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*FROM THE SOCIOLOGY OF SCIENCE TO SOCIAL STUDIES OF SCIENCE
AND TECHNOLOGY: SPECIALIZATION, POWER, AND CONFLICTS
BETWEEN SCIENTIFIC KNOWLEDGE AND POPULAR BELIEFS¹*

**DA SOCIOLOGIA DA CIÊNCIA AOS ESTUDOS SOCIAIS DE CIÊNCIA E
TECNOLOGIA: ESPECIALIZAÇÃO, PODER E CONFLITOS ENTRE
CONHECIMENTO CIENTÍFICO E CRENÇAS POPULARES**

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ABSTRACT

This article examines the evolution from the sociology of science to the social studies of science and technology, focusing on specialization, power, and conflicts between scientific knowledge and popular beliefs. Based on a literature review, the transformation of scientific practices and the emergence of growing specialization in the areas of science and technology are addressed. The article discusses the role of expertise in the scientific field, highlighting how specialization and knowledge production influence the social power of scientific professions, shaping authority in public discourse. Furthermore, conflicts between scientific knowledge and popular beliefs are analyzed, considering the role of institutions and knowledge networks in mediating these conflicts. The justification for the study lies in the need to understand how divisions between scientific and popular knowledge affect power relations and social dynamics. The results suggest that, although science has a predominant role, interaction with popular beliefs can generate resistance and challenges to their acceptance, requiring a deeper dialogue between different types of knowledge.

Keywords: sociology of science, specialization, expertise, scientific knowledge, popular beliefs.

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RESUMO

Este artigo examina a evolução da sociologia da ciência para os estudos sociais de ciência e tecnologia, focando na especialização, no poder e nos conflitos entre o conhecimento científico e as crenças populares. A partir de uma revisão de literatura, é abordada a transformação das práticas científicas e a emergência de uma especialização crescente nas áreas de ciência e tecnologia. O artigo discute o papel da expertise no campo científico, destacando como a especialização e a produção de conhecimento influenciam o poder social das profissões científicas, moldando a autoridade no discurso público. Além disso, são analisados os conflitos entre o conhecimento científico e as crenças populares, considerando o papel das instituições e das redes de conhecimento na mediação desses conflitos. A justificativa para o estudo reside na necessidade de entender como as divisões entre saberes científicos e populares afetam as relações de poder e as dinâmicas sociais. Os resultados sugerem que, embora a ciência tenha um papel predominante, a interação com crenças populares pode gerar resistências e desafios à sua aceitação, sendo necessário um diálogo mais profundo entre os diferentes tipos de conhecimento.

Palavras-chave: sociologia da ciência, especialização, expertise, conhecimento científico, crenças populares.

INTRODUCTION

The study of science from a sociological perspective has evolved over time, shifting from an approach focused on the analysis of scientific practices to a broader understanding of the interactions between science, technology, and society. The transition from the sociology of science to social studies of science and technology, known for their interdisciplinarity, reflects this paradigmatic shift. This movement has been driven by a greater emphasis on issues of power, authority, and the social impacts of scientific and technological advancement. In particular, questions of specialization and the growing division of scientific labor stand out as crucial factors in shaping the relationships between scientific knowledge and popular beliefs. However, scientific specialization has also generated tensions, especially with regard to the public perception of science and its interaction with cultural and traditional beliefs.



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The idea of expertise, essential in the scientific field, has been addressed as a factor that not only contributes to the production of knowledge but also constitutes a source of social power. Scientific professions, with their increasing specialization, become responsible for shaping the public agenda and political decisions, often being regarded as legitimate authorities on scientific matters. However, this authority also generates resistance from different social groups, especially when confronted with popular or traditional knowledge, which often challenges the validity of scientific knowledge. This resistance can be observed in various contexts, such as disputes over issues of health, the environment, and even climate change, where popular beliefs frequently clash with scientific conclusions.

At the same time, the role of scientific institutions and knowledge networks becomes central in mediating and even promoting the acceptance or contestation of science. Knowledge networks, including research institutions, universities, and international organizations, play a crucial role in legitimizing and disseminating scientific knowledge. However, these institutions are not always able to communicate scientific findings effectively to the general public, which results in misunderstandings and distrust. Furthermore, power dynamics within these institutions, as well as funding relationships and political interests, can influence the type of knowledge that is produced and disseminated.

This article seeks to analyze these issues from a sociological perspective, with the aim of understanding the complex processes of interaction between scientific knowledge and popular beliefs, and how these interactions are mediated by dynamics of power and social authority. The main question that motivates this study is: how do divisions between different types of knowledge affect social and political relations? The analysis of these issues is relevant not only for understanding scientific processes themselves but also for the



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development of public policies that integrate different forms of knowledge while respecting the cultural and social particularities of different groups.

FROM THE SOCIOLOGY OF SCIENCE TO SOCIAL STUDIES OF SCIENCE AND TECHNOLOGY: DELIMITING THE FIELD

The concept of science, its various epistemological approaches, and the social dynamics involved in its development and application have been widely discussed over time. The traditional distinction between natural sciences and human sciences has been progressively challenged, expanding the understanding of how science operates within a broader social and political context. The sociology of science, initially focused on the study of scientific practices and their relationships with society, has evolved into Social Studies of Science and Technology Social Studies (SSST), a field that adopts a broader and normatively engaged approach to contemporary issues. From a perspective that involves epistemological, cosmological, and conceptual vigilance, it is possible to reflect on how different ways of conceiving science influence its practice and social legitimation. The concept of science, therefore, is in constant dispute and evolution, constituting a field of tension in which different interests and logics of knowledge production are intertwined.

The definition of science has been the subject of philosophical and epistemological debates, especially regarding its conception as a universal and objective practice. Traditionally, science was understood as a rational and objective enterprise aimed at seeking universal truths about the world. However, the emergence of new approaches, such as scientific realism and social constructivism, demonstrates that the understanding of science is neither fixed nor immutable. Scientific realism argues that science is capable of discovering realities independent of human perception, while social constructivism emphasizes the role of social and cultural practices in the construction of scientific



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knowledge. On the other hand, post-realism and post-constructivism seek to transcend these dichotomies, proposing that science is simultaneously a reflection of social structures and a contingent practice, constantly under negotiation (Sismondo, 2008, p. 78).

These debates highlight that science is not a static concept but is constantly evolving, mediated by a complex network of social, political, and material factors. Callon and Latour (1989, p. 45) argue that science is not limited to an objective practice of discovery but is a process mediated by a network of interactions among different actors. In this sense, science should be understood not as something separate from society, but as a field of interactions involving multiple agents with different perspectives and interests.

The sociology of science emerges as a field of study dedicated to understanding how science is produced, legitimized, and disseminated in society. Based on the premise that science is not a purely objective activity but is mediated by social, political, and economic relations, Pierre Bourdieu, one of the leading theorists in this field, analyzes scientific practices in interaction with the social and cultural field in which they are embedded. In works such as *Distinction* (2001) and *Symbolic Power* (2004), Bourdieu argues that science is also a field of symbolic struggles, where different agents compete for resources and material conditions for scientific production, as well as for the forms of legitimation of knowledge. The concept of symbolic capital, which refers to prestige and credibility, is central to these disputes (Bourdieu, 2004, p. 160).

The sociology of science also addresses tensions external to the scientific process, such as the relationships between science, political and economic power, and the interests that shape its directions and applications. Collins and Evans (2010, p. 120) emphasize that science should not be viewed merely as a process of discovering universal truths, but as a field of dispute and negotiation, in which social, cultural, and political conditions directly influence the



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knowledge produced. Thus, science is deeply intertwined with issues of power, ethics, and social justice, making it essential to reflect on its impacts in the contemporary world.

The transition from the sociology of science to SSST reflects a significant shift in how the role of science in society is understood. SSST does not limit itself to analyzing the production of scientific knowledge but also addresses normative questions about how science should be practiced and regulated (Jasanoff, 2004, p. 28). This normative approach emerged in response to the growing perception that science and technology, far from being neutral practices, are deeply intertwined with issues of power, ethics, and social justice. It proposes a reflection on the impacts of science and technology, addressing issues such as the risks of new technologies, the ethical dilemmas of scientific research, and the role of science in public policy-making (Jasanoff, 2004, p. 32).

Theorists such as Bruno Latour and Michel Callon (1989, p. 68) have contributed to expanding the understanding of how social and material factors shape scientific practice. Latour, for instance, challenged the traditional view that science is a purely objective practice, suggesting that scientific knowledge is constructed through complex networks involving both human and non-human actors, such as technologies and devices. The “actor-network theory” proposed by Latour reveals science as a collective process in which the production of knowledge is not attributed exclusively to individuals but to a set of interactions among diverse agents (Latour, 1987, p. 72).

Other theorists, such as Flusser (1989, p. 10) and Guattari (2006, p. 43), offer an expanded perspective on science, also considering the impacts of technologies on ways of life, subjectivities, and social relations. Flusser highlights the epistemological changes brought about by digital technologies, emphasizing the transition from a model of knowledge production based on written text to one based on images and codes. Guattari analyzes how new technologies influence



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human subjectivity and the relationship between individuals and scientific institutions, suggesting that new forms of knowledge production have profound impacts on processes of subjectivation and power relations (Guattari, 2006, p. 50).

The epistemological, cosmological, and conceptual vigilance proposed by SSST implies a critical attention to how notions of truth, reality, and knowledge are constructed and negotiated within political, economic, and cultural spheres (Sismondo, 2008, p. 97). This normative approach allows for a more just and equitable analysis of contemporary scientific transformations, reflecting on the role of science in society and its ethical and political responsibility. Furthermore, as Morin (1994, p. 18) points out, epistemological reflection must attend to the systemic nature of science, recognizing that scientific practices are influenced by a multiplicity of interdependent factors that extend beyond academic research. Morin suggests that science should be approached as a network of interconnected forms of knowledge that challenge notions of absolute objectivity and the autonomy of science.

In summary, SSST, expanded by the sociology of science, provides a deeper understanding of scientific practices and the relationships between science, technology, and society. Disputes over the concept of science, epistemological vigilance, and critical reflection on the social and political implications of science are essential for a more equitable analysis of scientific transformations in the contemporary world. The contributions of authors such as Bourdieu, Sismondo, Latour, Flusser, Guattari, and others are fundamental to the development of a sociology of science that, far from being neutral, critically engages with the social and political issues that shape scientific practice in the 21st century.



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EXPERTISE AND THE SCIENTIFIC FIELD: SPECIALIZATION, KNOWLEDGE PRODUCTION, AND THE SOCIAL POWER OF SCIENTIFIC PROFESSIONS

Expertise, or specialization, is a central concept in the sociology of science, reflecting the growing complexity of scientific professions and the social impact of the production of specialized knowledge. This concept goes beyond the mere accumulation of skills or technical competencies, being understood as a dynamic process of acquiring and validating knowledge, deeply influenced by social, cultural, and political factors. Scientific specialization is not merely a technical issue, but a social, historical, and symbolic phenomenon, marked by power relations that determine which forms of knowledge are recognized and legitimized. The scientific field, therefore, is not only a space for the production of knowledge but also a field of power where different forms of expertise are contested for validation and acceptance by society.

For authors such as Bourdieu (2001), expertise is closely linked to the social field and to the structure of power that defines what is considered valid or legitimate. The possession of “cultural capital,” which encompasses specialized knowledge, is crucial for distinguishing between experts and non-experts. The legitimacy of experts is not based exclusively on technical competence, but also on their ability to be recognized within a social context that values certain forms of knowledge. Bourdieu understands the scientific field as a space of symbolic struggle, where specialization is not a technical or individual choice, but a manifestation of social and power dynamics influenced by historical and cultural processes.

In the same vein, Collins and Evans (2010) argue that the production of knowledge is a negotiated process in which experts seek to establish their authority and credibility among non-experts. This process of validation and trust-building is mediated by social practices that define who has access to specialized knowledge and how it is transmitted to society. The relationship between experts



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and society is not limited to the technical sphere but involves an ongoing negotiation over the legitimacy and social acceptance of specialized knowledge.

The contribution of Michel Foucault (1977) is equally relevant in highlighting that knowledge and power are interdependent. The expert often assumes a position of authority, controlling access to knowledge and thereby influencing social and political domains. Scientific production does not occur in isolation, but is constantly shaped by political, economic, and cultural interests. The recognition of expertise, in this context, becomes a mechanism of power whose implications extend to social organization and political decision-making.

Scientific specialization, in turn, is a practice that transcends national and cultural boundaries, as noted by authors such as Casanova (2006) and Ribeiro (2013), who analyze the role of intellectual elites in consolidating the legitimacy of certain forms of knowledge across different historical and geographical contexts. Expertise is not merely a technical matter but also involves a struggle over the control of scientific narratives, which confer power upon experts and the institutions that validate knowledge. Thus, specialization not only fosters scientific innovation but also reinforces power structures by determining who has the authority to define what is considered true or legitimate.

On the other hand, the increasing fragmentation of scientific knowledge, as noted by Guattari (2006), can lead to challenges for communication and interdisciplinary collaboration. As science becomes increasingly technical and specialized, barriers emerge that hinder the integration of different fields of knowledge, making collaboration among specialists from distinct disciplines more complex. This fragmentation calls for new forms of organization and collaboration that enable the convergence of diverse knowledge, fostering innovations that transcend the boundaries of traditional disciplines.

Specialization also raises questions about access to knowledge and the democratization of science. Ribeiro (2013) highlights that as expertise becomes



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more specialized, it paradoxically becomes less accessible to the general public. This phenomenon can result in a hierarchy of knowledge, in which certain groups - holders of cultural capital and embedded in networks of power - gain greater prestige and influence. This process of exclusion can be observed in decisions regarding public policy and the funding of scientific research, often shaped by a scientific elite whose knowledge and practices directly influence everyday life.

The work of Vilém Flusser (1989) also offers an important reflection on the relationship between specialized knowledge and modern technologies. For Flusser, scientific specialization is not limited to the production of academic knowledge but extends to the impact of technological innovations on society. He suggests that science and technology, in transforming reality, are inseparable, and that scientific expertise, by generating innovation, has a direct impact on social and economic life, shaping power relations and influencing political decisions.

In the context of scientific professions - such as medicine, engineering, and biology - practices of specialization are not confined to the technical domain of knowledge but are embedded within a field of symbolic struggle. Scientific authority is constantly negotiated and constructed, with institutions that train and validate experts, such as universities and professional councils, playing a fundamental role in legitimizing knowledge and consolidating the social power of scientific professions. The dynamics among various social fields, such as politics and the economy, also contribute to the construction and strengthening of scientific authority, as analyzed by Bourdieu (2001) and Casanova (2006).

In summary, expertise and specialization in the scientific field cannot be understood merely as technical or cognitive processes, but as social and political phenomena. Scientific specialization is intrinsically linked to struggles for power, legitimacy, and prestige. A sociological analysis of scientific professions reveals that specialized knowledge is not only the product of technical competence but



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also a reflection of the power relations that structure society. The role of experts, the institutions that validate their knowledge, and the networks of power that influence knowledge production are fundamental to understanding how science and technology shape contemporary social and political dynamics. Specialization is thus both a driver of innovation and a mechanism of control and social exclusion, directly affecting power structures and social relations.

CONFLICTS BETWEEN SCIENTIFIC KNOWLEDGE AND POPULAR BELIEFS: THE ROLE OF INSTITUTIONS AND KNOWLEDGE NETWORKS

Conflicts between scientific knowledge and popular beliefs reflect the growing tension between technical expertise and social perceptions, often influenced by ideologies and political interests. This phenomenon is particularly visible in contexts of crisis - such as health, political, or social situations - where experts and the general public dispute interpretations of reality and solutions to problems. Analyzing this issue requires an understanding of the nature of scientific knowledge, the authority of experts, and the politicization of knowledge, drawing on theories from authors such as Pierre Bourdieu, Bruno Latour, Flusser, Collins, Casanova, and others, who explore how dynamics of power and legitimacy shape conflicts of expertise.

Pierre Bourdieu, in his work, emphasizes the relationship between power and knowledge, proposing the concept of the “field,” in which different forms of capital compete for recognition and legitimacy. Bourdieu (2004) argues that science is not a purely epistemological sphere, but rather a field of struggles in which experts compete for the authority to define what is considered true or legitimate. This process of legitimation involves not only technical competence but also individuals’ cultural and social capital, which influences their ability to impose their views. In this sense, confrontations between experts and laypeople



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concern not only the content of knowledge, but also the social and political positions occupied by those involved.

Bruno Latour, in turn, proposes that scientific knowledge should be understood as the result of a collective and social process involving negotiations and disputes, especially in times of crisis. Latour (1987) shows that science does not neutrally reflect reality, but is shaped by political and social interests, as can be observed in the context of the COVID-19 pandemic, when scientific knowledge was challenged by popular beliefs and conspiracy theories.

Flusser's (1989) reflection on the role of media in the dissemination of knowledge also contributes to understanding these conflicts. Flusser suggests that when scientific information is mediated by mass media, it may be simplified or distorted, favoring popular beliefs and undermining the credibility of experts. This process of the mediatization of science reflects the politicization of knowledge, not only by political actors but also through the ways information is presented to the public.

Casanova (2006) provides an important analysis of the relationship between science and religion, highlighting how, in some societies, science positions itself as a superior authority, often in opposition to popular beliefs. However, the dichotomy between science and faith is not so clear-cut, as science can also be instrumentalized by political or religious elites to consolidate power, often at the expense of traditional and cultural forms of knowledge.

The "politics of expertise," as discussed by Sismondo (2008), reveals how scientific knowledge can be manipulated to serve the interests of governments, corporations, or social movements. Although scientists are often called upon to support public policies, their authority may be contested when knowledge is selectively used or distorted for political purposes, as occurs in disputes over climate change, where science is shaped by political and economic pressures.



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Collins (2010), in his sociological analysis of science, argues that scientific knowledge is socially constructed and that the credibility of experts depends on recognition within the scientific community. However, the authority of experts can be challenged by popular knowledge, as seen in anti-vaccination movements, where beliefs and misinformation contest the legitimacy of medical science.

Conflicts of expertise should not be seen merely as intellectual disputes, but as reflections of the social and political dynamics that characterize contemporary society. Scientific knowledge, although based on a solid methodology, is not exempt from the influences of power, interests, and social inequalities. The politicization of science and the conflicts between experts and laypeople highlight the complexity of these disputes, which require a more open and transparent dialogue between different forms of knowledge.

In summary, conflicts of expertise and authority are intrinsic to modern society, where the specialization of knowledge coexists with growing public distrust toward experts. The confrontation between technical knowledge and popular beliefs exposes tensions regarding forms of authority, power, and legitimacy, exacerbated by the politicization of knowledge. However, these disputes should not be reduced to a simple opposition between “scientific truth” and “popular ignorance,” but rather understood as manifestations of broader power relations that permeate society. Overcoming these divisions requires fostering a more inclusive and transparent dialogue between experts and the public, as well as critically reflecting on how knowledge is produced, disseminated, and used in the political arena.



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FINAL CONSIDERATIONS

The article highlights the complexity of the relationships between scientific knowledge and popular beliefs, pointing out that although modern science has achieved a predominant position, its interactions with other forms of knowledge are neither unilateral nor always harmonious. Tensions arise mainly in areas such as health, the environment, and education, where traditional or popular beliefs frequently collide with scientific consensus. This dynamic reveals a dispute not only over the merits of knowledge, but also over who holds the power to define truth and what is considered legitimate.

Scientific specialization, in turn, has led to an increasing fragmentation of knowledge, which can hinder communication both across different fields and between science and the public. This fragmentation is seen as one of the main causes of conflicts between forms of knowledge, since many scientists, by focusing on their specific areas, lose the ability to engage with a broader audience. This lack of communication contributes to a growing divide between science and popular beliefs, creating an environment in which distrust of science can flourish, especially when economic or political interests are at stake.

On the other hand, scientific institutions and knowledge networks play a crucial role in mediating these conflicts. Institutions such as universities, research centers, and international organizations are responsible for creating spaces for dialogue among different types of knowledge, but they often fail to establish effective communication with the public. The lack of a scientific communication strategy that is accessible and understandable to the general population contributes to the strengthening of alternative and popular views, which may be based on traditional beliefs or practices but often diverge from scientific evidence.

Moreover, the analysis of the role of power in scientific professions reveals that specialization also functions as a tool of social control. As experts become authorities in their fields, they hold a significant share of social power,



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influencing public policies and shaping societal attitudes toward fundamental issues. This power lies not only in knowledge itself, but also in the ability to define which problems deserve attention, which solutions are considered viable, and who has the final say on these matters.

In a broader context, the study of conflicts between scientific knowledge and popular beliefs also reveals the need for a more inclusive and plural dialogue among different forms of knowledge. Popular beliefs, although not grounded in rigorous scientific methods, reflect lived experiences and collective wisdom that are often overlooked by scientific institutions. In this sense, integrating these forms of knowledge into the scientific process may not only enrich the understanding of social and natural phenomena, but also promote greater public acceptance of scientific findings.

Finally, the intersection between the sociology of science and science and technology studies offers a critical and comprehensive perspective on how science interacts with society. By reflecting on power, specialization, and the conflicts between scientific and popular forms of knowledge, the article contributes to understanding how science can be more effective in its social role and how popular beliefs can be better integrated into scientific debate without diminishing their relevance in everyday practices. The pursuit of a balance between these forms of knowledge should be seen as an ongoing but essential challenge for building a more informed, inclusive society capable of addressing contemporary challenges with greater social cohesion.



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