Abstract

Leadership, management, and regulation are expressions that translate processes taken in schools. However, contexts characteristics are determinant for these practices and schools are complex and surprising environments, which should mobilize concepts, tools, and strategies different from those used in orderly and predictable environments. Thus, I discuss the constructs of leadership, management, and regulation from the premise that schools are complex adaptive systems, namely that interactions lead because they are capable to promote novelty and adaptations in the organization, formal(executive) leadership is based on the power to change interactions rather than individuals; management should be geared to handling the conditions of interaction between agents - which does not exclude the need to effectively manage other resources; and regulation is defined by the stimuli to coherence - and not so much by the stimuli to conformity. It is concluded that, since the educational policies structure the forms of relationship between the agents are, also, policies of interaction.

Keywords: Educational leadership; School management; Regulation; Complexity Theory; Schools.

Introduction

There are words and expressions whose use has become universal. This is the case of leadership, management, and regulation, which integrate the day-to-day of all organizations and which are attributed praxical meanings, that is, the concepts that the actors adopt have significant impacts on their actions and, consequently, organizational and social outcomes. Education naturally appropriated those expressions and gave them use to differentiate roles, responsibilities, and processes.

What I want to discuss here is exactly what leadership, management, and regulation are constructed of.

This discussion is relevant firstly because leadership, management, and regulation are processes that have become accessible and common to any agent and are no longer necessarily connotated with reflective processes, knowledge or skills – many agents can assume themself as educational leaders and as school managers since educational organizations are proficient in positions.

Secondly, because these concepts have their historical origin in business contexts oriented towards mass production and profit. They were enrolled in the educational field and particularly used to provide the governance of schools and educational territories without necessarily including reflections and adaptations to the specificity of the objectives of education.
And thirdly, because scientific and philosophical developments have pointed out that schools are complex environments and therefore require new, renewed or innovative instruments, concepts, and practices. Above all, they highlighted the influence of context on leadership actions, techniques, and objects.

Thus, the rational path I take is that the complex nature of education is decisive in the ways in which knowledge about the educational system can be produced which differentiates methodologies and practices of leadership, management, and regulation.

The nature of complex systems has been uncovered by thinkers as Edgar Morin (1990), Ilya Prigogine (1997) and Paul Cilliers (1998), who argue that complex systems are non-linear and unpredictable and, so, that one previous experience does not guarantee the success of the following. This poses epistemological challenges, because in the view of complexity knowledge emerge from the interaction of several agents and, in that process, the uncertainty of outcomes remains constant, which means that the system cannot be capture by the sum of its parts, has a provisional matrix and claims for transdisciplinary and cooperative forms of knowing.

Likewise, concepts, methodologies, and practices are also challenged. Several authors (e.g. Hazy & Hul-Bien, 2013; Plowman & Duchon, 2008; Snowden & Bonne, 2007) have shown that orderly and predictable environments and complex and surprising ones call for different tools and techniques to lead, manage and regulate, or in other words, that the nature of contexts must be at the origin of practices. And in education, several authors (e.g., Burns & Köster, 2016; Fullan, 2001; Mason, 2008; Silva, 2019; Snyder, 2014) have been stressing that schools are, indeed, complex and therefore uncertain and non-linear environments, requiring new approaches to governing.

This suggests that the field of educational sciences would benefit from a systematization of constructs that gathers and contextualizes the characteristics and impacts of complexity in education. In this case, I specifically address my reflection to the processes that are at the heart of the government of education: leadership, management, and regulation. To clarify, I do not wish to address the concepts of leadership, management, and regulation, because they are tinted by several scientific perspectives and theories (some are even antagonistic) and such a task would be inconsequent. I am addressing my discussion to the constructs of leadership, management and regulation in educational settings through the lens of complexity theory. As a method, the choice of constructs is rooted in the rationality of Complexity Theory, as it offers constructive pieces with which agents can interact to interpret their contexts.

It was taking into account the ideas that I just briefly discussed that I produced this text, whose main purpose is to build a critical reflection that contributes to a discussion in which possible developments regarding the nature and purposes of leadership, management, and regulation can be considered, as well as their relationship with educational policies.

In my discussion, which I take as an essay, I begin by differentiating orderly environments from complex ones and by deepening the characteristics of complex adaptive systems, as translated in the day-to-day of schools. It is, therefore, from these characteristics that I will propose a set of constructive elements of the notions of leadership, management, and regulation, as understood in education.

1. Ordered Environments and Complex Environments

Due to the nature of complexity, the question about leadership, management, and regulation finds a first answer: what is the context?

The ground base to the answer to this question is the characteristics of the environment. Those will able us to designate the context as ordered or complex.

The expression ordered refers to organizational forms that rely on predictability and the expectation of linearity and causality - that the same stimulus originates the same result times and times. Therefore, the word suggests that a given organizational state can be repeated and reproduced by the same actions and thus that the future of the organization can be pre-established and planned - that there is a possible and unequivocal order.

In this type of contexts, the action of leaders and managers (as well as the policies that underlie them) is based on instruments that control diversity (such as procedures manuals, planning, hierarchies and goals) (Leîche & Lissack, 2009; Plowman & Duchon, 2008; Snowden, & Bonne, 2007), since there are clear and reliable predictions, agents agree on what is happening and how to act, and above all that the system can be known, that is, everything that happens can be reduced to factors and elements that can be analyzed and eventually reconfigured without the order of the system changing significantly. It is in ordered systems that good practices, for example, can be replicated, since the characteristics of the contexts are irrelevant, or that factorial quality models are implemented, those in which each of the factors is objective and measurable, and above everything, the assembly of factors fully explains the system - or, in other words, the system equals the sum of its parts.
The orderly contexts thus allow a leader at the top of the hierarchy to define a future and encourage employees to join a movement that ensures this vision. The focus of leadership, management, and regulation is to ensure the correct state of the organization and to mobilize processes so that any deviations are corrected (and therefore that reorganization processes are in place when needed). The known cases are mainly derived from large companies and refer to products that aim to translate a certain lifestyle. The term complexity, as Edgar Morin (1990) puts it very well, refers to what is woven together. Thus, in essence, there are the interactions between diverse agents, interested and with the capacity to act autonomously, which increases doubts about what is happening and the best way to act and value the context and the agents that work in it, because even with similar problems, resources, interactions and personal and collective experiences are different and the solutions are unique: uncertainties and single ways of acting emerge.

One of the essential points in complexity is, precisely, that agents are not passive or neutral, on the contrary, they interact with a purpose, to change, to build, due to needs they share with others; they promote spontaneous movements to create innovations - which attributes the adaptive character to schools. To this extent, the term "complexity" - when referenced to organizational environments - must be considered in its polysemic power: a network of free agents in interaction, with the ability to bring forth innovations (or adaptations).

Therefore, they are heterarchical systems - in which the control is distributed - because each one of its agents has influence over the results; with a self-organizing capacity, because these same agents do not need higher orders to act in reality - they do so because there are local challenges that arise as a consequence of interactive processes - and, therefore, innovations emerge, instead of being implemented.

As a result, complex adaptive systems are surprising and, by concept, what surprises cannot be planned. Equally, it is impossible to know the whole system given the amount of interactions, the dynamism between agents and, above all, the persistent and varied stimuli to which they are subject (a state called ‘far from equilibrium’). As Paul Cilliers (1998) clarified, it is a space in which the actions of one agent can alter the context of others - the system is much more than the mere sum of the parts. And these disrupt reductionist forms of knowing the reality because this would mean the absence of some components and the exclusion of everything that cannot be objectified and quantified and, in the view of complexity, exclude elements that act in the system, corresponds to eliminating exactly the factors that can explain it.

### Table 1. Features of ordered systems and complex systems

<table>
<thead>
<tr>
<th>Ordered environment</th>
<th>Complex environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predictable</td>
<td>Unpredictable</td>
</tr>
<tr>
<td>Linear</td>
<td>Not linear</td>
</tr>
<tr>
<td>It is possible to know the system and to reduce it to factors</td>
<td>Knowledge of the whole system is impossible</td>
</tr>
<tr>
<td>Hierarchical</td>
<td>Heterarchical</td>
</tr>
<tr>
<td>Organization and reorganization</td>
<td>Self-organization</td>
</tr>
<tr>
<td>Implementation of activities</td>
<td>Emergence of adaptations</td>
</tr>
</tbody>
</table>

With this differentiation in mind (Table 1), I join other thinkers (eg Fullan, 2001; Morin, 1999; Mason, 2008) to defend that schools and education are complex adaptive systems. Although some lawmakers determine linear and business processes, schools are spaces in which the main products (students, learning, citizenship) undergo frequent metamorphoses and are self-constructed and heterogeneous in a process involving relatively coordinated entities (ministries, municipalities, and executive directorates) and powers that work more by local, specific desires, dreams and challenges (students, families, community, and teachers).

In short, leading, managing and regulating complex environments have different foundations than those considered in orderly environments. It is, therefore, the elements that build the concepts of leadership, management and regulation that I dedicate myself hereinafter.

### 2. Leadership and Management

Leadership has been linked to situations in which it is necessary to move people and the organization into a new state. Therefore, it involves decision-making in the face of emerging and unpredictable problems (Day, 2000). A key point is that in the traditional view, leadership relies on leaders at the top of the pyramid who are always in control and have the

foresight to define the future - hence, to define the point of arrival and the journey. They resort to goals and plans to close the gap between the current state and the intended future and direct the change through the capacity to predict events – and they do so with the help of an exciting charisma. It is a leadership profile that is based on pre-determinism and linearity, which allows planning and execution of activities that, with great certainty, allow the accomplishment of goals and results (Plowman & Duchon, 2008), therefore, that acts in the expectation that the system is ordered.

In this process, for some the behavior of the leader is dependent on the circumstances of the organization (Fiedler & Garcia, 1987), others emphasize the leader's magnetism and the transformational character of leadership (Bass, 1985) or the ability to favor systemic and learner functioning (Senge, 2006). There is a point that crosses these various visions: leadership is a process in which a person (or persons), endowed with authority, acts, defining an ideal future and stimulating the employees to fulfill goals and activities that allow to reach that future - for others to change.

Here lies a point of reconstruction, because, in the context of complexity, the future is determined by the set of possibilities that emerge from the current interactions; and these take place according to the needs that the agents share and that motivates them to adapt to the context. It means, therefore, that several futures are possible - which defies the notion that the leader is the person who has a superior intuition and understands where the organization should be headed. In complexity the interactions between the agents are determinant for those paths.

Science has been showing changes in the nature of leadership, which underline its distributed character and which can be explained by contemporaneity. On the one hand, the model of transformational leadership based on charismatic leaders has failed, on the other hand, the distribution of power that comes from the culture of social networking, is translated daily into greater demands for sharing and collaboration and encourages constant learning (Hartley, 2007).

In a practical and educational-oriented image, teachers, students, and families are indeed capable of promoting change. They do this because they interact and discover needs that must be answered and that mobilize them - even if organizational objectives do not frame such actions.

Therefore, the reconfiguration and improvement of educational systems benefit from structures that interact with agents, such as the Alberta Initiative for School Improvement, which promoted innovations and developments in the education system of the Canadian region of Alberta and was based on a multidimensional architecture (Hargreaves, et al., 2009). The vertical dimension favored the emergence of innovations from the local realities (of actions of self-promoted change), which implied the involvement of the executive directions with the dynamics and proposals of the teachers and, therefore, a bottom-up intervention, based on the contextual needs. The lateral dimension promoted the connection between the projects of the schools and the educational territory, through differentiated interactions. The radial dimension of the initiative has added to the previous collaboration with universities and the approximation of theory to practice, which has contributed to the collection of information with divergent potential. And the time dimension, considered cycles of three years for change, which provided the conditions for innovations to occur from the locals and not by centralized initiatives or due to any political requirement for short-term results. This strategy allowed the focus to be on the long-term objectives rather than on the immediate ones and that, eventually, they might not be consistent with the intended course.

Above all, it must be taken into account that complex systems are relatively free and interactions do not require formal initiatives. For example, educational policies - designed to be objective and uniform - are interpreted by educational actors, who manipulate them to seek to meet collectively assumed local needs (Honig, 2006; Porter, Fusarelli & Fusarelli, 2015; Torres, 2011) and the interaction between teachers and students may lead to new and surprising ways of functioning (Silva, 2019), in the margin of top-down expectations, as it was the case of the Portuguese projects "Turma Mais" and "Fénix" which emerged from local actors (school networks) and altered patterns of pedagogical relationship (Justino & Batista, 2013) and subsequently were disseminated throughout the country.

These data suggest a new look at what happens around schools, because interactions can be the source of unexpected behaviors that can change the organization (Marion & Uhl-Bien, 2001; Silva, 2019; Snowden & Boone, 2007). The importance of course is maintained (people interact to achieve common interests) - the matrix of leadership continues to be the change and innovation - but Complex Adaptive Systems Theory questions the feasibility of pre-setting goals and outcomes and of focus action and change on a person invested with formal power.

Therefore, if leadership involves learning that leads to change and so that the organization can adapt to new unforeseen situations; and if the interactions have exactly that capacity, then it is the interactions that are leading (Marion & Uhl-Bien, 2001).

Thus, the essence of leadership is social and leaders are the individuals who influence the dynamics and the products - this is new and makes everyone responsible, because it includes the globality of the agents, both those who collaborate, as those who compete, as still those who resign from acting (Marion & Uhl-Bien, 2001). To that extent, leadership is
differentiated from executive leadership positions (Uhl-Bien, Marion & Mc Kelvey, 2007), which raises the question of the role of formal leaders. If leadership is not a person, what is the role of people who have power over resources?

The complexity of schools suggests that if interactions are capable of fostering innovations and changes consistent with the interests of schools, executive leaders must devote themselves to providing this emerging capacity. To that extent, executive leaders must, metaphorically, assume more of themselves as managers of spaces between people, than managers of spaces and people.

As for management, it has been related to the allocation of the resources of the organization, according to relatively clear procedures, so that the established goals and targets are achieved. Therefore, it involves the application of known and proven solutions to known problems and manageable circumstances (Day, 2000). What the complexity adds is innovation that is, in schools innovation is the known and proven solution - problems and circumstances will, however, be systematically new. In an image, executive leaders will always have to manage human resources, rooms, work times and other elements that require rationality and linearity - this is a wake-up call, that schools do not dispense efficiency and effectiveness because part of the tasks are in fact linear and administrative in scope –, however, the reasons for this management, the students, are in permanent change and go through phases of growth that are, from the point of view of the individual, new and that are transported daily to the classroom and to the relations with others. The stages of development and the teaching strategies and resources that teachers use may even be the same. But students will always be new, and they are joined by the possibilities and the diversity of human intelligence (Dumont, Istance, & Benavides, 2010; Gardner, 1993; Patten & Campbell, 2011; Sternberg, 1997).

So, the resources are managed so that teachers can intervene, diversify, and adapt to the needs of the students (Davis, Sumara, & Luce-Kapler, 2008; Jörg, Davis, & Nikmans, 2007) - and these may deviate from goals, preconceived activities or eventual futures to which the organization has committed itself in its strategic project.

Therefore, in the presence of multiple and uncertain futures, school management cannot be limited to providing resources, motivating goals and controlling pathways: it becomes a much more ethical action - because it deals with uncertainties that require the constant mobilization of values - and flexible - since it resides in contingent actions. In essence, school management is defined by the management of the conditions under which the agents interact (Snowden & Boone, 2007). It is the interactions that build the future.

Helen Timperley (2005) provided an illustrative case of how it was possible to transform pedagogical practices by changing the conditions that governed the interaction between teachers. In this case, teachers learned to interpret the available data on student performance and had the opportunity to reflect together and share pedagogical practices, which was the source of positive changes in their pedagogical intervention.

Darleen Opfer and David Pedder (2011) also offered us an insight into the challenges of complexity in dealing with educational processes. They consider that teachers' professional learning is deeply rooted to the complexity of contexts, which makes it an uncertain process, supported by factors (such as the organizational structure of schools, available information, beliefs, knowledge) that interact and result in nonlinear developments that cannot be reduced to a fixed model (See also the works of Vázquez-Bernal, Jiménez-Perez, Mellado, & Taboada, 2012; and of Vázquez-Bernal, Jiménez-Pérez, & Mellado, 2007).

And Silva (2019) showed how, spontaneously, teachers can change their pedagogical practices. In this case, a group of teachers included, throughout the academic year, the practical teaching of the sciences because there was a set of shared reflections (from the realities of the classroom) that pointed to the pertinence of this methodology - there were no top orders involved; there were, however, the conditions for teachers to interact from relatively autonomous grounds (learning rather than outcomes).

So, management in complex educational environments is devoted to managing the conditions under which agents (teachers, students, parents) interface in order to innovate, in the best interest of student learning and social development. And, as Russ Marion and Mary Uhl-Bien (2001) argued, formal leadership becomes effective when it is able to train interactive dynamics, it assumes that it is not always possible to predict or control the future and that the best and most sustainable innovations can arise from the interaction of aggregates of people and ideas. And this suggests that executive leaders, whether elected or appointed, should include the dynamics of interaction rather than dominate them.

3. Regulation

Regulation generally refers to sustainable processes of influence (directed towards objectives that may or may not be clarified) of some agents over others, involving the collection and use of information (Afonso & Costa, 2014; Black, 2002): “In a general sense, regulation is a form of policy. It is an expression of power, simply construed: it constitutes an attempt by one player to structure the behavior of others” (Afonso & Costa, 2014: 1).
Therefore, on the one hand, it refers to clear, publicized and politicized influences; but also to the influences that may not be codified or assumed, put into practice much more by shared needs, self-organized movements and hidden feelings.

And, necessarily, regulation is a process that integrates the rules that govern agents' actions, but also the appropriation of the same rules and how they are manipulated by local realities (Barroso, 2005).

Thus, it reflects the influence power of agents, both those who, as families and students, manage their futures, as those who formally adopt strategies to guide the future of others (state, municipalities, international performance and learning assessments).

In fact, the educational sciences have long emphasized the multiple and shared nature of regulation (e.g., Barroso, 2005, 2006, 2013; Maroy & Voisin, 2013; Maroy, 2009; Ozga & Grek, 2012; Souza, Castro & Rothes, 2013).

However, such a plurality does not mean that the instruments governing schools and educational policies integrate it. On the contrary, they seem to be underpinned, especially on relatively straightforward roadways that offer inflexible and orderly boundaries, which has its roots in the history of the political regulation process (see, for example, Bell, Hindmoor, & Mols, 2010, and Barroso, 2005).

In an early pattern of political action, regulation, govern, and governance are relatively undifferentiated, as the state acts through compliance mechanisms - regulations, norms, rules - that minimize the regulation of schools to control and verify compliance with state laws.

What differentiates governance from regulation is the time mechanisms are implemented, governance as a posteriori control. Thus, the expectations inherent in this type of regulation are those of a predictable and controllable system and the rationale is that schools are administrative in nature. In this context, schools are limited to ensuring that the letter of the law is put into practice.

In a second pattern, regulation occurs through coordination among actors, through the establishment of goals and objectives that, allowing some contextualized solutions, regulate schools through the results that are achieved and the processes that are implemented. It is a kind of regulation that holds out expectations that the system is ordered, although it involves deeper efforts to understand it, insofar as cause-effect relationships are not so obvious and slightly different solutions are possible. It is the case of regulatory instruments such as external evaluation or the use of comparative results (such as school rankings), which define a cognitive framework that can be used for agents to reflect on school quality - a knowledge-based regulation tools (see, for example, Costa & Afonso, 2009; Ozga & Grek, 2012).

Thus, this type of regulation apprehends the school as a business organization, in which it is possible to achieve exactly the desired results so that the agents accomplish the activities aimed at achieving the goals - therefore, the result appears as the point of arrival of a linear and causal process. We have many indications about the limitations of this way of acting.

For example, Emilia Szekely and Mark Mason (2018) showed how, in India, educational policies aimed at promoting the right to education and the quality of education were in some cases leading to school drop-out and jeopardizing the continuity of schools serving the population - due to static and insensitive forms of regulation to the context.

The country has implemented a system of support and incentives for education and training projects based on student presence, hours attended and performance results.

The project the researchers studied was an initiative that was dedicated to students from nomadic families and essentially rural communities. In this context, the number of students' hours of attendance varies, either because the families move, or because at the time of harvest the students attend less. Since the targets are not being met, the initiative should lose funding; therefore, it will have to choose between losing funds and the ability to intervene, or losing the students (who will not stop be nomadic, for example).

Incoherence lies in the benefits of the initiative when faced with the goals of the legislation, because there has been educational success and, at the same time, children and young people have access to other essential services (drinking water and health services).

Thus, the legislation, in this case, promotes exactly the opposite that led to its implementation; and the initiative is consistent with these objectives, although it has no way of meeting the established targets.

The same inconsistencies can be found in other regulatory mechanisms that are based on expectations of order and certainty - therefore which expect linearity and causality - such as the intervention of educational inspection or school rankings.

Several countries have implemented processes for the external evaluation of student learning (through examinations whose results influence the classification and progression of students and which can be used to evaluate schools and
teachers), based on linear beliefs that this process would lead the inevitable improvement in the quality of education and would mean an increase in the rigor and equity of the system. However, this logic of predictability has been challenged by scientific data showing that the external assessment of learning has had more negative than positive effects. For example, they can lead to the narrowing of the curriculum - the backwash effect - which reflects the tendency of teachers to focus teaching on what they expect to be assessed in the exam and, therefore, minimize other areas relevant to student learning, treating them superficially. (Abu-Alhija, 2007; Fullan, 2009; Madaus, Russell & Higgins, 2009). In this case, only what is examined is taught, with no guarantee of effective learning (Shepard, 2000).

Besides, exams can lead to the production of classifications that compare schools and teachers, which can have adverse effects on educational politics, organizations, communities, and teachers (Carvalho, Costa, & Sant’Ovaia, 2020; Madaus, Russell & Higgins, 2009), far from guaranteeing social equity (Au, 2008) and can be the source of parallel education, which favors students whose families are economically privileged (Bray, 2007).

About schools external evaluation, Twist, Steen, Kleiboer, Sscherpennise and Theisens (2013) studied the case of Dutch primary school inspectors intervention, which is based on the principle of deserved trust: schools with satisfactory academic performance results benefit from minimalist accompaniment and maintain their autonomy; and if performance indicators point to negative outcomes, schools are closely supervised by inspectors (which the authors consider as top-down intervention).

Interventions have varying levels of success: several schools have improvements, others see the situation persist and in others, the situation worsens, because the mere attribution of an "insufficient school" seal has repercussions with the community that sometimes leads families to seek out other schools for their students, which means that some schools under intervention have to deal with students who are not able to look for other establishments and who are also usually the students with lower academic results and with less economic resources.

In addition, other schools that are not being accompanied enter into the universe of weak or very weak schools. Researchers attribute this effect to the linear and cause-and-effect strategies used by the inspectors, which do not seem to fit the school context, since they do not take into account the often subtle dynamics that influence educational organizations.

The cases indicate that the system of signaling and intervention in weak and very weak schools is subject to dynamic cycles and not to linear patterns, that is, the interventions have effects that, in turn, initiate dynamics that also have effects and whose results are unpredictable - and the same type of intervention can achieve results contrary to the intended.

And in Portugal, the media mobilized the results of national exam results to organize school rankings. These instruments, who do not have the capacity to convene other social indicators, have increased the search for better performing schools (Nunes, Reis, & Seabra, 2015), which may lead to the ghettoization of educational organizations serving populations with no capacity for demand. Also, the country has implemented a system of external evaluation of schools based on the results of student performance and organizational and leadership processes.

In a very interesting way, we found that a certain linear causality vision that these measures show - that the evaluation of schools based on external models permanently leads to quality gains - is called into question, since it can be the cause of the deterioration of social expectation in relation to specific schools and the consequent change in their social composition and internal culture, without even being able to respond to the needs of all agents.

In fact, the use of the results of external evaluation of learning to guide family decisions and compel schools to improve and attract "customers" finds limitations, exactly, in the complex character that involves the decision of students, families, and communities (Román & Murillo, 2014). Above all, the conception of what "quality" is based on very different factors, some more objective (school results), others more subjective (pleasure in learning, relationship with teachers, student happiness, promotion of civic values and citizenship) (Román & Murillo, 2014). So, what are the elements that favor the regulation of educational policies?

The data indicate that its impacts are positive in the organizational structure of schools (in documents, processes, and bureaucracies), valuing uniform profiles of acting, but with little learning outcomes (Santiago, Donaldson, Looney, & Nusche, 2012).

What these cases demonstrate is that the regulation - which I will characterize as commercial - does not seem to allow adaptation. It seems that schools that regulate themselves and are held accountable through these mechanisms adapt to control, instead of adapting to the context.

These examples reflect systems of compliance to results established a priori and at the top of the hierarchy and to that extent appear to be limiting the ability of agents in the field to reflect. To a certain extent, there is the phenomenon of proletarianization (Pavan & Backes, 2016), in which agents act by focusing on interests that are determined superiorly,
even if they are not coherent with the needs of the context and the established objectives. Perhaps it is to this process of reducing spaces of reflection - and therefore of manipulating the influence that agents seek to have - that João Barroso called the regulation of regulations.

Here I need to highlight an important standard: the instruments of regulation such as the external evaluation of student performance, the comparison, the external evaluation of the schools and the checklists of compliance of the legislation are aimed at regulating what is known and, to that end, in reduce the system to factors that can be quantified. Such type of instruments seems to have born from new ways of political action that were stimulated due to new social understanding of public capacity (Gunter, Grimaldi, Hall, & Serpieri, 2016; Maroy, 2009).

In recent decades, political decision-making seems to have come to be accepted more as an extended process of construction and deconstruction involving multiple and necessarily more flexible actors (Commaille, 2004), which has led to the need to open public and consequently, of producing instruments that structure the conduct of the actors according to interests considered superior by the policy makers. However, this political delegation (Latour, 1986) is limited to regulating through knowledge such as the Programme for International Student Assessment (Costa & Afonso, 2009; Grek, 2009), good practices and external evaluation of schools (Ozga & Grek, 2012). In this case, the information is defined and limited by the instrumental and political character that it possesses.

Yet, it can be recontextualized by the volitional dynamics and interactions that agents in the field establish. In the context of complexity, it is assumed that it is impossible to know the whole system, and therefore knowledge is always contingent and incomplete; that it is not possible to know or control all the elements that are operating and to influence the future. In schools, agents deal with information, interactions, and surprises that go beyond the indicators used in legislated and formal regulatory processes.

And since educational environments are composed of innumerable and autonomous agents, it is not possible to coordinate the actions of all of them. This is an essential learning of complexity.

So the system must be regulated by coherence, the point at which even agents that are not coordinated with each other act through feelings of interdependence - that it is not possible to achieve, separately, goals, needs or dreams.

**It is, therefore, the coherence that defines the regulation of complex adaptive systems**, which challenges instruments that, at the level of schools, limit interpretation and knowledge, exclude parts of the system or disdain the influences of less visible actors.

Coherence is a working mechanism since in complex environments it is not necessary to have concordant responses (that is, exactly to the expectations of the formal leaders), but responses that are coherent with the objectives of the organizations are acceptable.

Surprises are not regulated!

The difference between coherence and agreement is all the more important when coherence can be at the origin of collaborative work capable of satisfying personal and professional needs.

Regulation, thus understood, accepts coevolution and can contribute to the schools pursuing liberating paths, because it assumes itself as a space of interests sometimes shared, sometimes contradictory, in which spontaneous actions are taken, whose agenda emerges from the local reality, now strategic and founded on ideologies.

### 4. Conclusion

I wanted to discuss the elements that build the constructs of leadership, management, and regulation, because they are linked to a praxical matrix, which aggregates the theoretical foundations and the actions - therefore, they have reflections in the day to day and real impacts in the societies.

This discussion was based on the idea that different contexts give rise to different constructs, particularly that schools are complex and adaptive environments where, naturally, different forms of leadership, management, and regulation must be mobilized than those used in orderly and predictable environments such as corporations or factories.

That is why, in education, leadership must be based on the power of change and innovation that interaction have, rather than on changing the individuals - following interactions, rather than following leaders; management should be geared to handling the conditions of interaction between agents - which does not exclude the need to effectively manage other resources; and regulation is defined by the stimuli to coherence - and not so much by the stimuli to conformity (Table 2).

In a metaphor, it is not the gap between the current state of the organization and the future that is to be attained that we should mind about; it is rather the gap between the nature of schools and the instruments, strategies, and processes of leadership, management, and regulation because the visions that take schools as ordered systems are no longer able to withstand the events and characteristics that underlie complexity.
To that extent, paths to research should be developed, those that can lead to new, innovative or renewed objects of leadership, management and regulation.

For example, due to the human dynamics schools are upon and the unknowable essence of complex systems, the implementation of reforms and activities is always challenged because, to a considerable extent, it deals with uncertainties. Thus, policy options become much more experimental and contingent and call for ethical principles. Therefore, a field of research that will have to emerge is about the characteristics of this experimentation and the ethical horizons that can guide governance in education.

Another refers to the multiplicity of stakeholders and the need to create coherence between actions. So far, leaders and managers have been using tools and instruments to ensure stakeholders’ mobilization and that goals and objectives are achieved. However, these tools and instruments are causal and linear and, therefore, no longer capable of responding to unpredictable situations and people who assume spontaneous leadership roles. So instead of instruments and tools, education lacks objects (in the psychodynamic sense of the term, where objects are elements that, through interactions, enable development and relationship with the world) that facilitate interdependence and the cohabitation of various visions. It will be up to educational science research to discover what characteristics shape such objects.

### Table 2. Elements that build the concepts of leadership, according to the typology of contexts.

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<th>Features</th>
<th>Expectations</th>
<th>Management</th>
<th>Leadership</th>
<th>Regulation</th>
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<tr>
<td>Ordered</td>
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<td>Administrative</td>
<td>Implementation of decreed processes</td>
<td>By administrators</td>
<td>Comparison</td>
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<td></td>
<td>Central control</td>
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<td></td>
<td>Linearity</td>
<td>Business</td>
<td>Resource handling in response to known situations.</td>
<td>By executive leaders</td>
<td>Coordination</td>
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<tr>
<td>Complex</td>
<td>Unpredictability</td>
<td>Adaptive</td>
<td>Management of interaction conditions</td>
<td>Interactions lead</td>
<td>Coherence</td>
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<td>Distributed control</td>
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<td>Non linearity</td>
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In the last analysis, complexity emerges as a challenge for educational policies, insofar as they define the forms, structures, and conditions that govern interaction among agents, which suggests a conceptual redefinition: educational policies are, mainly, political of interaction.

**References**


**Author’s Biography with Photo**

Nuno Miranda e Silva, has a degree in Sports Sciences from the Technical University of Lisbon, Master in Educational Management and Administration, from the Open University and is a PhD researcher in Educational Sciences in the Research Center in Education and Psychology at the University of Évora. He has developed research in the areas of educational policies and educational leadership in the light of Complexity Theory and projects and research in the field of sport and its relationship with social inclusion. He has published books and articles on these research areas.

He is a teacher of Basic and Secondary Education in the Montemor-o-Novo School Grouping, and a teacher trainer. ORCID ID: 0000-0002-3574-7679.