AROUND AND INSIDE THE BLACK BOX OF COMPLEX PROBLEMS

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SUMMARY
The problems of complex disabilities remain unfairly poor in terms of the solutions needed to make early diagnoses, realistic prognoses, treatment plans, and achieve useful outcomes for children and parents. Many difficulties arise from the clinical practice which is satisfied with what it knows and does. The term 'complex' is used in various fields. This is why it lends itself to unnecessary simplifications. For many, the adjective 'complex' qualifies the seriousness of a difficult and multi-problematic condition. The clinic of the future has a great need to manage saturated and unsaturated explanatory models. The components of the methodological arch synthesize the potential available with clinical strategies distributed in as many paths of analysis and decision-making which, under certain conditions, can become "self-supporting", that is, very strong. The European debate on the social future is carefully considering the potentials of innovation in the health care. This is the future that awaits us, especially if the centers of excellence want to experience this challenge together.

Key words: complexity - clinical innovation - outcome

THE PROBLEM
The research into rehabilitation practices sometimes gives us sad results. We know that the problems of complex disabilities remain unfairly poor in terms of the solutions needed to make early diagnoses, realistic prognoses, treatment plans, and achieve useful outcomes for children and parents. Some problems arise from the difficulty of recognizing needs and capacities at the same time. The needs are fragility and requests for help, the potentialities are hope for a future to be built together. Many difficulties arise from the clinical practice which is satisfied with what it knows and does. It is only satisfied with sectorial diagnoses, closed within their own disciplinary competences. Other difficulties arise from the unjustified shift from diagnoses to recommended treatments. If everything becomes mechanical, bureaucratic, inconclusive and expensive, the relationship between cost and effectiveness is lost. Paradoxically, it guarantees more economic results for the providers and less outcomes for the recipients, who need and are entitled to them. These contradictions are well known, often criticized and stigmatized as bad practice. They highlight the demand for new ways of thinking and doing, with new paradigms for integrating sectoral specializations with multidimensional capacities, necessary to harmonize the different aspects of the problems to be addressed.

All these conditions are necessary because needs cannot be satisfied with the little provided, which for many children and young people is just damage reduction. The goal is about providing the best possible overall, not about individual parts of the rehabilitation treatments. Those who are satisfied with partial results actually accept the managerialism that adapts problems to available treatments. Those who operate in this way confuse performance with solutions, unfortunately chronicizing much avoidable suffering. We have seen this in the results of a study for the Italian Ministry of Health on the development prospects of rehabilitation services in Italy.

The report on the first year of this study anticipated a series of problems and emerging organizational pathologies by saying: "In the coming years, clinical-rehabilitation activities directed to disabled persons - with particular reference to the younger ages of life - could face significant difficulties in view of the chronic lack of knowledge about the relationship between needs, types of intervention, costs and indices of territorial coverage to be guaranteed. The lack of knowledge needed to tackle the problem could have negative consequences in terms of inadequate responses for people in need and in terms of insufficient funding for the bodies called upon to provide them.... If the demand for rehabilitation is destined to grow, clinical and scientific developments are also called upon to provide more appropriate and effective rehabilitation solutions at sustainable costs" (Bezze & Vecchiato 2015).

The failure to monitor results hides contradictions and fuels unjustified costs and their economic unsustainability. In this way disability is considered a source of expenditure and not a right that deserves protection, care and greater attention. What should be a reason for greater protection paradoxically turns into a condition of distrust that discourages the possibility of change. However, if we look at the Italian expenditure figures for 2021, the true economic significance of this epidemiology emerges. Unfortunately, it affects many living conditions. For persons under 18 years of age the incidence is 1.91% (Table 1).
Table 1. Individuals 0-64 with medium-severe disability, absolute and percentage values, Italy 2021

<table>
<thead>
<tr>
<th>Number</th>
<th>Incidence on reference population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium-serious invalid adults (74-99%)</td>
<td>355,712</td>
</tr>
<tr>
<td>Medium-serious invalid minors</td>
<td>177,358</td>
</tr>
<tr>
<td>Severely disabled adults (100%)</td>
<td>489,758</td>
</tr>
<tr>
<td>Serious invalid people with non-self-sufficiency</td>
<td>425,960</td>
</tr>
</tbody>
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Source: Fondazione Zan can processing of Ipn and Istat data

In 2020 the total public expenditure for LTC (Long Term Care) was 32.1 billion euros (1.93% of the Italian GDP), of which 23.6 billion euros for the elderly (1.43%), of which 4.3 billion euros for home care and 7.3 billion euros for residential accommodation (RGS, 2021). This total amount can be traced back to three expenditure streams:

- Health expenditure for services to non-self sufficient persons in outpatient, homecare, intermediate care, residential care, pharmaceutical treatments. In 2020, this expenditure reached 13.6 billion, of which 9.1 billion for the over-65s;
- In social assistance spending, the largest item is autonomy allowances. In 2020 the number of benefits provided was about 1,950,000, with a total expenditure of 0.8% of GDP or 14.1 billion, of which 10.7 billion for the over-65s;
- Expenditure for other services provided at a local level amounted to about 0.27 GDP points, of which 58.4% referred to territorial and residential services. The remaining 41.6% concerned cash transfers. This expenditure in 2020 amounted to 4.5 billion, of which 3.8 billion for the elderly.

Public expenditure on LTC as a proportion of GDP is projected to rise from 1.9% in 2020 to 2.6% in 2070 (RGS, 2021), with the increase spreading almost evenly across the entire forecast period. After the peak due to the pandemic crisis in 2020, the values remain lower until 2026, then gradually increase until 2060 and then decline slightly from 2060 to 2070. An analysis of this trend tells us that it will not be an impossible challenge to balance public spending. It is therefore a figure that encourages research to make welfare responses even more sustainable and, above all, more effective, especially those concerning complex problems. These are problems that in their clinical diversity, however, have a sad familiarity, which unites them in the set of unsolved problems that represent a widespread existential suffering for many individuals and families. These are the families where the greatest difficulties are concentrated. But precisely because of this, they ask us to find urgent and necessary solutions. Their reliability will make them methodologically usable for other problematic conditions.

WHAT ARE COMPLEX PROBLEMS

The term 'complex' is used in various fields. This is why it lends itself to unnecessary simplifications. But what does 'complex' mean and what does this term mask?

For many, the adjective 'complex' qualifies the seriousness of a difficult and multi-problematic condition. It is complicated for those who experience it and for those who are called upon to deal with it. But is it necessary to think this way? The available evidence does not justify the generic use of the term 'complex'. For example, they tell us that ‘complexity’ depends on the ignorance of those who attribute this qualification to problems they do not know enough about. The term ‘complex’ can also mean the opposite, the effort to know what we do not know. There are multidimensional problems that can only be understood using multifactorial ways of reading and interpreting them. Therefore, a solution is not enough, first we need a strategy to explain and understand. The difficulty therefore depends not only on the nature of the problem but also on the ability of the person analysing and understanding it to put together the factors that can solve it. A good conductor has no difficulty in governing the harmony of the instrumental ensemble he is conducting. He knows how to read in a single musical score the sound lines of each instrument that is part of the orchestra. This is why he can normally handle a challenge that is not complex, even if for many others it seems impossible.

In these cases, a special ability is needed, which does not only concern those who can conduct the orchestra but also the orchestral players who are part of it, if they allow themselves to be guided. In our case we are not thinking of the music professions but of the welfare professions. The capacity for care cannot be extraordinary, difficult to find, difficult to guarantee, but ordinary and well distributed among those working in the rehabilitation services. Clinical practice needs this. It was born to compose a single vision and as many as genomics and bioimaging do, which provide the ability to see with amplified eyes.
approaching reliable knowledge, which would otherwise remain outside our ability to know. In fact, the Cartesian clinician uses explanations arranged on planes of deduction, as if they were tablecloths unfolded on a table. When they are arranged on a Cartesian plane they represent linear ways of configuring the relationships between the factors that make up the problem and the chains of explanations that help us explain it. It is his way of "simplifying", while reminding us that there is more under the tablecloth. It is "the other" which is recognizable by using practices of "understanding", capable of seeing beyond the explanation, knowing that there is always something else under the tip of the iceberg to be recognized and understood. In the middle of the twentieth century, Von Wright (1951) also explained this to us with his deontic logic, deepening the differences between explanation and understanding.

With different arguments, they anticipated the doubts summarized three centuries after Descartes by Kuhn in "The Structure of Scientific Revolutions" (1962). For Kuhn, they are the result of integrated techniques of explanation and understanding. When they introduce new paradigms they surprise us, because they come from roads we have not yet known and travelled. But they need to be understood and legitimized by the scientific community. Scientific communities often use the criterion of majority thinking. When this majority consensus is missing, what can happen? What makes it possible to move from a verified truth that is 'true in itself' to a truth shared by a community of researchers? Is the power of the majority strengthened or weakened? To what extent will the majority approach be willing to justify minority innovation, that innovation which refutes old paradigms and adds new ones?

In healthcare work, professional choices do not foresee this contradiction, especially when they favour evidence that institutional instances and organizational convenience do not like. In these dilemmas, solutions do not always arise from reliable choices but also from ethically questionable compromises. They function like addiction syndromes, which in this case are unjustified dependencies on power. They arise from bureaucratic ties that weaken clinical action, that action which adapts without risk, without considering complexity as a methodological gymnasium for innovating and enhancing outcomes.

**RECIPIROCITY IS RELATIVITY**

The general theory of relativity encourages us to consider these ways of proceeding. They can be useful to make way for complex ways of knowing and multiplying the available forces, especially those that, under certain conditions, can release multiplicative energy, that energy which adds value to the sum of the available input resources. We can, for example, draw inspiration from the model of the parallelogram of forces. When applied to a point, they converge towards a common goal. In these cases, the result is not only explainable by the amount of input available but also by what happens, composing capacities to release energy that are much greater than the sum of the resources given as input.

Rovelli (2020, 84) describes this possibility as a reckless leap. It was foreshadowed by Heisenberg 100 years ago, when he measured the force that binds the electron to its nucleus. He explained it as the result of the relationship of the forces that compose it and not as the sum of the parts. He put it this way: «The heart of the 'relational' interpretation of quantum theory, which I present here, is the idea that the theory does not describe how quantum objects manifest themselves to us (or to special 'observing' entities). It describes how any physical object manifests itself to any other physical object. How any physical object acts on any other physical object».

In other words, Rovelli invites us to better consider the potentials of relationality, which in this case takes place between physical bodies, observing the force that only together they can release. Reciprocity, even in rehabilitation services, under certain conditions, acts by generating surplus, additional force, which is measurable as benefits greater than the sum of the forces that prepared it. This surprising result occurs not only in the material worlds but also in the vital worlds, when the strength of capacities finds multiplying conditions. They are made possible by systems of trust capable of making the difference. In these cases, we can say that in physics there are potentials hidden in the heart of matter, while in generative reciprocity there are potentials hidden in the heart of people. We can observe this especially in critical conditions when they provide the necessary force to enliven and multiply the outcomes of non-prognosticated clinical and rehabilitative conditions.

But in order to understand and demonstrate this, a paradigm shift is needed, capable of questioning the practices of the 'Silo Approach' (Parekh & Barton 2010). These are what we observe when multi-problem conditions become chronic, heavy to sustain, resilient to change. The worst is when they are fuelled by welfarist and institutionalizing approaches. They turn the people being helped into passive recipients of professional treatment. Research into these problems fortunately provides conditions to prevent this risk, avoiding its sometimes tragic consequences. They manifest themselves in the form of allostatic overload. It is a concentration of unnecessary suffering and unjustified human and economic costs (European Science Foundation 2011).

It is therefore necessary to ask ourselves why many clinical recommendations settle for actions that are poor in relational attention. It is a deficit of humanity and professionalism that penalizes the ability to prefigure possible outcomes. If they are not foreshadowed, how
can they be achieved? Why give up this possibility and not deepen the range of the good that can be achieved? It is a value that can be positioned in organic, functional, cognitive, behavioural, socio-environmental, relational and spiritual benefits. It may seem too long a sequence, but it is not so because it allows us to synthesize within a horizon of clinically and humanly observable factors. They have a complex aspect because they represent many folds and many nuances which together can be a source of solutions to be enhanced in clinical and “habilitation practices” (from now on we rename “rehabilitation practices” as “habilitation practices”).

Those who deal with complex problems learn over time to do so. They learn to connect diagnoses with outcome prognoses, to make the most of all available strengths, to manage generative practices (Vecchiato 2015b). Generative practices do not emphasize the limits of resources. They know that outcomes depend not only on the resources available but also on the capabilities (professional and non-professional) that each person can share to make a difference in a care plan. For this reason, the focus on available resources is important but can overshadow the transformative capacities that make the additional outcome of generative practices possible. When functionalist thinking prevails we do not observe them because this way of thinking is not able to associate functioning with living. In this way the classical conditionality (if...then...) wins, even when it is unsuitable to explain the added value that multidimensionality can provide.

The clinic of the future has a great need for this, in order to manage saturated and unsaturated explanatory models. They were prefigured by Kurt Gödel's incompleteness theorems (Nagel & Newman 1974). They warned us against thinking that does not accept its own limitation. The habitative care does not deserve this trap, it is the trap of thought satiated by its own knowledge. On the contrary, the joint management of saturated and unsaturated paradigms can encourage the necessary refutations for the development of new paradigms. The clinic of the future needs to seek and see beyond the traditional paradigms, in particular those that replace the 'someone' with the 'something', those that act in materialistic ways, those that make diagnoses 'in a relational vacuum', that favour settings less exposed to reciprocity. The limits of their capacities separate them from the problems, force them to operate chronically instead of managing problems effectively.

The components of the methodological arch (Figure 1) synthesize the potential available with clinical strategies distributed in as many paths of analysis and decision-making which, under certain conditions, can become "self-supporting", that is, very strong. They resemble the composition of arches made of well-composed stones which, thanks to this, have all the strength necessary to support cathedrals (Vecchiato 2015a). It becomes possible with a syntax that is very demanding in enhancing the capabilities of each part that makes up the arch. In our case, it is a syntax capable at the same time of explaining, understanding and deciding on possible outcomes, with professionals and non-professionals sharing responsibility and skills in order to tackle otherwise impossible challenges. A good methodology arises from integrating completeness with incompleteness, avoiding inconclusive doing. First of all, the conclusive doing avoids the bypass linking diagnosis to prescription, avoiding the other necessary steps: multidimensional diagnosis, outcome prognosis, shared plan, treating and taking care, outcome assessment. Only in this way care and habilitation do not become recursive, repetitive, that is, what they do not want to be.

**THE PARADOXES OF COMPLEXITY**

Paradoxes are useful when they emphasize help to see better, because they amplify difficulties and possibilities. In this way they can make it easier to recognize the best conditions in which to operate. The main obstacle is the narrowness of the professional vision, if it fails to contain multidimensionality, becoming incapable of recognizing complex problems in order to explain and understand them. It confuses what is done with the solutions that are achieved, because it does not know how to walk the methodological arch and unfortunately does not avoid the risks of the Silo approach where everything is heavily overlapping.

Figure 1. The Methodological Arch

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The consequences are numerous and can be seen in the black box. Around the black box we see a lot of unjustified suffering, the loneliness of individuals and families, hurried evaluations, sectoral diagnoses, generic prognoses, extended periods of time with no decisions. Inside the black box we observe a clinic in difficulty, closed in its methodological functionalism, in difficulty in connecting the perspective of the ICF (International Classification of Functioning) with that of the ICL (International Classification of Living, which is an ideal classification that should be developed). Functioning wins instead of living. The suffering of individuals and families is the cost to be paid, but it is also professional suffering. Illogical practices win, those that discourage the hope of children and parents and incite us to find ways out.

A well-made prognosis should be ‘at least two-dimensional’, capable of highlighting the nature of the problem and the achievable outcome. Together they deal with possible habilitation and technological resources. It starts with organic, functional, cognitive and behavioural factors and then considers the socio-environmental and relational factors that characterize the living space. Only together can all the necessary capacities and strengths be released. It becomes possible with polarized prognoses capable of foreshadowing outcomes and steering the possible choices. They can be short-, medium- and long-term. Each is equally called upon to achieve its maximum, treating individual parts without ceasing to see the whole. It is a basic clinical attitude, to break down first of all the "empty time of responsibility". It is a first step to face the drama of asking and not receiving, to start reducing the inequalities that especially disadvantage the weakest.

Traditional rationality is normative and procedural. It helps to circumscribe professional responsibility by compressing it with limits. Sometimes they are not ethically acceptable. Ethical dilemmas are necessary when we realize that it is not enough to listen, observe, interpret, ... without managing the succession of decisions in a unified manner, making the most of everything available. It is the future that awaits us, to overcome these difficulties. Those who are experimenting with generative practices are offering us interesting indications. In their actions, they promote a joint contribution to the result. This is not new, genomics tells us by looking at the very small regenerative. The term habilitation teaches us this, when it encourages every potentiality, even those that are difficult to recognize. It is a paradigm shift that starts by integrating the knowledge needed to look beyond our boundaries, which are sometimes our black box. It is not integration at any cost, but rather integration understood as "enough" to read differently the relationship between needs, capacities, outcomes. In particular, outcomes can be positioned at an alpha level (the outcome explained by the effects/benefits of professional services), at a beta level (the outcome explained by the effects/benefits of the relationships established between those who help and those who are helped) and at a gamma level (the outcome explained by the benefits of the “joint contribution to the result”, the outcome co-generated by people while receiving help in their living space).

**WHAT DOES THE FUTURE LOOK LIKE FOR US?**

The courage to look inside the black box can help put the critical issues we have considered in order. It allows us to linearise the analysis of problems. To linearise does not mean to simplify, but to represent the factors in a multidimensional way, geometricising the relationships between all the forces available. This has been done for a long time by the physical, biological and logical sciences (in particular modal logics) to understand the functioning of action ecosystems.

On the epistemological level, we are interested in the potential of the relationship linking reciprocity to generativity. It is a relationship that has to do with the joint management of shared objectives, of the achievement of multidimensional outcomes, which depend synergistically on the composition of the available arches of forces. Common sense would say ‘act as when two competing forces are applied to the same point’. This possibility was considered by classical physics many years ago. It was then called into question by physics when it gave up considering the position and movement of the forces at play at the same time and concentrated on their relationships, even those not easily observable. Previously it considered the relationships in the background because the particles were the objects of study, now the parts are both figure and background, to better understand everything that makes them act together. This is a necessary step towards understanding observation and action in 'multiplicative' ways.

Some valuable suggestions come to us from the linear logic of computational resources. It is a logic developed by Girard (1987) that does not reason by causes and effects but by networks of evidence, demonstrative structures made up of antecedents and sequents. In other words, it uses a different way of thinking, we could say inverted. It considers the intended and the achieved. It expresses this using additive and multiplicative rules. Together they allow for better management of the available value, that value which is additive or multiplicative. Under certain conditions it allows much more to be obtained from the same input. The multiplicative possibilities, by the mere fact of being able to prefigure the multiplicable value, put us in a better position not only to think about it but also to generate it.
To facilitate this paradigm shift Girard uses proof nets also understood as demonstration nets. They highlight better the conditions of input, output and possible outcome. The incompleteness paradigms had encouraged this research to better manage the double interpretative key to start from: I cannot help you without you; You cannot help me without me. It applies to Heisenberg's matter and it applies to each person's humanity. They are not antagonistic but complementary forms of incompleteness, which is why they can be used in the same action strategy. Complex problems, by their very nature, can have more than one solution. It is their multi-factor nature that makes this possible. They do not have one right solution but several possible/preferable solutions. For example, fractals are a geometric way of describing possible polymorphisms that can be traced back to common starting conditions. The life sciences have a great need to combine theory and practice, thinking and doing, resources and outcomes. In other words, they need to better prefigure what can be achieved together. It would be paradoxical not to look in this direction to verify it, as other disciplines have already done.

A good instrumental reason is the one highlighted above: the difficult sustainability of our welfare. Does it depend on the limits of resources or on the limits of our current capacities? Is it appropriate to think of multi-functionality with rationalistic and closed categories? Generative reciprocity is not interested in the dynamics of mere exchange, it seeks surplus. It knows that it can challenge the unbalanced power relations between the strength of those who help and the weakness of those who are helped. Instead, it is necessary to consider the spaces of surplus, offered for example by agapic action, as proposed by Boltanski (2005), Araújo et al. (2016). The aid that helps values goods that do not deteriorate, that do not get corrupted in the entropy of market exchange. It is a concentration of possibilities, to be better known, with methodologies and original research able to test (as Girard would do with his proof net) for all those interested in developing possible new solutions.

CONCLUSIONS

The European debate on the social future is carefully considering the potentials of innovation in the social economy. They concern very closely basic human needs. They have to do with the definition of professional and organizational processes in health and social services. They need original solutions to manage the interplay of forces between the actors involved, both on the demand and on the supply side. They have to deal with results distributed along the whole "value chain" from "I" to "We". They need measurable results in terms of outcomes for beneficiaries and positive social externalities for communities. Ultimately, they need to understand how social generativity, as a method of analysis and action, can help us enhance multidimensional outcomes and necessary professional improvements. The guiding idea is that social and health services are not just for people but made with people.

If the culture of exchange discourages this possibility and prevents the valorization of reciprocity as a strategy to innovate health and social services, it becomes a heavy limitation for innovation. In other words, it penalizes everyone at a professional, managerial and institutional level. It also penalizes the settings of the services we are interested in, particularly habilitation services. It would be a constraint that forces us to settle for practices made up of "give and take", consuming services without a convincing return in value. In these conditions, people do not generate but use, they remain constrained within a procedural reciprocity, where one is in a relationship just out of interest and not in order to build better living conditions.

In ancient Greek "κλίνω" means to incline, to lean, to oblique, to go "towards someone". In our case "κλίνo" is not an orientation towards "something" but towards "someone". We have to remember this every day, without being satisfied with diagnoses and prescriptions, that address the problems with those who live them. It becomes possible with the architectures of decision-making and professional skills as we understand them. Responsibilities and capabilities do not curdle, as the cheesemakers would say, they remain separate and are dispersed, if they are not concerned with the best.

The alternative is the retreat into many "Ts" incapable of becoming "We's", stones destined to remain without form, without the possibility of becoming a house, a bridge, a cathedral. On their own they are inert matter, in conditions of reciprocity they become self-supporting architectural forms and forces. All this must be guaranteed for complex disabilities as an essential level of authentic care, with timely access, early diagnosis, appropriate choices, guaranteeing hope for every life condition. This is the future that awaits us, especially if the centers of excellence want to experience this challenge together.

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