

Los Estudios Sociales de la Ciencia y la Tecnología en Cuba. Institucionalización y proyección social Social Studies of Science and Technology in Cuba. Institutionalization and social projection

Yenis Sánchez Matos¹**Salvador Ernesto Pérez Rosales²****Maritza Maure López¹**¹Universidad de Guantánamo. Cuba²Policlínico Omar Ranedo Pubillones. Cuba**ORCID:** <https://orcid.org/0000-0002-3538-6420><https://orcid.org/0000-0002-3650-6922><https://orcid.org/0009-0004-3932-5360>**Correo electrónico(s):**

yenissanchezmatos@gmail.com

salvadorernesto301289@gmail.com

maritzamaure@cug.co.cu

Recibido: 08 de julio de 2024

Revisado: 09 de septiembre de 2024

Aceptado: 07 de octubre de 2024

RESUMEN: El presente artículo tiene como objetivo explicar la institucionalización de los Estudios Sociales de la Ciencia y la Tecnología en Cuba dentro del sistema educacional, con una visible proyección social. Se presenta una revisión con enfoque cualitativo, el cual toma como base el método dialéctico materialista, y la utilización de los métodos histórico lógico y la sistematización, además de técnicas como la entrevista. Como resultado se logra una contribución a enriquecer el panorama que se tiene sobre la institucionalización y trayectoria de este campo, para entender la pertinencia de su consolidación y generalización en el contexto de la Educación Superior.

Palabras clave: Estudios sociales de la ciencia y la tecnología; Marxismo; Cuba; Educación superior

ABSTRACT: The objective of this article is to explain the institutionalization of the Social Studies of Science and Technology in Cuba within the educational system, with a visible social projection. A review with a qualitative approach is presented, which is based on the dialectical materialist method, and the use of the historical-logical and systematization methods, as well as techniques such as the interview. As a result, a contribution is achieved to enrich the panorama of the institutionalization and trajectory of this field, in order to understand the pertinence of its consolidation and generalization in the context of Higher Education.

Key words: Social studies of science and technology; Marxism; Cuba; Higher education

Introduction

Towards the sixties of the 20th century, as an alternative to the anachronistic classical conception of science (with a narrow philosophical field of analysis focusing on the formulated system of knowledge, interested in truth and the search for the logical coherence of scientific language based

on verifiable facts) and in response to the growing importance of the scientific-technological phenomenon in society, related to the events of World War II, as well as the accumulation of evidence that scientific-technological development could bring negative consequences to society due to its military use, ecological impact or other ways, a new way of understanding the relationship between science, technology and society was emerging. These are the “Science, Technology and Society Studies” (CTS), also known as Social Studies of Science and Technology (CTS Studies), which changed the research landscape, and science began to relate to technology within an academic and educational context (González et al., 1996).

CTS Studies reflect this new perception of science and technology and their relationship with society. They are currently defined as a well-established field of work, critical of the traditional image of science and technology, and interdisciplinary in nature because they bring together subjects such as philosophy, the history of science and technology, the sociology of scientific knowledge, the theory of education and the economics of technical change (Thomas, 2010).

The perceptions on scientific and technological development contained in different Marxist sources, through their main representatives (Marx, Hessen, Bernal) show the recognition of the interrelations between science, technology and society. According to Núñez and Figaredo (2008) it is this Marxist root that in Cuba has facilitated and accompanied the process of institutionalization of CTS Studies.

The topic to be addressed is considered timely, since the consolidation of an interdisciplinary vision of the problems of science, technology and innovation has gained relevance in the last 3 decades and has influenced undergraduate and graduate teaching. Taking into account the analyses carried out, the following Scientific Problem is formulated: Insufficient recognition of the institutionalization of CTS Studies in the Cuban educational system and its social projection.

Taking as essential elements the inadequacies revealed in the research, the following Objective is formulated: to explain the institutionalization of CTS Studies in Cuba within the educational system, with a visible social projection.

If the systematic dissemination of the introduction of the CTS approach is carried out, the promotion of scientific knowledge based on the needs of social development will be achieved.

Development

Around 1987, the Group for Social Studies of Science and Technology (GESOCYTE) emerged in Cuba at the Faculty of Philosophy and History of the University of Havana (UH), promoted mainly by professors and students of Philosophy (with the leadership of Núñez, 2022) and a few of natural sciences and mathematics. This was the first step in the institutionalization of CTS studies in Cuba.

Through the creation of the group, the objectives of generating interdisciplinary studies on science and technology and, from them, contributing to the teaching and debates on science in Cuban society were outlined. The problem of the social function of science, introduced by Bernal in his classic work of 1939, was debated. An important role was played here by the contributions of the Marxist tradition, with a marked social approach to knowledge, the contacts with Latin American studies on the social history of science and technology, the research on Science and Technology Policy (PCT) that was being developed in the country and the knowledge of the Latin American Thought on Science, Technology and Society (PLACTS) through the study of figures such as Sábato, Herrera and Varsavsky, among others (Núñez, 2022).

According to Díaz (1999), a movement on technological studies began at the Instituto Superior Politécnico “José Antonio Echeverría” and the group of Social Studies of Technology (GEST) was created.

The Sociology program had been closed since the previous decade; therefore, only much later would some sociologists join CTS.

At the beginning of the 1990s, the National Commission for Scientific Degrees, as the governing body of doctoral policy in Cuba, replaced the Philosophy exam to which doctoral candidates were usually subjected with a PSCT exam. This decision was also adopted for promotions in teaching and research categories.

Through an interview conducted by the author of this article with executives of the Ministry of Higher Education (MES) and the Directorate of Marxism-Leninism, it was possible to confirm that these changes occurred as one of the actions of the Directorate of Marxism-Leninism aimed at reversing the manualistic, dogmatic, orthodox and Eurocentric approach in teaching and research in the social sciences. They also appeal to the fact that, on an international scale, the CTS field was a discipline in full take-off, with much strength in Spain, which guaranteed important and diverse

academic and bibliographic sources on the new discipline, in order to develop it in Cuba from a sovereign and creative position.

According to Román García Báez (one of the interviewees), who at that time was an advisor to the Directorate of Marxism-Leninism, and currently holds the position of Advisor to the Minister of Higher Education, these changes were also explained because they managed to reverse the obsolete contents and approaches present in the programs and texts of Marxist-Leninist Philosophy, and were presented as a form of pragmatic solution to the claim and the need to link the contents of our subjects with the professional profiles. This made it very attractive to authorities, directors, careers and professionals.

In this sense, insicts Román, the mastery of the subject and contagious enthusiasm of Dr. C Núñez Jover, was a key factor that made him the protagonist and standard bearer, with the decisive support of the Direction of Marxism-Leninism, who had to face the predominant orthodox-conservative positions of many professors opposed to any change. It was necessary to convince the Party, the Direction of MES and all the departments of the country related to the subject. Once this process was completed, the approval of the National Commission of Scientific Degrees, presided by the outstanding scientist Dr. Carlos Peniche, went smoothly.

In correspondence with everything that was happening in that stage, there were several changes in the contents and denomination of the subjects of the disciplines of Marxism-Leninism. Some were eliminated, such as Scientific Communism and others. New texts were written, where a critical, Cuban, anti-dogmatic and Third Worldist approach predominated, but, undoubtedly, the transcendental change was to replace Marxist-Leninist Philosophy by the novel PSCT for the minimum and teaching category exams, since, among other reasons, it covered professionals from all sectors and not only from the university world, which then had transcendence at the level of the whole society. This forced professors to take a leap and prepare themselves in a new discipline of great diversity and demand.

For their part, Núñez and Figaredo (2008) refer to the fact that these changes are in response to the importance that specialists, apart from possessing the knowledge, technologies and skills of their field, must also be able to estimate their value and impact on society; they must have the possibility of reflecting in political, economic and social ethical terms on the professional activity they carry

out. With these ideas, the public of this discipline expanded in the academic field. The first text, by Núñez and Pimentel, was published in 1994.

As a result of the progress of these studies in Cuba, a space is created for the discipline Social Problems of Science and Technology (PSCT) first for scientific degrees and then to be taught in most university careers within the social sciences. This decision was able to enrich the training of scientists and engineers, from the study of the problems of scientific and technological development, in its universal dimension, but also focused on the Latin American and Cuban levels. Through Núñez (2019) it is assumed that the incorporation of this discipline was favored because Cuban Higher Education recognizes that scientific-technical and humanistic formations have to march together, and that the classic separations between science and value that give rise to disciplinary and institutional orders that tend to separate sciences and humanities here have no place. Thus, this conception made possible the creation of a space to introduce PSCT as a discipline in the curricula. This has been a Cuban contribution.

In the 1990s, an effort was made to consolidate a scientific and technological strategy to face the serious economic situation caused by the disappearance of the socialist camp, and to advance in social development. Public policies were changed; research and postgraduate studies increased their space in universities, and a process of legal, organizational and institutional transformations was initiated to increase the economic, social and cultural contribution of the national scientific potential. All this led to conceptual, discursive and practical changes in which reflections on science, technology and society play an important role. Thus, the growth of postgraduate programs significantly expanded the space of PSCT in the tertiary education of various professional profiles with interest in the field, generating a greater demand for courses in this subject (Núñez, 2019).

On the basis of all these changes, it can be said that by 1996 the country had made progress in the teaching of CTS courses. The acronym CTS was not used until then.

In this context, a familiarization with the developments on these topics taking place in Europe began, and systematic connections with the development of CTS Studies (postgraduate courses, research, editorial activity, courses, working groups, etc.) began. This rapprochement occurred about a decade after GESOCYTE was created, preferably through links with Spanish professors, where José Antonio López Cerezo, from the University of Oviedo, stands out.

According to Núñez and Figaredo (2008), this support was fundamental to advance a postgraduate training program aimed at training personnel to professionally develop CTS teaching and research. An important step was the opening, at the UH, of the Master's Program in Social Studies of Science and Technology in 1997, which to date has been developed in three other Cuban universities and one Venezuelan university. This master's program at UH was awarded the category of program of excellence by the National Accreditation Board (JAN) in 2009. It was developed from the first to the third edition at the University of Cienfuegos and it obtained in 2016, the evaluation of excellence. In the case of the University of Holguín, it is developed the first edition in this year, still without external evaluation.

Through the master's degree programs, there has been an excellent level of acceptance, where more than 200 people have graduated, according to information provided by the master's degree database. The master's degree is the driving force that mobilized efforts and made possible the consolidation of the disciplinary field, as well as bringing together professors and students around a shared project, with significant national and international visibility.

The centrality and conflictive nature of knowledge in contemporary society pose problems that call for educational systems and institutional cultures that CTS helps to shape. The professors and students of the Master's program have made and continue to make a significant contribution in this regard.

Through interviews with several of the coordinators of editions of the CTS Master's program, and information from self-evaluations of the programs of these editions, it is possible to learn that in many Cuban universities, such as the University of Guantánamo, the University of Cienfuegos and the University of Holguín, graduates of the Master's program are teaching the subject of Social Problems of Science and Technology, which more recently has taken the name of Science, Technology and Society Studies. A significant number of university professors have benefited from the bibliographical production and research results that have emerged from different editions of the master's program, both to meet the requirements for the degrees and teaching categories, and also as support for other research related to CTS issues.

The interviewees say that the Master's program has not only allowed for updates in CTS matters, as this field is defined internationally, but has also made it possible to materialize an CTS perspective that is much closer to our national realities.

An increasing number of graduates of the master's program have continued their doctoral training, which demonstrates the long-term commitment.

Another significant step in the trajectory of CTS should also be highlighted, which was the First International Workshop on Social Studies of Science and Technology, held in Cuba between November 23 and 26, 1999, organized by the University of Camagüey with the sponsorship of national and international organizations. At the international level, it was supported by the Organization of Ibero-American States (OEI), UNESCO and the universities of Zaragoza and Oviedo, and at the national level, it was hosted by the universities of Havana and Matanzas and other institutions. It was attended by more than 100 participants. According to Núñez (2022), this meeting helped Cuba's incorporation into the Ibero-American CTS movement, favored the establishment of personal and institutional relations and greatly facilitated access to relevant information.

In 1999, following the convening of the World Conference on Science, a breakthrough and another decisive step was achieved in the process of institutionalization of CTS Studies, with the creation at the UH of the Chair of Science and Society, which in 2002, through the OEI call, became the Cuban Chair of Science, Technology, Society and Innovation (CTS+I), with greater national and international projection. The Chair was later replicated at the University of Cienfuegos. It was then that innovation issues came to be incorporated with greater force into the CTS agenda. According to Núñez (2022) the network of chairs created by the OEI strengthened the exchange between Ibero-American specialists and made joint publications possible. It also served to support the master's degree program.

International exchange was favored by participation in the Developing Universities Network (UNIDEV), led by the University of Lund, Sweden. It operated in two periods: Developing Universities - The Evolving Role of Academic Institutions in Innovation Systems and Development (2006-2009) and Universities in Inclusive Systems of Innovation: Challenges for the 2015 Millennium Goals (2010-2013). To a large extent, CTS studies in Cuba were nourished in this way by innovation systems approaches, especially in their Scandinavian aspect, which is relevant to the Cuban context (Núñez, 2022).

On this particular topic there are contributions from Latin American authors, including Dagnino (1996), Arocena and Sutz (2009), among others, which have influenced Cuban CTS practitioners.

In Cuba, the Chair of Social Studies of Science and Technology (Chair of Social Studies of Science and Technology, CTS) is the cell that coordinates most of the academic activity in CTS. Since its beginnings it has been coordinating numerous academic initiatives and is involved in various international networks. In Núñez and Figaredo (2008) and Núñez (2019) the main actions that have been carried out from the chair can be found: created the Master's program in Social Studies of Science and Technology in 1997 with international collaborative support; whose conception is closely linked to the intellectual trajectory of the Chair; develops training programs in PSCT; collaborates with the teaching of PSCT, particularly in the preparation of texts that facilitate this type of teaching; teaches PSCT courses with significant receptivity in other Latin American countries, for example Mexico, and also in Spain; the Chair has defined a research agenda focused on the theme of University, Innovation and Society, which also allows for a reasonable international articulation; the production of reports, articles and books accompanies the training and research needs of CTS; the Chair of Integration Andrés Bello Agreement (obtained by competition); exchanges are made with Brazilian universities through the CAPES-MES Program.

According to Núñez (2022) it can be added that the Chair participates in the Local Development Program (PRODEL), with financing from the Swiss Agency COSUDE, and in the Articulated Platform for Territorial Development (PADIT), of Cuba. Every two years, the Chair organizes the international Workshop University, Science and Technology within the University Congress, attended by dozens of Cuban and foreign colleagues.

In recent years, the CTS+I Chair has assumed a research agenda focused on three fundamental topics: the role of the university in the science, technology and innovation system, Science and Technology Policy and Higher Education, technological change and local development.

This agenda has allowed active participation in public policy advice, has enabled the presence of CTS studies in national and international publications, and has enriched the undergraduate and graduate courses carried out.

In 2015, following the holding in Havana of the conference of the GLOBELICS network, the most relevant in the field of studies on innovation systems, interest in these issues in the country began to gain momentum.

In this regard, contacts with Brazil have been of great significance. An agreement with CAPES allowed an exchange with the Fluminense University of Rio de Janeiro, in particular with Professor

José Mello, and later with REDESIST, of the Federal University of Rio de Janeiro, led by José Cassiolato and Helena Lastres. Their theoretical developments on local productive and innovative arrangements (APIL) provided an excellent perspective on knowledge and innovation in local contexts (Núñez, 2022).

Likewise, contributions from the sociology of technology have been enriching, with the focus on social technologies promoted by Renato Dagnino and developed by the Institute of Studies on Science and Technology of the National University of Quilmes. In this sense, the link established with its director Hernán Thomas is significant.

The Chair is a participating institution of the Doctorate in Social Studies of Science and Technology of the University of Cienfuegos.

The Chair accompanies the training of doctors in the most diverse branches of knowledge both through courses that are part of the curricula of different doctoral programs, as well as through the teaching of courses on Social Problems of Science and Technology and the completion of their respective exams, a mandatory requirement for the acquisition of the degree of Doctor in the country.

Several doctoral projects related to the agenda of CTS Studies are underway, tutored or in charge of members of the Chair, and it also contributes to the training of PhDs at national and international level.

The Chair has obtained several awards, where the following stand out: the ACC Annual Award 2017: Knowledge Management and Innovation for Local Development: role of universities. In which most of the country's universities and the MES participate; the ACC 2019 Award with the title: Higher Education, Government and Local Development: practical advances and academic contributions (2015-2019). This award reflected the academic results associated with the participation of universities in their links with governments in the territorial development of Pinar del Río, Artemisa, Cienfuegos and Holguín, together with the CTS+I Chair of the University of Havana.

With all these results, CTS Studies stand out for having a relative popularity in Cuba. According to a bibliometric study by Torres and Lorenzo (2015), where the alternative methodology of analysis of records of scientific production related to education in Cuba, generated by Google Scholar, was assumed, there was access to a useful level of information on the reception of CTS.

The study was also supported by “Harzing's Publish or Perish” software, version 4.0.18 4859 for WinNT (x86) based on bibliometric indicators: total number of documents viewed, total citations received, average number of citations per year, average number of citations per document, average number of authors per document and the h and g indexes. Sixteen different lines of research were identified with an appreciable level of visualization in the Cuban educational field, among which is “Science, Technology and Society”. The research showed that the studies on this line, in spite of occupying the eleventh place in number of documents (78), showed a very high productivity in bibliometric terms by reaching the second place in citations, with 1338. Regarding these results, Núñez (2022) states that:

to give you an idea, the first place in documents and citations was held by higher medical education, with 967 documents and 5764 citations. Obviously the CTS academic community is much smaller. What is most interesting is that CTS achieved 17.3 citations per paper with 1.95 authors per paper, while higher medical education had 5.96 citations per paper and 2.26 authors...that influence on education was part of our goals at the founding moments. (p. 5)

In November 2020, in celebration of the XXV Anniversary of the Interdisciplinary Center House of Higher Studies Don Fernando Ortiz, at the University of Havana, an event was held under the name: Sciences in the construction of Cuban society and culture (Torres & González, 2021 with the objective of dialoguing and debating the state of current sciences and their perspectives. It was held by invitation and was attended by approximately one hundred scientists. It was also attended by the President of the Republic, Miguel M. Díaz-Canel Bermúdez, among other decision makers. From the theses and debates of this event, a book with the same name of the event will be published in 2021 through the compilations of Eduardo Torres Cuevas and Patricia González Díaz. Jorge Núñez Jover's participation in the event, as a representative of the CTS field, and the only guest from the Social Sciences, is noteworthy. This demonstrates the prestige enjoyed by this field of study and its growing presence in important debates taking place in Cuba in terms of science and its contribution to social development.

Conclusions

CTS studies in Cuba have emerged from a social and intellectual process, being considered a social product that has been part of the academic and cultural transformations that have occurred in Cuban universities over the decades. The institutionalization of this field has been influenced by the

revolutionary process of which it has been a part, the influence of Marxism, the studies on science in the socialist camp and the influence of Latin American thought, as well as the advances of CTS at the international level.

In the Cuban context, CTS Studies have developed from the processes of institutionalization with a consequent trajectory connected to social development, which has managed to occupy an important place within the social sciences, with a considerable level of acceptance in the academic and educational sphere in the country. This field has had a participation in the enrichment of theories and social thought within Higher Education, as well as educational and technological scientific strategies that the country has been developing during the last decades.

Bibliographic references

- Arocena, R. y Sutz, J. (2009). Sistemas de innovación e inclusión social. *Revista Pensamiento Iberoamericano*, (5)
- Dagnino, R. (1996). *Innovación y desarrollo social: un desafío latinoamericano*. Seminario Taller Iberoamericano de actualización en gestión tecnológica. CITMA, La Habana
- González, M. I., López, J. A., Luján, J. L. (1996). *Ciencia, tecnología y sociedad: una introducción al estudio social de la ciencia y la tecnología*. Tecnos.
- Núñez, J. (2022). CTS en Cuba: trayectoria académica y proyección social. *Revista Iberoamericana de Ciencia, Tecnología y Sociedad —CTS*, 17(50), 237-242.
- Núñez, J. (2019). *Universidad, conocimiento y desarrollo: nuevas encrucijadas. Una lectura desde ciencia, tecnología y sociedad*. UH.
- Núñez, J. y Figaredo, F. (2008). CTS en contexto: la construcción social de una tradición académica. En *Pensar Ciencia, Tecnología y Sociedad*. Félix Varela, 287 pp.
- Thomas, H. (2010). *Los Estudios Sociales de la tecnología en América Latina*. Social Studies Technology in Latin Américam.
- Torres, E. y González, P. (2021). *Las ciencias en la construcción de la sociedad y la cultura cubanas. Tesis a debate*. Ediciones IMAGEN CONTEMPORÁNEA.
- Torres, F. y Lorenzo, M. (2015). ¿Cuán visible es la producción científica de la educación cubana actual? *Revista Didasc@lia: D&E*, VI(4)

