

Estrategia didáctica para Estudios Sociales de la Ciencia y la Tecnología en el sector salud

Didactic strategy for Social Studies of Science and Technology in the health sector

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Resumen: En la superación de los profesionales de la salud la disciplina Estudios Sociales de la Ciencia y la Tecnología tiene gran importancia. El diagnóstico realizado en la Universidad de Ciencias Médicas de Guantánamo mostró insuficiencias que permitieron determinar la necesidad de que estos profesionales incorporen el contenido de esta ciencia a su actividad social, y la pertinencia de una estrategia didáctica encaminada a una mejoría en su modo de actuación ante los problemas de salud en los diversos escenarios sociales. Los resultados de la triangulación de criterio de especialistas, usuarios y el pre-experimento, evidencian su viabilidad.

Palabras clave: Estrategia didáctica; Estudios Sociales de la Ciencia y la Tecnología; Superación profesional; Profesionales de la salud

Abstract: In postgraduate courses designed for the health professionals, the discipline Social Studies of Science and Technology is of great importance. The diagnosis made at the University of Medical Sciences of Guantánamo showed insufficiencies that lead to design a plan for these professionals, which aims at incorporating the content of this science into their social activity, granting further relevance to a didactic strategy that allows to improve their way of acting to solve the health problems in the different social scenarios. The results were validated by specialists, users and the pre-experiment, and its viability has been demonstrated.

Keywords: Didactic strategy; Social Studies of Science and Technology; Postgraduate education; Healthcare professionals

Introduction

The Scientific-Technical Revolution causes constant changes in science and technology that are put in function of social development (Núñez Jover and Macías Llanes, 2007). To apply them it is necessary to go to education and thus update the knowledge and skills of men to carry forward the development of their countries. The new role of knowledge is inducing deep transformations in higher education that becomes a key factor to start the necessary processes and face the challenges of the current world.

Higher education in the 21st century is immersed in the claim of relevance, in satisfying the need to contribute to economic development, to occupy ever greater spaces in the construction of knowledge, all in the context of its field missions of training, research, and university extension (Núñez Jover and Macías Llanes, 2007). The overcoming of human resources and their improvement is a problem addressed with great interest in the field of education, therefore within the framework of Cuban medical education take on special meanings Social Studies of Science and Technology, whose fundamental purpose is stimulate reflection on the political, economic, cultural, epistemological and ethical dimensions of scientific-technological practice, contextualized in the country in recent decades (Núñez Jover, 2010).

Cuban medical education is not excluded from the purposes of attending training processes, putting under scrutiny the model of medical education, and modes of professional action is a task that places the images of science-technology relations in the center of attention -society that are transmitted in said process.

In contrast to all the foregoing, in the process of professional improvement of the University of Medical Sciences of Guantánamo no actions designed to this end are conceived. To analyze this situation, a diagnosis was first made to determine the status of the problem in the period from September 2015 to January 2016, based on an empirical finding and the application of various methods and investigative techniques that showed as insufficiencies: fragmentation in the treatment of the content of Social Studies of Science and Technology in the process of professional development, limited contextualization of the content of Social Studies of Science and Technology to the performance of health professionals, shortcomings in the theoretical and methodological preparation of the health professionals in the contents of said discipline.

These shortcomings confirmed the relevance of this research and the design of a didactic strategy supported by Information and Communication Technologies (Tics) as an instrument for self-management of knowledge, in which methodological guidelines are provided and theoretical references were taken into account for the preparation in Social Studies of Science and Technology intended to achieve efficiency in the comprehensive academic, research and axiological preparation of these professionals, and place this reflection on theoretical bases of greater comprehensiveness, contextualization and depth.

The procedures followed in this investigation correspond to those of a qualitative research in that they allowed designing, establishing and evaluating a strategy for medical teaching in the postgraduate course that emerges as a guiding line in the process of professional improvement in the aforementioned discipline.

Based on these considerations, there is a contradiction between the lack of a didactic procedure in CTS that enables the overcoming of health professionals and the aspiration to improve the integrality of these professionals as demanded by current Cuban society, which allows determining how objective of the research the design of a didactic strategy for the treatment of the content of Social Studies of Science and Technology in the overcoming of health professionals.

Taking into account the criteria of De Armas (2001), Robas (2010), Vidal and Lemus (2012), the conditions for a strategy that facilitates the solution of the diagnosed insufficiencies are present. The didactic strategy is assumed because it constitutes a system of actions in the short, medium and long term that allows the transformation of the teaching-learning process based on the components of the same and the achievement of the proposed objectives in a specific time.

The contribution to the theory is in the integral conception of the Social Studies of Science and Technology, which is based on a didactic strategy for the treatment of its content, in which the components and interrelationships are reflected, which contributes to the improvement of the process of overcoming health professionals and improving their way of acting.

Development

Considerations around the Social Studies of Science and Technology. Importance of its content in the improvement of health professionals

Cuban medical education demands greater scientific rigor in the didactic of the overcoming of health professionals, and of raising the scientific-technological culture, for that reason special Social Science and Technology Studies acquire special meanings, which have been called: field of study (Macías, 2010), academic tradition (Núñez and Figaredo, 2009), social movement (Fuller, 2001), and paradigm of education sciences (Mansour, 2009). In fact, these studies constitute an area of knowledge production of considerable relevance for the political dimension,

the management of science and technology, and for the educational field, without doubt, they occupy an important space in the most adequate conception of the phenomena that concern the social nature of science and technology and their relationship with social contexts. (Macias, 2010)

The central mission of these studies consists of an interpretation of science and technology as social processes, that is, as complex companies in which cultural, political and economic values help to shape the process that, in turn, affects said values and about the society that maintains them. (Núñez, 2010)

Social Studies of Science and Technology is an important area of work in academic research, public policy and education. In this field, it is about understanding the social aspects of the scientific and technological phenomenon, both in terms of its social conditioners and in terms of its social and environmental consequences. Its general approach is of a critical nature (with respect to the classic views of science and technology where its social dimensions are hidden) and interdisciplinary, where disciplines such as Philosophy, History, Sociology of Science and Technology, among others, concur. Through such an interdisciplinary synthesis it is intended to understand more deeply the interrelations between science, technology and society. Social Studies of Science and Technology today defines a field well consolidated institutionally in universities, public administrations and educational centers of many industrialized countries and also some of Latin America. (Núñez, 2010)

The theoretical elaborations and the empirical information that result from such approaches aim to fertilize social actions in fields as diverse as scientific education, public policies in science, technology and innovation and, of course, the academic research itself. (Duharte, 2014)

For health professionals, who are graduates of Higher Medical Education - doctors, stomatologists and graduates in nursing, in technology and health psychology - with a high degree of commitment to their people and humanity, a great vocation for service and ethical sense of their profession and their civic life, provide services and health care in a specialized manner (Hernández, 2013), the fundamental purpose of Social Studies of Science and Technology is to stimulate reflection on the dimensions political, economic, cultural, epistemological and ethical practice of science and technology, contextualized in the country in recent decades.

These studies have a special significance in the continuing education of health professionals, before them common problems are imposed on medical practice in any coordinate and to specific phenomena in the country.

In the Cuban health sector, Social Studies of Science and Technology has a specificity that should not be underestimated in the training and improvement of the professional. Therefore, it must be considered how the introduction of this approach in this sector has been characterized.

In the early nineties advances in the relation science-technology-society made it possible to consolidate a space for the discipline Social Problems of Science and Technology in the social sciences cycle of the majority of university careers in Cuba.

In the decade of the 90s the exercise of Social Problems of Science and Technology was also introduced in the processes of professional improvement of Cuban Medical Education, together with other requirements for obtaining teaching or research categories and scientific degrees. By joining the postgraduate curricula, this fact favored the promotion of the socio-humanist training component in these professionals. (Núñez, 2010)

However, medical education does not present in the undergraduate curriculum the discipline Social Problems of Science and Technology, which puts it at a disadvantage in relation to other university careers where it is taught.

Therefore, to emphasize in the postgraduate course the field of Social Studies of Science and Technology beyond the epistemic factors, interests and values play a decisive role in the production, diffusion, use and appropriation of knowledge, and in the layout of the various scientific-technological trajectories as human decision processes.

The promotion of a reflective attitude in relation to scientific and technological practice allows us to move away from scientism, and we place our own scientific research, the institutionalization of science and the policies that promote its development, as objects of study. In the field of Social Studies of Science and Technology as a scientific field there are valuable theoretical and conceptual structures for the fulfillment of this purpose and for its contextualization in the analysis of health sciences and technologies, which makes it a instrument for medical education, and the science of public health in general. (Ramos, 2016)

The conformation of the system of science and technological innovation in the health sector reaffirms the need to develop the aspects that address the political, social and ethical reflection of science and technology in this, through professional improvement and academic training Priority is given to the integral training of human resources. (Ramos, 2017)

By agreement of the National Philosophy Group of the Ministry of Public Health (Minsap), in November 2009 the Philosophy and Social Studies of Science and Technology program was approved for its generalization in postgraduate education in medical education.

This postgraduate course allows health professionals to raise the levels of scientific-technological culture and, with it, the analytical capacities of society and new contexts, and of their own professional activity, to participate in the management of the science and technology, and in the ethical evaluation of scientific results.

Its general objective is to demonstrate the theoretical and methodological meaning of Marxist philosophy as a tool for the understanding of social processes, especially those related to science and technological innovation in the new contexts of the twenty-first century.

Dimensions for the treatment of the content of Social Studies of Science and Technology in the improvement of health professionals

Dimension 1. Cognitive: level of knowledge reached by the health professional about Social Studies of Science and Technology

Indicators:

1.1-Knowledge about the contributions of the Social Studies of Science and Technology approach in the interpretation of scientific-technological processes.

1.2- Knowledge about current global trends in science and technology, and their political, social and ethical impacts.

1.3- Knowledge about the relationship between the critical vision of science, technology and health as a social process. Social meaning

1.4- Knowledge about the ethical and bioethical sustenance of the scientific-technological activity in Cuba: the social responsibility and reflexivity of the scientific activity.

1.5- Knowledge about the main international codes related to research on human beings and the code of the worker of science in Cuba.

Dimension 2. Procedural: teaching and intellectual skills developed by health professionals in Social Studies of Science and Technology.

Subdimension 2.1: teaching skills.

Indicators:

2.1.1- Interpret; 2.1.2- Summarize; 2.1.3- Graph.

Subdimension 2.2: intellectual skills.

Indicators: 2.2.1- Analyze; 2.2.2- Argument; 2.2.3- Demonstrate; 2.2.4- Assess.

Dimension 3. Axiological: moral values developed by the health professional in Social Studies of Science and Technology

Subdimension 3.1: moral values.

Indicators: 3.1.1-Responsibility; 3.1.2-Laboriousness; 3.1.3-Honesty; 3.1.4-Humanism.

Design of the didactic strategy for Social Studies of Science and Technology in the overcoming of health professionals

Didactic strategy is the set of sequential and interrelated actions that, starting from an initial state and considering the proposed objectives, allows to direct the development of the teaching-learning process in the school. (Valle, 2010)

Strategic objectives:

- 1- Acquire knowledge about Social Studies of Science and Technology.
- 2- Develop the system of teaching and intellectual skills.
- 3- Strengthen the moral values system.
- 4- Improve the management of information and knowledge with the proper use of Tics.

General features of the didactic strategy: conception with a systemic approach; a structuring based on phases or stages related to orientation, execution and control actions; responds to the contradiction between the current state and the desired one; dialectical character; unrepeatable.

Stages of the didactic strategy to develop the content of Social Studies of Science and Technology in the overcoming of health professionals

1st Stage: organization.

Main actions: determination of problems, insufficiencies, contradictions in the process of professional development in Social Studies of Science and Technology; design of the diagnosis of learning needs; application of the instruments to teachers; processing of the results obtained in the diagnosis; define the problems and their causes; define and value what I know wants to modify and transform.

2nd Stage: planning

Main actions: design the technical-tactical plan through which the bank will be treated for problems detected by the diagnosis; the objectives of the Social Studies of Science and Technology program are defined; determine the materials, through the computerized media, that will serve for the implementation of the objectives that are to be achieved; elaboration of the instruments to treat the insufficiencies; assess the development of teachers and the preparation of them to achieve the highest quality and efficiency of learning; select the responsible human resources with the implementation of the strategy; define and organize the cognitive, intellectual, professional and axiological directions of work; direct the fulfillment of the planned actions according to the foreseen schedule and monitor partial results in a way that facilitates the flexibility of the planning according to the reality of the process; statistical control of the application process.

3rd Stage: execution

Main actions:

No	Tasks Run Responsible Date	1 Teach and / or receive instructional and demonstrative methodological classes about the learning strategy for the 2016-2017 academic year. Head of department August-September 2016.	Designated Head of department August-September 2016.	Request advice on Educational Research Methodology. Head of Dept. Postgraduate Methodology Designated Head of Department September 2016
1	Diagnose the learning needs of teachers. Appointed Department Head October 2016	Develop methodological workshops to determine the necessary changes in the program of Social Studies of Science and Technology (study guides, didactic materials, complementary bibliography). Appointed Chief Discipline and teachers October-December 2016	Socialize on the intranet of the University the digital materials related to the topics of CTS, previous approval of the Department Designated Chief Discipline and research professors December 2016	
2	To familiarize participants with the systematization of knowledge through the use of Tics. Designated Teachers who teach the discipline January 2017			
3	Tasks Run Responsible Date	1 Teach and / or receive instructional	Designated Head of	Request advice on

		and demonstrative methodological classes about the learning strategy for the 2016-2017 academic year. Head of department August-September 2016.	department August-September 2016.	Education al Research Methodol ogy. Head of Dept. Postgradu ate Methodol ogy Designate d Head of Departme nt September 2016
4	Diagnose the learning needs of teachers. Appointed Department Head October 2016	Develop methodological workshops to determine the necessary changes in the program of Social Studies of Science and Technology (study guides, didactic materials, complementary bibliography). Appointed Chief Discipline and teachers October-December 2016	Socialize on the intranet of the University the digital materials related to the topics of CTS, previous approval of the Department Designated Chief Discipline and research professors December 2016	
5	To familiarize cursistas with the systematization of knowledge through the use of Tics. Designated Teachers who teach the discipline January 2017			
6	Tasks Run Responsible Date	1 Teach and / or receive instructional and demonstrative methodological	Designated Head of department August-	Request advice on Education al

		classes about the learning strategy for the 2016-2017 academic year. Head of department August-September 2016.	September 2016.	Research Methodology. Head of Dept. Postgraduate Methodology Designated Head of Department September 2016
7	Teaching according to the established schedule (1 week concentrated in each school year) with the modifications approved by the discipline group. Appointed Head of Discipline and teachers February 2017		Execute plan of attention to the needs and individual differences of the trainees. Appointed Head of Discipline and teachers October 2016- May 2017	Systematic evaluation of CTS supervising the development of the trainees (objectives and strategic directions planned). Appointed Head of Discipline and teachers February 2017
8		Evaluate the effectiveness of the teaching strategy. Designated Head of Department, Head of Discipline	Researchers September 2016-	July 2017
9	Promote the trainees to walk in the teaching category. Appointed Head of Discipline and teachers According to the	Promote the participation of the cursistas in	Promote tutoring to students for	Promote the developm

	date set in the Institution	scientific events with themes related to Social Studies of Science and Technology. Appointed Head of Discipline and teachers According to the date set in the Institution	their participation in scientific events with topics related to Social Studies of Science and Technology. Appointed Head of Discipline and teachers According to the date set in the Institution	ent of research projects related to issues related to the science-technology-society and innovation relationship. Designated Department Head, Head of Discipline and teachers October 2016-May 2017
10	Final evaluation through the Social Science and Technology Studies exercise PSCT Tribunal Head of department, Head of Discipline and court According to the date set in the Institution	Analyze together with the trainees the results achieved so far in the fulfillment of the strategy. Designated Head of Department, Head of Discipline and professors. July 2017	Balance of the results of the strategy in the school year 2016-2017 Head of Discipline and professors Head of department First week of the school year 2017-2018.	
11	Teaching according to the established schedule (1 week concentrated in each school year) with the modifications approved by the discipline group.		Execute plan of attention to the needs and	Systematic evaluation of CTS

	Appointed Head of Discipline and teachers February 2017		individual differences of the trainees. Appointed Head of Discipline and teachers October 2016- May 2017	supervising the development of the trainees (objectives and strategic directions planned). Appointed Head of Discipline and teachers February 2017
12		Evaluate the effectiveness of the teaching strategy. Designated Head of Department, Head of Discipline	Researchers September 2016-	July 2017
13	Promote the trainees to walk in the teaching category. Appointed Head of Discipline and teachers According to the date set in the Institution	Promote the participation of the cursistas in scientific events with themes related to Social Studies of Science and Technology. Appointed Head of Discipline and teachers According to the date set in the Institution	Promote tutoring to students for their participation in scientific events with topics related to Social Studies of Science and Technology. Appointed Head of Discipline and teachers According to the date set in the Institution	Promote the development of research projects related to issues related to the science-technology-society and innovation relationship. Designated Department Head,

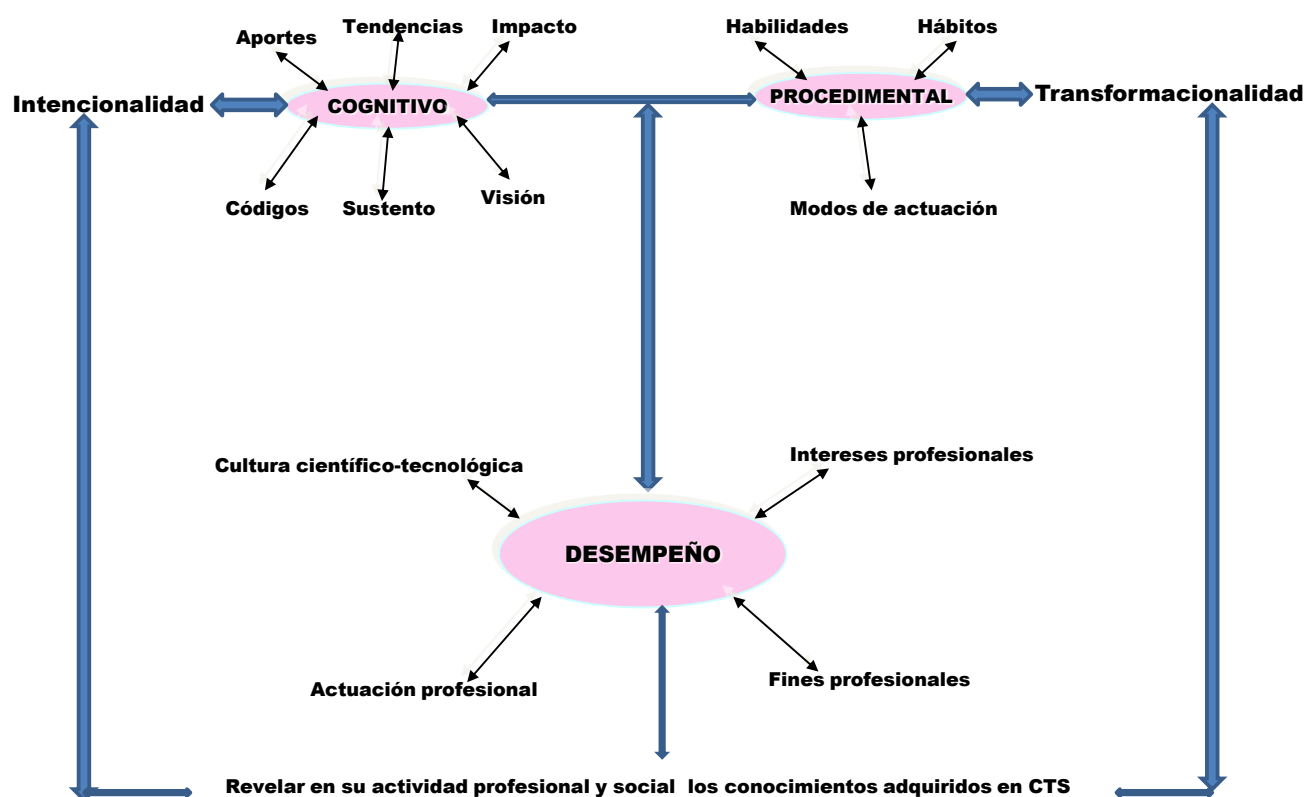
				Head of Discipline and teachers October 2016- May 2017
14	Final evaluation through the Social Science and Technology Studies exercise PSCT Tribunal Head of department, Head of Discipline and court According to the date set in the Institution	Analyze together with the trainees the results achieved so far in the fulfillment of the strategy. Designated Head of Department, Head of Discipline and professors. July 2017	Balance of the results of the strategy in the school year 2016-2017 Head of Discipline and professors Head of department First week of the school year 2017-2018.	
15	Teaching according to the established schedule (1 week concentrated in each school year) with the modifications approved by the discipline group. Appointed Head of Discipline and teachers February 2017		Execute plan of attention to the needs and individual differences of the trainees. Appointed Head of Discipline and teachers October 2016- May 2017	Systematic evaluation of CTS supervising the development of the trainees (objectives and strategic directions planned). Appointed Head of Discipline and teachers February 2017

16		Evaluate the effectiveness of the teaching strategy. Designated Head of Department, Head of Discipline	Researchers September 2016-	July 2017
17	Promote the trainees to walk in the teaching category. Appointed Head of Discipline and teachers According to the date set in the Institution	Promote the participation of the cursistas in scientific events with themes related to Social Studies of Science and Technology. Appointed Head of Discipline and teachers According to the date set in the Institution	Promote tutoring to students for their participation in scientific events with topics related to Social Studies of Science and Technology. Appointed Head of Discipline and teachers According to the date set in the Institution	Promote the development of research projects related to issues related to the science-technology-society and innovation relationship. Designated Department Head, Head of Discipline and teachers October 2016-May 2017

IV Stage: evaluation and control

Main actions: controls to classes; methodological meetings and socialization workshops; application of evaluation techniques; presentation and / or publication of results; before the final evaluation, make an exit diagnosis; assess achievements and difficulties; comparison of the results of the initial diagnosis with the final evaluation, to verify the expected progress.

TRATAMIENTO AL CONTENIDO DE LOS ESTUDIOS SOCIALES DE LA CIENCIA Y LA TECNOLOGÍA



This teaching strategy is being implemented at the University of Medical Sciences of Guantanamo through postgraduate courses that pay tribute to two graduates in Higher Medical Education and for the development of sociohumanist competence, which are based on two research projects: evaluation of the impact of the methodology for the development of intellectual capital, and sociohumanist development for health professionals, contributing to the improvement of the process of professional improvement of teachers of Higher Medical Education in science-technology-society and innovation, which allows them to face more effectively the exercise of Social Problems of Science and Technology for the transition of teaching category, as well as the practical application of this knowledge.

Conclusions

The design, execution, and monitoring of the efficiency and effectiveness of the didactic strategy of Social Studies of Science and Technology contributes to the improvement of the process of professional improvement and to the demands of the new model of professional training in Higher Medical Education.

This strategy allows health professionals to have a more objective knowledge of this process, to assimilate in a scientific and optimal way the content of Social Studies of Science and Technology, to increase their preparation to carry out the exercise of Social Problems of Science and Technology to travel in the teaching category and obtain better results, which is supported by the results of the application of the proposal, by the consensus of the judgments issued by the users, and the criteria of the specialists who validated the strategy.

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