"WE KNOW IT IS REAL": HARVESTING CONSCIOUSNESS WITH A DESCRIPTIVE INFORMATION SYSTEM

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Abstract

How can an IS help enact scientific research, based on the descriptive, transcendental phenomenological method, affording the assessment of child psycho social emotional development, from therapist daily treatment notes, in a way credible to the concerned professional communities? We look at the overlap between subjective and scientific, in constructing an ad-hoc *IS, by applying Amedeo Giorgi's scientific descriptive phenomenological method to the investigation of human consciousness, elaborated from Edmund Husserl's transcendental phenomenology. We use Giorgi's method, in our case study search, for scientifically assessing evidence, on the validation of the clinical treatment. Illustrating socio-technical issues involved in the sophisticated organisational intervention, for the adoption of the technical infrastructure. Changing the clinic's formative context (Ciborra 1994), in "therapeutic" co-construction with users, beyond participatory design (Jacucci 2007, Martin & Jacucci 2008). Key in performing: technically, is the choice of the very scale used in clinical treatment for describing child development, as scaffolding structure supporting therapist expression in reporting; organisationally, is merging all therapists into a community of practice, and exploiting the web of shared understanding developed in their intersubjective dialogue. Our methodology of scientific investigating therapists' notes, provides a subjectively derived, scientific assessment of the clinical treatments practiced.*

Keywords:transcendental phenomenology, descriptive information systems, qualitative research, assessment.

INTRODUCTION

The paper describes a case study based research, on how to design an information system, and how to perform the accompanying IS adoption research intervention project, to promote consciousness events in, and harvest consciousness content from, a group of professional operators; on objective facts, pertaining to their profession; while granting methodological conditions, for scientific research conduct and results; and socio technical attention points, for promoting, respecting, not influencing, the subjective judgement of the operators involved. These operators are occupational therapists and psychologists of a paediatric clinic practicing a method based clinical therapy for children with differences in psycho social development.

The *information system* is to promote and capture therapist *consciousness events and content,* reported in daily treatment notes redacted immediately after clinical sessions. The objective is to elicit therapists *subjective assessment* of the developmental progress of children under longitudinal treatment, hence assessment of the value of the clinical practice performed. And to do it in a scientifically based way, to complement, and compare with, current objective measurement studies.

Doing it while granting methodological conditions, for scientific research conduct and results:

- Scientific relevance in harvesting therapists' consciousness is granted with Giorgi's *descriptive phenomenological method* (Giorgi 2009). Correct application of Giorgi's scientific method - developed for psychology research -, applied to *data from another person,* including confirmation from peers, renders the assessment of objective value.
- A detailed *description scaffolding structure,* to be used by therapists in composing their daily treatment notes, was first developed, to address therapists attention during their reports, to child development evaluation and assessment tasks, cleaned from personal bias.
- The description scaffolding structure entailing a sequence of preordered text-writing boxes, carrying a meaningful title, describing the bit of information - pertaining to single aspects of child development - to be freely expressed in each text box, with qualitative remarks.

- Each section of the scaffolding structure asks for the expression of a quantitative evaluation of progress, in terms of a Likert[1] scale, for simplified data comparison and averaging.

Cultivating socio technical theory attention points:

- Obeying *ethnomethodology* requirements (Garfinkel 1967), the language used in the description scaffolding structure of the information system, to support therapist accounting of their evaluations and assessment, is chosen to be the same as the language used by therapists in their clinical practice.
- The appropriation of the habit of using the description scaffolding structure meaningfully and uniformly, is enacted in the clinic *community of practice* of therapists (Wenger 1998), through the establishment of a *web of shared understanding* (Baskin 1999) of its meaning and function.
- Reaching the assessment goal with the innovative IS requires a change in the *formative context* for action (Ciborra 1994) of the clinic therapists, who are otherwise unused to express their evaluation of child development progress in their routinely reports - traditionally limited to recording therapeutic activity performed, and child reactions -. With the suppor of an external *reflector*.
- Through the *social practice design* approach to organisational intervention (Jacucci 2007), entailing the presence of an external agent in the role of *counsellor* (i.e., Ciborra's *reflector*), a formative context change facilitator. Promoting therapeutic, co-construction conversations with therapists, to identify problem issues be addressed (how questions) and hints on how to make use of own strong features towards progress (visions of solution).

The paper contains new and significant information on how to design an information system, and how to perform the accompanying IS adoption research intervention project, to promote consciousness events in, and scientifically harvest consciousness content from, a group of professional operators, about the assessment of objective facts pertaining to their profession. The main points on research, for the IS audience: w.r.t. *theory,* they consist in reverting research attention to Ciborra's formative context, and to Jacucci's social practice design. While Giorgi's descriptive phenomenological method is only used. W.r.t. *methodology*, they consist in reverting research attention to the use of an appropriate, qualitative and semi-quantitative, description scaffolding structure, as the base for IS recording and elaboration; and of a Likert scale to transform qualitative data onto quantitative language. While Garefinkel's ethnomethodology, Wenger's community of practice, and Baskin's web of shared understanding, are only used. Theory, methodology, results and discussion of their value, is presented along these lines, in sections to follow.

1. THE CASE STUDY: Assessing *DIR* practice with Phenomenology

This case study is hosted at the Joy Center (www.dirsi.org), an American paediatric clinic for children with special needs, of English speaking military families from NATO bases in Italy.

What we do. In this clinic, we extract evidence from internal reports, about the proficiency of children under treatment, recorded by therapists on the clinic accountability, information infrastructure. Towards the assessment of the treatment practice performed.

Approach. With Giorgi's descriptive phenomenological method (Giorgi 2009), we construct methodically the evidence that we bring, in a way described in the *Methodology* section. The process entails considering aspects of human consciousness, in gathering, the evidence expressed by therapists in internal reports, and in extracting, by researchers, evidence from those reports. The respect of coherence of meanings of clinical treatment concepts, in the therapists consciousness, requires the establishment of *a web of shared understanding* (Baskin *et al.* 1999)[2], in *the intersubjective dialogue*[3] (Stern 1985) of the *community of practice*[4] (Lave & Wenger 1991, Wenger 1998) of therapists. This requires the sociology of organisations.

Research process. After the initial, establishment phase of the research intervention, the case study investigates the recording in the IS, of therapists daily treatment notes during, a period of three months, 5 therapists were involved, with 15 children on treatment each. The overall meaning of the data, contained in the collection of reports gathered, is carefully extracted, providing an assessment of the effectiveness of the clinical practice. The resulting evidence is found to be clear and unambiguous.

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[1] The Likert scale is a five (or seven) point scale which is used to allow the individual to express how much they agree or disagree with a particular statement

[2] *Web of Shares understanding* - the semantic patterns of connections among data items, process definitions, and other patterns which give meaning to the data items along with the ability for communication and storage.

[3] *Intersubjective Dialogue* - - shared meanings, in people interactions with each other, constructed to interpret events in the same way in their social life; an exclusive environment of shared understanding and complicity.

[4] *Community of Practic*e - a group of people who share a craft or a profession

Focus. This paper merges concerns of science of being general, systematic, critical, controlled, for being acceptable by the research community; with sophisticated tenets of the social study of Information Systems, concerning meaning rather than function. Main perspective and focus is on the resulting features of the *ad-hoc* IS. So that arguments and discussion presented mostly address socio technical design approaches, and socio cultural aspects of the accompanying organisational intervention.

Theory of Organisational Change. As of today, the clinic therapists do not have the habit of putting the assessment of the efficacy of their treatment practice at the center of their concerns in writing daily treatment notes. So, we need change the context of therapist note editing practice of the current clinic activity, in terms of norms, routines, and interpretation schemes. What we know today, on how to go about performing this change, is described in the *Theory* section.

Research question."How can an IS help enact scientific research based on the descriptive transcendental phenomenological method, affording the assessment of a child psycho social emotional development from therapist daily treatment notes, in a way credible to the concerned professional communities?" This *research question* came up during the research intervention project for innovating the mentioned paediatric clinic, treating special children with psycho social emotional developmental differences, with the *Developmental, Individual differences, Relational (DIR)* (Greenspan &Wieder 1997, 1998, 2006) method based clinical practice. Giving rise to the case study on the above research question.

1.1. *Using continuous video recording observation*

The clinic therapists normally enact micro level observation of child behaviour. Child observation is described in a meaningful way by psychologist and researcher Daniel Stern (Stern 1977, page 2):
"*The observations on which this book was based began in the late 60s. At the time only a handful of people were observing parent-infant interactions, especially naturally occurring ones, in minute detail. Such close observations had only just become possible, thanks to the new availability of portable television and movie cameras that were reasonably priced and not impossibly heavy. TV became the new microscope for seeing behaviours that passed in a split second. You could look in slow motion, freeze a frame, review as often as needed. A fascinating world opened up - a small world, but the foundation for so much else. When you have the opportunity to be among the first people to see a new world, many of its surprising features are striking enough that they force you to reevaluate your preconceptions. You quickly grasp a new perspective and new realities, such as the fact that nonverbal behaviours like those observed in animal ethology - a head pushed forward, or tilted up, or turned away rapidly to the side and down -, need to be the starting points for observing human social behaviour. This original perspective and the ideas that it gave me have played leapfrog with the ideas of many others over the years … Unexpectedly, the people that were originally most interested in these kinds of observations, were choreographers and dancers.".*

1.2. *Child Development*

A child's personality is the product of the continuous and unique interplay between "nature" and "nurture", in the interaction with parents. A dramatic difference can be made by parents, in the way the child can make use of her natural abilities, often wonderfully different (Greenspan & Salmon 1995). The child is thirsty of being present and participating. She learns everything from her early experiences. We have come to know in recent years that in her early months and few years, she learns new abilities mostly from relating to people, other than interacting with objects of the world, so that nurturing the baby on the part of her caregivers, is essential for social and intellectual growth. Emotions she feels in her experiences of relating, during nurturing, provide motivation, perform as catalyst, and act as glue on her neurons, for capturing, consolidating, and developing. Communication - that always consists in both content and relation - with her caregiver, is more relation than content. Nonverbal and words elements exchanged, enmesh feelings, rather than pieces of information. The opposite, with respect to words in a book. Communication acts flourish in their private, exclusive environment of shared understanding, of complicity: it is an *intersubjective dialogue*. When this is insufficiently present, therapy needs to resume and substitute for, as precisely that, is the process needed: *intersubjective dialogue*. Development never stops, this mechanism works for school age children, teen agers, even adults (Brazelton & Greenspan 2000).

1.3. *DIR: A Developmental, Individually differentiated, Relational" method*

DIR (Greenspan & Wieder, 1997, 1998, 2006; ICDL 2019), is one of the most promising methods available as a base of clinical practice, for children with psycho social emotional differences. Connection between parent and child is key in the *DIR* approach to clinical treatment of children with psycho social emotional differences. In this approach, child development is marked by successive milestones indicated by Functional Emotional Development Levels (FEDL: see http://www.icdl.com/). Here more than ever human communication is both content and relation (Bion 1961, Watzlawick et al. 1967).

2. THEORY OF ORGANISATIONAL INTERVENTION FOR CHANGE

In practice, we need the clinic therapists to intentionally address, in their notes, the assessment of the efficacy of their clinical practice. Something they do not currently do. We need change the cultural context of their reporting practice: norms, routines, interpretation schemes, without forcing their intention.

Harold Garfinkel's Languaging. A key issue regards the *language* to be promoted and used in the assessment section of therapist reports. The point is best stated by Harold Garfinkel on ethnomethodology: "*The following studies seek to treat practical activities, practical circumstances, and practical sociological reasoning as topics of empirical study, and by paying to the most commonplace activities of daily life the attention usually accorded extraordinary events, seek to learn about them as phenomena in their own right. The central recommendation is that the activities whereby members produce and manage settings of organised everyday affairs are identical with members' procedures for making those settings 'account-able'".* (Garfinkel 1967, page 1). In our study, the scale used to describe child development (account), will be the same as the clinical treatment scale (manage).

Claudio Ciborra's Formative Context. We are here addressing issues of organisational interventions crucial for their efficacy, by illustrating their essence in this case study. It is an application of Claudio Ciborra's paradigm of leveraging double loop learning (Argyris and Schön 1978,1996)) to overcome the limitations of the extant *formative context,* and promoting its evolution. From Ciborra's paper (Ciborra 1994; Ciborra 2009, page 169) :*"The formative context is the set of the pre-existing institutional arrangements, cognitive frames and imageries that actors bring and routinely enact in a situation of action (Unger, 1987). A formative context comprises both an organisational and a cognitive dimension and has far-reaching, subtle differences: It constitutes a background condition for action, enforcing constraints, giving direction and meaning, and setting the range of opportunities for undertaking action. Though a formative context provides the ground for routine execution and influences the creation of new routines, actors are usually not aware of the formative contexts that inform their practical and argumentative routines. They tend to take them for granted, except in the case of major breakdowns (Bateson,1973; Garfinkel 1967; Schutz 1960)."*

On overcoming limitations in the formative context. Claudio Ciborra indicates explicitly (Ciborra 2009, page 181, and following) the nature of successful *intervention* for innovation: help change the formative context while designing and introducing novelties. For Ciborra, the condition for successful organisational *interventions* for innovations is the *"...facilitation of changes in the right direction, of the formative context ..."*. Then he asks: *"How can people deal with the design of formative contexts?"* Answer: *"One can change formative contexts only by intervening in situations. Intervention, as we propose it, is a strategy of action to come to grabs with the pasted-up nature of contexts, both cognitively and institutionally. Practical intervention in a specific organisational setting challenges the institutional arrangements and the cognitive imageries on which established routines are based. It aims at creating conditions that help people question and gain insight into formative contexts, while actually designing or executing routines in situations. It is a sort of analysis-in-action."* Requiring the intervention of an external facilitator: *"Being often difficult or impossible for people to conduct an inquiry of this kind while they are engaged in designing, the presence and activity of a 'watcher' or 'reflector' become crucial for intervention and designing-in-action. The reflector-who is a designer in his own right-helps designers and users to carry out evaluative and reflective functions on their own ways of thinking and acting in the design process."*

Organisational Intervention. Two independent organisational socio-technical intervention approaches were developed in the years 2000-2010, one in Italy, strongly influenced by the thought of Claudio Ciborra, at the Social Study of Information System Laboratory of the Sociology School of the University of Trento, teamed *Social Practice Design* (SPD) (Jacucci 2007); the other in Great Britain, in the Centre for Social Informatics of the University of Newcastle, named *Intervention* (Martin et al 2009).The researchers of these two schools came in contact and recognised their similarity of their unique approaches. It is remarkable how parallel their paths had been over a few years. If one were to identify the differences in theoretical emphasis, one would point to the influence of Bateson (deuteron learning, 1973) and Bourdieu (second step back, 1992) on one thinking, in contrasts with the use of Ciborra on the other, but the methodological and practical conclusions are very similar. The emphasis of co-productive therapeutic relationships is the same.The two schools eventually merged their approaches in joint research in the socio-technical domain (Martin & Jacucci 2008), whose basic tenets are illustrated here below. It all amounts to envisage what we are calling a therapeutic co constructive, client consultant relation, in research intervention, to promote deutero learning in an organisation to modify its formative context in desired, necessary ways. Modifications of the formative context, apart from occasional breakdowns, needs to be brought in by external consultants, Ciborra's *reflector*, as the organisations managers alone can't. This happens in an SPD intervention, where a blend of socio-technical insight (Claudio Ciborra 1996) with counselling to client (Carl Rogers 1951, 1969, 1980), generates the dialectic process between *How questions* (how can we solve this problem); and *Visions of solution* (Jacucci 2007), that produce organisational

learning, by developing the *therapeutic* co-constructive relation between *Counsellor* and *Client e*nabling innovation of the formative context .

Social Practice Design. SPD is a form of intervention research based on counselling. It can be considered an extension of Participatory Design (PD) approaches to the implementation phase of information systems. It regards the concept and participative introduction of new things to do, or of new ways to do things, by humans, in order to make place for technology (Ehn 2006), and in order to resolve a variety of other pending social problems in organisations (Jacucci et al. 2007; Cattani el al. 2007; Jacucci et al. 2008).

3. METHODOLOGY

"How can an IS help enact scientific research based on the descriptive transcendental phenomenological method, affording the assessment of a child psycho social emotional development from therapist daily treatment notes, in a way credible to the concerned professional communities?" We answer this research question by verifying applicability of Amedeo Giorgi's descriptive phenomenological method (Giorgi 2009). In a case study with participant, interpretive, qualitative methodology, enacting a list of crucial attention points. Basic features of the situation:

a) the phenomenon to be studied, child psycho social emotional development, is to be observed and evaluated by her therapist, and later analysed by the researcher - IS designer
b) evaluation data is to be reported by each therapist, for each treatment session, and for each child
c) the data is to be gathered continuously in the clinic IS, for comparison and statistical averaging
d) the data is to be analysed by the researcher for overall meaning, both for the treated child development in time, and for the average impact of clinical treatment over patient population, with procedures invented by the IS designer, embodied in the IS structure and functions.
e) the outcome is to be meaningful to the professional communities interested in the assessment.

3.1.*Relying on therapist assessment*

Science endeavours to establish the most stable knowledge possible about the phenomena of the world. In natural sciences this is done gathering evidence in dialogue with nature. A radical shift occurs, in human science, when humans and their relationships replace things and processes. Humans introduce some qualitative things that bear new problems. Consciousness is not a minor one. The difference between *Subjective* and *Objective has been* crucial for a long time in philosophy, but has become blurred with the advent of last century phenomenological - if not constructivist (Bateson 1973) - epistemology. The evaluation of real world facts (even if reported) resides at last instance in a *human consciousness*,, rather than in the *objective world*. In our research, we need assess scientific merit evaluating *the scientific evidence of facts in human consciousness.* For this, we revert to Husserl's *transcendental phenomenology* (Husserl 1982); we choose the version modified by Amedeo Giorgi (2009) to extend the evaluation of evidence to scientific method. From the beginning, phenomenology - a philosophical method for investigating the structure of consciousness, and the type of objects that present themselves to it - addressed epistemological issues. Standards for scientific evidence vary according to the field of inquiry, but the strength of scientific evidence is generally based on the results of statistical analysis and the constraint of scientific controls.

3.2.*Giorgi's Descriptive Phenomenological Method*

Scientific, objective evidence requires method, systemic approach, generality, and statistics; as well as control and critical thinking. To treat evaluations of child behaviour, we apply:

- Method: A systematic, general scaffolding structure, for qualitative evaluation and comparison
- Critical dimensions: Based on avail by all of concepts of treatment method practiced in the clinic
- Control: Detailed, single subject comparison of child behaviour in time, also to assess progress
- Statistics: Qualitative data turned into numbers, multiple children/therapists, more control
- *Likert scale* sharing and appropriation by therapists, providing intersubjective dialogue control.

Psychology can be founded scientifically, based on Husserl's phenomenological philosophy (Husserl 1982), as a science of subjectivity able to keep the "specifically human" at its inside (Giorgi 2009). By performing methodical, critical, systematic, and general research, while using a descriptive approach, founded on intuition, detail, and intersubjective validation (Applebaum 2011). It uses as input data facts reported by another person, in natural attitude. The researcher assumes the following intellectual postures:

A phenomenological attitude (look at essence of the phenomenon of conscious experience)
Transcendental reduction (value conscious experience facts, not presumed underlaying real)
Epoché (put in parenthesis all past knowledge on the phenomenon)

At first encounter, it is amazing (see e. g., James Morley's seminar on YouTube (2019):

Should always bring out what is already there. To lay it out. To grasp the meaning

Make explicit what is implicit. To open up, unpack or bring forward. To bring to light , illuminate. Make visible what is invisible. To give voice to what is silent.

Developed for psychology, methodical, to found psychology as a science (Giorgi 2009):

It is a scientific Psychological Method, not constructed following natural science criteria
Based on careful description of the phenomenon and formulation of a researchable question
Data collection: Written protocol and/or interview (data is reported by another person)
Data Analysis: part-whole analysis of description
1. Read for sense of whole. (look for invariants of meaning, look for average behaviour)
2. Assume phenomenological attitude (focussed on phenomenon essence, epoche',reduction)
3. Break into Meaning Units (articulate the structure).
4. Explication of meaning (heart of the method, general result). Situated Structure
5. General Structure Description (generalisable claims, nomothetic - discovery of general scientific laws). Dialogue with literature and interpretation of results.

Transcendental phenomenology is scientific, being invented for scientific foundations of disciplines. The socio-technical field has seen excellent scholarship of high scientific rigour from non objectivist stance.

3.3. *Eliciting the list of* How Question *issues, & respective* Visions of Solution

In SPD; the co-construction conversations with the counsellor proceed in terms of the crucial points at stake, as well as their resolving steps forward. Ten issues are listed here, denoted with letters from i) to x): some of them are addressed just as research design choices, while most of them, obviously needing therapist involvement, are object of discussion and co-construction with the group of therapists in the clinic:

i) *How question:* The phenomenon is subjective, it resides in the consciousness of the therapist (point a), where the meaning of the original fact - observed child behaviour - takes form, and the stage of development evaluation is enacted. How can we extract objective data?

Vision of solution: ENFORCING HUMAN SCIENCE: for consciousness, we revert to Husserl transcendental phenomenology (Husserl 1982) indicating as appropriate the *descriptive approach at micro level* of child behaviour (Daniel Stern 1977, Introduction, page 2)

ii) *How question:* the evaluation is enacted and recorded by *another person,* in descriptive notes, as primary data (point b) reported to the researcher for phenomenological analysis. How can we extract objective data?

Vision of solution:ENFORCING SCIENTIFIC VALIDITY: revert to Giorgi's scientific, descriptive phenomenological method, affording scientific value to the result, with method, system, generality, critical, control (Giorgi 2009)

iii) *How question:* To enable analysis (point c) the therapist's subjective evaluation has to be expressed (point b) in terms of a reference developmental scale, and accounted with routinely used clinical treatment language. How can we?

Vision of solution: ENFORCING CREDIBILITY OF RESULTS: Garfinkel's ethnomethodology: the *accounting* language has to be the language of therapists practice (Garfinkel 1967)

iv) *How question:* Evaluations must be expressed with very same reference developmental scale (point c).

Vision of solution: ENFORCING CONTROL FROM PEERS: common language & reference scale

v) *How question: T*he expression of the evaluation of observed child behaviour of qualitative nature has to be translated in a form affording seamless procedures for comparison and averaging (point c).

Vision of solution: ENFORCING STATISTICAL RELEVANCE: from qualitative language to a sensitive, quantitative language: we revert to the *Likert scale*

vi) *How question:* The intended analysis procedure on the data (point d) is to be crystallised onto IS functions and elaboration features.the intended analysis procedure on the data (point d) is to be crystallised onto IS functions and elaboration features.

Vision of solution: USE ACTABILITY FOR EXTRACTING THE OVERALL MEANING: take up the *Language* A*ction Perspective* (LAP) in developing IS (Goldkuhl & Agerfalk 1998)

vii) *How question:* The overall process performed with the IS has to satisfy credibility measures and validity indicators of the interested paediatric educational and medical communities (point e).

Vision of solution: CRITICAL THINKING: results need be shared in the research community (Giorgi 2009)

viii) *How question:* Points iii), iv) (for points b, c) call for the *web of shared understanding* (Baskin *et al.* 1999) among therapists, of concepts of treatment, and language for description of child behaviour.

Vision of solution: ENACT A COMMUNITY OF PRACTICE among them (Lave & Wenger 1991)

ix) *How question:* Points iii), iv)(for points b, c) call for shared understanding between users, and designers, of concepts/structures of treatment method, of language expressing description of child behaviour.

Vision of solution: ENACT A PARTICIPATORY DESIGN project (Boedker, Kensing and Simonsen 2004)

x) *How question:* Again (for points b, c), the intervention goes *beyond participatory design*: therapists, and IS designers, introducing the IS, need enable therapists to access *ex novo,* and routinely enact the

appropriate description of child behaviour, and the appropriate evaluation of development stage: something they are not used to (Martin & Jacucci 2008; Jacucci 2007; Martin *et al* 2009).

Vision of solution: CHANGE THE FORMATIVE CONTEXT of the clinic (Ciborra 1994): enact a *Social Practice Design* intervention (*SPD)* (Jacucci 2007) to establish *new action meanings* in the organisation.

4. SCALE AND STRUCTURE OF THE SCAFFOLDING TOOL

4.1. *A key element in the experiment: Daily Treatment Notes (DTN)*

In the starting phase of the research intervention, special *Daily Treatment Notes (DTN)* were developed at Joy Center. Our *DTN* are computer based artefacts, routinely used in accounting session activity and outcome into the information infrastructure of the clinic, including a non standard section, determining the stage of development reached by child. We report and discuss method and findings of the scientific phenomenological investigation of the case study, based on facts live in the subjective consciousness of the clinic therapists, reported in *DTN,* regarding the progress of children under their clinical treatment care. Central to our investigation, is the special, *slotted structure* of our *DTN,* allowing to capture therapist genuine meanings on detail bits of child development, while respecting original facts of their consciousness. And, all *DTN* are routinely accessible to all therapists for reference, discussion, and shared understanding. They are employed for the assessment of clinical treatment impact, on the population of children treated at the clinic. Their design responds to the numerous socio cultural requirements of the Methodology section.

4.2. *Aspects of using special DTN as description Scaffolding Structure*

The phenomenon to be studied: *child psycho social development,* in its essence. The phenomenological intentional object: child development progress in time, during clinical treatment. Natural description comes from therapist report: a complex research situation, called in psychology *"data taken by another person"*. As analyses, meaning discrimination, intuition into crisp data, take place in the consciousness of researchers, in phenomenological attitude. The *DTN* structure enforces the methodology in gathering facts from therapists consciousness, making facts available to researcher consciousness. The *connection* between *DTN* structure, and intended methodology is the intellectual epistyle, architrave component, of the study. We provide detailed information on our *DTN,* to invite the use of it in other studies, as scaffolding conceptual structure. The key point is, that the analysis process is foreseen ahead of time, prefabricated and crystallised into the (original *DTN* structure of the) *ad-hoc* IS. The IS limits itself to record bits of therapists descriptions in appropriate pre prepared slots, as pre analysed data. Part of the analysis is software automated. Attention point: coherence in, and between, both actors consciousnesses, requires that:

I. Therapists collect data with natural, not phenomenological, attitude. Unaware of use of report to assess positive impact of treatment. Reports are routinely fulfilled requirements of their practice
II. Report writing be supported by a general systematic scaffolding structure, supporting report description of phenomena; allowing later enacting of phenomenological attitude by researchers
III. Capturing the essential features of the phenomenon (phenomenological attitude), while bracketing contingent facts (transcend, reduction), with no reference to expectations (epoché)
IV. Systematically allowing methodical parsing of the whole into fine units, affording the extraction of invariants (average behaviour), in action by any researcher, or therapist, on any child
V. Facilitating reassembling of the discovered meanings of the data, into general conclusions of *eidetic*[5] nature; affording replication of the analysis in different contexts, for comparison.

A delicate aspect: the structure interrogating therapist consciousness be rooted in the shared understanding of all therapists, as part of their clinical treatment, not made of management chosen concepts. The finer step structure is *co-constructed* by therapists, part of organisational practice[6]. The predication (Giorgi 2018) of facts of consciousness, is expressed with routine elements of evaluation of child development, from the very method of their clinical practice. The methodology is implemented in the *ad-hoc* IS via the *DTN* structure, described below in detail. The *DIR"Functional Emotional Development Levels"* (FEDL) scale (Greenspan & Wieder 1997) routinely used in treatment is perfectly appropriate for helping therapists report child development stage. Concentrates on essential aspects, brackets natural facts, does not reference past experience. It allows methodic, well articulated and systematic research, crisply meaningful, of general applicability. We base our scaffolding structure on FEDL - at corse grain - as already

[5]*eidetic* - as mental images having unusual vividness and detail, as if actually visible.

[6]This is an element of *Critical Systemic Thinking* in socio-technical approach, long noted by Bednar & Welch (2012, p. 146) " … social practice design involves efforts to support participating organizational actors to become change agents in their own environment. This provides a possibility for participants to create visions about problem solving and thus share in ownership/visions of solutions …"

present in therapists consciousness. We further subdivide each scale steps in a number (seven) of finer qualitative descriptions, for increased sensitivity, capable of signal-ing progress of smaller entity. Finer qualitative descriptions have been communally defined by therapists, to ensure shared understanding and appropriation, and granting authentic expressions. The Likert scale mimics quantitative analysis, seamless comparison and averaging, in standardised data formats.

4.3. The *DIR "Functional Emotional Development Levels"* (FEDL) scale

The Child Development DIR Scale. We assess a specific developmental method (*DIR*) based practice exhibiting a *child development scale* as conceptual architrave. In future studies, in assessing impact of a non developmental method, one may lack a naturally available scale of development, and might revert to the *DIR* FEDL scaffolding structure. The *DIR* FEDL scale exhibits six main levels:

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"Level 1 - Self regulation and attention
Orienting, registering sensory information (touch, movement, visual, auditory, muscle sense, olfactory, gustatory).
To support readiness for relationship, therapeutic activity, safety, ADL's.

———————

Level 2 - Engagement and relating
Awareness of emotional communication within relationships.
Ability to share positive emotions (facial expression, gesture, vocalisation).
Ability to share negative emotions.

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Level 3 - Purposeful two-way communication
Use of Affect to convey intent- two way communication (facial expression).
Capacity for emotional self-efficacy.
Responds to your gestures, initiates interactions with you, rhythm and pacing evident.

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Level 4 - Social problem solving
Continuous emotional and gestural signaling involving multiple sequences of actions.
Incorporates facial expression, body language, tone of voice, gestures, visual referencing.
Develops personal responsibility in social interactions.

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Level 5 - Using symbols and creating emotional ideas
Creates and ideas and emotional themes during interaction and play.
Ability to use vocabulary of emotion.

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Level 6 - Logical thinking and building bridges between ideas
Connects emotional ideas.
Can elaborate and reflect on actions.
Aware of time.
Can play games with rules.
Reflects on their own feelings.
Gives opinions and reasons for feelings and actions.
Uses logic.

———————————-*"*

The *DTN* Likert scale details any one FEDL step of child behaviour with values from 1 to 7:
1 - Not reached.
2 - Barely even with support - very intermittent in and out.
3 - With persistent and/or predictable support has islands of this capacity.
4 - With structure and scaffolding, given high affects, gestural, language, sensory supp. can expand.
5 - Not at age expected level, immature, fragmented, may be cyclical but comes back for more.
6 - Age appropriate level but vulnerable to stress and/or a range of affects.
7 - Age appropriate level with full range of affect states.

4.4. *DTN* structure

Daily Treatment Notes (*DTN*) at Joy Center consist of descriptions and predications of various aspects of child behaviour in the session, including assessment of development stage status and plan for future treatment, compiled by the therapist in charge for documentation and later reference. *DTN* support seamless, streamlined compilation. Are routinely accessible to management, and to all therapists. As base for intersubjective dialogue, sharing and continuous training in their community of practice, and supervision by

mentors. And, for extracting clinic accountability information to parents, insurance company. *DTN* help researchers reading of the consciousness of the reporting therapist. Encourage open, volunteered, expanded comments allowing critical thinking, and control. Yet incorporate a scaffolding structure, enforcing method, system, generality, completeness. Direct inspection shows that the methodology described satisfies Giorgi's science requirements. Below, we first describe the *DTN* scaffolding structure, that helps assess child development stage. Then we give a full example of *DTN*, including comparison of sessions 3 months apart, to compare tone and content of predications of child behaviour, looking for positive impact of treatment. To show how descriptions of development stage, make sense for assessing impact of clinical practice.

The *DTN* scaffolding conceptual structure is parsed into five chapters, showing itemised sample commented entries (varied as needed), articulated in parenthesis in sample sub-entries (varied as needed). For each sub-entry, an *Assessment*, and eventual *Plan*. Starts the report an open text in first chapter *Session Identification*, named Subjective Report, with free therapist considerations. At the end, a further section shows FEDL values of the session, for first three levels4.5. Experiment and Data

We have involved in the experiment 5 therapists of the clinic, having 5 children each on care. The experiment lasted three months. The data consists in 25 pairs of *DTN,* filled in and reported for each child: one at first session (child evaluation), one after three months of clinical treatment. The meaning-carrying bits of text, are therapist inserted into the appropriate slots of *DTN* invariant structure. The resulting *DTN* is recorded onto the IS, and later offered for off line analysis. Crucial is the comparison of the DTN pair for each child, to show eventual improvement. The analysis intends to extract the overall trend of progress.

5. QUALITATIVE RESULTS, IN QUANTITATIVE LANGUAGE

The analysis of results is simplified, the low-level-meaning data of therapist report being already herded into the desired, predisposed, FEDL meaning, scaffolding structure.The higher-level-meaning invariant (in the mean) remains to be extracted. Details of result are expressed both in the language of child therapy, and in Likert scale values. Data consist of bits of recorded therapist response, inserted in pre prepared meaning slots of the scaffolding *DTN* structure. *DTN* details are provided to let the reader understand, evaluate the process, without mastering meaning of clinical treatment jargon. Consistency between qualitative data and Likert scale values, filled in by therapists, have been checked by the analyst researcher. The actual analyses, beyond browsing appreciation, is left to statistical data handling procedures. Remains the extraction of meaningful trends from the entire data set. Best done in numerical language.

5.1. *Comparing child behaviour in specific treatment sessions, 3 months apart*

An example of *DTN*, for the firs session of the child, exhibiting most items from the list is shown, including the comparison with items of the *DTN* after three months, with the first three FEDL levels present.

DTN of INITIAL session, the evaluation session *(with more comments, and state at first encounter)*
COMPARE: *DTN* of session AFTER 3 MONTHS *(inserted as COMPARE in first encounter data)*
Session Identification

- Patient information: Mouse, Kendrick, Date of Birth 06/29/2010
- *Basic Session Information: Therapist's Name(s)*: Z., A.; E., R.; Date: 02/19/2019 *Duration:* 120‘
- *Subjective Report:* K. excited to arrive, impulsive with running to trampoline, not checking in with therapists, moving around the space without a plan.

COMPARE:
Basic Session Information: Therapist's Name: M., J. & El., R. *Date:* 05/28/2019 *Duration:* 120‘
Subjective Report: K. excited for session today, K transitioning well today throughout session with use of visual schedule. Mom reported that K. was excited for the activity all day today as he enjoys eating macaroni and cheese.
Performance Areas

- *Activities of Daily Living:* Bathing/showering/hand washing. *Assessment:* Sensitive to the creme, screaming when on his hand, interferes with home ADL's per parent report, not able to notice creme on foot, needed visual cue to notice, Supported his attention by joining, imitative, non-verbal cues, to orient and remembering,

COMPARE: Functional communication. *Assessment:* Kendrick participated in therapeutic activities to promote functional communication for increased independence in expressing needs, communicating with family and peers, and sharing intentions. K. was able to sustain multiple circles of communication with the therapists during the therapeutic activity, remaining concentrated in his work 70% of the time. Therapist provided visual schedule, simple language, gestures, and imitation techniques to assist K with functional communication. *Plan* is to continue to provide time, space, gestural and verbal language with K and not assume his needs or intentions to continue to develop his communication skills with others.

- *Work and Productive Activities:* Safety procedure. *Assessment:* K. was unsafe and threw a weighted ball at therapist head, avoiding consequence of processing it, hiding, needed to contain him physically to control his body and process the incident. Visual drawing did not work, instead physically hold him, 10 seconds when your calm we can resume. 20 minutes before he was able to self regulate, needed body sensory input, physical input,

COMPARE: Meal prep and clean up. *Assessment:* K. engaged in therapeutic activity to promote skills for meal preparation and tool use required for increased independence in feeding, preparing meals, and engaging in social mealtimes. Therapist supported him using verbal and gestural instructions, dividing the activity into 4 steps and providing a visual schedule. K. was able to follow the steps with medium therapist support; He needed movement break during the activity, between the steps. *Plan* is to continue to use meal preparation activities to build K's confidence and skills.

- *Play or Leisure Activities:* Exploration - Sensory motor. *Assessment:* explored the ball pool, by covering his entire body, needed this input to begin to share attention with others and initiate play.

Performance Components

- *Sensorimotor Component*
- *Sensory Awareness:* Orient. Assessment: Did not notice creme on leg, not able to register tactile object on his shoulder, climbing in the swing, not aware legs and head out, hiding, not aware feet out, oriented him to this body, allowed him to problem solve, and he improved in his awareness with the prop only, not tactile stimuli
- *Sensory Impact on Activities of Daily Living:* not able to be independent with ADLS' needs max cueing, *Plan:* inquire about the home, video analysis,
- *Perceptual Processing:* Spatial relations. *Assessment:* needed prompting to orient to spatial organisation of the room, used gestures , physical prompting, close proximity for a response needed. responded well to problem solving,
- *Fine Motor/Dexterity:* Radial/ulnar functioning. *Assessment:* Spraying the creme from the can, able to do without support, good strengthening activity, however, needed support to open the door know
- *Praxis:* Organisation and sequencing. *Assessment:* Clean up, drying hands, setting up equipment, Needed a prompt for each step. Plan: to begin to decrease physical and verbal prompting

COMPARE: Execution. *Assessment:* K. participated in therapeutic activity aimed to promote execution for increased independence in daily routine (packing a bag, setting up meals, bedtime routine, etc.). The purpose activity was composed by 4 different steps that required him fine motor/gross motor skills and bilateral coordination. K. was able to execute the therapeutic activity with medium therapist's support. Therapists used hand over hand when using the stove for safety reason, verbal and visual cues, visual schedule and attunement. K. showed some difficulties in remaining focused during the passage from one step to another. *Plan:* continue work on praxis and execution for increased independence in age-expected daily routine tasks.

Cognitive Components:

- *Flexibility/adaptation. Assessment:* Difficulty accepting the room choice, needed physical cues to support following the direction, wants to go into rooms with other kids and is impulsive, not able to manage without max support

Psychological Skills and Components:

- *Impulse control, reading social cues, intentions of others. Assessment:* needed environmental and physical support to control impulses, not safe, not able to read social cues, laughing with a negative face response from therapist.

COMPARE: *Assessment:* K participated in therapeutic activity to promote flexibility of ideas for increased independence in peer interactions and daily routine changes. K demonstrated improved flexibility with unexpected changes made to the schedule of an activity; K. was able to make an agreement on the new timetable. Therapist supported him using verbal and gestural cues to engage K in change of activity and providing a timer to which he responded well. *Plan* is continue to foster flexibility by downgrading K off of specific activities and making small changes/expansion on his ideas.

Functional Emotional Developmental Level values of Initial Session

Level 1 - Self regulation and attention

- *Orienting, registering sensory information (touch, movement, visual, auditory, muscle sense, olfactory, gustatory).To support readiness for relationship, therapeutic activity, safety, ADL's.*
- *Assessment:* With familiar activities, as ball on the trampoline, Lycra, able to self regulate. *Value:* 3.

COMPARE: *Assessment:* K. required breaks between steps of the activity, although he was able to follow the steps while maintaining his regulation to complete the activity. *Value:* 4.

Level 2 - Engagement and relating

- *Awareness of emotional communication within relationships. Ability to share positive emotions (facial expression, gesture, vocalisation). Ability to share negative emotions.*

• *Assessment:* not able to share negative emotions, and when he feels pleasure does share always, flaps his hands and curls into flexion. *Value:* 2

COMPARE: *Assessment:* K. required initial prompting for communication however he was able to share negative interactions, and positive interactions with familiar and even unfamiliar people. *Value:* 4.

Level 3 - Purposeful two-way communication

• *Use of Affect to convey intent- two way communication (facial expression). Capacity for emotional self-efficacy. Responds to your gestures, initiates interactions with you, rhythm and pacing evident*.

• *Assessment:* cause effect, with question, response. *Value:* 2

COMPARE: *Assessment:* K. continues to required initiation for communicating engagement, however if he shows interest in activity or game he will continue reciprocal communication. *Value:* 3. *Plan:* Continue to support K in the clinic and explore K's participation in his home routines. Continue to incorporate structured activities to challenge K and work through perseverations and impulsivity. Downgrade sequencing activities to increase participation. Downgrade turn taking activities.

AT EVALUATION: Values of first three FEDL: 3, 2, 2

COMPARE: Values of first three FEDL: 4, 4, 3

A rich picture emerges from the notes, of changes by clinical treatment, also shown by FEDL level values. INCREASE of the first three FEDL Values change, in three months: +1, +2, +1 (exhibited by scaffolding).

5.2. *Presentation of general results*

The example of Section 4.1 above shows a striking change in the predications about child behaviour. For this point of evaluation of child behaviour, the comparison of the two subsequent qualitative expressions: *Work and Productive Activities*, shows unambiguously progress for this child. Similarly for other points of the comparison. Extending the comparison to all children, will let emerge the overall trend. But the example in 4.1is non typical, . We have involved in the experiment five therapists of the clinic, having five children each on care. The overall set of results has 75 entries: 25 children, 3 FEDL sub-step values each. Qualitative comparison of single children, before and after three months, is often non conclusive. The quantitative translation with FEDL level values is congruent with this observation: FEDL numerical value changes often appear erratic, showing mixed behaviour: frequent no-change, some decrease (-1) some increases (+1); not all three levels showing consistent trend. In sum, data is blurred, hindering to derive immediately and directly a clear cut conclusion from the results. However, for many children the description of behaviour markedly changes towards clear progress, already after three months of treatment from evaluation, including time lag for start up acquaintance with child, and parents: an increases, in a short time.

5.3. *Analysis of general results*

The analysis of the general results is intended to extract the overall meaning of the data: the higher level structure of invariant meanings. As we said, data is blurred. Statistical averaging of the data is needed to extract a clear cut result. Luckily, data is numerous, and statistical averaging will provide the desired objective conclusion, affected by a relatively small statistical error. And, numerical averaging can is done easily over Likert scale values. More explicitly: The analysis of the general results is simplified by the fact that what is needed to extract the overall meaning, i.e., finely determined values as evaluation of child behaviour, has been already prepared, wired into the IS via the Likert scale. The analysis then simply consists in performing averages of Likert scale values.

The mean change over all entries, 25 children, 3 FEDL sub-step values each, is clearly biased towards positive. On the 75 entries (5x5x3), the average value change is (+0.33 units). Assigning to the error on the average, the mean square deviation (0.4) divided by square_root(75), we get (+0.33 +/-0.05 units). A positive trend, that would be characterised as *"well over statistical noise"*, in any quantitative study.

In conclusion: a standard structure helps therapists express seamlessly qualitative opinions in a (familiar and co-constructed) decorated, differentiated, and oriented conceptual, non metric space. When a numerical Likert scale is used in data collection, aggregation, and averaging, to help merge indications from multiple therapists and on multiple children, we get results into quantitative language, as the space were metric. Assigning apparent real quantity weights to artificial, qualitative scale steps, yes, but also being able to get credible, useful results. In this way we are able to extract, much wanted indications for the higher level structure, of invariant meanings. The message is clear. Therapists reports are (unintentionally) saying:

"We know it is real" (+0.33 +/-0.05 units)

The methodically conducted experiment has turned subjective qualitative evaluations into a scientifically valid statement. The resulting average impact is positive, of value poised about seven standard deviations away from the control point (0.0 units). The probability of the event that, the positive result 0.33 units, be just a statistical error, is represented by a very, very small number, of order (10**-23) (ten elevated to minus twenty three). Statisticians say: an impossible event, result is true beyond human doubts. The power of numbers! The methodical experiment on subjective facts has produced an irrefutable, scientifically valid

statement, made clearly readable by averaging the quantitative translation of qualitative evaluations, into an adamant, numerical result. We have put on scientific, rigorous, objective grounds, therapists' subjective knowledge. Opening to increased statistical weight over longer experimental time, cumulated results over a larger therapist/children population, and confirmation of these results in a similar, independent experiment.

6. DISCUSSION

Are theories and method, on which the paper is based, appropriate:

We have considered and questioned whether harvesting facts and meanings from people consciousness, in a careful and accurate way, with an information system as a respectful scaffolding support and automation tool for gathering statistics, can be trusted to produce objective assessment of facts in the world. We have argued that we can construct a positive response to our research question being able to change the formative context of all therapists of the clinic, in order to promote the inclusion of an assessment section on child development as tacit, comfortable routine in their daily treatment report notes; and, if we can swiftly and carefully extract *from another person consciousness* the facts of interest. We have shown how this result can be reached by: reverting to Claudio Ciborra's theory on *Formative Context* change with a *reflector* (Ciborra 1994), and to Gianni Jacucci's *Social Practice Design* theory to organisational intervention with a *counsellor* (Jacucci 2007); while leveraging on Amedeo Giorgi's *Descriptive Phenomenological Method* as the appropriate methodology to grant scientific merit in harvesting facts from consciousness.

6.1. *Specific Relevance issues: what now, what is being tested, how close to DIR*

First of all, transcendent phenomenology in fact provides objective evidence and scientific validation by taking care of a number of attention points, with an appropriate IS. Affording scientific results for *time plots of treatment impact on child development*. Opening the way to future averaging over children of specific age, sex, syndrome, population of kind, including parent attitude, and therapist connotations.

Second, *what has been tested* here? a) a specific method to base clinical practice on; or b) a specific clinic with its clinical practice? Details of clinical protocol, depth and accuracy of employed approach, extant quality of therapists, clinic environment and materials, all is holistically included in a single independent variable tested/assessed: this clinic, professing *DIR* practice.

Third, to support DIR as a method, we need establish, by appropriate indicators, *how close clinical practice be to the method*. On individual therapists, and on overall clinic culture and organisation. A similar methodology can be used for this. Cybernetic thinkers had it already (von Foester 1974). First order cybernetics, they said in the 70's, is about what we can say of the *model* (they were investigated in models of the world). Second order cybernetics, is about what we can say of the *modeler*.

6.2. *Rigour*

Can scientifically rigorous, phenomenological, subjectivity based research, be a legitimate approach in the assessment of evidence based practice?

The value for the human science community of our results is methodological. Represented by the demonstration in practice of the feasibility, of phenomenology approaches to the validity assessment of a practice. That, and how - objective, scientific - valid evidence can be drawn from phenomenology, i. e., from subjective evidence. From Edmund Husserl's transcendental phenomenology, *modified* by Amedeo Giorgi: *'A little Learning is a dangerous thing; Drink deep, or taste not the Pierian Spring'* (Alexander Pope 1711).
A value of generality of this study: *'For fools rush in where angels fear to tread'* (Pope 1711).

CONCLUSIONS

Illuminated and guided by theories on change in *formative context,* and on *organisational intervention* with social practice design, both calling upon and external agent as *reflector* or *counsellor*, an *ad-hoc* IS based methodology is turned into a legitimate candidate for assessment studies, thanks to prescriptions of the descriptive phenomenological method. An important result for assessing theories and methodologies. As well as opening new paths to assessing clinical practice.

We provide positive evidence for effectiveness of *DIR* based clinical treatment. A fact not yet warranted by professions, albeit concerned therapists volunteer positive indications: *'We know it is real'*.

'To Err is Humane; to Forgive, Divine' (Pope 1711). To insist in the error, is not.

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