
Mapuche Ethnomathematics: Mathematical Learning's Promotion from Cultural Knowledge¹

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The objective of this research project is to create activities that favour the learning process of the Mapuche People's ethnomathematics, answering the need to revalue their knowledge and spread it within Chile's traditional Educational System. The implemented methodology is qualitative, with a strong emphasis on content analysis, ethnography, and participant observation. The expected results are centred in reporting Mapuche ethnomathematics, constitute a culturally pertinent design of teaching activity, and inform about a concrete teaching activity that favours the learning of ethnomathematical elements that are relevant to the Mapuche people.

The centre of interest of this project is in Mapuche³ students and their mathematical education in a formal context in Chile. The problem is that, for years, children have been instructed omitting their diversity and richness of knowledge that constitutes them in a particular community. In addition, our native people have not only not had the right to see their knowledge integrated in a national curriculum, but also new knowledge was imposed as unique and true, isolating them to an inferiority status in the national educational standards.

In the actual educational system, Mapuche boys are forced to attend a school that not only does not offer them an education for the conservation of their roots, but also evaluates and classifies them as slow students when learning prescribed knowledge and in "proper" schoolwork, since both occidental and Mapuche logic are not explicit (Quintriqueo & McGinity, 2009). Nevertheless, as stated by D'Ambrosio (1985), referring to other native cultures, the "experts" tend to omit this reality, pointing out that these low results are solely due to the poverty context in which the students are immersed. Therefore, they discard the possibility of giving them a mathematical

education starting from the development of their practices, knowledge, languages, and codes that clearly state the ways in which they do mathematics.

In this way, knowledge in the mathematical area has been one of the most affected, given that the existence of cultural mathematical knowledge is not officially recognised⁴, ignoring the fundamental step of evaluating its relevance to mathematic education. Accordingly, this project attempts to emphasise the relationship between mathematics and the Mapuche People's culture.

At a national level, the Ministry of Education, conscious of the need to contextualize the national program to the reality of the native people, created in 2003 a curricular document oriented to the adequacy of contents to an environment that favour the Mapuche people, Aymara and Licarantay. Therefore, each subject possesses an appropriate contextualization, which in mathematics is oriented to a rural reality with elements of the indigenous people that only an educator who knows the culture will comprehend (Huencho, 2012).

The theoretical element supporting the project is based in Ethnomathematics as a field of research that has contributed to comprehend that mathematical knowledge has developed in diverse cultural groups (indigenous people, associations, etc.), to explain and represent the reality that surrounds them (D'Ambrosio, 2012). First, it is necessary to know the mathematical elements fundamental to the Mapuche people from acknowledging their primary activities, then move towards a proposal associated to the promotion of the learning process through the people's mathematical knowledge.

In this way, we have analysed two research sources, which are centred in ethnomathematics, that are focused on the rescue of mathematical knowledge of a native sociocultural group and the use of this knowledge in the classroom.

The first group object is comprehension of how studies of academic relevance develop an emic and etic methodology to be introduced in the cultural knowledge of indigenous people; these studies centre their methodology in ethnographic work or historiographies to rebuild ethnomathematic knowledge. The second group shows how ethnomathematical knowledge is valid to be presented in the classroom, mainly because of its similarity to the contents that the academic curriculum proposes, informing the best results that indigenous and non-indigenous achieve. Little is said about who decides

the implemented didactic model and if it is culturally relevant, in the same way that evaluations used to measure the learning processes of the students leave an empty space concerning the characteristics that these instruments possess. A high percentage of the research is placing ethnomathematics at the service of the Mathematic Education.

So, the main objective of this research is to create activities that favour the learning of Mapuche ethnomathematics in a culturally relevant way. To achieve this goal, it is necessary to fulfil the following specific goals: (1) Identify and organize the ethnomathematics knowledge of the Mapuche people, (2) Identify the processes to transfer knowledge developed by the Mapuche people, (3) Contrast the ethnomathematical and transfer knowledge with *kimches* (wise people) of the Mapuche community, (4) Design activities that favor the learning of Mapuche's ethnomathematics, (5) Validate the design of activities in diverse Mapuche communities.

The methodological proposal to develop this project is based on a qualitative focus group divided into two phases. The first phase develops three of the first specific objectives, starting with an analysis of the contents of the documents with historical relevance to the Mapuche people, anthropological documents, the work of linguists, historians, and narrators in their own history, that enlighten the normal life of the people where we could find the foundations of their ethnomathematics and the ways in which the transference of knowledge is achieved from the wise people to the community in general. The identified information is contrasted with the Mapuche community and their *kimches* (wise people) with the idea to achieve a higher degree of comprehension of the interpretation made to the historical documents, then, through ethnography, semistructured interviews, and participant observation, we expect to gather relevant information, which will give the research sense in the actual world.

The objective is to contrast, but also gather new elements that could be a contribution to the construction of activities that favor the learning around relevant activities to the community, because of their implication to the past, the present, and future of the Mapuche people.

The comprehension of the knowledge transition process of the ethnomathematics and the activities with meaning to the Mapuche people, will allow us to move on to the second phase of the research in which the fourth and fifth objectives will be addressed. Therefore, the

period to design the activities for learning starts. So different tables will be set up to dialog with the community, teachers who know the culture, and the researcher, with the object of formulating a design of activities that favor the learning of Mapuche ethnomathematics. We will take notes of the formulated decisions, which will serve as a foundation for the design and proposal of the learning activity.

Finally, the discussion table will evaluate the pertinence of the crafted activity through a discussed design, and different validation sessions will be carried out with Mapuche students from different communities. The objective is to validate their effectiveness as long as they meet the objectives that the activity proposes and culturally pertinent learning instances regarding the teaching method and the content.

The proposed methodological design covers three type of data. The first comes from written documents; the second comes from the transcribed interviews and discussion tables; the last one comes from execution of the teaching activities for which we will register each of the sessions. These sources of data will be analysed with the software Atlas.ti since it uses Grounded Theory to classify, structure, and analyse large amounts of text audio and video making easier the interpretation of such, given their hierarchical system of codification, variable definition, and weight analysis to the selected units of analysis.

This research seeks reporting elements that help rescue a culture that has been “historically denied and prejudiced”, not only in the educative system, but also in the economic production and the social relationship between Mapuche and Non-Mapuche people. Therefore, this investigation wants to be a contribution in three dimensions: report the Mapuche ethnomathematics and constitute it a basic element that favors multiple new researches in the education area; build an activity design which favours a culturally pertinent teaching dynamic; and finally, inform concrete teaching activity which favors the learning process of ethnomathematical elements that are relevant to the Mapuche people.

Notes

1. This research Project is part of the work that I must develop to opt for a PhD in Educational Sciences.
2. Mapuche. Teacher of mathematics. Masters Degree in Education. And student of the PhD Program in Education at Pontificia Universidad Católica de Chile.
3. The Mapuche people represent 9.06% of the total population and the 81.8% of the total indigenous population (INE, 2012) (National Institute of Statistics).
4. Adalberto Salas (1980) is the only one who has developed a numeric system, used by the Mapuche people, from a linguistic perspective.

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