Reforming Medical Education System: Using System Thinking as a Paradigm

Ali Tareq Abdulhasan, Ali Abdulridha Abbas and Alaa Qasim Hadi Alawadi

1,2 College of Medicine, Kerbala University, Kerbala, Iraq
3 Pediatrician (F.I.C.M)-Karbala Children Hospital, Karbala Health Directorate, Karbala, Iraq

ABSTRACT

Background: In general, the crisis in higher education system and medical education system is an outcome of being functioning inside the dead machine boundary\skin of the modern science. Boundaries are threshold concept in all systems, regardless of their nature whether they are natural or artificial systems. There are two kinds of boundaries: physical and symbolic boundaries. The type of boundary defines the type of signals that can be received and communicated.

Objective: Providing a new method and strategies for educational reformers to lead a systemic intervention at the level of the boundaries can change the whole system.

Methods: In this paper, we used complexity science and phenomenology as theoretical framework providing a solid foundation for using dermatosemiotics as system thinking tool. Dermatosemiotics is a system thinking stance that understand the skin as a system boundary that function as a semiotic medium and physical model. Dermatosemiotics is a transdisciplinary, system thinking approach that emerge from the interaction of four systems: biological, cognitive, social and ecological systems.

Results: Understanding system boundary \skin as an embodied intentional is a major theme in this study. The intentionality of the system has different names. In natural science, Intentionality called a function, in an educational context, it is called learning outcomes and in complexity sciences, it is called mental models. All these names unified share the same metaphor, the skin, which function as semiotic boundary, communicative interfaces that unite different parts of the system into a complex whole. Intentionality \{learning outcomes as a boundary\} skin will define what is inside and outside, the self from environment. Systems can’t function without a boundary (membrane \skin). Awareness of the system boundary is essential for selecting what is relevant and essential for that system. Presence of a boundary is essential for self-reference, self-control (cybernetic) and self-organization. Feedback loops, positive or negative are signs of being inside intact skin boundary that connects the input \{perception and output \{action to ensure balance and homeostasis. Dermatosemiotic analysis of the current medical education system revealed that most of them still functioning within the skin/boundary of modern science which wear a solid, machine skin that respond to only one type of signals, the physical signals. Failure of most reforms is an outcome of focusing on the parts of the system and forgetting to step outside the skin of the system to examine its symbolic and physical boundaries.

Conclusion: Sustainable reform need to be achieved at the level of the whole, the semiotic boundary \skin, that is, an ontological reform or triple loop reform, to ensure wearing new skin, new system boundary that select new input, new processes and new outcomes. This kind of reform can be called a reskinning, creating a new form, a new system rather than just repairing or renewing a dysfunctional part of the system and keeping the whole intact.
The crisis in all domains of life, is outcome of being inside modern science skin, which is dead skin \ creating independent individuals, disciplines, and professions. The call for interprofessionalism, transdisciplinarity reform can be achieved only if we wear a living skin which enable touching the whole before the parts.

All Tareq.

The phenomenon that distinguishes life forms from inanimate objects is semiosis. This can be defined simply as the instinctive capacity of all living organisms to produce and understand signs.

Thomas Sebeok(2001, p. 3).

**INTRODUCTION**

“The fruit without changing the root.” — Stephen R. Covey

In this study I will introduce the word “skin” as metaphor to provide educational reformers with new language and new ontological stance that view life, health, learning as emergent phenomena from enskinned living systems rather than deskinned machine system. Enskiment is our mode of being which is neglected by modern science which give primacy for detached eyes, detached observation as if we are two independent entity, mind and body, and we can use our mind without a body \ skin. The aim of this paper to make us aware of semiotic nature of reality that make it complex adaptive system, everything in touch with everything. Lived experience can’t be divided into mind and body, inside and outside as long as we are inside skin that make us whole and part of whole, self and other, inside and outside. This what is meant by complexity, the coupling phenomena that make life define as a difference \ action potential that make difference. We need to rethink life as embodied mind, embodied cognition, embodied semiosis with different levels of complexity. Human beings differ from other life forms by his ability to adopt phenomenological stance that make him translate their mental models semiotically using their skin \ body, verbal language and icons as communicative system.

There are three levels of loop learning or thinking .Most of the reform focus on the single loop which is to change the outcomes of the system and forgetting that sustainable change and reform should be done at the level of paradigm ,the level of boundary ,the skin of the system that can change the kinds of input and process rather than just the output .The aim of this study is to introduce lifeworld penology as system thinking approach that facilitate Triple loop reform. Thinking at the level of the system boundary is called system thinking in complexity science or lifeworld phenomenology in qualitative research. Leading sustainable reform should be achieved at the level of skin if we need to see new form and shape and ensuring touching not just the physical dimension of reality but the spiritual one. Still medical education system wears the skin of modern science, which is reductive, machine, linear paradigm\skin that touch only physical signals. To graduate a doctor who can cope with the complexity and uncertainty of the 21st century, we need to change the boundary of the education system from machine dead boundary that touch only what is physical to a living boundary, living heart\skin that can touch the whole patient, can listen to patient stories, we need reform at the level of being , professional identity to ensure graduating lifelong learner having living heart , sensitive , empathic and compassionate .Introduction of reform without changing the skins\boundary of the system is futile. The aim of this skin shift is to ensure graduating doctors having semiotic intelligence enabling to read the patients as complex adaptive text ,composed of different interacting systems: biological , cognitive , social and ecological .Health is an emergent phenomena resulting of the interaction of these four systems .Reductionism and linear reading reduced the patient health into the dysfunction of the biological system creating linear solutions with unintended consequences .Single reading of any text creates a crisis, hegemony and totalitarianism. Crisis in medical practice, commercialism creating unbridgeable gap in patient –doctor relationship. This article can be used to lead reform from linear machine medicine to lifeworld system medicine which is the basis for person centred medicine, family medicine and narrative medicine.

Medical education wears the paradigm of the modern medicine that function as boundary\skin controlling what is inside and outside the attention of this system .Ethics , attitude , subjectivity are outside the boundary of modern science as they adopted positivist stance that reduced knowledge and truth in only the physical dimension of experience. The kind of doctors produced from such system surely will wear its skin as habitus , tacit boundary that make them mute and blind to the subjective qualitative dimension of the clinical encounter .The problem in medical education system is not in the structure or curriculum but in the boundary that make them part of machine system thinking .This explains why most of the medical education system reduced the assessment to the disciplinary knowledge and skills and overlooking the attitude , professional identity , communication skills , empathy and other soft skills which are transdisciplinary .Thus, The reason will become clear if we remember Bloom's Taxonomy which was created in 1956. Bloom identified three domains of educational activities or learning : Cognitive: mental skills (knowledge), Affective: growth in feelings or emotional areas (attitude or identity ) , Psychomotor: manual or physical skills (skills). This fragmentation of learning experience into three independent domains is outcome of being inside machine skin that can touch only discrete objects, cannot see the in-between, the relations. Hence, modern science follows the logic of divide to control rather than unite to lead. Departments were formed to fulfill this analytical thinking, by departing the holistic stance transforming living systems into machine systems manifested as primacy of anatomy and fragmentation to physiology and integration. The failure is not in the taxonomy itself, but in the analytical physical stance that envelop the educational system with dead skin that can recognize only two domains (knowledge\mind) and skill (hand) and ensuring its blindness and insensitivity to the attitude (the heart) which can interfere with objectivity and generalization. The origin of problem is reductive.
framework against which we divided educational experience to only to what can be seen physically and measured objectively. The focus become on having knowledge (doing the right things, & skills (doing things right) but not graduating the right person. The affective domain represents the triple loop learning through which our being and identity transformed, our perception is changed, the shift is ontological (being) rather than just epistemological (knowledge). Our problem is related to weakness, sometimes absence of the professional identity for this reason we can graduate medical students having knowledge and skill of doctors but not being doctors. To solve a triple loop problem, you need triple loop methodology. Phenomenology is the most appropriate tool to lead this transformative, ontological paradigm shift. Phenomenology is antidote against reductive 'linear thinking which is produced by Positivism which resulted in the machine age with its industrial revolution. Phenomenology rethink the criteria of what is scientific, what is objective, what is knowledge. The power of phenomenology resides in its call to see what is in front of our eyes rather than looking through already made theories. Returning to lifeworld is the slogan of phenomenology, which make us system thinkers, seeing organized meaningful whole embodying intentionality. Phenomenology has many roles in our study, it is the framework that guide the shift from knowledge to system thinking, it is research paradigm that guide the methodology and methods of getting our evidences. Using phenomenology as qualitative research revealed that the crisis of educational system and health care system will not be solved unless we give the priority to this hidden 90% of our Iceberg (consciousness/identity \being) which direct and create the visible 10% of our behavior, personality. We introduced phenomenology as research methodology & as the radical therapy for this crisis as it is the science of consciousness, science of subjectivity, science of this 90% of our hidden iceberg & this is what made it deserve the task of being overarching paradigm of qualitative research. Lifeworld phenomenology gives primacy for the lived experience, metaphorically speaking, the meal rather than menu. It is essential for educators if they are interested in changing the skin of the education system, the root of crisis, in touching the whole, the big picture, in searching for things as they are, if they are interested in student’s lifeworld, generally in what is like to be a human. Phenomenology is essential if they are caring to be a leader of change, coach and mentor rather manager of status qua. Phenomenology is the best alternative paradigm to Positivism which is the root of crisis in science and culture. Understanding positivism is the key to understand phenomenology. unfortunately, our current pedagogical paradigm originated in positivistic philosophy which is the basis of machine age and induial revolution consequently factory model & behavioral psychology that shape the educational philosophy and curriculum and educational environment. This crisis that occurred in educational system caused by this reductive framework, in which the whole reduced to parts, the students reduced to his behavior, overlooking his affective dimension, his attitude. Phennomenology as philosophy fight this reductive philosophy and diagnose their contribution in this spiritual crisis, we still suffering from it. The slogan held by phenomenology is what make system thinking tool, this slogan is Back to the lifeworld, to things themselves. This Going back means bracketing any theoretical stance, any paradigm until meeting the lifeworld of people studied whether patient or students. Phenomenology is holistic approach to nature and human, focusing on the whole as starting point, and this whole is intentionally and logically connecting, unifying its parts. Phenomenology offer the best answer to this question, what is look like to be human. The answer to this question is the first step in any science. Ali ibn Abi Talib, Husserl, Heidegger, Gadamer and Maurice Merleau-Ponty and Ricouer, Habermas are my main reference in addition to my lived experience and my students and colleague.

The root of crisis: The Reductive Frame

Reducive thinking has dominated Western thought patterns for at least three centuries and can be traced back to Aristotle’s “logic” and then Descartes “Rules for the Direction of the Mind”. Indeed, reductive thinking has become such a societal habit that it is seldom questioned by the general populace and even many scientists. In essence, Descartes proposed that the only sound thinking practice was to isolate phenomena from each other and their environment and apply a process of reduction, simplification, and clarification based on a disjunctive logic of “either/or,” which he borrowed from Aristotle.

The logic and philosophy of this reductive thinking ended by Edmund Husserl (1859—1938) at 1900 when he published his magnum opus: logical investigation, in which he introduced his new logic of whole and parts which he called it Phenomenology, the logic of appearance, of the lifeworld, lived, concrete experience. Phenomenology introduced lifeworld as a foundation for logic, philosophy and science. it is the foundation for critical\ system\ complexity\ creative thinking. Husserl in his last published book, the Crisis of European Sciences and Transcendental Phenomenology (1936), introduced the concept of the lifeworld in his The Crisis of European Sciences and Transcendental Phenomenology (1936). In whatever way we may be conscious of the world as universal horizon, as coherent universe of existing objects, we, each "I-the-man" and all of us together, belong to the world as living with one another in the world; and the world is our world, valid for our consciousness as existing precisely through this ‘living together.’ We, as living in wakeful world-consciousness, are constantly active on the basis of our passive having of the world... Obviously this is true not only for me, the individual ego; rather we, in living together, have the world pre-given in this together, belong, the world as world for all, pre-given with this ontic meaning... The we-subjectivity... [is] constantly functioning.
This is turning point in Husserl phenomenology which is the We-subjectivity, lifeworld, or can called intersubjectivity, world, which is condition that make system thinking possible. Habermas in his great work on communicative mind, gave the lifeworld the central role to shift from instrumental mind (reductive) to the communicative mind (system thinking). For Jürgen Habermas, life-world is more or less the "background" environment of competences, practices, and attitudes represented in terms of one's cognitive horizon. It is our hidden 90% part of Iceberg. It is the lived realm of informal, culturally-grounded understandings and mutual accommodations. Rationalization of the life-world is a keynote of Habermas’s 2-volume Theory of communicative action. The penetration of life-world rationality by bureaucracy (machine system) is analyzed by Habermas as "colonization of the life-world." The main aim of this study is to restore, liberate our lifeworld from this reductive 'machines' system. The crisis in sciences and culture diagnosed by Husserl is called colonization by Habermas.

The crisis or colonization is happened when we dehumanize our lifeworld in the name of science, philosophy, religion. Any discourse overlook people lifeworld, their subjectivity, their value, imply it saw them as machine. This diagnosis become evident to every one if he just returns to the lifeworld in which we will see interdependency, relationship rather than just subjects and objects, the difference between material objects and human is big enough that the outcome of being human is not just following natural laws but create lifeworld, culture and civilization, so surely there is something irreducible to matter that differentiate them from natural objects like animal and stones. The crisis is when scientific methods applied the logic of one size fit all, studying human beings as if He material object 'machine.' The great success of their reductive method gave them false paradigm that their method is universal can be generalized to the degree that their approach is the only road to truth and certainty.

Reducing human to objects 'machine' for the sake of science, and dividing him into different parts studied by different branches of science resulted in fragmentation of the human and consequently spiritual \\ and ethical crisis which gave rise to wars, poverty, ecological crisis.

Edmund Husserl in this quote shift our eyes to body as one coin with two faces, He said:

"The body is originally constituted in a double way: first, it is a physical thing, matter...Secondly, I sense ‘on’ it and ‘in’ It: warmth on the back of the hand, coldness in the feet".

The concept of body in phenomenology is translated in this study as a skin, which can lead a paradigm shift from biomechanical model to the lifeworld model in which we have two approach to the body, one seeing it from outside as living organic body studied by medicine and biology and the other is the lived body which is seen from inside, from first person perspective which is studied through phenomenology. In general phenomenology discourse use the word embodiment instead of body, as we are only one person in lifeworld, just embodiment of our knowledge, skill, and attitude, organized embodied whole, can be divided only in theatrical stance.

Lifeworld is embodiment of our culture as human being, not just our local culture which should be founded on this primary, intersubjective, cosmopolitan, compassionate one in which we determine what is meaningful for the whole not just our fellow.

This make the need for new foundation of science that take into consideration both side of the human being, the objective (outside) and the lifeworld 'intersubjective' (inside). This new science called phenomenology, which is introduced by Husserl at 1900 through his book: logical investigation, in which he discovered the logic of experience and the conditions that make it possible.

One of the painful outcomes of this mechanization of life, is to find the human sciences like psychology and sociology following the reductive model of this dehumanized natural science and thus trying to touch human lifeworld quantitatively. They sacrifice of the 90% for the 10% in the name of objectivity -as it will have discovered lately by Husserlian phenomenology which give primacy for heart 'intuition lived as a tactile stance, embodied perception, as stratified qualitative and quantitative layers, the subjectivity and objectivity as they parts of single skin, that function as medium connecting these different dimensions of experience creating complex adaptive system Phenomenology as qualitative research design adopted first-person approach to uncover the lived meaning that control the perception and behavior, that is, it focus on the tacit dimension of experience metaphorically represented as the 90% of the hidden Iceberg. The aim of doing phenomenology is to facilitate emergence, manifestation of this invisible lived dimension of the experience or lifeworld using different tools like semi-structured interview, narrative method, arts in its different genre. Phenomenology success in its task when this lifeworld, the subjective dimension, become touched semiotically using non-verbal communication or symbolically using verbal communication. appear, disclosed through dialogue, interview, and other qualitative research methods. This is reason behind calling it phenomenology, it is science of the reality as symbolic skin, appearance, providing the conditions that make the invisible touchable, it is a science of subjectivity, science of consciousness as interface, medium, a skin that unite different levels of reality into semiotic holarchy. The below figure summarize the meaning of life as skin, layers of organization, connected semiotically. The presence of skin or boundary create two different worlds, external and internal which are interconnected and interdependent through this living boundary. Using dead boundary create

1 Semiotics is science of signs systems. Phenomenology understand signs as embodied intentionality \ mental model. Thus, it can be defined as a study of mapping and maps, that is, a study of modelling systems. Phenomenology is the lived experience that connect the perception of territory to this semiotic modelling. The guiding slogan is that the map is not the terror or the menu is not the meal.

2 A holarchy is a connection between holons, where a holon is both a part and a whole. The term was coined in Arthur Koestler's 1967 book The Ghost in the Machine.
independent different world as it is embodied by modern science. System view of life, health, learning, meaning can be translated metaphorically as a skin, iceberg which become the relational ontological stance that unite phenomenology, biosemiotics\(^3\) and complexity science. Figure 1 stand for this systemic view of lived experience as learning, as an example.

As shown above in Figure 2, the crisis of educational system and health care system will not be solved unless we give the primacy to this hidden 90\% of our Being iceberg which direct and create the visible 10\% of our personality and organization, and shift from abstract \textit{machine/linear} world to lifeworld in which there is cycles, circles, feedback loops, system thinking\(^{10,11}\). The discourse of modernity respect only that is visible to our sensory organs, the parts, and regarded them as the only legitimate foundation for science and objectivity, overlooking the whole, regarding it as metaphysics as long as it is not visible. This reductive attitude is also the origin of terrorism, as they reduced the truth to only their position. Reductive thinking is the outcome of Positivism and resulted in materialism, thinking in everything as machine, close system in which causes and effect has only one direction, linear, and their discourse is of the kind of either 'or.'

This discourse of modern science is the reason behind machine age and industrial revolution which resulted in culture expecting from the students to fulfil the criteria of factory model.

Educational theory that guide this formation of students is called pedagogy in which the teacher act as manager, holding the power to make students pass or fail so students evaluated mainly by objective measures, what is visible, their knowledge and skills as they are expressed in written and oral exam. His Attitude remain a secondary issue as it is subjective and beyond science\(^8,9,10,11,12\).

It became clear from where we can start & how to lead sustainable reform, it is from this 90\% of our life which is overlooked in the name of objectivity.

Phenomenology deconstruct the positivistic claim of objectivity & certainty, and giving the evidences of broad meaning of objectivity to include the subjectivity, call it lifeworld, or intersubjective world, which is the ultimate foundation of any science\(^13\).

Phenomenology making strong attack the foundation of modernism creating the space for postmodern discourse in which the truth can’t be reduced to any position, as long as we are historical being, contextual, seeing things through a perspective, what is possible now is system thinking which respect all perspective, physical and spiritual, and any avoid claim of generalization and certainty which is not justified scientifically, as we are in the era of uncertainty/probability, and this what make higher education worldwide obliged to shift their paradigm and attitude.

**What is your paradigm, your symbolic skin? & what is paradigm shift?**

“To change ourselves effectively, we first had to change our perceptions.”Stephen R. Covey

Being inside 21\textsuperscript{st} century skin which embodies shifting from industrial \textit{machine age} to information \textit{system age}, that is , from modernism to postmodernism, these changes create a big challenge to the educational system, health care system, political system and economy. This resulted in continuous call for a reform and change that can address the need of this age, and rethinking the competencies expected from graduates.

To meet this demand, higher education witnesses many paradigms shifts in educational philosophy, curriculum, teaching methods, educational environment, assessment, but all these changes were either single loop reform or second loop reform, that is either focus on the product/outcome or the process/educational strategies while forgetting or their blindspot making them unaware of the identity of those who are working inside such systems. Triple loop reform is change at the level of being, professional identity ,the attitude of students and faculty members making them aware of their skins ,that make them outside the game. The skin in the game, is another way to express what I mean by triple loop reform .We need to reform at the level of heart ,relations that can


---

\[Figure 1: \text{Lived experience as iceberg, a skin that connect the mind to the body, the perception to action , can be translated in cybernetic language as systemic relation between the input and output, and semiotically between the signified and signifier creating a complex adaptive system.}\]

\[Figure 2: \text{By giving the primacy for the lifeworld, that is, phenomenology, system thinking, we can solve the chronic crisis in medicine, education and politics and facilitating the emergence of communicative mind rather than just instrumental ones. Modern science overlooks this subjective dimension and reduced the living systems into their visible behavior as if they are machine to ensure control, absolute prediction and value free judgments.}\]
unify students and teachers into complex adaptive system, making them function as whole, as a living system. The impersonal relation between students and teachers, doctors and patients is outcome of working inside machine system which provide their members with dead skin, dead heart making empathy, care, personal touch a taboo.

Unified by the root of these changes which is the shift from positivism to phenomenology (social constructionism) from machine thinking to system thinking, from management to leadership.

But what is this paradigm?
The best metaphor that can translate the function of the paradigm is skin. Biological skin is the boundary that control the input and output, hence, it has cybersemiotic function, defining what is meaningful to the system, relevant as input. As human beings, we are inside two types of skins, biological and symbolic skins. Husserl used lifeworld to embrace both types of skins. Thus, we can say we are inside lifeworld, complex skin. In this paper, I understand paradigm, mental models, mental frames as a symbolic skin, symbolic boundary, making us a member inside a discipline or community of practice. To be a member, you need to wear a membrane skin. Our biological skin makes us member inside biosphere while the socially woven skins make us member in a semiosphere culture. Understanding paradigm as a symbolic skin, invisible boundary, can explain immunity to change and reform when it touches this invisible skin.

Phenomenology used here as qualitative research paradigm and method that function as selffe, a mirror enabling us seeing these invisible, symbolic skins.

The function of language, our symbolic system of communication as skin is traced to Ronald Barthes, he says:

Language is a skin: I rub my language against the other. It is as if I had words instead of fingers, or fingers at the tip of my words. My language trembles with desire. Elizabeth Meese in her book (Sem)Erotic’s: Theorizing Lesbian Writing confirm this metaphoric use of language as skin, she says:

“Language is like a skin, both on the side of the body and out-side the body, between the body and the world, but also of the body, in the world.”

The function of skin as medium and interface uniting the inside to outside with keeping them apart, is one of paradoxical nature of being living system. This inside/outside mode of being make living system neither free nor unfree, neither self nor other, they are entrapped in the space of in-between, in this liminal space which is embodied by skin naturally and semiotics culturally. This what is meant by complexity, the coupling phenomena mediated by language at the social level, skin as living boundary at the macro level and a membrane at cellular level. Changing paradigm is changing skin, that is changing language, the mental frames that define what can be perceived and enacted. Thus reframing as paradigm shift is closer to reskinning as boundary shift. Because it becomes secondary skin. We need to adopt phenomenology as mirror to enable visualization, verbalization of these tacit skins \ paradigm, which is the first step in leading sustainable reform and lifelong learning. Surely if we know that we are inside old clothes, outdated and out of the current style, we can market the new paradigm as new style, new model. The new clothes, new style in science today is system thinking paradigm, we need to be inside it as our new skin if we seek for sustainable reform.

Our perception and behavior is a function of our paradigm, not just our conditions. Paradigm is a word which means “a pattern or mental model; the generally accepted perspective. Our paradigms will represent our views of the world, our explanations for what we observe in the world around us. As a metaphor, I like to compare our paradigms to the lenses in our glasses. What we see isn’t a completely accurate reflection of reality, it is shaped by our attitudes and perceptions. Paradigms are natural and inevitable, and they are useful to us in many ways. However, sometimes our paradigms become so far removed from reality that they become dysfunctional. A “paradigm shift” occurs when our paradigms change, allowing us to see the world in a new light.

Understanding this study is dependent on grasping the concept of paradigm and paradigm shift, and consequently the ability to lead profound change and sustainable reform.

The first time the word paradigm shift is used is by Thomas Kuhn in 1962 in his seminal work The Structure of Scientific Revolutions., argued that change in a scientific field does not occur as a step-by-step, cumulative process, instead, new paradigms emerge as the result of tradition-shattering revolutions in the thinking of a particular professional community. These shifts involve the adoption of a new outlook on the part of researchers and others in that community. Well-known examples of paradigm shift in the physical sciences include from Ptolomeian to Copernican astronomy and from Newtonian to quantum physics. When a paradigm shift takes place, we see things from a different perspective. Twentieth century paradigm shifts across a wide variety of fields can be seen as part of a larger shift from positivism to phenomenology.

Paradigm shift as triple loop learning (ontological shift):

To understand the turning point that can be induced by the paradigm shift we need to understand the anatomy of learning using organizational learning model. The language of Loop learning indicate we are using system thinking, organizational learning, indicate we are inside system age, not linear machine age, for the relationship inside any system is not linear but based on feedback loops.

Organizational learning is based on the work of Gregory Bateson (1972) as well as Chris Argyris and Donald Schön (1978) and addresses the purpose and extent of

---

8 Luhmann, Niklas. 2007. The mirror to enable visualization, verbalization of these tacit skins \ paradigm, which is the first step in leading sustainable reform.
9 Luhmann, Niklas. 2007. The mirror to enable visualization, verbalization of these tacit skins \ paradigm, which is the first step in leading sustainable reform.
10 Luhmann, Niklas. 2007. The mirror to enable visualization, verbalization of these tacit skins \ paradigm, which is the first step in leading sustainable reform.
11 Luhmann, Niklas. 2007. The mirror to enable visualization, verbalization of these tacit skins \ paradigm, which is the first step in leading sustainable reform.
12 Luhmann, Niklas. 2007. The mirror to enable visualization, verbalization of these tacit skins \ paradigm, which is the first step in leading sustainable reform.
13 Luhmann, Niklas. 2007. The mirror to enable visualization, verbalization of these tacit skins \ paradigm, which is the first step in leading sustainable reform.
14 Luhmann, Niklas. 2007. The mirror to enable visualization, verbalization of these tacit skins \ paradigm, which is the first step in leading sustainable reform.
15 Luhmann, Niklas. 2007. The mirror to enable visualization, verbalization of these tacit skins \ paradigm, which is the first step in leading sustainable reform.
16 Luhmann, Niklas. 2007. The mirror to enable visualization, verbalization of these tacit skins \ paradigm, which is the first step in leading sustainable reform.
17 Luhmann, Niklas. 2007. The mirror to enable visualization, verbalization of these tacit skins \ paradigm, which is the first step in leading sustainable reform.
1-Single loop learning (Learning to adapt): skills the hand
Results in a change of strategy or tactics without questioning the underlying goals or assumptions. It helps to control individual behavior within existing decision-making protocols; provides short-term solutions to implementation problems and deals with symptoms more than root causes. The core question is ‘Are we doing things, right?’
This question asked by managers, this is what is meant by linear machine thinking

2-Double loop learning (Learning to change): knowledge the mind
By reflecting on goals and assumptions, one probes the generative mechanisms of problems, their underlying causes and their consequences. This leads to adjustments in strategy and to better mid- and long-term course corrections in response to contextual changes. The core question is ‘Are we doing the right things?’ This question asked by leaders

3-Triple loop learning (Learning to learn): Identity the heart|skin
By reflecting on the learning mechanisms, existing rules are challenged and possibly changed in ways that affect knowledge acquisition and behavior, i.e. by identifying different patterns of recognizing and handling problems or coping more effectively with contextual changes. The core question is ‘What kind of skin/ boundary that makes such things perceived as right to do? This boundary question can be answered by adopting phenomenological stance or critical system thinking stance. This diagram translates these three interaction loops as holarchy:

Fig. 3: Thinking at the level of boundary|skin is called triple loop thinking or system thinking, it can define what kind of signals recognized by such boundary. Living systems connected to each other through living skin or membrane according the level of organization. In social system, semiotic systems like language, icons used as boundary, as secondary skins. Reform in any domains of life should be careful for the power of language as boundary|skin. Without changing our language, we cannot be inside different world, different age. The language of our age is haptic language, language of network, integration, synthesis, synergy, love, connection, which all grounded in being touching and touched.

Fundamental shifts that led from machine age to system (wisdom) age?
1-Paradigm shift from Positivism to Phenomenology
The root of the crisis as we discussed before is due to Positivism, which function as ontological stance, that is, skin or boundary define what is valid epistemology from not. Positivism create symbolic boundary that receive only physical signals and described other kinds of signals as metaphysical. The organ that is used as the only trusted receiver is the eyes, the detached eyes, forgetting the biological fact that all sensory organs are part of the skin, they presuppose the tactile nature of the body that make perception perspectival and contextual. Thus, we can say that positivism is oculocentric paradigm that separate the body from the mind. Edmund Husserl in 1900 introduced his phenomenology as breakthrough, as paradigm shift from disembodied science to lifeworld-based science that
give primacy for the body as tactile medium uniting the subjectivity and objectivity into a lived experience. There is no lived experience without intercourse between the mental and physical. The mental side of the lived experience expressed phenomenologically as intentionality and semiotically as model. While the physical side of the lived experience embodied as expression and actions and interaction to fulfill this intentionality. The mental and physical are parts of complex adaptive system and the meaning is lived as event, as emergent phenomena. Adopting phenomenology as new paradigm is the guarantee that we will not bypass the skin as boundary that define our ontological stance, that is, who we are.

System thinking assume that we can be inside and outside the system, that is we can be aware of the kind of skin/clothes we are inside. The need for others or mirror is called by Husserl, intersubjectivity or empathy. Empathy as being inside the skin of others is the threshold concept in phenomenology and system thinking.

One of the intended learning outcomes in this paper is to understand the primacy of paradigm as symbolic boundary, symbolic skin that define our ontological stance, who we are, and where we are standing. Worldviews, mental models, mental frames can be used exchangeable with paradigm as boundary/skin.

According to Guba (1990), paradigms can be characterized through their: ontology (What is reality?), epistemology (How do you know something?) and methodology (How do we go about finding out?). These characteristics create a holistic view of how we view knowledge: how we see ourselves in relation to this knowledge and the methodological strategies we use to un/discover it.

2-Paradigm shift from machine world to lifeworld

Contemporary education suffered from chronic crisis. One of its symptoms is the teacher–student relationship which is still colonized by machine system paradigm, in which students reduced to objects, measurable behavioral outcomes (knowledge mind) and skill(hand) overlooking their attitude(heart) as they are subjective and beyond scoring.

According to the machine system model, you need to control and predict, keep order and quantify the nature, for this reason, everything should be reduced to experimental objects, if we want to be objective. What is bracketed in traditional scientific method is the subjective ethical aspect of the human being, his heart, his value, for the sake of objectivity and machine model. This discourse of objectivity resulted in teachers who don’t listen and students who don’t talk. Resulted in teacher centred pedagogy in which the teachers take the role of managers, bracketing their heart aside for the sake of control and prediction, they dehumanize the people to ensure their behaviors fit the orders and rules, fit their machine model that is inspired by behavioral psychology.

The problem of bracketing the lifeworld (intersubjective world) of the human being resulted in crisis not just in social system and personal life but also in ecosystem. This is clear enough to be seen as everyday encounter with others, at our current situation, we found this (crisis) evident in all these three dimensions. There is disconnection between human and nature, human and others and human and himself because of this colonization by the machine linear instrumental thinking.

This crisis is the natural outcome of this reductive, instrumental mind of modernity, which gave priority to rules, laws, control and domination over lifeworld, the world of shared meaning that create spiritual cement between people themselves and nature, also propriety to the world of quantity over quality, to the power to divide and manage rather than communication to unite and lead. Using hermeneutic phenomenology as discourse analysis expose the origin of this crisis which is rooted in the philosophical framework (paradigm), created by René Descartes, Newton and other philosopher of enlightenment, which become darkness through their Dualistic \ Machine\ materialistic Philosophy. This philosophy is the foundation on which scientific reductive thinking is built, in which the knowledge is reduced to only that is given physically and can be measured mathematically.

Practical steps in achievement of triple loop reform:

Fifth discipline and Theory U:

Working on developing faculties and students preparing them for the challenges of our information age led me to the best ever known model for leading profound change, triple loop reform that transform traditional organization into living 'innovative one which is called learning organization.

Peter Senge, the author of fifth discipline, and C. Otto Scharmer, author of Theory U, brought to our life unified, integrated system thinking approach that make us self-aware of our blind spot that determine the symptoms we faced at the visible shred world.

learning organization is embodied phenomenology, which can be reached using the power of Theory U (Presence) and fifth disciplines (system thinking) which prove to be able to lead a paradigm shift and triple loop transformation giving us the power to transcend the boundaries of the past mental models, our local culture to create space for the future letting come. These two programs guided by hermeneutic phenomenology can graduate student think globally to act locally, students with global awareness which is essential to be cosmopolitan.

The main premise in these models is derived from phenomenology in its call for bracketing our prejudget, prejudices, our past culture to see our future. Most models of change are susceptible to this problem of "downloading" habitual notions and tap into the state of "letting come". According to Peter Senge, "That's when presence occurs. We shift from repeating past patterns and mistakes to transforming the emerging future.

What is the fifth discipline?
“breakthroughs come when people learn how to take the time to stop and examine their assumptions.” Peter M. Senge.
The fifth discipline is the system thinking which is embodied in all parts which are should manifest the whole making them interdependent, meaningful and organized entity that can produce effective change, learning and living.
The core of this work is based upon Peter Senge five learning disciplines. These five disciplines come together to form a system (a whole).
The outcome of this system is learning organizing on the level of individual, the team, and the organization.
Peter Senge defined learning organization as: continually expand the capacity to create desired results, nurture new and expansive patterns of thinking, set free collective aspiration through enabling people to continually learn how to learn together. Learning organizations are fundamentally different from traditional authoritarian “controlling organizations.” Rather, they excel by tapping people's commitment and through capacity to learn at all levels in an organization.
By transforming our university, college into learning organizations human capital can adapt in order to survive the 21st century and beyond. They can learn to learn not only in order to survive as a species but mainly to maintain their societal role and significance. Learning organization is embodiment of autopoiesis and phenomenology.

What are these five disciplines?
1. Personal Mastery is the discipline of continually clarifying and deepening our personal vision to create the results most desired.  
2. Mental Models are deeply ingrained generalizations and visions influencing how we see and understand the world and how we take action. 
4. Team Learning is the transforming conversational and collective thinking skills, so that groups can reliably develop intelligence and ability greater than the sum of individual member’s talents. 
5. Systems Thinking integrates all five disciplines, fusing them into a coherent body of methods, tools, and principles, all oriented to looking at the interrelatedness of forces, and seeing them as part of a common process.

In summary, Peter Senge created the model of learning organization to foster systems thinking that needs the disciplines of building shared vision, mental models, and personal mastery to realize its potential. Building shared vision fosters a commitment to the long term. Mental models focus on the openness needed to unearth shortcomings in our present ways of seeing the world. Team learning develops the skills of groups of people to look for the larger picture that lies beyond individual perspectives. And personal mastery fosters the personal motivation to continually learn how our actions affect our world.

Lastly, systems thinking makes represent the new way individuals perceive themselves and their world. At the heart of a learning organization is a shift of mind - from seeing ourselves as separate from the world to connected to the world, from seeing problems as caused by someone or something ‘out there’ to seeing how our own actions create the problems we experience.

Theory U as a Social technology lab.
In each institution, organization, they need to build U -lab to ensure cultivation of system thinking as mode of being, shared vision, shared skin. Otto Scharmer the author of Theory U which integrate the phenomenology, complexity science and system thinking in innovative way which become leading force of change worldwide.
At the core of the “U” theory is presencing: sensing + presence. Presencing is a journey with five movements: We move down one side of the U (connecting us to the world that is outside of our institutional bubble) to the bottom of the U (connecting us to the world that emerges from within) and up the other side of the U (bringing forth the new into the world).
Peter Senge work is the best guide and resources for manger and leaders, his work addresses the macro -level of life as team, as organization. This project of learning organization needs a work at micro-level, individual cultivation, which is offered by this brilliant system thinking theory which is essential resource for coaching.
In this ground-breaking Theory, Otto Scharmer invites us to see the world in new ways. Fundamental problems, as Einstein once noted, cannot be solved at the same level of thought that created them. What we pay attention to, and how we pay attention - both individually and collectively - is key to what we create. What often prevents us from attending is what Scharmer calls our blind spot, the inner place from which each of us operates. Learning to become aware of our blind spot is critical to bringing forth the profound systemic changes- triple loop changes- so needed in business, education and society today. By moving through the "U" process we learn to connect to
our essential Self in the realm of presenting - a term coined by Scharmer that combines the present with sensing. Here we are able to see our own blind spot and pay attention in a way that allows us to experience the opening of our minds, our hearts, and our wills. This holistic opening constitutes a shift in awareness that allows us to learn from the future as it emerges, and to realize that future in the world.

Theory U is applied phenomenology moving from skin as perceptual stance to actions as presencing, semiotic stance. That is why sensing matters. It’s about awakening the collective skin, our natural skin, that is what the sensing journeys do. The U-Process comprises three primary phases:

**The skin level, the Sensing**—uncovering current reality by expanding and deepening awareness; **Presenting**—retreating and reflecting to enable individual “inner knowing” as a foundation for collective commitment; and **Realizing**—generating a new reality through rapid-cycle prototyping, piloting and implementation of breakthrough ideas.

**CONCLUSIONS**

The sustainable reform of the educational crisis which is outcome of being inside the skin of 19th century while we are living inside 21st century cannot be achieved by changing the structure or or process. The change should be started from the boundary that make us inside visual culture, still worship the images rather than the concepts. We are in the conceptual ages, the age of wisdom in which only those who can read the absence in the present can survive. What we need to survive is the cultivation of system thinking as relational paradigm, that is, skin, making us whole and part of whole, making us in touch with life rather than imprisoned in the past, that looks at pattern rather the things. Pattern recognition is sign of presence of system intelligence which can ensure adaptivity and lifelong learning. Thus, the intended reform should be transformational ( triple loop change ) rather than just adaptation, ( single loop changes ) in which the effort is paid to disciplinary knowledge and skills. The practical steps to achieve such reskinning is using U-lab as place for self\skin-awareness and cultivation of 21st century skills: critical thinking, system thinking, communication, collaboration and creativity using different strategies like paintings, theatre, cinemeducation relevant to the intended outcomes. All these changes can be included in a medical humanity course. These tools should be carefully selected and introduced to bypass the immunity to change, the hypersensitive boundary \skin which can become disengaged. Paradigm shift is embodied as new identity, new mode of being, new attitude, new skin, new habitus.

In this paper, I showed that conditions that make reform sustainable and transformative is by giving primacy for language of touch, the dermatosemiotics rather the language of eyes (oculosemiotics) which create distance and detachment. Changing the language is one of the paths to change our skins.

Most reforms failed due to unawareness of the kind of skin that connect the system to the external environment. Most social organization-like universities and colleges still wearing the skin of Newtonian mechanics which make static and outdated and hence unable to cope with rapid changes and complexity of 21st century which demand an active adaptive semiotic skin that make them in touch with everything meaningful for the system.

Sustainable, lifelong change should be started at the level of paradigm \skin that define what kind of system we are, static or adaptive, machine or living system.

In this study, I disclosed the root cause of pathology that created the disconnection between human and nature, human and others, and human and himself is the machine skin of modernity. The first disconnection resulted in ecological crisis, the second in social and political, economic crisis and the third one resulted in spiritual crisis.

The pathology is due to wearing the skin of positivism which is reductive, linear and binary skin producing the machine \industrial age which is embodied as analytical, habitus resulted in disembodied science and culture.

The radical therapy offered by Edmund Husserl (1859-1938) as anti-dualistic paradigm that give primacy for touch, the lived experience in which the mind and body are function as autopoietic process rather than solid substances.

Lifeworld is the threshold concept in Husserlian phenomenology to ensure the primacy of touch, the meal rather than the menu, the linguistic models. Husserlian phenomenology translated into different names, like transcendental phenomenology, interpretivism, social constructionism, hermeneutic phenomenology, lifeworld reflective approach and I add another new name, I call it dermatosemiotics.

Shifting the paradigm from positivism to phenomenology, is shifting from the primacy of eyes \observation, that is, disembodiment, to the primacy of touch/semiotics that is, embodiment. Phenomenological stance ensures viewing reality as complex adaptive process, connected by living boundaries, boundaries inside boundaries responding to different kinds of signals rather than solid independent substances. making later shift founded and legitimate like the shift from machine \linear thinking to lifeworld system thinking, from management to leadership, from instrumental mind to communicative mind, from I-it to I-you relationship, from pedagogy to Heutagogy.

**REFERENCES**

