regurgitated Education (Absence of Meaning)
3) Blinded Education or Key-hole Education (Absence of Big picture)
4) Fragmented Education (Absence of connections)
5) Superficial Education (Absence of rigor and depth)
6) Subtracted Value Education or No-added Value Education (Absence of Value)

When we are dealing with absence of context, meaning, big picture, connections, rigor, depth, and value, this means that we are suffering a distortion in thinking that needed micro scale level (thinking) treatment.

FIGURE 17
MAIN SYMPTOMS OF EDUCATIONAL SYSTEM'S FAILURE



EVOLUTION OF TRANSPARENT PERSPECTIVE (TP): SEEING UNIVERSE THROUGH TTA LENSES

Transition to Holistic Thinking

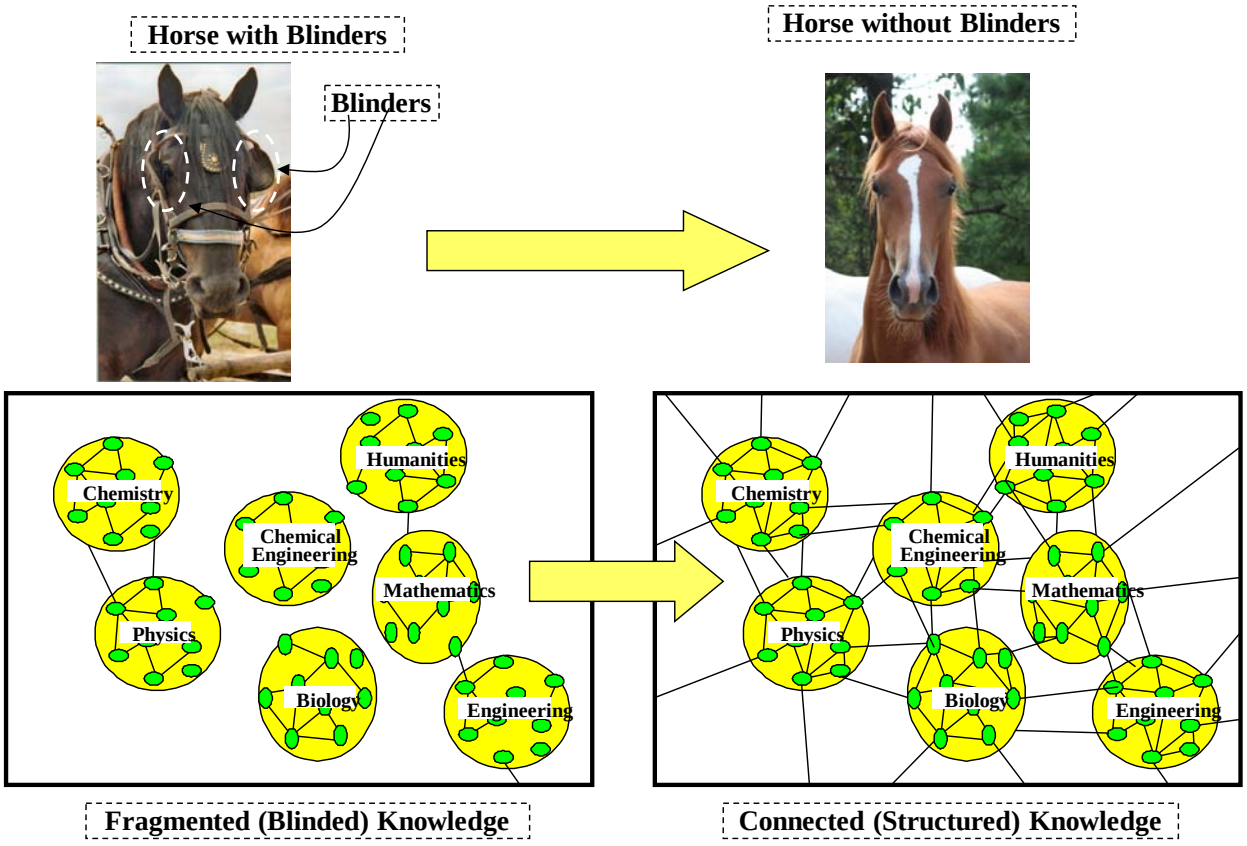
Reductionism Is Ruining Our Educational System

Our thinking is still trapped in the old reductionism approach. Our educational system is applying reductionism to learning and teaching knowledge in which everything is taught locally without looking at the big picture. Students are not able know where is their position in this universe. The focus of all lessons is to look at the topic studied without paying any attention to the big picture of the subject studied or to its relation to our life in this universe. Reductionism is ruining our educational system by fragmenting knowledge or blinding it as we sometimes do with horses or donkeys (Harsh analogy), as

illustrated by FIGURE 18. It is a narrow-perspective, short time approach that aims to pass the exam and get high grades but no answer to the question why the student is studying this topic? and how it is related to his/her immediate and long-term future?

FIGURE 18 is using harsh analogy to create a connection between blinding a horse and blinding a curriculum. Blinding a horse may be a need in certain circumstances, but no more blinders are needed in our life and in educational system in specific. Systems studied should be deeply analyzed and then openly synthesized to show its connections with the surrounding context. It is essential to see the connections between topics, concepts, fields, ideas, people, and cultures.

FIGURE 18
THE NEED FOR TRANSITION FROM FRAGMENTED OR BLINDED KNOWLEDGE TO CONNECTED OR STRUCTURED KNOWLEDGE



Affecting Six Fundamental Transitions Using System Thinking

Using fragmented scientific fields to deal with this huge, highly complex and interconnected burden of problems necessitate adopting system thinking as a unifying approach to integrate this fragmentation and creates solutions. Skyttner, L., (2005), in his book about general systems theory, clearly explained the importance of adopting systems science principles to deal with these global severe problems by affecting six fundamental transitions:

1. **Demographic transition** to stable world population.
2. **Technological transition** to halt the environmental impact.
3. **Economical transition** in order to charge real costs for goods and services in addition to environmental costs.
4. **Social transition** for sharing of wealth and opportunities.

5. **Institutional transition** to affect the widest scale of cooperation to solve global problems.
6. **Informational transition** to make a world in which education and research allows most people to understand the nature of global problems.

To realize these six deep and important transitions, a tremendous effort is needed to filtrate system thinking to the grassroots level. TTA will be the proper approach in thinking that will help in realizing these important transitions.

Six Shifts in Perception for Sustainability Implementation

The Center of Ecoliteracy outlines six different shifts in perception that impede system thinking:

1. **Shifting from parts to whole**: The focus should be shifted from the fragmented parts of the system to the connected and collective behavior of the whole inside a context.
2. **Shifting from objects to relationships**: The focus should be shifted from understanding separate system entities to formulating an understanding of the relationships between these entities and how they interact to form a whole.
3. **Shifting from knowledge to contextual knowledge**: The focus should move from gaining decontextualized knowledge to gaining knowledge embedded in an authentic context.
4. **Shifting from quantity to quality**: The focus should be changed from quantitative knowledge to qualitative assessment. Qualitative understanding is as important as quantitative one.
5. **Shifting from structure to process**: The focus should be shifted from identifying the building elements of the system structure to study the process of change that this system undergoes.
6. **Shifting from contents to patterns**: The focus should be shifted from revealing systems entities to uncovering the hidden patterns that these entities structure shows.

These six shifts are deep and interrelated. A grassroots and deep change is needed at all levels and scales in order to materialize these six shift in perception. TTA will be the proper thinking approach that will substitute the concept of shift with Dynamic Maneuvering. DM is a more appropriate process, because it deals with change as a point in continuum not a switch to be turned on and off. It is a planned and skilled change in position on that continuum scale based on current circumstances. TTA has the appropriate tool to dynamically maneuver in all these continuums.

Whole System Thinking as a New Educational Paradigm Change

Sterling, S., (2003), in his PhD thesis paved the road towards an ambitious and a difficult task of envisioning and articulating an alternative educational paradigm. Sterling, S., (2003), catches the core theme of whole system educational paradigm by writing:

> *"In essence, whole system thinking involves an extension of perception, a quality of connection in our conceptual thinking, and integration in our planning and actions towards healthy systems" [Sterling, S., 2003, p9]*

The shift in thinking from fragmented to whole system thinking is a difficult job to accomplish but it is not impossible. TTA will be the proper strategy to achieve this by affecting DM in thinking. Extension of perception is translated in TTA in the form of dynamic zooming between scales, levels and domains. Quality of connection is translated in TTA in the form of revealing the real connectedness of planning and actions.

Evolution of Transparent Holistic Thinking (THT)

Universe Transparization: Main Components of Universe

Based on system thinking, the whole universe can be seen as a group of systems that are interacted to constitute the whole structure of the universe. Each system is enclosed within a boundary that separates it

from an environment. The boundary can be hypothetical or physical. As shown in FIGURE 19, system, boundary and environment are the three basic components of the universe.

Our universe is made-up of infinite number of connected and interacted entities that can be grouped to form systems. To clearly identify a certain system, a boundary (either physical or hypothetical) is needed to be defined. The boundary will enable us to divide the universe into an interior part which is the system and an exterior part which is the environment, as illustrated in FIGURE 19.

Universe Structure Transparization

Universe transparization is a process applied to the three main components of a universe (system, boundary, and environment) to reveal their structure and behavior, as shown in FIGURE 20. Structure and behavior transparization can be in the form of

1. **Content Transparization:** revealing the content in the form of entities,
2. **Organization Transparization:** revealing the organization of these entities and
3. **Connections Transparization**: revealing the connections that attach entities together

Universe structure transparization: What Is a System?

> *"A system is a black box of which we can't unlock the locks and all we can find out about is what goes in and what comes out" (Boulding, K. in Skyttner, L., 2005)*

An unexplored system can be considered as a black (opaque) box. Learning (transparization) about this box will gradually make it more transparent as its structure and behavior revealed. Humans started their life on this earth with few transparently understood systems that are encountered in their life. Illness, germs, human bodies, galaxies, planets, reactions, electricity, nuclear energy …etc where once seen by humans as black boxes. As these systems get investigated, humans where able to transparize these opaque boxes and reveal its contents.

FIGURE 19
THE MAIN COMPONENTS OF UNIVERSE

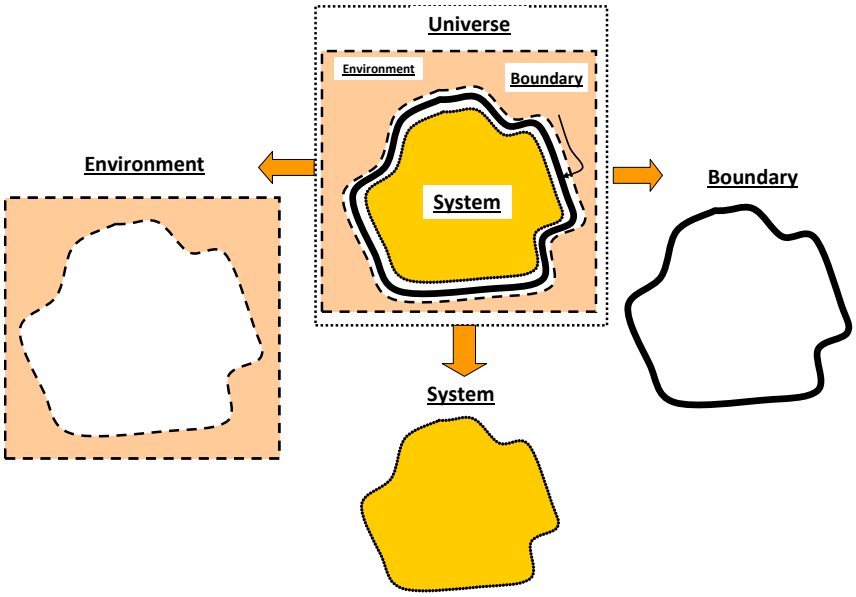
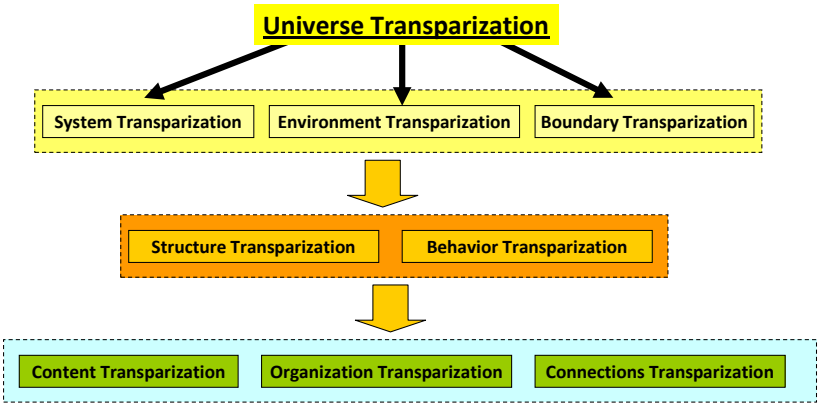


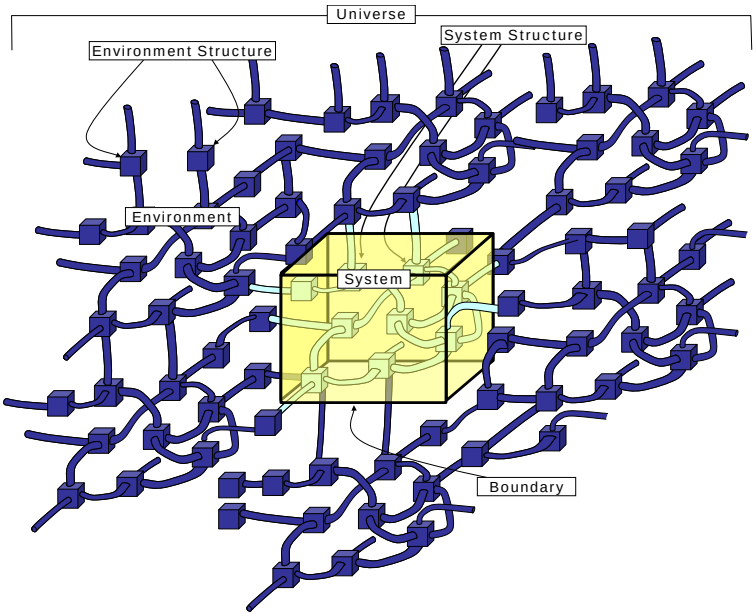
FIGURE 20
UNIVERSE TRANSPARIZATION HIERARCHY



A system can be defined as a group of interconnected and interacted entities that forms a whole and behaves collectively rather than as individual entities. Based on this definition, car, cell, company, human, plant, animal, community, government, aircraft ….etc can be considered as a system. Systems can work as a process in which a throughput of information, matter or energy gets processed inside.

To give a more realistic representation of a system, a 3D drawing of the universe is shown in FIGURE 21. The small cubes represent the entities that constitute the basic skeleton of the system and the surrounding environment. The channels connecting the entities (small cubes) represent the connections that are formed between these entities. The boundary as represented here is the transparent cube in which the eight squires of flat surfaces define the borders that divides the system from the environment. Interaction or flow can be exchanged between the system and the environment by passing through the boundary.

FIGURE 21
3D TRANSPARIZATION OF A UNIVERSE MAIN COMPONENTS



Earth Transparization (Earth as a Space Shuttle)

Transparization of our earth is very important in opening our eyes to the simple facts that are blinded by our current way of thinking. When we ride a horse, a car or an airplane we feel worried of falling off the horse, having a car accident or an airplane crash, respectively. But how many of us feel that humanity is riding a big ball of mass that orbits around the sun and we are in a similar situation to an astronaut who rides a space shuttle and orbiting around the earth. How many of us feel that we are riding this huge object called the earth and that it is possible that an accident may happened to us, as illustrated in FIGURE 22. This level of tranparization is an essential component of TTA.

Evolution of Transparent Meaningful Thinking (TMT)

Human needs are the driving forces for change in life. These needs are similar to the engine of the car that drives it to the targeted destination. FIGURE 23 illustrate the analogy between a car and a human body. As illustrated in FIGURE 23, the mind is corresponding to the steering and control devices inside the car; the car motor represent the human needs; and the car body represent the human body that accommodates both motor and steering and control system. This analogy stressed the crucial importance of human needs in driving humans to work to improve their environment while striving to satisfy these needs.

TTA Is Expanded Holistically and Meaningfully

Transparency as a core value is expanded to transparize system's structure and behavior under the umbrella of Transparent Holistic Thinking (THT) and to transparize meaning under the umbrella of Transparent Meaningful Thinking (TMT). TTA made a big stride towards being established as new fully structured methodology by combining two important core values, holism and meaningfulness.

FIGURE 22
EARTH TRANSPARIZATION: EARTH AS A SPACE SHUTTLE

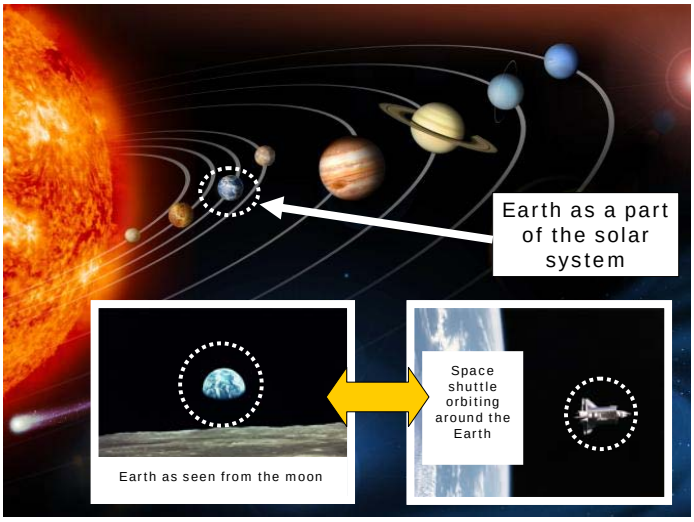


FIGURE 23
DRIVING FORCES IN HUMAN BODY AND CAR ANALOGY

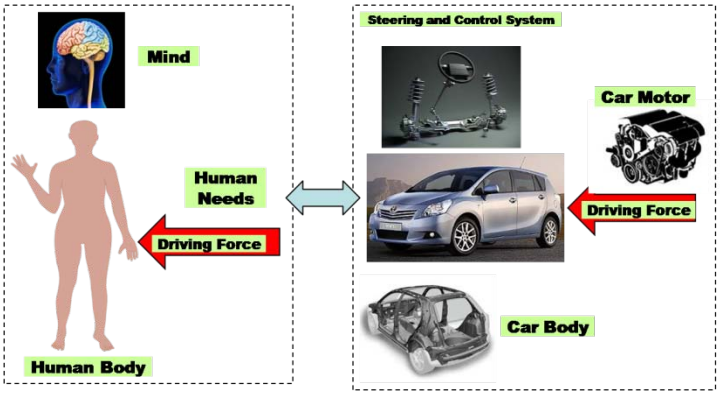
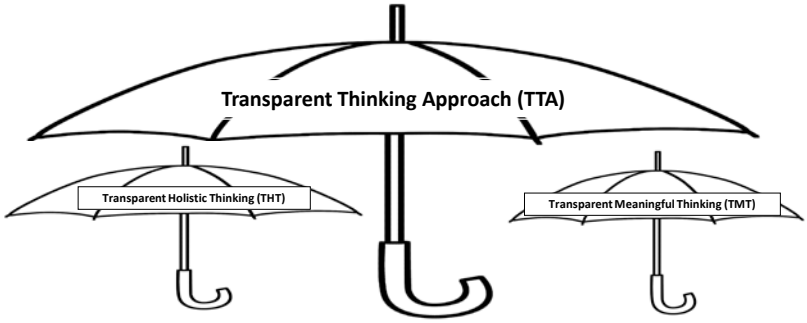


FIGURE 24
TTA EXPANDED TO ENCOMPASS TMT AND THT

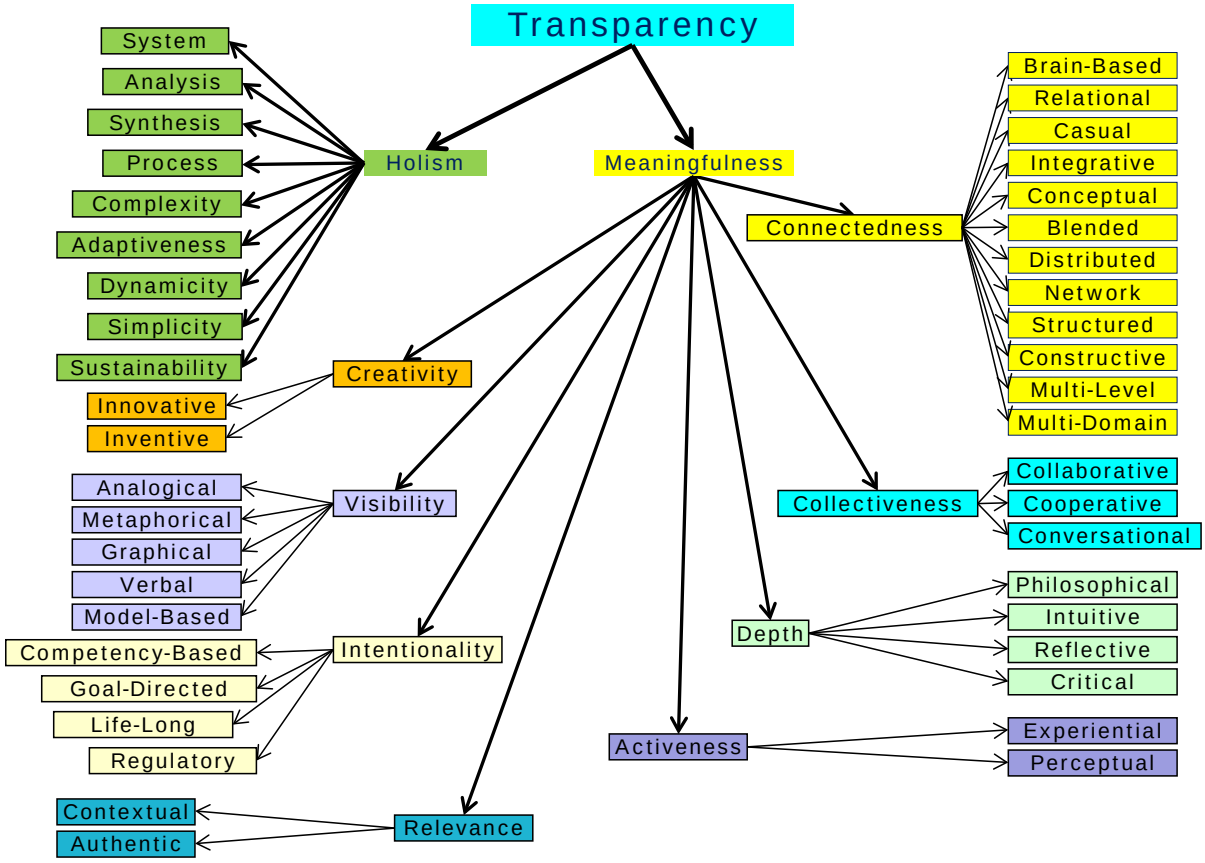


TTA EXTENDED CONCEPTUAL FRAMEWORK

Transparency as an Overarching and Breeding Core Value

Transparency as a core value continues to expand to encompass additional core values. As illustrated in FIGURE 25, holism core value continues to expand to eight more values: Analysis, synthesis, process, complexity, adaptiveness, dynamicity, simplicity, and sustainability. In a similar fashion, Meaningfulness, as a core value, continues to expand to gather another eight more values: Connectedness, collectiveness, depth, activeness, relevance, intentionality, visibility, and creativity, as illustrated by FIGURE 25. Connectedness is expanded more to comprise more traits: brain-based, relational, causal, integrative, conceptual, blended, distributive, network, structured, constructive, multi-level, multi-domain. The breeding of values and traits continues to move in all other core values as shown in FIGURE 25.

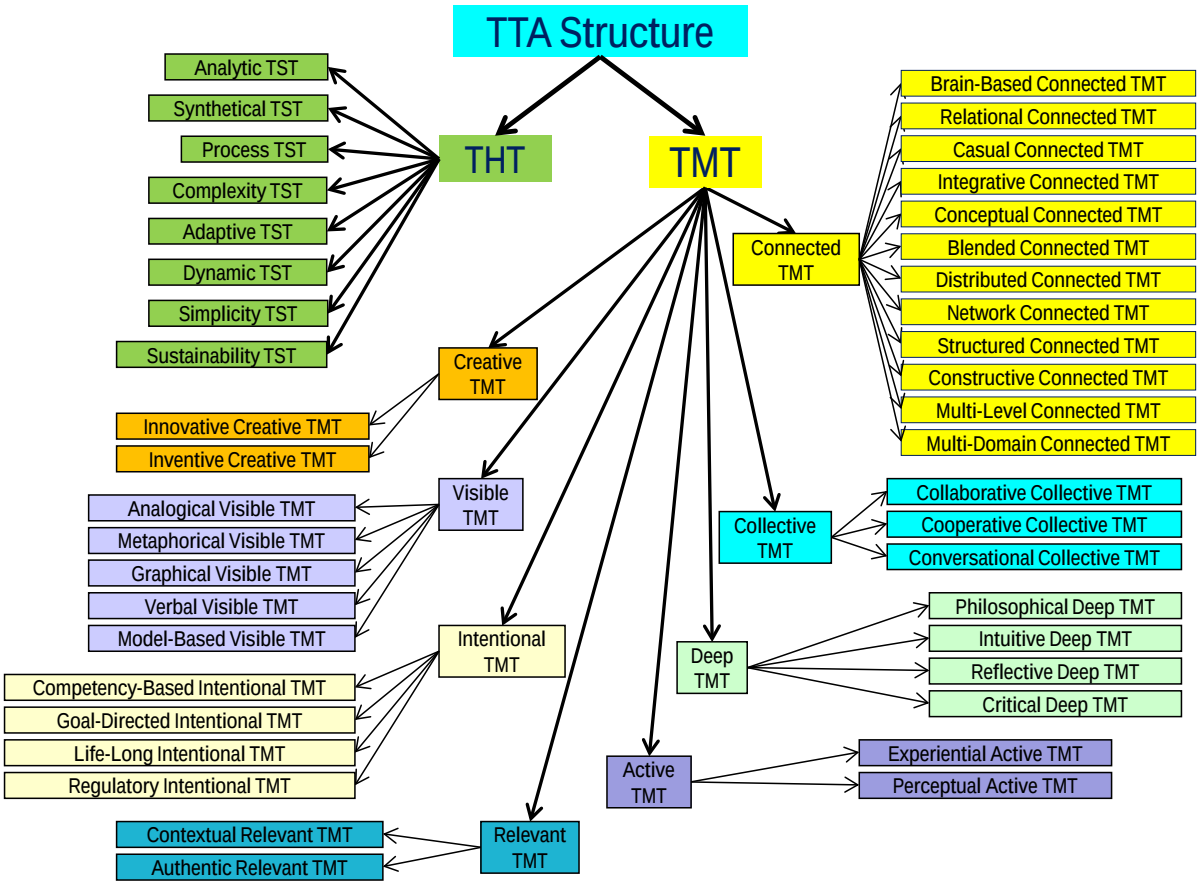
FIGURE 25
TRANSPARENCY AS AN OVERARCHING AND BREEDING CORE VALUE



TTA as an Overarching and Breeding New Thinking Conceptual Structure

TTA core construct is expanded in thinking skills domain (FIGURE 26) in a similar way to the process of expansion and breeding that carried out in the core values domain (FIGURE 25). To deepen the understanding of the evolution of the TTA, a graphical conceptual model is built in FIGURE 26. This graphical model shows that Holistic and Meaningful thinking interacted with transparency to formulate two evolved type of thinking (1) Transparent Holistic Thinking (THT) and (2) Transparent Meaningful Thinking (TMT). The two emerged types of thinking constitute the back bone of TTA. Transparization is the process that the Transparent Thinker (TT) uses to reveal universe structure, behavior and their hidden meanings. Meaning transparization is manifested based onto eight themes (relevancy, productivity, activity, depth, intentionality, connectedness, collectiveness and visibility). Universe transparization seeks to reveal behavior, structure , organization, content and connections. Universe transparization also get manifested onto eight themes of thinking (Analysis, Syntheses, Dynamicity, Adaptiveness, Complexity, Simplicity, Sustainability and Process).

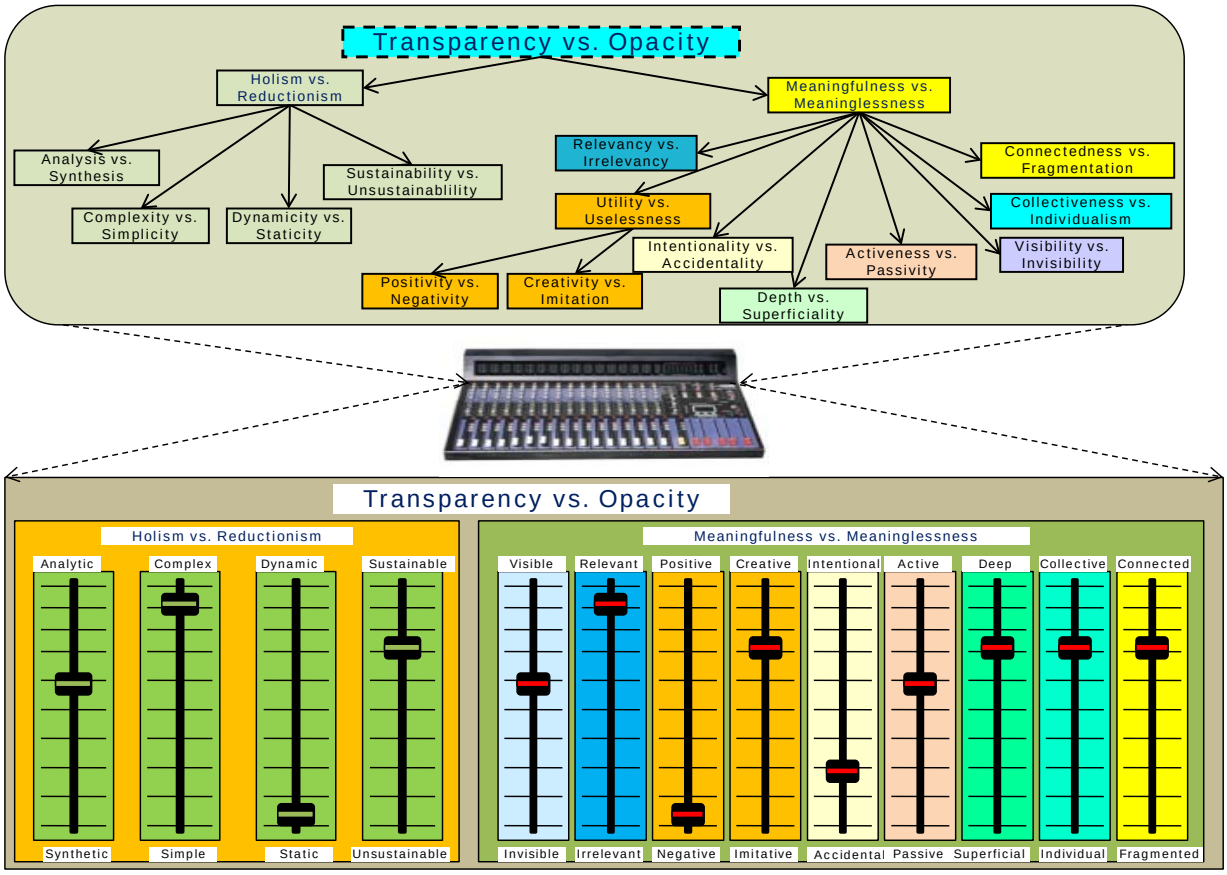
FIGURE 26
HIERARCHICAL STRUCTURE OF TRANSPARENT THINKING APPROACH (TTA) EXTENDED CONCEPTUAL FRAMEWORK



Orchestration of TTA Application: Sound Mixing Analogy

TTA extended conceptual framework shown in FIGURE 26 is a wide-spectrum and fully extended construct. This big construct requires also a meaningful application approach. Dynamic Maneuvering (DM) as transparent diagnosis tool, developed in this series of articles, indicates that transparent thinking is not targeting shifting from extreme to extreme, but is adopting the smart maneuvering technique to dynamically, gradually and tactically move in the continuum to an optimum value by manipulating multiple scales. As illustrated in Figure 27, Sound mixing, as a methodology of optimizing the output mixed sound by manipulating different scales of sound sources and effects, is employed to help in simplifying the idea of optimizing the TTA application using DM. Figure 27 shows that transparency and opacity are not an on/off switches to click to an extreme value but a group of continuum scales that needs to be manipulated to reach an optimum transparency dose based on DM methodology. As shown in Figure 27, TTA mixer keyboard is divided into two groups of scales: Holism vs. Reductionism group and Meaningfulness vs. Meaninglessness group. The overall performance of TTA depends on how effective the Transparent Thinker (TT) (Mixer) in employing DM (Dynamic Tuning) to manipulate all these scales.

FIGURE 27
EXTENDED TRANSPARENT THINKING APPROACH (TTA) MIXER PANEL



Transparent Conclusion (TC)

These series of articles are continues to be written in a unique way in order to be a living example of TTA. TTA extended conceptual framework is completely presented in this 2nd part of the series as an evolution of the TTA core construct presented in 1st part. To complete the whole story, TTA Extended Conceptual framework is further expanded to encompass education, development, and change domain in the 3rd part. Encompassing change domain means including the whole processes of this universe under one umbrella. In the 3rd part, the resulting expanded TTA conceptual framework is applied to Math, Science and Engineering Education as transparent solution to higher education under the umbrella of Transparent Higher Education (THE).

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