

Efectividad de los mediadores tecnológicos para la realización de Seminarios integradores con enfoque interdisciplinario integrador

Effectiveness of technological mediators for the realization of integrating seminars with an interdisciplinary and integrative approach.

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RESUMEN: Las tendencias pedagógicas actuales indican la factibilidad de poner en el centro al educando logrando un proceso formativo integrador, justificándose desde el diseño de seminarios integradores, tiene como objetivo: transformar eficientemente el estado actual del proceso enseñanza-aprendizaje desarrollador y el desempeño profesional en docentes de ciencias naturales, mediante el uso de mediadores tecnológicos como herramientas en la realización de seminarios integradores para elevar la calidad del proceso con enfoque interdisciplinario integrador, se realizó un estudio cuasi experimental de intervención educativa, deviniendo evolución eficiente del proceso de formación tecno-investigativa, coadyuvando a la proactividad y perfeccionamiento.

Palabras clave: Superación profesional; Formación continua; Interdisciplinariedad; Mediadore didácticos

ABSTRACT: Current pedagogical trends indicate the feasibility of putting the learner at the center, achieving an integrative formative process, justifying itself from the design of integrative seminars, aims to: To efficiently transform the current state of the developmental teaching-learning process and professional performance in natural science teachers, through the use of technological mediators as tools in the realization of integrative seminars to raise the quality of the process with an interdisciplinary integrative approach, a quasi-experimental study of educational intervention was conducted, becoming efficient evolution of the techno-investigative training process, contributing to proactivity and improvement.

Keywords: Professional improvement; Continuing education; Interdisciplinarity; Didactic mediators.

Introduction

Cuba's achievements in the educational sphere in recent years are undeniable. However, this does not mean that these results fully correspond to the demands posed by society, circumscribing the same, to an impetuous development, preceded by the impetuous advance of the Scientific-Technical Social Revolution, imposing new educational challenges with accelerated transformations, which according to García (2017):

It marks an increasingly global vision of the scientific and technological picture of the world, increasing in this sense the role of philosophy, axiology and ethics, which has influenced the emergence of integrative conceptions and practices in dealing with the complex processes of different spheres and branches of human activity, such as multidisciplinary, interdisciplinarity and transdisciplinarity. (pp. 9-25).

These elements raise the new challenges that Pedagogy assumes and with it the teachers with problems of fragmented conceptions and practices of the educational institution, which reveals the need for a development with an integrative approach in education Science and Technology in their union have become fundamental factors of contemporary life.

From this projection, the teacher requires from the educational institution an orientation and a mobilization of his interests, motivations and concerns that are related to self-education, co-education and hetero-education,

That is why, in the process of professional improvement, the teacher plays an essential role as a conscious social subject, which: "Constitutes an axiological cultural manager, and to achieve this quality must be a permanent and constant subject in their professional improvement" (Fuentes, 2013, p. 10).

To focus the approached towards the improvement of education professionals, it can be said that it allows:

- Leading an inquiry with conditions of possibility and contextual sense, taking the third improvement as a reference.
- Recognition of concrete and determined social rules (Levels of attention).
- Connecting between objectivities and subjectivities mediated by interpersonal praxis in circular way knowledge, power, desire and discourse.

Therefore, this is due to the fact that the continuous training of teachers accounts for the necessary improvement and self-improvement of teachers, keeping in mind their lasting personal and collective growth. The permanent transcends, as it is conceived as a process inherent to the teaching practice and systematized theory of teachers who work in educational institutions where students play an essential role as they are the active entities of the process and receive knowledge from their teachers.

This analysis made it possible to characterize the current state of the process of continuous and investigative training in pre-university education teachers, taking into account an initial diagnosis, which yielded the following manifestations:

- Insufficient methodological designs from the institutional educational projects that respond to the techno-investigative work.
- Insufficient valuation of continuous training procedures in pre-university education teachers to allow concrete and conscious processes related to the use of technological mediators that favor developmental learning.

Considering the manifestations expressed, it is declared as a scientific problem how to efficiently transform the current state of the developmental teaching-learning process and the professional performance of teachers in the area of knowledge of natural sciences, through the development of the integrating seminars with the use of technological mediators as tools to raise the quality of the process with an integrating interdisciplinary approach.

Based on these shortcomings and taking the diagnosis as a reference, the objective is determined as follows: to efficiently transform the current state of the developmental teaching-learning process and the professional performance of teachers in the area of knowledge of natural sciences, through the use of technological mediators in the integrating seminars as tools to raise the quality of the process from an integrating interdisciplinary approach.

Development

The scientific-technical revolution is a complex and multifaceted phenomenon, it is a radical qualitative change in the whole system of productive forces, caused by the unique and correlated process of the development of science, technique and technology. Its current stage is characterized by the phenomenon of biotechnology, genetic engineering, and informatics.

For Paredes (2017) the level of development achieved with the use of technological mediators, is an indicator of social progress, based on the most important law of the development of science, the acceleration of the scientific process.

Therefore, it leads us to the investigative training in the Higher Secondary Education professional related to his or her continuous training and becomes in this the improvement, responds to a renewed need for a developmental teaching-learning model, expressed in the framework of a society in permanent change that demands to rethink the way of elaborating, acquiring and transmitting knowledge with quality and equity criteria.

This demands from teachers a great responsibility and reflections, their commitment to a continuous process of updating and the permanent disposition to learn and build knowledge about their own teaching practice, since, at present, they are faced with a problematic context, not only must they know the competencies of their students and the contents that will be taught, but they must assume the change of interests resulting from both cultural-contemporary, techno-innovative transformations and the character of the institution, as a cultural meeting place.

From this perspective, promoting the development of an investigative formation is based on the generation of new knowledge from a scientific vision, where the integrating interdisciplinarity underlies.

It is for this reason, and in line with what has been addressed, that in the basis of the integrative explanatory approach introduced in the design of the discipline of Biology in General Education from the third year onwards, the need to form in students an understanding of the universal concatenation of phenomena based on the recognition of the unity and diversity of the natural world is based, the biotic integrity that manifests itself from the simple to the most complex levels of organization of living matter, which integrates knowledge and skills from physics, chemistry, earth and space sciences, leading to interdisciplinarity (Jardinot *et al.* , 2017).

For Parra (2022) "Interdisciplinarity as a generalizing process, guarantees a holistic and methodological vision for the analysis of facts and phenomena of nature, society and thought, by establishing relationships between disciplines and their methodologies" (p. 6).

Consequently, the continuous training that is implemented, imposes a challenge to the educational management process to the institutions, which direct their attention to the improvement of teachers, now with a new approach to be able to face the current educational demands; a conception far from

what happens in the pedagogical reality and the need for the improvement of the performance of practicing teachers.

For this purpose, a quasi-experimental study of educational intervention was carried out in a universe of 94 professionals of pre-university education related to the area of knowledge of natural sciences, in Palma Soriano, Santiago de Cuba, pursuing as an objective: To efficiently transform the current state of the developmental teaching-learning process from the development of the integrating seminars with the use of technological mediators as a tool to raise the quality of the process with an integrating interdisciplinary approach, after carrying out a documentary analysis of the subject, we proceeded to elaborate an initial diagnosis, where indicators related to professional improvement emerge from the use of technological mediators such as:

Socialización de materiales multimediales entre docentes y educandos a través del uso de los mediadores tecnológicos.

- Improvement in the projection of educational institutions based on continuous teacher training with emphasis on integrative seminars.
- The use of technological mediators as a collaborative tool in the dynamics of the research activity in the model of continuous teacher training.

Once the instrument was developed, it was applied and then the multimedia materials that would be used in the different socialization workshops were designed.

The information gathering methods were related to the following:

From the theoretical level:

Historical-logical, induction-deduction, analysis-synthesis, system approach, abstraction-concretion and the hermeneutic-dialectic.

Empirical level:

Documentary analysis, observation

Techniques:

Surveys, interviews to graduates and teachers of the specialties of Biology, Chemistry, Geography and Physics respectively, experts' criteria, methodological triangulation between methods and techniques, Likert scales, socio-formative rubrics as a response to the formation and development of the integrative professional improvement.

After the processing of the information, the participants were selected, where in the concentrated methodological preparation they were provided with information about what happened and how

the integrating seminars would be worked, taking into account the interdisciplinarity of the subjects of the area of knowledge of Natural Sciences.

Next, a set of requirements for the development of the Integrating Seminars are specified, where the topics should:

- To have meaning for life, inasmuch as they help students to understand daily events and to interact in the environment that surrounds them for their human improvement, their ideopolitical formation and civic behavior.
- To be of interest to students because of their direct and immediate usefulness.
- To provide the necessary bases for the development of humanistic, scientific and technological education.
- To reveal potentialities for the cognitive development from the educational and integrative developmental teaching-learning process.
- To include the concepts, theories and laws essential to understand the current state of science, technology and society, and to enable the development of skills and abilities to solve learning problems.
- To have an integrating character based on its interdisciplinary nature.
- To allow students to approach the procedures, ways of thinking and acting in contemporary science, technology and society.
- To enable students to prepare themselves, from the integrative teaching-learning process, in the transforming practical activity, for the solution of daily life problems, and their future professionalization and employability.
- To make possible the solution of specific problems defined for each of the areas of work and contents approached in the education recognized in the curricular conception adopted from the requirements of the Third Improvement of the National Education System.

The following conditions were considered to carry out the proposal:

1. Situation presented by the social context and circumstances in which the teaching-learning process is developed and integrated from the disciplines that interrelate it.
2. Systems of tasks with an integrating interdisciplinary approach in correspondence with the demands of the topics addressed, these can be individual and group tasks.
3. Design of group activities where the effective use of technological mediators is verified.

4. To generate a favorable climate of trust.
5. Motivate the exchange between the socializing agents, i.e.: (students-teachers), (students-teachers), (teachers-teachers).
6. Dynamize the exchange based on triggering phrases foreseen in the socialization workshops developed in the concentrated methodological preparations in the area of knowledge of natural sciences.

The preparation for the implementation of the methodological design of the Integrating Seminars taking into account the technological mediators was carried out in the months between April-June 2022, with a face-to-face frequency of 2 times a month for four hours, followed by the methodological offices for the teachers as one of the assignments foreseen to fulfill their individual self-preparation and the pedagogical ones for the students, through the use of the tools.

Once the proposal was implemented, we proceeded to its verification, with the results shown below.

Taking into account that the subject of this study is the use of technological mediators for the realization of integrating seminars with an integrating interdisciplinary approach, it was analyzed what concerns the realization of group integrating tasks, to give rise to the preparation and design of the seminars highlighting the interdisciplinarity and the search for information from the mediators, being of the criterion that it would be interesting to determine to what extent the development of the continuous training of teachers influences in a successful way the use of the tools.

Table 1. The use of technological mediators as a collaborative tool in the dynamics of the research activity and the search for information in the model of continuing professional education.

Criteria	Description			
	before		after	
	No	%	No	%
Search in specialized databases	41	43,61	62	65,95
Doctoral thesis and	37	39,36	24	25,53

master's thesis consultations				
Group I and II journal inquiries	16	17,03	8	0,085

Source: self elaboration

It was found that the prevailing criterion before the intervention was the search in specialized databases, registering 43.61%, while after the implementation of the study this criterion amounted to 65.95%, showing a transformation of 33.87%.

No studies were found with which to compare the results found here.

The criterion of the reflected, deserves to be discussed in that the search of information for the realization of seminars and tasks with investigative, interdisciplinary, integrating approaches plays an important role from the actuality, years of publication, pertinence of the documents where shared knowledge emerges, the search in specialized databases with the help of technological mediators provides us with information with speed and quality.

The quality of the writing of reports received by teachers to socialize multimedia materials between teachers and students through the use of technological mediators was analyzed, and the results are shown in Table 2.

Table 2: Socialization and evaluation of multimedia materials between teachers and students through the use of technological mediators.

Criteria	Description			
	before		after	
Quality assessment in report writing	No	%	No	%
Adequate	29	30,85	75	79,78
Inadequate	65	69,15	19	20,22

Source: Self elaboration

The inadequate criterion prevailed before the implementation of the study, registering 69.15% of the participants, in the evaluation of the quality of the reports reviewed, while after the

implementation of the study, it decreased to 20.22%, prevailing the criterion of adequate in 79.78% and a transformation with respect to the criterion of inadequate with the same results, i.e. 79.78%. It should be emphasized that no studies were found with which to make a comparison, but in spite of this, there is a need to study the effectiveness of the educational models with emphasis on the pre-university model based on the new forms emanating from the Third Improvement of the National Education System, to raise the integrative professional improvement taking as a reference the knowledge acquired with the use of technologies, importance and trends applied to everyday life with the sole purpose of sustaining in the educational process the developmental knowledge. From these considerations it can be understood that scientific activity establishes the system of subject-subject and subject-object relationships, so that man interacts with the objects of the outside world and also with other men. These relationships are proposed reciprocally and synthesize the different spheres of human activity. (Parra, 2019).

It is important to signify with regard to scientific research as that which provides the learner with "knowledge, skills or attitudes that must be applied in the performance of the function of researching and must be possessed by a researcher to perform such activity effectively and efficiently" (Buckworth, 2017, pp. 9-17).

Table 3 below, shows the results obtained after applying the study regarding the improvement in the projection of educational institutions based on the bibliographies used, supported by the continuous training of teachers.

Table 3: Improvement in the projection of educational institutions based on the bibliographies used, supported by the continuous training of teachers.

Criteria	Description			
	before		after	
Updating of the bibliographic references used	No	%	No	%
Last 5 years for journals	12	12,76	63	67,02
Last 10 years for books	31	32,97	26	27,65
> 10 years	51	54,25	5	5,33

Source: self elaboration

The criterion of using bibliographic references older than 10 years before the implementation of the study prevailed, being registered in 54.25% of the participants, while after the implementation of the study, it decreased to 5.33%, prevailing the criterion of updating the bibliographic references of the last 5 years for the journals, reaching 67.02%, being valued as satisfactory in correspondence with the previous one, which was 12.76% respectively.

In this sense, the main purpose of education, in the area of knowledge where the tasks are conditioned, the development of the teaching-learning process should be given by the interests of the students, taking into account the search for educational and research information and the development of training skills.

Conclusions

This work reflects an efficient transformation of the developmental teaching-learning process and the professional performance of teachers in the area of knowledge of natural sciences in pre-university education and its resizing from the Third Educational Improvement using technological mediators in the integrating seminars as tools to raise the quality of the process with an integrating interdisciplinary approach where the continuous training of teachers is the essential element to face the challenges imposed on modern society by the advances of science and technology with a quality performance.

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