Educação em Perspectiva / *Education in Perspective*
DOI: 10.22294/eduperppgeufv.v11i00.8561

ARTICLE

Future of labor and education: from bibliographical insights to theoretical issues

Futuro do trabalho e da educação: das impressões biográficas às questões teóricas

Futuro del trabajo y la educación: de las impresiones biográficas a las cuestiones teóricas

Marcelo Lima[2]

Abstract: Early and direct contact with work anticipated concerns about job access requirements. From doubts about the validity of the Human Capital Theory, which would confirm the effects of school knowledge on access to formal work, I moved from the dramatic experiences of unemployment to more complex questions arising from theory. With Antunes and Braga (2009), and in contrast to Castells (2007), but mainly in line with Marx (2008) and Mészáros (2008), we consider that there is a tendency for a nonlinear but real deepening of the polarization of qualifications; in the progressive but finite absorption of living labor by dead labor; in residual magnification of complex and immaterial labor; precariousness and flexibility of work. From the theory I resist the apologies of the knowledge society of full employment (very leisure and high productivity), so that through research I foresee the combination of the singular movement, "forward", the productive forces, and universal, "backward", of the social relations of production.

Keywords: Biographical impressions. Future of labor. Polarization of qualifications. Education.

Resumo: *O contato direto e precoce com o trabalho me antecipou inquietudes sobre requisitos de acesso ao emprego. Das dúvidas sobre a validade da Teoria do Capital Humano, que confirmaria os efeitos do conhecimento escolar para o acesso ao trabalho formal, transitei das experiências dramáticas do desemprego para questões mais complexas, advindas da teoria. Com Antunes e Braga (2009), e em contraposição a Castells (2007), mas, sobretudo, alinhado à Marx (2008) e Mészáros (2008), consideramos haver uma tendência de aprofundamento não linear, mas real, da polarização das qualificações; na absorção progressiva, mas finita, do trabalho vivo pelo trabalho morto; na ampliação residual do trabalho complexo e imaterial; na precarização e flexibilização do trabalho. A partir da teoria resisto às apologias da sociedade do conhecimento de pleno emprego (muito lazer e alta produtividade), de sorte que, pela pesquisa antevejo a combinação do movimento singular, "para frente", das forças produtivas, e universal, "para trás", das relações sociais de produção.*

Palavras-chave: *Impressões biográficas. Futuro do trabalho. Polarização das qualificações. Educação.*

Resumen: *El contacto temprano y directo con el trabajo anticipa las preocupaciones sobre los requisitos de acceso al trabajo. A partir de las dudas sobre la validez de la Teoría del Capital Humano, que confirmaría los efectos del conocimiento escolar sobre el acceso al trabajo formal, pasé de las dramáticas experiencias de desempleo a preguntas más complejas que surgen de la teoría. Con Antunes y Braga (2009), y en contraste con Castells (2007), pero principalmente en línea con Marx (2008) y Mészáros (2008), consideramos que existe una tendencia a una profundización no lineal pero real de la polarización de las calificaciones; en la absorción progresiva pero finita del trabajo vivo por el trabajo muerto; en el aumento residual del trabajo complejo e inmaterial; precariedad y flexibilidad de trabajo. Desde la teoría me resisto a las disculpas de la sociedad del conocimiento del pleno empleo (muy libre y de alta productividad), de modo que a través de la investigación preveo la combinación del movimiento singular, "hacia adelante", las fuerzas productivas y universal, "hacia atrás", de las relaciones sociales de producción.*

Palabras clave: *Impresiones biográficas. Futuro del trabajo. Polarización de calificaciones. Educacion.*

[1] **Submitted:** 24 June 2019 - **Accepted:** 08 Oct. 2019 - **Published:** 16 Nov. 2020
[2] Federal University of Espirito Santo (UFES) – Email: marcelo.lima@ufes.br

Introduction

Knowing how the future of Labor and Education will be in Brazil and/or in the world is a herculean but seductive task and, therefore, there are those who by trying to be prophetic, move away from the most elementary criteria of scientific research. Given this, the limits of research, as well as the limits of researchers, must be recognized, because what we have left is only to probe and prospect some evidences and signs that are already present in places where the future is anticipated somehow.

But where are the signs of this future? It is believed that almost always the leading industry of central capital countries points the way, but what are the limits of its viability and generality to peripheral countries and local productive realities? By observing the technological context and the international division of labor, many data point to a diverse, complementary, heterogeneous, unequal and combined world-productive based labor reality.

Nevertheless, on some islands of development, the progression of technology proves to be frightening and many attempt to copy it, as they did with the discoveries of the English Industrial Revolution in the late 18th century and in the 19th century discourse. Such efforts of production and appropriation end up defining geopolitical hierarchies, what would lead to a generalization of human welfare. However, the technological evolution itself does not seem to move alone, being grounded, then, in the social relations of each mode of production.

Very far from solving such issues, but seeking elements in the statements of Marxist thinking, based on the most recent study of sociology of labor on the reality of work, we endeavor to discuss in this study a set of questions about the future of Labor and Education. According to Bueno (2002), initially we take our own life story to question the future of labor in its relationship with education. In a second moment, in dialogue with some elements of the Marxist perspective, we list theoretical arguments by repositioning the current theme in order to, in convergence with recent studies in the sociology of labor, indicate in the conclusion perennial and mutable aspects that should constitute the future of work in the capitalist society.

Biographical insights

Inserted in the labor field since nine years old as a newsboy, the experience and the need to work have always been placed in my daily life as conditions to survive and help at home to feed a large family without the paternal presence, compelling me, almost always, to match four hours of work with four hours of study during the former 1st grade in a public school. After adolescence, getting into high school while working full-time, I was part of Youth and Adult Education (in Portuguese, *Educação de Jovens e Adultos* - *EJA*), a situation that I left when I could get into technical education in a federal technical school in 1981. From there I was convinced that, by obtaining a good professional education, I would be accredited to join the large industries, which proved, in the midst of the economic crisis of the 1980s, sort of a relative truth. However, concerning to my case, it did not materialize.

Having succeeded in a civil public exam for the Department of Traffic (in Portuguese, *Departamento de Trânsito - Detran*), I began to carry out traffic lights maintenance, a semi-complex but very dangerous technical activity, which I left in 1987. Looking for new working positions, I succeeded in inserting myself in teaching, discovering my real personal vocation and starting to work at a school of the National Service of Industrial Learning (in Portuguese, *Serviço Nacional de Aprendizagem Industrial - Senai*) in my state. In this experience, I found out how insufficient it is to rely solely on technical knowledge, and how complex it would be to conduct the teaching-learning processes of industrial work.

In this movement, after working five years as an electricity instructor, seeking to understand my own work as a practical-professional education teacher, I decided to take an undergraduate course in Education at a federal university. It did not take long to realize the countless limitations of what the Education course would offer as answers to the complex ontological, technological, economic and educational questions that cross the fields of Labor and Education.

By not having proper answers about the specificity of the teaching modality in which I was working and without any expectancy of professional growth within the institution due to my work in the Employees Union in Cultural, Recreational, Social Assistance, Guidance and Vocational Training (in Portuguese, *Sindicato dos Empregados em Entidades Culturais, Recreativas, de Assistência Social, de Orientação e Formação Profissional - Senalba*) I found myself compelled to keep studying and to look for other working options.

In addition to not accepting that my work was reduced to the mere reproduction of the workforce, I realized that I should change my professional practice and deepen on the studies (if possible, at the master's level). Therefore, through a civil public exam, I took office as school coordinator in the municipal school of the state capital where I was living. By trying to reinvent myself professionally being the technical assistant for school management for 15 years, I concluded not only by the incompleteness of my education, but also by my enormous administrative inability. I realized that as much as I was prepared for a certain position, the lack of vocation for command and school management prevented a performance even if it was undistinguished.

Simultaneously, in the late 1990s, I was looking for my postgraduate placement at a federal university. There, I found out a vocation for the act of researching and I was enchanted again by the field of study on Labor and Education, which was, as before, intriguing and disquieting. By beginning my first investigations, my reflections on the field of vocational education began to gain some consistency, leading me to a permanent conflict between study and work, now taken not only as existential but also as epistemological. Thus, I proceeded in the endeavor of answering how the sphere of education is articulated with the labor field and, in this way, some issues were released in educational journals that gave rise to my reflections.

In this same period, I tried to understand why so many people study but don't get a good job. And in this context, in a postgraduate program journal produced by the students themselves, I published texts analyzing the Theory of Human Capital and the National Qualification Plans in which I made my first criticisms of the structural mismatches between

employment and schooling. The formulation of these early texts debated the cause and effect relation between schooling and employment. At this point I was able to find space for the elaboration of a text whose role was not only to give place to my academic production, but also helped me to understand how a postgraduate program depends on the collective effort for publishing.

Following up my studies, I got into the doctoral program in Education at another federal university, from 2000 to 2004, from which, after completing my studies as a PhD in Education, I was unable to get into public higher education. The deep crisis of higher education produced by the FHC governments (1995-2002) that intended to scrap the public university greatly restricted my chances of approval and admission in public civil exam for the teacher position.

Later, in 2010, with my admission in the university, during the Lula's administration (2003-2011), while Restructuring and Expansion of Federal Universities (in Portuguese, *Reestruturação e Expansão das Universidades Federais - REUNI*) was in force, I continued to produce insights on the many inconsistencies between training and insertion in work. During this period I carried out several studies on National Program for Access to Technical Education and Employment (in Portuguese, *Programa Nacional de Acesso ao Ensino Técnico e Emprego - Pronatec*), generating publications that criticized how training for the market had metamorphosed into the training market, highlighting a perverse dialectic of educational policies linked to basic and vocational education.

Theoretical issues

The current debate on the relation between technology and education necessarily goes through research on changes in the world of labor and their articulations with the knowledge produced historically. This context does not affect education systems in a linear and uniform manner, since its effects are dynamic, contradictory and place new demands to the policies of vocational and technological education in each country.

In order to go further in a way to grasp such a complex theme, we have to resume the debate on the category of labor developed by Marx, given its ontological nature in the context of the current stage of development of the productive forces and the social and technical division of labor. Understanding this process presupposes perceiving the man as a species, but also as a product and producer in the 21st century.

Despite being a 19th century author, in his several works in contrast to the naturalistic thought of his time (HÚNGARO, 2014), Marx has already explained the man as a social being and defined him, still in a very valid way, based on the historical means of production of material existence. For Marx (2010a), human production is the engendering of the man himself who, through human labor, produces himself. Thus, "by acting upon nature external to him and by modifying it, he modifies, at the same time, his own nature" (MARX, 1983, p. 32).

While working, man produces not only objects and things, he produces himself, and in this sense, the work is the form of material existence that determines man's being, consisting himself on the way by which man produces much more than his own existence, but also autocreates himself, what gives an ontological dimension to the human activity.

According to what Húngaro (2014) states, this is not a reduction of men to the material production, but the recognition that the material production is the primary data, the starting point for knowledge and understanding the human history. That is, by taking work in its ontological sense, we are taking production as praxis, as a set conscious of exclusively human actions and activities.

This means saying that the set of human intentionalities, reasons and purposes integrates consciousness and constitutes itself in the foundation of praxis. The man, consciously "by his own action, mediates, regulates and controls his metabolism with nature", putting "in motion the natural forces belonging to his corporeality, arms and legs, head and hands, in order to appropriate himself of the natural matter in a way that is useful for his own life" (MARX, 1983, p. 32).

According to Leontiev (1978), the reason why we act is the result of a need that mobilizes a certain action. The transformation of action into activity signals a process from which new needs are arisen, thought and made due to the emergence of new reasons that boost new actions and operations that are determined to certain conditions for their achievement.

Lukács (1978), in turn, reiterates the awareness as something inherent to the process of human labor and proposes the concept of teleology, according to which man performs work through conscious purposes, that constitute the telos, the end of their actions. The author states that the work is not reduced to the instrumental implementation of knowledge, which is also a knowing act. In this sense, human material production is also a cultural and epistemic production that generates knowledge about "how" and "what" is produced. Therefore, human consciousness cannot be understood on its own, because as the man himself, it both produces and is produced by work.

In the same perspective, Duarte (2013) states that, in addition to actions and operations, human activities are objectivations. A concept that operates dialectically the relation between the individual and the object not dichotomizing the labor process, explaining the relation between man and work in a triple movement of subjectivation, appropriation and objectification, which results from the complex and dynamic socio-historical relation of the human dimensions bonded by internalizing thinking and doing, awareness, theory (purpose, calculation, telos) and practice (material production), which achievement takes place within the limits of man's technical-scientific-productive interaction with nature, in each stage of the development of productive forces.

Up to a certain period of history, men produced collectively, guided by the logic of need and subsistence, and all of them, to some extent, also collectively, owned the land and the means of production that allowed them to do their work in a relatively autonomous way. From the earliest communities, all members were involved in some way in granting the

elements necessary for the survival of the community. With the emergence of slavery (antiquity) and later servitude (feudalism), more degraded forms of labor relation and labor division arise. With the emergence of "free" labor in capitalism, the development of productive forces and the emergence of private property, enabled by the enclosures, men began to produce higher levels of surpluses that became not only use values, but also and mainly, in exchange values, based on the exploitative relation that emerged from the technical and social division of labor of a new type.

This stage, built on the base of much violence by capital and worker resistance, led the productive locus of domestic space to the factory; from simple cooperation, through manufacturing and consolidating itself in the big industry; in the process of transition from housework, craftwork, to the use of tools; from full-time, autonomous and subsistence work to factory work, fragmented, using machines and tools, heteronomous, salaried.

This transition, that was neither linear nor natural, took many decades in certain places and centuries in others to be implemented, and was articulated with the emergence of manufacturing and salaried labor. Prior to this stage, the labor process had as its basic unit the skilled craft, in which the worker had a vast collection of knowledge, methods and techniques employed in the process of production, so that he "combined, in his body and mind, the concepts and physical abilities of his specialty" (BRAVERMAN, 1987, p. 100), what demanded years of learning and experience. In this condition, the worker who mastered all stages of the process, determining their pace, became a hindrance to the development and to the optimization of the value production process.

For the capitalist, by intending to expand his profit, it is essential to increase the exceeding working time, what constitutes the core of surplus value. The most repeated form of undertaking this goal, however, is the reduction of socially demanding time, which is in the base of the value of the labor force commodity. In the impossibility of extending progressively the working day (demanded time + exceeding time), the capitalist shortens the required working time, generating relative surplus value, most of the time, through technological and organizational innovations.

In this condition, the producer generates more use values with the same demanded working time, allowing to the capitalist who accelerates production to obtain a greater achievement of surplus value, in its relative form, as he sells his products through average production price with a labor cost comparatively lower, but pays only for the labor time demanded, that tends to be each time shorter.

The fundamental strategy of capital to undertake its goals of producing more and paying less is to deepen the alienation process, not only of the labor product, but also of the labor process, leading to the ultimate consequences of the dismissal of the worker from mastery over his own work and incorporating more dead labor into the process.

How was it (and is it) possible for capital, at the same time, to embed, in machinery and management, and withdraw, from operators, knowledge in the production, producing more for less and with a greater profit? Braverman (1987) explains how the capitalist does to reconcile labor cost, pace of production, and value generation.

Historically, this process has been combining technological and organizational innovations that enables, according to Babbage (*apud* BRAVERMAN, 1987), to produce more standardized products with fewer qualified people, since that a scientific management of the process is guaranteed. In this view, the more fragmented each worker has his master of productive doing, the more useful and cheaper it becomes, being more suited to the capital than that less controlled and more expensive workforce, that gathers various integrated capabilities in few workers.

In this process, as well explained by Smith (1998) and Braverman (1987), to reduce the complex labor rate in favor of the expansion of simple labor, it changes not only the socially demanded time for the production, but also the socially demanded time for the worker training, that is on the base of the organic composition of labor power costs. If innovation generates simplification and fragmentation of tasks, as Taylor has sought ceaselessly, it also produces labor disqualification and average under-qualification of the employee, cheapening the workforce commodity even more, in addition to allowing the quick and voluminous production of semi-skilled workers and their quick and easy replacement.

The human productive consequences of this process were many. As Braverman (1987) highlights, the need for professional qualification for most workers has been reduced, being enough for them mastering the task of performing a sequence of repeated tasks established by the subdivision of work. Therefore, there was a re-elaboration of the own notion of professional qualification, which previously bonded the worker to the complete mastery of his craft (MARX, 2010b).

The conduction of the productive process in the hands of management and the new ways in which labor began to be organized affected the notion of professional qualification (BRAVERMAN, 1987). Thus, the traditional concept of qualification was eventually dismantled, leaving the worker “a specific ability, a limited and repetitive operation” (BRAVERMAN, 1987, p. 375). That is, the technical division of labor, by simplifying the crafts, impacted the appreciation of the knowledge of the average worker, reducing his need, what was intensified thanks to the introduction of factory production, which also transferred to the machines part of the social knowledge produced historically. It is combined the transformation of complex labor into simple labor with the transformation of living labor into dead labor, merging alienated labor into abstract labor.

In this movement, the labor process has its ontological foundations eroded and the working class, expropriated from the means of production and possessing the workforce, was also expropriated from autonomy related to the domain of labor knowledges. Such aspects have compromised the interfaces between activity-conscious and work-knowledge described previously, driving away producer and product and establishing the estranged work, in which the employee no longer masters his work, but is mastered by him.

In this case, as highlighted by Duarte (2013), it is deformed the individuality towards itself, that tends to be reduced to the condition of individuality itself. In this way, the breakdown between consciousness and activity, though partial, is favored. Simplification, pace and fragmentation of activity, determined by the owner of the means of production, favor operational automation more, turning dexterity into training. The telos, the calculus, the

science and the know-how that underlie the mental-operational elaboration are emptied. Here, the Chaplinian image of **Modern Times** is not an exaggeration, and characterizes not only the endless pursuit of production but also the explicits, as Dejours (1992) describes the suffering and dehumanization of estranged factory work.

The technical division of labor influences in the issue of professional qualification and education, determining both its modes of organization and to which sectors of society each type of educational provision is compelled. Thus, the split between manual and intellectual activity produced by the process described above tends to deepen the disqualification of the worker and human education, which is sometimes compelled for simple work, sometimes for complex work. This process investigated by the field of sociology of labor and Marxist theory has consolidated what we call the **qualification polarization thesis**, that explains the heterogeneity and hierarchy present in the labor world.

The debate over the meaning of qualification has taken several meanings throughout years, emanating three theses that affirm three trends. The first thesis defends the tendency of general and average qualification of the labor power. Highly influenced by a kind of technological determinism, it advocated the general trend to increase worker qualification. Such a view seems to be enclosed in an optimism and in a homogeneous and homogenizing view from which the most developed forms of production would be generalized to all countries and to all types of occupations and productive activities. The second thesis, more pessimistic, defends the general trend to disqualify the labor power. Like Braverman (1987), it operates in a perspective of permanent and progressive disqualification of the average labor power. But a third view, which seems to us more appropriate, supported by authors such as Hirata (1994), claims for a productive basis that tends to be heterogeneous, in which several combined movements would occur. According to the thesis of the polarization of qualifications, the labor power is dialectically qualified and disqualified, valued and devalued, demands, destroys and/or generates more technical and social knowledge for production.

Such assertion is presented in each country in a different way, as stated by Arrighi (1997). Through historical processes of cultural, commercial, and technological domination, nations in the organic center of capital came to dominate neuro-cerebral activities more, and countries in the periphery of capital began to dominate neuromuscular activities, thus having much lower rates of complex labor use. This movement also explains how education systems of the countries absorb qualification demands in a heterogeneous way. This configuration was consolidated during the Taylorist-Fordist system of electromechanical technology-based production, during the golden age of Fordism, comprising the period between the end of World War II and the oil crisis in the early 1970s.

From then on, the processes of social protection, of salary-earning and of production and consumption come into crisis. This context has boosted, at the turn of the century, even more radical processes of incorporating living labor and knowledge through the increase of production technologies, with very complex consequences and expectations that still need clarification. At this point, many theses began to advocate the emergence of the information

society and the hegemony of complex work, a context that would delimit an inflection in the degradation of labor in its alienated and abstract form indicated by Marx and Braverman.

Castells (2007) foreshadowed the surpassing of degraded work by technical-scientific progress especially the **Internet** -, by the dissemination of skilled jobs with strong autonomy at work, by the consolidation of common values, uniting employees and management, by the hegemony of complex labor in activities related to technological innovation, and finally, through the growth of a new economy of services unified by a richer model of productive communication (ANTUNES; BRAGA, 2009).

According to Antunes and Braga (2009), this is the well-known post-industrial argument, widely used by Castells and other authors, that consists in proclaiming the surpassing of the Taylor-Fordist factory's degraded work by "creativity" and "autonomy" inherent to service activities associated with tasks of conception and planning of processes and products. Still according to these authors, in fact, the supposed hegemony of this mode of productive development, to which Castells called "informationalism", carries with it the promise that emancipated occupational insertion into and through complex work is potentially accessible to all.

In order to have this very complex debate one has to think about the impacts of the latest technological innovations on workers' qualification. However, it is worth remembering that, in this case, a logical-historical perspective[i] of the current process cannot be privileged. It becomes more important to operate with a historical-logical analysis[ii], otherwise we face reductionisms that take history as a linear and evolutionary trajectory of facts, in which trends remain unchanged over time. In our view, this is the main mistake of Castells, who believes in the continuous growth of the complexification of human labor.

The process of precariousness of human labor can be seen in the study performed by Antunes and Braga (2009, p. 8) about the sector linked to information and communication technologies, called as "infoproletarian" or "cybertarian": "After intense privatization and outsourcing process, the telecommunications and telephony technology sector achieved meaningful expansion, in a way that by the end of the first decade of the 20th century it reached 675,000, establishing one of the largest professional categories". Also according to Antunes and Braga (2009, p. 9), "the search for the maximum profitability on assets in companies in the sector has produced a deep cycle of outsourcing, involving multiple forms of job precariousness, in addition to exacerbated forms of intensifying times and movements in the liberal act".

Research on labor in this sector has shown that, "contrary to what is often advocated by the 'post-industrial society' thesis, work in the telemarketing sector is rigidly conditioned by the characteristics of this contradictory reproduction process" (ANTUNES; BRAGA, 2009, p. 9).

For Antunes and Braga (2009, p. 10), the telemarketing sector

> Articulates 21st century technologies with 19th century working conditions, merging strategies of intense and brutal teleoperator emulation, in the mode of toyotized flexibility, with Taylorist managerial control techniques over the employee; associates group service with the individualization of labor relations,

> stimulates cooperation while strengthening competition among telemarketers, among many other changes, broadening the more complex forms of estrangement and contemporary alienation of work.

This study, similarly, to others, shows the fragilities of technology's apologetic theses, which does not allow us to simplify the ongoing process. We know that the current stage has long included in the system the administrators, both experts and planners, who have progressively taken the position of command, formerly exclusive to the owners of the means of production. It is worth asking: why this occurs and how it evolves?

According to Marxist concepts, I think that the increase of the group that carries out complex work occurs because, when there is an acceleration in the average production time, on the one hand, the average training time for workers in the productive sectors is reduced, but, on the other hand, the average time of workers' training in the technical and managerial command sectors is increased. Such a process would induce the quantitative and relative expansion of the presence of complex labor in current production, which would lead to overvaluation of the labor power, which would be increasingly complex to produce, as well as to form.

That would be true, but in addition to production progressively suppress jobs and education systems permanently produce surpluses of average skilled workers, complex labor undergoes a permanent metamorphosis towards its simplification. That is, when this group begins to expand a lot and innovation produces more complexification than simplification, requiring more workers with longer period of training, increasing the participation of complex labor to the detriment of the use of simple labor and overvaluing the cost of the labor power, capital is forced to re-simplify complex labor.

Thus, even if the consumer market grows in a direction of demanding more production and more skilled employees, the relative weight of labor needs to be hold. In this case, in each technological stage it will be essential and useful for capital, as long as it is capable of complexifying production, suppressing more living labor. Thus, historically, complex labor increases and then shrinks, being in the composition of the labor power relatively smaller. That is, if, on the one hand, the development of the productive forces does not exclude the more qualified labor force, it keeps it as an intermediate and peripheral element to the structure of the labor market.

As stated by Marx (2010b), the production of existence presupposes social relations that are, on the one hand, determined independent of the consciousness of men and, on the other hand, determine that same consciousness. Castells fails in considering that the development of productive forces would lead ad infinitum to new social relations of production. For Marx (2010b), the productive forces of society confronts existing social relations of production, which are legally founded in property relations.

Thus, the overcoming of the capitalist society will not occur by the so-called knowledge society, where private property would be the human knowledge, because, according to Marx, a social arrangement does not disappear before all the productive forces that it can possess are developed. On the other hand, new relations of production do not

appear before the material conditions of demanding these relations have been penetrated within the old society.

Nevertheless, Marx (2010b) warns that, dialectically, these same productive forces, which are developed within bourgeois society, also create the conditions for solving this antagonism. But this does not happen by inertia or naturally, since it is the result of class warfare, a process that will lead society to overcome this social formation.

Conclusion

Considering data from reality, analyzed according to Marx's theory of labor-value, we conclude that Castells' thesis does not ensure that the present stage of capitalism, or even its future, represents a breakdown with the essential elements of capital, but, on the contrary, it constitutes its deepening. In this sense, some questions about the consequences for the professional qualification of workers still remain.

If the apologetic discourses of the information society were true then, how would school, technical and technological education levels be? Would they tend upwards and would we have a more educated society with all individuals employed and able to master the technologies to produce better and in an equal way?

Considering industry 4.0, the internet of things, what awaits us? Does our humanization depend on technology or on a true social revolution? Far from being able to answer these questions, we reiterate the Marxist conceptual legacy in an attempt to understand this process.

No one knows what history will show. So far, we notice Marx statements as valid, which lead us to realize that the future may not reserve us an evolution of capitalism, of labor relations, in the sense of overcoming the exploitation of man by man. On the contrary, as stated by Mészáros (2008), as far as we can see, the historical process of deepening the capital form increasingly reduces its civilizing bases each time more. Taking Mészáros thought, I tend to believe that the future of capitalism is the barbarism, but a barbarism of a sophisticated nature, in which the algorithms of artificial intelligence incorporate part of the human subjectivity indispensable for the contemporary production of industry 4.0.

I can still observe that another part of the knowledge and of the inherent creativity of the human being remains immune to technological incorporation, making the value of living work in highly qualified activities survive, leaving, for the majority, unqualified and precarious work.

Thus, in dialogue with the study by Antunes and Braga (2009), and in contrast to the positions of Castells (2007), but mainly aligned with Marx (2008) and Mészáros (2008), I conclude by the nonlinear trend of deepening, but relative, of the polarization of qualifications, by the progressive but not infinite absorption of living labor by dead labor, by the residual expansion of complex and immaterial labor, but, above all, by the deep precariousness and flexibility of labor.

That is, after years of research and personal insertion in the work field, I reject the false ideas about the relation between labor and education and I deny the Theory of Human Capital or the apologetic elaborations of the society of knowledge of full employment (a lot of leisure and high productivity) because I observe from research that the advancement of the productive forces conceals the setback of labor relations.

References

ANTUNES, Ricardo; BRAGA, Ruy (org.). **Infoproletários**: degradação real do trabalho virtual. São Paulo: Boitempo, 2009.

ARRIGHI, Giovanni. **A ilusão do desenvolvimento**. Tradução de Sandra Vasconcelos. Petrópolis, RJ: Vozes, 1997.

BRAVERMAN, Harry. **Trabalho e capital monopolista**: a degradação do trabalho no século XX. Tradução de Nathanael C. Caixeiro. Rio de Janeiro: Editora Guanabara, 1987.

BUENO, Belmira Oliveira. O método autobiográfico e os estudos com histórias de vida de professores: a questão da subjetividade. **Educação e Pesquisa**. São Paulo, v. 28, n. 1, p. 11-30, jan./jun. 2002. https://doi.org/10.1590/S1517-97022002000100002.

CASTELLS, Manuel. **A era da informação**: economia, sociedade e cultura. São Paulo: Paz e Terra, 2007.

DEJOURS, Christophe. **A loucura do trabalho**: estudo de psicopatologia do trabalho. São Paulo: Cortez; Oboré, 1992.

DUARTE, Newton. **A individualidade para si**: contribuição a uma teoria histórico-crítica da formação do indivíduo. 3. ed. rev. Campinas, SP: Autores Associados, 2013.

HIRATA, Helena. Da polarização das qualificações ao modelo de competência. *In*: FERRETTI, Celso João *et al.* (org.). **Novas tecnologias, trabalho e educação:** um debate multidisciplinar. Petrópolis/RJ: Vozes, 1994. p. 124-138.

HÚNGARO, Edson Marcelo. A questão do método na constituição da teoria social de Marx. *In*: CUNHA, Célio da; SOUSA; José Vieira de; SILVA, Maria Abádia da (org.). **O método dialético na pesquisa em educação**. Campinas, SP: Autores Associados, 2014. p. 15-78.

LEONTIEV, Alexis. **O desenvolvimento do psiquismo**. Lisboa: Horizonte, 1978.

LUKÁCS, Georg. **As bases ontológicas do pensamento e da atividade do homem**. Temas de Ciências Humanas. Tradução de Carlos Nelson Coutinho. São Paulo: Livraria Editora Ciências Humanas, n. 4, p. 1-18, 1978.

MARX, Karl. **Contribuição à crítica da economia política**. 2. ed. São Paulo: Expressão Popular, 2008.

MARX, Karl. **Crítica da filosofia do direito de Hegel**. São Paulo: Boitempo, 2010a.

MARX, Karl. **Manuscritos econômico-filosóficos.** São Paulo: Boitempo, 2010b.

MARX, Karl. **O capital**: crítica da economia política. Livro 1. São Paulo: Abril Cultural, 1983.

MÉSZÁROS, István. **A educação para além do capital**. São Paulo: Boitempo, 2008.

SMITH, Adam. **A riqueza das nações**. Rio de Janeiro: Ediouro, 1998.

Notes

[i] According to this perspective, cognitively, the process of historical development and the relations of causality between factories and historical facts became valid in a way that they are presented as logical and intelligible, in the sense of moving in the direction of the analytical-inductive thought, as an example of Hegel's view of reality.

[ii] According to this perspective, each process of historical development is crossed by contradictions and mediations that establishes the relation between factors and historical facts to define, in a cognitive nature, what is logical, in the direction of the inductive-analytical thought, as an example of Marx's view of reality.