Homemade modelling clay as a tool to introduce a critical thinking point of view

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Abstract:

This work intends to reflect, from the proposal of homemade modelling clay manufacture, what questions can (future) teachers take into account when planning an activity. Modelling clay is a very plastic substance that sometimes has toxic materials for children and/or the environment in its composition. A good alternative for the teacher is to do himself/herself the modelling clay for and with children using non-toxic, natural, local, low-cost ingredients. Since planning is an important part of the teacher's work, issues such as ethics, costs, environment, health and safety should not be ignored. But how much are these aspects considered, introduced, debated and taken into account? To understand what importance is given to all these aspects a two-hour session was developed in a class of Elementary and Early Education Bachelor's Degree. The session included: a) a presentation of the concepts through the Mentimeter platform followed by a debate, and b) the experimentation of practical proposals presented as a possible solution to the identified problems. At the end c) an individual questionnaire was passed to assess the relevance of the questions and/or generate other questions/ suggestions to be discussed and also to obtain a synoptic evaluation of the session. The result of the developed activity shows that in educational activities, the pedagogical issues of child development are much studied and debated and are highly valued in teachers' plans. However, issues such as ethics, the relationship that specific activity may have with the community or environment, and the good use/creation of resources are often ignored. To bring this "secondary issues" to the agenda it is not only necessary; it is a challenge!

Keywords: homemade modelling clay, critical thinking, elementary education, mentimeter, ethics.

1. Introduction and aim

The use of modelling clay, commonly called plasticine, is part of our imagination and has been passing through successive generations of children and to do an homemade modelling clay can be a good alternative for teachers and/or educators for and with children creating a moment for playing and, at the same time, to think critically about different aspects that may affect our attitudes and behaviour practices.

To plan educational activities is a task of teacher day life work and the pedagogical issues of child development are already very much studied and debated and are highly valued in teachers' plans. However, issues such as ethics, the relationship that specific activity may have with the community or environment, and the good use / creation of resources are often ignored. If we consider schools are the privileged spaces where the building of communities and society happens, we understand how important is to create dialogue spaces where teacher and students, educational community and families, children and adults think critically, starting from the local

needs, knowledge and experiences, the global aspects that will be part of our lives when school time finish. Therefore, all the possibilities for exploring the taking advantage of integration and / or reinforcing themes of Education for Global Citizenship and Development must take place as they are crucial for the solid holistic formation of the individual and the group.

We defend that both for training of teachers and educators as well as in the implementation and dissemination of activities, schools must assume a role on social transformation. This means school must also consider as a work, not only the scientific work but also the human development including here citizenship construction (Tonon, 2018). School must work for citizen empowerment; looking at what is possible and not at what does not exist. Assuming and recognizing the difficulties and betting on collaborative and support work, it is possible, as Tonon (2018) states, to have a school that answers some of the current problems. Schools must have "in mind" how important is "to help students increase their awareness and understanding of the interdependent and unequal world in which we live, through a process of interactive learning, debate, reflection and action" (Saúde et al, 2018). For these authors, all "the educational process must be experienced in the context of citizenship"; This aspect does not mean that it belongs to school all the responsibility for education. This means "school has a central role in guaranteeing the democratization of knowledge". And as Saúde et al (2018) argue "this will be achieved by critical and constructive reflection on all matters that contribute to global and local citizenship, especially those that ensure a commitment to a more just and sustainable world". To enhance the role of the school in education, we must consider education as more than teaching. We must also bring to the classroom not only the scientific, technical and pedagogical aspects but also relationship aspects and dimensions such as, among others, ethics, collaborative work, equity, solidarity, respect or active and interventional citizenship.

For Boni (2014) a school that promotes and creates conditions for the existence of global citizens, active, responsible, committed people, who want to transform based on a set of principles such as social justice, equity, respect and equality, is a school that is able to transform individuals, groups and ultimately, able to transform society. So, if we can work on values, attitudes and behaviours that are decisive for the construction, on an individual level, of a conscious and co-responsible global citizen (such as respect for others, solidarity, self-esteem, self-confidence, etc.), and at the (school) community level, creating spaces for dialogue, mutual learning, participation and interaction, we are allowing the school to be that space of transformation; starting from the individual, his/her community but bearing in mind the global society. There is no doubt School, as an institution, must be considered as a space to promote learning and motivation to learn.

In Portugal, The proposal for the National Strategy for Education for Development 2018-2022, (ENED 2018-2022), results from a deep debate and reflection work promoted by various public entities and civil society (Resolução do Conselho de Ministros n.° 94/2018) succeeds the National Education for Development Strategy 2010-2016 (ENED 2010-2016, Despacho n.° 25931/2009) and follows up on the main recommendation of its external evaluation, which aims at «updating the Strategy, given the national and international recognition of its social, political and educational relevance. In this document, Development Education (DE) assumes itself as a commitment to transformation through education for global citizenship. Following the approval by the United Nations General Assembly of the Resolution "Transforming Our World: the 2030 Agenda for Sustainable Development" that presupposes the integration of the Sustainable Development Goals (SDG) into the policies, processes and actions developed at the national, regional and global levels, ENED 2018-2022 can contribute for some of the SDG such as all the more transversal SDG and specifically SDG number 4 – Education, goal 4.7 - By 2030,

ensure that all students acquire the knowledge and skills necessary to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and valuing cultural diversity and the contribution of culture to sustainable development " and also for some responsibilities that Portugal assumed in the framework of the European Union (EU). The New Consensus finds that Development Education and awareness raising can play an important role in increasing levels of public participation and in the way to seek to achieve the SDGs at national and global levels, thus contributing to global citizenship" (in Resolução do Conselho de Ministros n.° 94/2018).

This work intends to reflect, based on the proposal to manufacture homemade modelling clay, on the issues that (future) teachers take into account when planning an activity.

The interest for using modelling clay in child development is widely studied and known, with many advantages associated with its use. As Cuxart (2016) refers to the pleasure of playing, the importance of handling the dough is combined. Plasticine strengthens the muscles of the hands and fingers and promotes the development of motor skills and coordination of the eyes and hands. It also benefits the literacy process, since the movements of the hands and fingers will facilitate the best use of the pencil, pen, making drawings, for example.

Modelling clay is a very plastic substance, sometimes containing toxic substances for children and / or the environment. A good alternative may be for the teacher to make the plasticine for and with the children using non-toxic, natural, local and low-cost ingredients. Due to its plasticity, the modelling clay allows the child to develop sensory-motor skills - fine motor skills, creativity, oculo-manual coordination. Due to the ease of executing the recipe, this activity can also be very useful in promoting other cognitive skills, such as the interpretation of instructions and basic mathematics operations in older children (1st cycle of Basic Education) or the identification / recognition of colors, textures, smells and flavours associated with the basic ingredients of the recipe in the case of pre-school children.

2. Methodology

Using non-toxic, natural, local and low-cost ingredients, the activity of doing the modelling clay can be a tool to bring to the educational community, and not only to students, aspects such ethics, social justice, equity, diversity and respect but also aspects of cognitive domain and content areas like Portuguese or math. Since planning is an important part of the teacher's work, issues such as Ethics, Costs, Environment, Health and Safety as well as the others already mentioned, should not be ignored. But how much are these aspects considered, introduced, debated and taken into account? To understand what importance is given to all these aspects a two hours' session was developed with 10 students in a class of Elementary and Early Education Bachelor's Degree. The session included a) a presentation of the concepts through the Mentimeter platform followed by a debate and b) the experimentation of practical proposals presented as a possible solution to the identified problems. At the end c) an individual questionnaire was passed to assess the relevance of the questions and/or generate other questions/suggestions to be discussed and also to obtain a synoptic evaluation of the session.

Mentimeter is an interactive presentation's software (mentimeter.com) that appears as one more effective strategy to develop in class and motivate students and we used Mentimeter

since we know that normally, using the students' views as a starting point, in a context of formal education and disciplinary work, technological environments helps students to develop their learning path in a more motivated way.

The tried recipe, was previously tested and created and adapted from various recipes available on web such as https://blogaespumadosdias.wordpress.com/2018/08/29/plasticina/ or https://www.youtube.com/watch?v=Brz-GOZfAqE. It was also designed to work with 3 different age groups - pre-school (3-5 years old), 1st and 2nd years of the 1st cycle (6-7 years old) and 3rd and 4th years of the 1st cycle (8-9 years old) as well. For this purpose, the educator's help was used in the first case, the graphic explanation of the recipe using the measurements of the ingredients with volumetric measuring (like spoons and cups) in the second case and, in the third case, the more detailed written explanation, with a smaller font type and in which the dry ingredients are weighed in the balance and liquids are measured with a graduated cup. The last part of the session was the answer to the questionnaire. After characterizing the participant with regard to the level at which he / she participated, the questionnaire aimed to find out if the proposed activity was adequate to the level of education identified, if the ethical, health / safety and financial issues raised in the initial presentation are pertinent and that other issues of the same thematic(s) could arise. At the same time, we tried to find out if the way the activity was proposed, addresses (or helps to address) the problems and issues raised initially in the presentation and how much the activity was pleasant or not.

3. Results and discussion

In educational activities, the pedagogical issues of child development are much studied, debated, and are highly valued in teachers' plans. The result of the developed activity confirms this. Results show us, both in the Mentimeter and in the survey results, the pedagogical issues and concerns are the ones presents in mind. Participants admitted that they are not aware of all the questions raised when they are planning an activity.

One of the addressed issues of the presentation was the fact that the base ingredients of the recipe are flour, salt and water, which are the same for bread (the most basic human food). However, none of the students presented in the session was able to connect the two concepts, in order to understand that teaching children to play whit this homemade modelling clay is basically the same as teaching them to play with food and, in another plan of discussion, that is an ethical problem, if one remembers that there are millions of children living in famine around the world. So, the topic ethics brought many doubts and questions; it was the factor that generated the most confusion. Participants didn't realize how much ethics is an element to consider when planning an activity and there were many questions about it.

The use of Mentimeter software technology can represent a non-inclusion factor. Indeed, one of the participants do not use a smartphone and for that reason couldn't participate actively in the mentimeter time session. This aspect is of particular relevance since the good reception that the tool presents to the student public is notorious.

On the other hand, the dominion of the tool is fundamental. For example, the Mentimeter platform does not store questions that are marked as "Answered". if we want to keep the questions present and use them and can return to them if necessary, we cannot mark it as answered.

In the development of the practical activity of making modelling clay, participants only had access to the recipe presented to their working group; they did not have access to the recipes of the other "levels of education" groups. This aspect limited the global view of the participants to the particularities worked within each group and, consequently, the possibility of establishing comparisons and reflecting between groups. To promote a discussion in which all participants were aware of the particular aspects of the various working groups, the session would have to be longer. However, for the aspects we wanted to bring to the discussion (other than the pedagogical ones) this global lack of knowledge of the different ways of working for the different levels of education, does not seem to be relevant. Nevertheless, it is important to emphasize that the existence of different levels simultaneously allows tolan and to work with different school levels but also addressing individual motor / cognitive needs that, even at the same school level, may be diferent. So, results from this activity confirmed that in educational activities, the pedagogical issues of child development are extensively studied and are highly valued in the teachers' plans. Within pedagogical relationships, fun and playful sense are also recognized and considered. On the other hand, issues such as ethics, the relationship that specific activity may have with the community or the environment and the good use / creation of resources are considered ancillary factors and even, many times, ignored when planning an educational activity.

This work was developed within the scope of a semester course, but it gives us an indication of how absent aspects of the domain of citizenship are in the integration with pedagogical activities and gives us clues for future work. Indeed, the work deserves to be continued, since it has been possible to promote critical thinking, reinforce collaborative work and bring this dimension of responsible and critical citizenship to the educational community.

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