

ICT and oral presentation as didactic axes in university research training

Las TIC y/ la exposición oral como ejes didácticos en la formación investigativa universitaria

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ABSTRACT

Research training in higher education requires strategies that integrate Information and Communication Technologies (ICT) and oral presentation techniques to strengthen the production and socialization of scientific knowledge; In this sense, the objective of this study was to develop a didactic strategy that supports this process in university students. To this end, a mixed approach was applied that combined Likert-type surveys, semi-structured interviews, participant observation and documentary analysis, with a sample of 20 students and 4 teachers of subjects related to scientific research. The results showed access to ICT resources, although with low integration in oral discourse and limited critical capacity to evaluate digital sources; in addition, the interviews revealed individual initiatives without institutional support and the observations showed a restricted use of basic visual resources, while the documentary analysis confirmed the absence of specific content on ICT in the study programs. Consequently, the discussion made it possible to identify the need to articulate digital competencies with research objectives and to overcome traditional approaches focused on the transmission of content. Finally, it is concluded that the proposed didactic strategy, organized in phases of diagnosis, planning, execution and control, contributes to mitigate the gap between technological availability and research competence, favoring both the construction of knowledge and academic communication through oral presentations supported by ICT.

Keywords: scientific research, ICT, higher education, oral presentation, didactic strategy.

RESUMEN

La formación investigativa en la educación superior requiere estrategias que integren las Tecnologías de la Información y la Comunicación (TIC) y las técnicas de exposición oral para fortalecer la producción y socialización del conocimiento científico; en este sentido, el presente estudio tuvo como objetivo elaborar una estrategia didáctica que sustente dicho proceso en estudiantes universitarios. Para ello, se aplicó un enfoque mixto que combinó encuestas tipo Likert, entrevistas semiestructuradas, observación participante y análisis documental, con una muestra de 20 estudiantes y 4 docentes de asignaturas vinculadas a la investigación científica. Los resultados evidenciaron acceso a recursos TIC, aunque con baja integración en el discurso oral y limitada capacidad crítica para evaluar fuentes digitales; además, las entrevistas revelaron iniciativas individuales sin respaldo institucional y las observaciones mostraron un uso restringido de recursos visuales básicos, mientras que el análisis documental confirmó la ausencia de contenidos específicos sobre TIC en los programas de estudio. En consecuencia, la discusión permitió identificar la necesidad de articular competencias digitales con objetivos investigativos y de superar enfoques tradicionales centrados en la transmisión de contenidos. Finalmente, se concluye que la estrategia didáctica propuesta, organizada en fases de diagnóstico, planificación, ejecución y control, contribuye a mitigar la brecha entre disponibilidad tecnológica y competencia investigativa, favoreciendo tanto la construcción de conocimiento como la comunicación académica mediante exposiciones orales apoyadas en TIC.

Palabras clave: investigación científica, TIC, educación superior, exposición oral, estrategia didáctica.

1. Introduction

The contemporary Cuban university model pays special attention to the use of Information and Communication Technologies (ICT), recognizing their impact on the knowledge society and on the learning process. In this context, Ortega (2025) argues that informatization constitutes a strategic axis to enhance pedagogical innovation and the quality of higher education.

However, shortcomings persist in the research training of university students, derived from the epistemological contradiction between the potential of ICT and their didactic application in scientific research (Sánchez, 2021). In this regard, although digital competencies have been proposed for higher education, their integration into research practice remains limited, restricting the critical appropriation of information and academic communication.

Likewise, La Hoz and Roca (2022) emphasize that the incorporation of educational technologies in Cuban organizations requires new teaching strategies that foster critical reasoning and collaborative work, overcoming the fragmented and occasional use of ICT. The lack of didactic procedures that promote active participation, the socialization of experiences through synchronous and asynchronous communication, and the systematic use of digital resources negatively affects the development of research competencies.

In this line, Sánchez (2021), in his doctoral thesis on research training in higher education, demonstrates that students' scientific preparation requires coherent articulation between theoretical, methodological, and praxiological references, supported by the use of ICT as mediators of learning and knowledge construction. His contribution confirms the need to design didactic strategies that integrate oral presentation techniques and academic communication as essential components of the Educational Teaching Process (ETP).

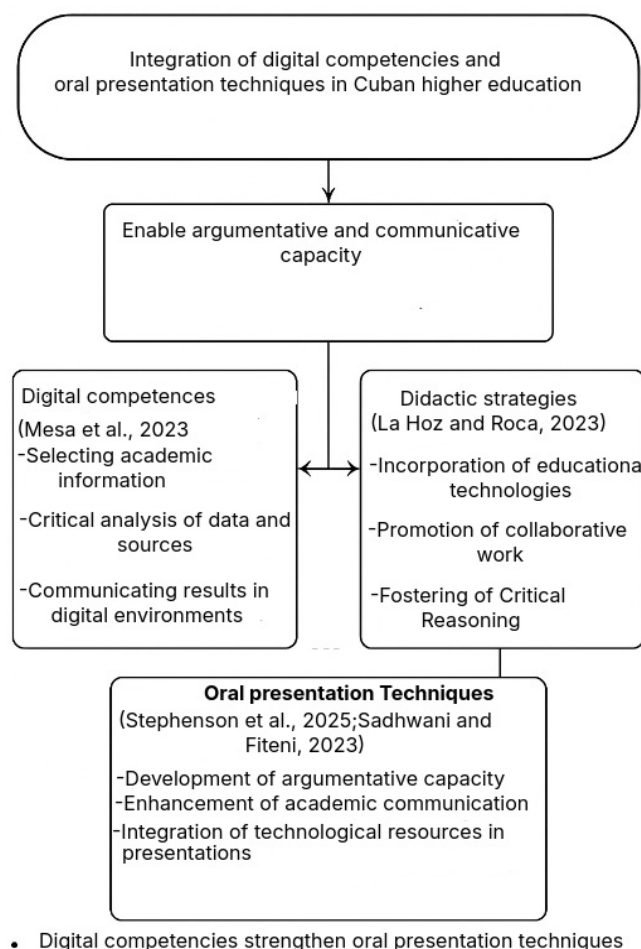
Consequently, the objective of this research is to develop a didactic strategy that supports training for scientific research in university students, integrating the use of ICT and oral presentation techniques.

It is based on the premise that research innovation requires new theoretical-practical models that respond to the demands of the 21st-century information society, favoring the transition from teacher-centered protagonism to student-centered learning, and from passive content transmission to active knowledge construction.

In the field of research training, León et al. (2021) highlight that Cuban higher education is in a transitional stage toward a model based on science, technology, and innovation, where ICT become essential mediators for the production and dissemination of knowledge. This perspective coincides with Sánchez (2021), who in his doctoral thesis emphasizes the need to articulate theoretical and methodological references that allow the integration of ICT into research training, overcoming their use as mere support tools.

The integration of digital competencies assessed by different authors, as well as their relationship with oral presentation, is summarized in Figure 1.

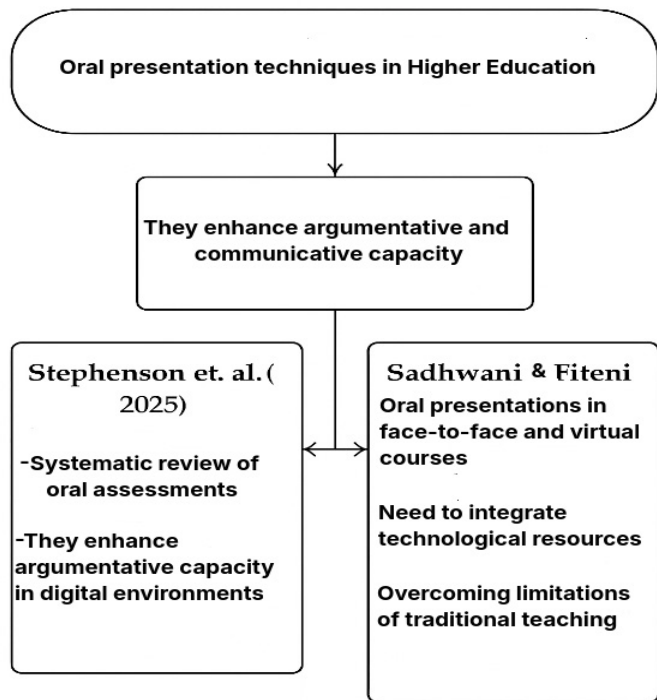
Figure 1. Integration of digital competencies and oral presentation techniques in Cuban higher education.



Source: Own elaboration

Authors such as Stephenson et al. (2025) conducted a systematic review on performance in oral assessments (see Figure 2).

Figure 2. Oral presentation techniques in training.



Source: Own elaboration based on Stephenson et al. (2025)

Finally, the benefits and challenges of oral presentations at the higher education level are synthesized, highlighting that their effectiveness depends on students' ability to articulate scientific content with the use of ICT (Cheng, 2025), which reinforces the relevance of this study.

2. Materials and methods

The research is based on a mixed approach that allows the integration of objective measurement of variables with the interpretation of meanings. The study has a descriptive and correlational scope, as it seeks to characterize the techniques used after oral presentations by university students and to analyze the relationship between their communicative performance and the use of ICT in the training process (León et al., 2021). The population consisted of Physical Culture students from the 2024 course, and the sample was selected through **purposive sampling**, considering criteria such as:

- Students enrolled in the subject *Scientific Research Methodology*.

- Participation in academic activities that include oral presentations mediated by ICT (Sánchez, 2021).
- Techniques and instruments for data collection
- **Structured surveys:** to measure digital competences and perceptions regarding the use of ICT in oral presentations.
- **Semi-structured interviews:** directed at teachers and students, aimed at deepening experiences and limitations.
- **Participant observation:** applied during oral presentations, recording indicators of communicative performance and use of technological resources.
- **Documentary analysis:** review of curricula, course programs, and institutional strategies related to research training (La Hoz Gómez & Roca Ducasse, 2022).

Procedure

1. **Initial diagnosis:** identification of needs and limitations in the use of ICT and oral presentation techniques.
2. **Instrument design:** preparation and validation of surveys and interview guides.
3. **Data collection:** application of surveys, interviews, and observations.
4. **Processing and analysis:** use of statistical software (SPSS, R) for quantitative data and content analysis for qualitative data.
5. **Interpretation of results:** triangulation of findings to generate conclusions and recommendations (Stephenson, Johnson-Glauch & Cruchley, 2025).

3. Results

Structured surveys: digital competences and perception of ICT use

A Likert-type scale (1 = Strongly disagree; 5 = Strongly agree) was applied to evaluate five dimensions: access, use, integration, communication, and critical perception of ICT in oral presentations (see Table 1).

Table 1. Descriptive statistics by item (n = 20)

Item	Media	Standard deviation	Minimum	Maximum
Access to ICT resources	4.3	0.47	3	5
Frequent use in presentations	3.85	0.67	2	5
Integration in oral discourse	3.6	0.73	2	5

Synchronous/ asynchronous communication	3.95	0.58	3	5
Critical evaluation of sources	3.25	0.81	2	5

Students report high access to ICT resources ($M = 4.30$), but lower effective integration in their presentations ($M = 3.60$) and low critical capacity to evaluate digital sources ($M = 3.25$). This suggests a gap between technological availability and research competence.

Semi-structured interviews: teachers and students

Four teachers and six students were interviewed. Content analysis revealed three emerging categories:

- Structural limitations: lack of stable connectivity and limited availability of devices in the classroom.
- Individual initiatives: use of ICT motivated by personal interest, with limited institutional guidance.
- Pedagogical assessment: recognition of the potential of ICT to improve oral presentation and collaborative work.

Highlighted quote (teacher 3): "Students have access to digital tools, but they do not know how to use them to build scientific knowledge."

Participant observation: communicative performance and use of ICT

Ten oral presentations were observed in the subject Scientific Research Methodology (see Table 2). Indicators were recorded in two dimensions: oral expression and use of ICT.

Table 2. Record of communicative performance and use of ICT

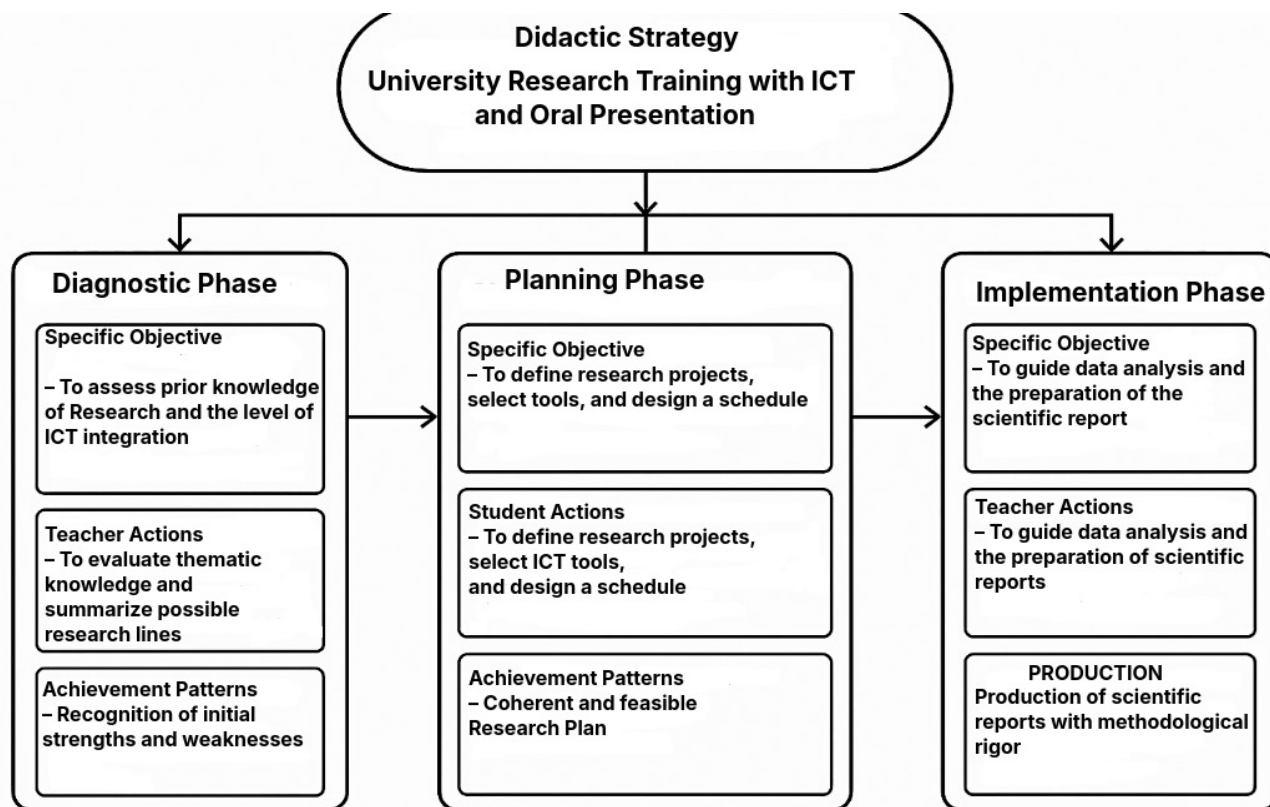
Indicator	Frequency	Percentage (%)
Clarity in presentation	8	80%
Use of visual resources (PowerPoint)	6	60%
Interaction with the audience	4	40%
Integration of digital sources	3	30%
Use of technical language	5	50%

Although most students achieve an adequate oral presentation, the use of ICT is limited to basic visual resources, without integration of digital sources for academic networked interaction.

Documentary analysis

A review was conducted of the curricula corresponding to two subjects: Research Methodologies and Data Analysis and Informatics. From this analysis, significant findings were identified that reveal certain shortcomings in the integration of ICT in the academic and research fields. First, a lack of specific content addressing the use of ICT within the scientific research process was noted, which limits comprehensive training in digital competences applied to research. In addition, a traditional approach was observed in teaching and oral production, where conventional methods prevail that do not effectively incorporate digital tools to enrich communication and learning. Finally, a limited articulation between digital competences and the research objectives set out in the programs was detected, evidencing a disconnection that hinders the development of research supported by ICT. Consequently, the need arises to propose a didactic strategy that promotes research training through the use of ICT and oral presentation (see Figure 3).

Figure 3. Didactic strategy to promote research training through the use of ICT and oral presentation.



Source: Own elaboration

4. Discussion

“Results obtained in this research confirm the hypothesis that there is a significant gap between access to ICT and their effective integration into university research training. Although students report a high level of access to digital resources ($M = 4.30$), integration into oral discourse ($M = 3.60$) and critical evaluation of sources ($M = 3.25$) remain at moderate levels, evidencing a dissociation between technological availability and research competence. This finding coincides with the arguments of Mesa Vázquez, Escobedo Nicot, and Lamadrid Vallina (2023), who warn that digital competences must be directly linked to students’ ability to select, analyze, and communicate information in academic settings. Likewise, Sánchez Ramírez (2021) reaffirms that the use of ICT cannot be limited to support tools, but must be integrated as a structural component of the research process. Semi-structured interviews reveal that, despite the pedagogical recognition of the potential of ICT, their use responds more to individual initiatives than to institutional policies. This situation reflects what La Hoz Gómez and Roca Ducasse (2022) point out, namely that digital transformation is not yet fully reflected in curricular designs, limiting the articulation between digital competences and research objectives. On the other hand, participant observation shows that students’ communicative performance is acceptable in terms of clarity (80%), but limited in terms of academic interaction and use of digital sources (30%). This reinforces the arguments of Stephenson, Johnson-Glauch, and Cruchley (2025), who emphasize that oral presentation techniques, when supported by ICT, enhance argumentation and scientific communication. Documentary analysis confirms the absence of specific content on ICT in the reviewed curricula, which hinders the development of integrated research skills. Cheng (2025) warns that the effectiveness of oral presentations depends on students’ ability to articulate scientific content with the use of technologies, underscoring the relevance of redesigning didactic strategies. In this context, the proposed didactic strategy—structured in phases of diagnosis, planning, execution, and control—emerges as a viable alternative to overcome the identified limitations. By fostering the integration of ICT and oral presentation techniques from a methodological perspective, it promotes research training more consistent with the challenges of contemporary higher education.

5. Conclusions

The designed strategy offers an adequate methodological framework for university research training by being structured in phases that allow progress from diagnosis to control of results. This facilitates students' gradual development of research and digital competences. The incorporation of ICT together with oral presentation techniques enhances the quality of the training process, as it fosters both the critical management of digital resources and the ability to communicate findings with quality and rigor. The combination of both elements supports the construction of scientific knowledge and academic-research solutions. The application of the strategy helps to overcome the limitations detected in traditional programs by linking digital competences with research objectives. In this way, it promotes training that responds to the current demands of higher education and the need to prepare students capable of researching and communicating in digital environments.

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