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Interdisciplinary Tradition

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ABSTRACT: *Based on information from the Brazilian government, the article discusses the advancement of the interdisciplinary field on specialist studies, especially in relation to master's and doctoral courses in Brazil. From Walter Benjamin's concept of experience, the article reflects on the possibility of creating an interdisciplinary tradition that helps in understanding the uncertainties of the present.*
Keywords: *Interdisciplinarity. Tradition. Education.*

I. INTRODUCTION

The interdisciplinary field is not yet a consolidated area as a research area. In fact, it is viewed with disbelief by a substantial portion of the academic community. Part of this mistrust stems from the fact that interdisciplinary thought admits the transposing of fields of interest that are seen as sacred. On the one hand, interdisciplinary reasoning is regarded as a secular activity invading paradigmatic knowledge, on the other, it is controlled by groups of distinct interests within departments.

However, it is worth both challenging the boundaries and entering the interdisciplinary field to think about the relationships enabling the building of bridges leading the connection of knowledge with the clear objective to propose solutions to regional development. However, before we get into the focus of this article, we need to step back in order to envision the dynamics involving Brazilian education.

The interdisciplinary study has received much attention from agencies running education in Brazil. The Ministry of Education has promoted several actions to strengthen the growth of the interdisciplinary field. I will mention some of these initiatives because I believe they show in many ways that there are advances within interdisciplinary area. Capes, an agency of the Ministry of Education, which regulates graduate studies in Brazil, has regularly approved master's and doctoral programs in the interdisciplinary area. These are master's and doctoral academic or professional programs. The committee of the area was created in 1999 and has 433 programs today, divided into 231 professional master's degrees, 110 academic master's degrees, and 92 professional master's programs. There are also 97 programs combining masters and doctorates. The interdisciplinary area is the one possessing the largest number of graduate programs. So, this is an area showing the highest growth among all, despite being relatively new when compared with the other areas. To draw a clear picture of the subject, the second largest area is Education, with about 244 programs.

Within the sector of graduate studies, there was robust growth and it is noticeable that the area has still space for further increase in number. As for the undergraduate level, the numbers were less visible. However, one can associate this fact with the creation of higher education courses in technology. Though not being properly interdisciplinary, technological courses have opened up the possibility of carrying the experience into the Higher Education Institutions (HEI), and that was a novelty. Although planned since the 1970s, these courses remained in limbo for more than 30 years and only from 2000 on, they became part of the daily routine of the university life. Data from INEP (National Institute of Educational Studies and Research) report that these courses grew by 74.7% between 2000 and 2002. Neglected by the network of the federal universities, they flourished with the growth of private Superior Educational Institutions, along with the 2005 expansion of the network of Federal Institutes.

II. THE BARBARIC PRESENT

Walter Benjamin wrote that the barbarian is the individual who is able to establish a tradition of his own. Those were the years of digestion, but gradually, you can understand the author's thought in the form of aphorisms. The barbarian does not have history and, therefore, he needs to start a tradition of his own from the present, because he was denied a past. In other words, the barbarian does not have as past.

When we think of the idea so often repeated by theorists who have directly or indirectly studied the themes of Postmodernity, we find the echo of this passage of Benjamin's reverberating in many ways. One realizes the need of both the individual and society to establish themselves before new conditions, within which the past cannot provide experiences of continuity.

Since the tradition of rupture by Octavio Paz, when one starts thinking about the tradition of the present, the social formations need to reinvent themselves in many ways, not to mention that one needs to

reinvent oneself in every way. On the basis of this philosophical shift of thinking about tradition, is the devastating impact of new information and communication technologies (ICT). These occurred from the 1980s on (as a continuation of those changes perceived by Benjamin in the 1930s). Benjamin found out that technology was able to mechanically reproduce art in a way that the work's unicity could no longer be thought of along the lines of the past. That would bring (in fact, it brought) a dilemma for one to think about art forms and the very culture in the dynamic 20th century. Later in the 1980s, the changes promoted by ICT opened the field of action that prompted a change of base influencing both social and political changes, namely the digital culture. Digital culture modifies the way people live their lives and, therefore, transforms the way society lives its own culture. Cultural construction is collective, but only possible within the social bell jar.

Benjamin's initial lesson suggests that barbarism builds civilization from the rubble of World War II. This event has opened the minds of people with a lot of destruction, but also with a lot of technological innovation, such as the development of atomic energy, the creation of computers and the invention of new materials. The possibility of a new form of society based on ICT is born from the rubble of the destruction caused by a war that almost destroyed the entire human race.

In order to understand the barbarian's function in the world today, let us reflect on the figure of a parent who cannot teach or pass on his or her experiences to the child. This happens because the parent him/herself sees the current world as estrangement. In fact, the parent does not fully understand how past experiences can be used in a world which no longer takes these experiences into account, especially when we think of the experiences related to the world of work.

In the wake of these changes, we find the need to create an education different from that practiced during the war. We must forget the past and move on. One of the dearest perceptions during the war was precisely the one based on the collective experiences shared by brilliant people with different educational experiences. The collective work of physicists and biologists, social scientists and philosophers, allows us to look, for example, at the environment from another perspective. An expert can see in the environment a specific research field. However, a group of people with diverse interests can see the environment as a multidisciplinary body of concern and, as a result, interdisciplinary view becomes naturally necessary.

(...) There are certain problems that are beyond the boundaries of a single discipline. Far from being marginal, these problems are often central such as, for example, the environment, health and energy. There is an asymmetry between the development of problems and the disciplines. This asymmetry is accentuated by the fact that the development of fields and disciplines is determined by the increase within specialization. Ecological problems are complex and can be solved only through the cooperation of many disciplinary skills. The same applies to energy and health. However, this means that the term interdisciplinarity deserves emphasis, not only as an elegant ritual, but as a force that proceeds from the development of their own problems. (...) In other words, if one invests in interdisciplinarity in order to restore greater disciplinary orientation or to increase factual cognitive interest inside or outside certain fields or disciplines, one thing stands out: the properly understood interdisciplinarity does not allow switching between the fields and disciplines. Interdisciplinarity should not hover above the disciplines and fields, as an absolute spirit. (MITTELSTRASS: 2001: 496-7)

The asymmetry highlighted by Mittelstrass between society's problems and disciplines lies in the fact that the problems have their own speed. On the other hand, the disciplines are tight and have historical commitments with different contexts and not necessarily with current events. While disciplinary study in depth allows growing specialization to happen, problems require multiple thinking involving people with different backgrounds and experiences proposing solutions to complex problems.

However, also according to Mittelstrass, there is a need to challenge the role of interdisciplinary interpretation. This is required because to consider it above the disciplines, from an absolute view, will not serve to build a new field. This will not allow the foundations of a new field to be able to respond to complex problems derived from an equally complex society that started to live with the constant increase in the speedometer of events and information. This kind of speed increases the need for actions pomoting the solutions of problems with this kind of dynamics. One cannot but say that the speed of life has been changed by the extensive use of ICT, which affects, as was said earlier, the constitution of culture itself and, therefore, of society itself.

III. INTERDISCIPLINARY IN ACTION

After the technological advances observed during the Second World War, several modern essayists began to emerge, also called journalists, who with cunning and wit observed that experts "knew more and more about less and less." The criticism started from the Academy and had an exact destination: the new intellectuals who were sheltering in the emerging post-war press. However, in fact, it was a more ancient thing.

Michel de Montaigne, considered the first modern essayist, already practiced a discourse that wandered into various subjects and visited quickly a diverse range of theories and philosophies, often mixing them.

However, that which was seen as an eccentric philosophical exercise practiced by a philosopher was, in fact, a lonely work and for many should remain so.

In just over half a century, between the late 19th century and the 1950s, the press turned into a real "headache". It was not one, but tens, then hundreds, and a little more time, thousands new intellectuals ensconced behind modern machines (for the time) talking and writing about various subjects. To date, the academic world seems to view with suspicion the quick and agile text that dominated the newspapers for about fifty years. To further intensify the debate came the internet in the 1990s and, then, the "headache" has become a constant magraine.

In this context where modernity appears as the new tradition, breaks out a highly interconnected world, uncertain or even drifting. As a result, the notion of interdisciplinarity suggests the possibility of learning "more about more", going further than the expertise allows. The growing concern shared on society's multiple and multifaceted issues are giving rise to a debate on the effects and appropriate responses that higher education can make in order to create the foundations of a project capable to answer related questions. For instance, both sustainable economy and development as the foundations of higher education through the innovation and the application of new technologies in carrying out studies or creating solutions (products and services) highlight the competences and skills of the actors involved in this process.

The move from both sustainable economy and development to regional development is a small jump. Here, the idea behind sustainability involves meeting the needs of the present without compromising the satisfaction and the needs of future generations, this being a key challenge in the 21st century. Therefore, this has to do with developing life skills and sustainable work, transforming that in a value that is able to promote sustainable regional development capable to ensure that the main goal is contemplated and that this goal is linked directly to economic and social progress.

But how do we come to interdisciplinary use properly?

Let us remember that the word "discipline" comes from the Latin "discere", meaning learning. Discipline has been used since the Middle Ages to represent a way of ordering the knowledge for teaching and learning. Therefore, one can think of discipline as a space of thought and this space enjoys some stability and autonomy paving the paths of research of the philosophical and scientific problems (ARUM, 2004).

Thinking disciplinarily or interdisciplinarily, besides being a methodological option, refers to a philosophical option, as one leaves a space of thought and meets another space for reflection. In that other space, we will find multiple and multifaceted issues, with a marked degree of complexity because it is a field in progress. And so, the disciplinary field connected to the space of specialized thinking gives way to the field of uncertainty and multiplicity.

The disciplinary field is the space of regularities and tradition, where there is past, present and future. So, there is a 'natural' flow of tradition. Tradition exists when there is structured continuity. On the philosophical level, there is tradition when one realizes the logical existence of the dialectic, which is manifested in the historical background of a discipline that possesses past (thesis), present (antithesis) and future (synthesis). In this case, the advancement of knowledge takes place when occurs a tension between the knowledge of the past and the knowledge produced in the present. The result of this tension or tensions projects the evolution of knowledge in the future. We're talking about control.

When we have well-defined and controlled boxes on the past (the first box) and we know the state of the art on the present (the second box), we will have, or we may have, or we may predict or control the future knowledge (the third box). Here, we begin to understand that there is a philosophical criticism when one says one needs to think outside the box. Who needs to think outside the box? Who invented the boxes? Where do these boxes come from?

Box here can mean paradigm. The term is a free translation of a thought pattern or a standard model. Paradigms are vital to dialectical thinking. The past (thesis), the present (antithesis) and the future (synthesis) are their standards, which, over time, turned into their own boxes and these are their own work tools. It is curious to hear theorists saying that one needs to think outside the box, as they want to preserve some kind of dialectical movement. Classically, dialectics is the river movement that Heraclitus observed and was surprised to find that the water passing at a certain point of the river (above) was not the same water elsewhere in the river (below). It was the same water and the same river, but another water, completely. Knowledge transforms the water at the point above. It learns from the action of current (act of knowing) and modifies itself into something else in the future or at the point below. Thus, it produces its evolution, as one climbs more steps in the ladder of knowledge of things.

The understanding of the dialectics from this perspective ceases to be a complication or a mystery. In fact, here we understand why the new French philosophy, based on the Nietzschean thought, abandons dialectics when it needs to think about the multiple faces of today's society (from the 1960s on) called Post-Modernity or Information Age, or Neo-Baroque Time.

In this sense, one must realize that the interdisciplinary field provides discontinuity, ruptures and drift. However, interdisciplinarity provides a means to transform negative concepts into positive ones. For example, for a long time between the 1960s and the 1990s, one reflected on discontinuity, rupture and drift. It has become common to notice a certain decadent, disillusioned and even dark air within the theories of Postmodernity. The interdisciplinary field grew under the sign of that thought taken as negative. However, network society began to provide unusual answers so that hitherto negative concepts started to be seen as an opportunity of rethinking, without the burden of determining the past.

Thinking outside the box has recently brought out the so-called disruptive technologies. And what is that? The term "disruptive" refers to that which disrupts, changes or interferes; to that which is inappropriate, inadequate or inadvisable. Let us see how this happens in practice.

The meaning of the word "disruptive" is clearly negative. However, the concept used in the Internet age is positive. Let's see how this works. The meaning is dated (it belongs to the disciplinary world) and refers to a world where everything, which breaks or changes, is inappropriate. This is how culture works: inside the old box of modern paradigms, disruption is inappropriate. Today, disruptive technologies or innovations based on disruption are desired because they are able to bring out answers outside the box, which are able to create products and services. And these technologies are called disruptive because they have no past. They are born as a barbarian, with no past, but are intended to create a tradition from within themselves. That is, they are their own starting point. Here's an example: internet together with various services and related products are considered disruptive innovations because they are neither an evolution or a development of things that existed previously (which could be recognized as its past) nor do they have ties of continuity.

Since then, disciplinary thinking confronts difficulty to frame these innovations. From the traditional point of view, these innovations have neither content, history, nor continuity, or are regular. They are understood only from their present. Their present is continued and changes in a very fast way. The pace of changes still makes disciplinary approach difficult because when one starts to learn about them, they move and change, sometimes radically.

I used an example from the technological environment. However, I could have used examples from emerging gender studies, or from the environment and sustainability, or from the emergence of educational changes. Anyway, we live a period of disruptive innovations and, of course, there exists resistance to the debate on transgender, gender equality, sexuality, environmental preservation issues, food waste, the expansion of areas for agricultural and livestock farming, the emission of gases that cause the greenhouse effect, the overconsumption, the extensive use of plastic, recycling, the resurgence of diseases associated with poor sanitation. All this mixed is what we call a multifaceted society.

IV. EDUCATIONAL ENVIRONMENT

With the loss of space for the disciplinary, there emerges and expands the interdisciplinary study. In the educational environment, both the subjects and the ways they are organized are questioned. From the 1990s on, several pressures on the disciplinary grid started to appear. Grid refers to prison, but today one uses the term to refer the set of disciplines of graduation of matrix. The matrixes should be turbinated in order to give account of complex issues of our society. These complexities are known as legal requirements. They are considered legal and should be discussed with students in disciplines, integrating projects, or transversely. Some examples: issues of citizenship (all questions assisting the development of awareness of the problems of society, especially the issues of human rights), sustainability (quality of life, HDI, food production and conscious consumption, environmental preservation, recycling, sanitation, etc.), sexuality (transgender, the right to use the social name, homosexuality, gender equality, etc.), internationalization of curricula (due to global competition one needs to align national learning to its global dimension).

Although all this exists on paper and is required under specific laws, and must be included in undergraduate programs, discussions on the issue rarely occur. Our teachers are, in most cases, disciplinary professionals. As a result, they end up leaving aside these questions because they do not feel well-equipped to, or do not want, approach certain issues. Or, they do not agree with the requirement, have differing views on the issues, do not consider the questions relevant; finally, there is an apologetic rosary not to conduct the debate of these topics in the classroom.

Disciplinarity X Interdiciplinarity

At this point, we come to the time to oppose the actions of disciplinary to those of the interdisciplinary system within the environment of teaching and learning. Within the educational process, it is very difficult to tell teaching from learning. However, it is clear that, teaching emphasizes disciplinary practice while learning highlights the interdisciplinary environment. There is also a clear difference in the emphasis of the actors involved in the educational process: the teacher plays a crucial role within teaching; when it comes to learning the role belongs to the learner.

Every educational system needs the support of a method. One needs to diagrammatize things so that we can understand that the use of the method defines institutional choice or teachers' choice within the classroom space.

Disciplinary system

It utilizes conventional methodologies and is based, above all, on lectures. It insists on a communicational model that replicates the model of one to many. A teacher speaks and the learners listen to him. This is the all-mighty model of analog communication process of newspapers, radio and television. These media are in crisis for some time because, above all, they are inadequate to the digital world and the restrain the use of new technologies. By the way, the media that avoided the crisis are precisely those which have left the analog matrix and have adopted a multi-platform model, which has brought, invariably, the digital matrix to their business.

It is never too much to say that most teachers defend the disciplinary method, even if it is done covertly, without requiring any public demonstration on the subject, because next to it is the tradition. It is easily understandable that the method gives teachers *status quo* and provides them with security and confidence that work relations will be preserved and protected at all costs.

Here, are some features of the disciplinary system: its practice is stable and regular; its results are predictable and stable; its narrative is linear, with a beginning, middle and end. Therefore, it becomes a familiar and comfortable narrative; its practice is controllable, because it knows where it wants to go; its content ensures accountability (both the learner's and the institution's evaluation systems are scheduled to the disciplinary model); therefore, the system ensures the maintenance of work relations, because one knows what one must deliver (to both the learner and the institution), which ultimately vitiates the entire system, turning it into an inducer of resistance to change.

For institutions, the application of the disciplinary method is comfortable. This is due because any change may interfere with the teachers' working hours. However, for the learners, there seems to exist a growing consensus that we need to change something that contributes to decrease the gap between society and the classroom.

V. INTERDISCIPLINARY SYSTEM

This system uses non-conventional methods such as the so-called active methodologies. Active methodologies (subject to be explored below) reproduce a communicational model that replicates the model of many to many. The teacher ceases to be a teacher and transforms himself into a mediator. The teacher listens to the learners more than he speaks to them. Or, he speaks in the same proportion in which the learner speaks. This is the model speaking a language more akin to that on internet or, more specifically, to that on the social networks, where one can chat, research, speak and be heard, and all at the same time. For the unaccustomed teacher, this is an uncomfortable model. It is so, initially, because learning is developed by all those involved in the process. Above all, interdisciplinary system implies the recognition that one is dealing with a change, which challenges authority.

Few teachers advocate the meth. However, most learners already realize that it is necessary to change the power relations within the classroom. They suggest that improvement in the quality of education undergoes such a change

Some features of this system include: unstable and irregular practice; unpredictable and unstable results; non-linear narrative. Such a kind of narrative requires successive restarts on the thorniest issues, generates repetitions, and constructs narratives unknown previously. One must wait for their evaluative cycles if one wishes to measure its results. Its practice is poorly controllable. This is due to the fact that one cannot know where it will arrive. The contents do not always guarantee good results because when one practices interdisciplinary language one seeks to understand specific things with objective purposes and not only to understand theoretical models. In this case, theoretical models are starting points, not arriving points.

As for accountability, it is worth saying that both the learners' evaluation systems and institutional assessment are not yet scheduled for the interdisciplinary system. As a result, the system does not guarantee the maintenance of teachers' labor relations, because one cannot know exactly what it takes to deliver (to both the learner and the institution), what ultimately leads to instability. The system transforms because it is an inducer of change. It requires changes both in the teacher's and the learners' profile, leading them to be more active in solving problems. The system has a substantial load of disruption because there are not many echoes to be reproduced. Such a lack creates suspicion, given that the chances of error increase much in the absence of reliable references.

For institutions, the application of the interdisciplinary method is uncomfortable and inconvenient. The changes affect the teachers' working hours and messes with their business model. In the case of public education, interdisciplinary methodology requires collective work, which can be thorny and challenging. For the learners, the gains provided by interdisciplinary activities are visible because products and services can be

developed. Besides, theoretical models can be tested and this contributes to emancipating the learner, turning him/her into a problem-solver. And it is precisely this professional profile that organizations are lacking.

Interdisciplinarity and active methodologies

Active methodologies have the purpose to develop the process of teaching and learning with a focus on the broadening of learners' autonomy. They are based on the improvement of the ability to identify, describe and solve problems occurring in daily professional practice in different areas of knowledge.

One can say that active methods seek to better learning. This may take place by applying real and/or simulated parameters, building interactive processes of knowledge, analysis or research. From this interweaving come individual or collective decisions-making, in order to find solutions to a given problem.

The implementation of active methodologies places the learner at the center of the learning process. The content shares importance with the development of skills and competences. In general, this means that knowledge is not enough. One necessitates to know how to apply knowledge, skills, to solve problems alone and learn more autonomously. The idea is to transform the learners by giving them the opportunity to be more creative, innovative, while learning how to solve distinct problems. This allows the learner to systematically live with a more efficient educational method. As a result, the learner becomes better prepared to face the unexpected, the surprising and the unpredictable.

Types of active methods

1. Case study (building a case study).
2. Problem-Based Learning (PBL).
3. Project Based Learning (PBL)
4. Conceptual Map
5. Peer Instruction (PI).
6. Problematizing Methodology (This is the recombination of Paulo Freire's ideas and the *Arch of Maguerez;* parallel and/or supplementary application of active methodologies).

Active methodologies have been used since the 1950s. However, in Brazil, these methodologies have been neglected and have never been used systematically and uniformly. Since 1990, the Ministry of Education has encouraged higher education institutions to incorporate diverse methodological actions in order to both improve the quality of education and join the organizations' daily routine and the classroom's dynamics together. The too theoretical profile of most teachers is due in part to the graduate studies' detachment from undergraduate education. It also shows one of the main characteristics of research carried out in Brazil, which is mostly theoretical, reinforcing the gap between teaching experience, basically theoretical, and the extremely dynamic reality of organizations.

This gap also shows the need to instigate the educational institutions to revise their models. Seen as too traditional, educational institutions are challenged to establish cross-cutting, interdisciplinary practices and to use active methodologies that are able to reverse the lack of interest of students who feel discouraged with lectures and the lack of action in the classroom.

The combination of the active methodologies of information and communication technologies is a way to strengthen the participation of young people. The use of ICTs highlights the presence of new concrete and operational elements leading to strengthen the trend regarding interdisciplinarity. The information avalanche provides data for the innovation that takes place in an unprecedented rate in human history. This innovation demands segmentation to occur in the production of knowledge, because one person cannot keep pace with innovation in more than one field of technology. Segmentation, or specialization, is inevitable in this context, but it becomes useless if there is no interdisciplinary integration.

A concrete example of this situation can be seen when we observe a team of multimedia production. In order to be updated regarding software, hardware and production systems, it is necessary that each of its members is updated on his work field because it is unlikely for anyone to be updated in all areas. However, in order for this individual update to become efficient and functional, this must be integrated collectively. Without this integration, specialization does not make sense. The same phenomenon begins to happen at the theoretical level, as interdisciplinarity is already an important tool undisputed by the nature of academic work.

On the other hand, and complementarily, government pressure on higher education institutions began to occur (from the 1990s on) at a time during which the discussion of globalization and internationalization of the curriculum became more systematical. None of this happens by chance.

Higher Education Institutions (IES) are concerned with the so-called curriculum internalization. However, more important than signing an international agreement that will be shelved or eventually used, other aspects demand adjustment. For example, the expository method is not hegemonic in the United States or Europe. If a foreign student comes to study in our institutions he will feel uncomfortable with the number of

both classes and hours that will be stuck in the classroom. To say the least, both research and development of projects are far short of the minimum standards that the diversification of the national education needs. On one hand, this turns the curriculum internationalization into a challenge for our higher education institutions. On the other, it requires investment in teacher training, technological infrastructure betterment and the development of a attraction policy of youth. Another difficulty relates to cultural resistance. We have a clear conflict of interest between the theoretical aspects caused by interdisciplinarity and the daily practice with IES.

In their way, MEC and CAPES foster the interdisciplinary discourse. However, teachers and researchers resist to abandon individualist practices for the benefit of shared and collaborative culture. Individual ownership of knowledge is still a major obstacle to the collective and interactive recombination of individual information, aiming at generating collective knowledge.

We will need more time to deepen the understanding of the effects of digital culture and all its consequences within the educational environment. Resistance to change is still strong. However, the tendency is for a jump to occur. While society changes and demands more rights it creates space to discuss diversity. On the other hand, the extensive use of technology is pushing for changes in the relationships among institutions, teachers and students.

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