COMPLEXITIES OF TECHNOLOGY TEACHING IN RURAL ELEMENTARY EDUCATION: BETWEEN EPISTEMOLOGICAL CONFUSIONS AND GAPS

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ABSTRACT

The concept of technology has historically been complex. This complexity, logically, has permeated the school and in it the teaching of technological knowledge developed in the classroom, especially at the basic education level. The present reflective study shares some advances achieved in the research developed in the municipality of Lorica, Department of Córdoba, addressing the question: what underlies the classroom practices of teachers who are in charge of the teaching of technological knowledge. The qualitative data collection is carried out through individual in-depth interviews to teachers of the official sector at the basic level, supported by the analysis of development data through theoretical sampling and the constant comparative method of the Grounded Theory. The findings rooted in the data demonstrate an understanding of the concept of technology from an artifactual conception that underlies the teaching experiences and meanings of the teachers who were the subjects of the research. Finally, the need for reflection on the teachability of technological knowledge in the midst of conceptual confusion and the scarcity of technological resources in contexts with a technological gap such as the one in Córdoba is discussed.

Keywords: technology, technological education, rural context

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INTRODUCTION

The concept of technology has historically been complex as Cervera and Quintanilla state (Cervera et al., 2010; Quintanilla, 2017). It has varied according to the historical moment, the location from which it is elaborated, the training and experience of those who reflect on it: philosophers, engineers, sociologists (Mitcham, 1989), understanding it as objects, productive activity, applied science or as volition (Mitcham, 1994) or as instrumental, cognitive or systemic according to Quintanilla.

It is pertinent to point out that some authors use the terms "technique" and "technology" interchangeably, while others use them differently, for example, in the specialized literature. In some areas such as the governmental one, teachers are trained superimposing scientific knowledge on technological knowledge, affirming that it is applied science (Williams, 2013, p. 10), varying from the statements proposed in the guidelines for the area of Technology (MNE, 2008). This complexity has permeated the school and the technological education that takes place in it (Williams, 2013, pp. 1-13), as is the case of the teaching of technological knowledge developed in the classroom, especially at the basic education level.

Faced with this reality, the question arises as to what underlies the classroom practices of teachers who are in charge of the teaching of technological knowledge? In this regard, it is necessary to understand this background, seeking to address the meanings and experiences of elementary school teachers and thus unveil the foundations of the teaching of technological knowledge, managing to articulate the theoretical constructs and praxis, a necessary and sometimes scarce aspect in the educational field.

Following this qualitative route, basic education teachers were interviewed in the municipality of Lorica, Department of Córdoba, belonging to five public sector institutions located in rural areas that gave their consent.

The introspective analysis revealed that, in basic education, specifically in primary education, the differentiated work observed in classroom practices is frequent, between urban and rural sectors where the work around computational thinking and education with STEM approach is in consolidation in urban institutions as it is tradition in developed countries such as the United States and the conglomerate of the European Union (National Sciencie Fouindations, 2020; Nistor et al., 2018). Likewise, it is evident that in rural official sectors where the presence of gaps for this type of work in technological education is frequent due to the lack of infrastructure, weaknesses in teacher training and disarticulation of work between levels.

In this context, students at initial levels in rural areas face a greater complexity to achieve quality technological literacy in low-income departments, victims of the armed conflict and with large social gaps. This situation added to the problem of the low quality of education has national and international records (EDUCASE, 2019).

Indeed, researches point out the differences found between teacher training between rural and urban areas; also indicating that the predominant type of linkage favors the urban area [8](Acosta et al., 2016, p. 26) Thus the educational lap of the rural area especially the Caribbean is even greater at all levels (Bonilla-Mejía & Martínez-González, 2017, p. 1,6). Added to this, technological literacy in rural contexts is mainly in charge of the school, however, the absence or scarcity of technological experiences can lead to poor development of technological competencies and a self-concept of ineptitude (Adenstedt, 2018, p. 21).

Qualitative data collection is done through in-depth interviews with teachers in the official sector at the elementary school level. The data analysis was carried out by means of theoretical sampling and the constant comparative method, typical of the Grounded Theory.

The findings point out teaching processes in technological education linked to teachers' artifactual conceptions and which are, in turn, influence their students (Mazzitelli & Quiroga, 2015, p. 75). These are demonstrated with understanding from an artifactual conception. Finally, the need for reflection on the teachability of technological knowledge in the midst of conceptual confusion and the scarcity of technological resources in contexts of technological gap is discussed.

MATERIALS AND METHODS

The present study was framed within the interpretive paradigm (Koetting, 1984; Sandín Esteban, 2003), employing for this purpose the constant comparative method and theoretical sampling (Charmaz, 2014; Glaser & Strauss, 1967; Strauss & Corbin, 2002) characteristic of Grounded Theory, with an inductive gaze seeking contact with key informants, who provided qualitative information represented mainly in their accounts and recognizing certain intuition in the field, as recommended by Flick (Flick, 2015, p. 34) thus overcoming the rigid and simple application of methodological steps, procedures and routines as occurs in quantitative research.

The research scenario (population), was established in the dispersed rural area of the municipality of Lorica (Córdoba) with official institutions that agreed to participate in the study and from them participated those research subjects who agreed to be interviewed. The narratives were processed in the qualitative data analysis software NVIVO.

RESULTS

The emerging codes point out as a central category the association of the concept of technology with artifacts, advances and tools by the teacher research subjects; and as dimensions the teaching of characteristics and use of artifacts and teaching focused on the use of technology:

"for me technology is all those advances that serve us people to help us in our work, they serve us as a tool in our daily chores in everything".

Other teachers point out:

"Technology is when there is innovation, inventions...all that can be called technology".
"...we look for them to look at tools that range from a toothbrush, a spoon...those are technological advances."

The findings also reveal the strong tendency to associate the concept of technology to that of computer science and this in turn to the teaching of office applications and hardware elements even though the student is not in contact with them.

"...they knew the parts of the computer and that; as they are not going to be at school but at home so I send them again for example the parts of the computer so that they can cut them out and write them in their notebooks so that they, for example, their parents can explain it to them".

The emerging codes were compared with new samples until theoretical saturation was achieved.

CONCLUSIONS

The concept of technology is framed in conceptual complexities, then teaching technology in contexts with an evident technological and social gap such as the rural environment (as opposed to urban environments or developed countries) is a pedagogical and state challenge. Students are trained as martyrs of the visions and conceptions that teachers have on the subject. Many openly acknowledge their shortcomings in training.

In the same methodological order, the present work addressed the question of the associations of the concept of technology held by the research subjects which, according to the findings, reveal its association with *"advances, artifacts and tools"*, as well as with the teaching of office applications and computer hardware parts, leaving out aspects such as the solution of environmental problems, the development of thinking skills, parallel to the learning of the technological process.

FINAL BALANCE

The teaching of technology in the rural context with a marked technological gap requires the recognition of the context, the problematization of situations of this context in search of thinking strategies, the development of skills and competencies to access the technical culture (Rojas Carrasco et al., 2019, p. 77). The issue of teaching technological knowledge in rural areas should be the subject of new research directed towards the in-depth understanding of the phenomenon or event unveiled; as well as, to support quality educational practice responding to current social and productive demands, while recognizing the difficulties of the context to make bets aimed at minimizing the technological reductionism present in current educational practices in technological education.

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